



In-depth Interactive Learning Tools
— Because You Want Results

Intervention That Adds Up: The Impact of Merit Math Software on Middle School Students

OVERVIEW AND SUMMARY

The following is an overview and summary of the Marshall University Graduate College research study conducted at the Horace Mann Middle School in Charleston, West Virginia during the winter and spring of 2005.

Research Study Genesis

Merit Software, a leading provider of educational software, commissioned consultants at the Marshall University Graduate College in South Charleston, West Virginia to conduct a quantitative research study utilizing their educational math software programs at Horace Mann Middle School.

The purpose was to follow-up studies at three schools, which evaluated the impact of Merit reading and writing software on students in grades 3 through 8. The studies have demonstrated that using Merit software as a supplement to everyday instruction improves student achievement and standardized test scores. In each of the studies gains transferred over to other academic areas. It was also demonstrated that Merit software had a long-term impact on lowest-quartile students.

In this new study, Marshall University researchers evaluated the effects of Merit math software on students in grades 7-8 in an urban middle school. Effects of the math treatment were also evaluated by examining whether it transferred over to the three additional content areas: science, social studies, and reading/language arts.

Data for 2004 and 2005 was collected. The data was analyzed, both separately and comparatively, using descriptive and inferential tests. Variables, including socioeconomic status, ethnicity and grade level, were analyzed for statistical significance.

About Horace Mann Middle School

Kanawha County, West Virginia was chosen as a test site primarily, because it is an urban district with a population facing economic, social, and educational challenges. The unemployment rate is 4.9% and 14.1% of residents live below the poverty level. Horace Mann Middle School is located in Charleston, the major city and capital of the state. Horace Mann Middle School was selected, as it is an inner-city school in which 51% of students qualify for free or reduced-price lunch. 63% of students are white; 36% are African-American.

In the spring of 2004, 31% of sixth graders, 40% of seventh graders, and 28% of eighth graders tested at the below-mastery level for math. Both school administrators and teachers expressed keen interest in investigating the effects of a research-based intervention on the learning of low-achieving students.

How the Research Study was Implemented

Students at Horace Mann Middle School were assigned to classes by the school board's classroom management software. Seventh and eighth graders were placed in four heterogeneous classes based on assignment, grade level, and needed skills. The treatment group consisted of 150 students: 90 seventh graders and 60 eighth graders. The control group consisted of 124 students: 65 seventh graders and 59 eighth graders. All students were either in the treatment or control group.

Teachers voluntarily chose which classes would be in the treatment group and use the Merit Software programs. Students in the Merit treatment group at Horace Mann Middle School received an average intervention time of two 45-minute sessions per week for 9 weeks.

Merit Software Programs Used in the Study:

- Fraction Shape-Up
- Pre-Algebra Shape-Up
- Basic-Algebra Shape-Up
- Word Problem Shape-Up

Merit Software math programs teach essential math concepts, and help students develop problem-solving strategies. Students are encouraged to proceed at their own pace. The software breaks down the mathematical-thought process into understandable steps, and then gives students the chance to apply what they have just learned. All Merit math programs include straightforward instructions, and clear and specific steps for working within program content. Scores are tracked by a record management system, allowing teachers to follow student progress and administrators to export class data for analysis.

Merit math software skill areas include integers, fractions, decimals, and percents; solving word problems and algebraic expressions; determining key data in word problems; relating notation to meaning; interpreting and applying information from graphs; using concrete objects to model algebraic concepts.

All Merit math programs help students to build a math vocabulary, to understand which math operation to choose, to apply equations, and to solve problems by working step by step. Most Merit math programs include a portfolio section for students to respond to math topics by writing about them. All provide teachers with specific rubrics about what students will learn mathematically while utilizing each Merit program.

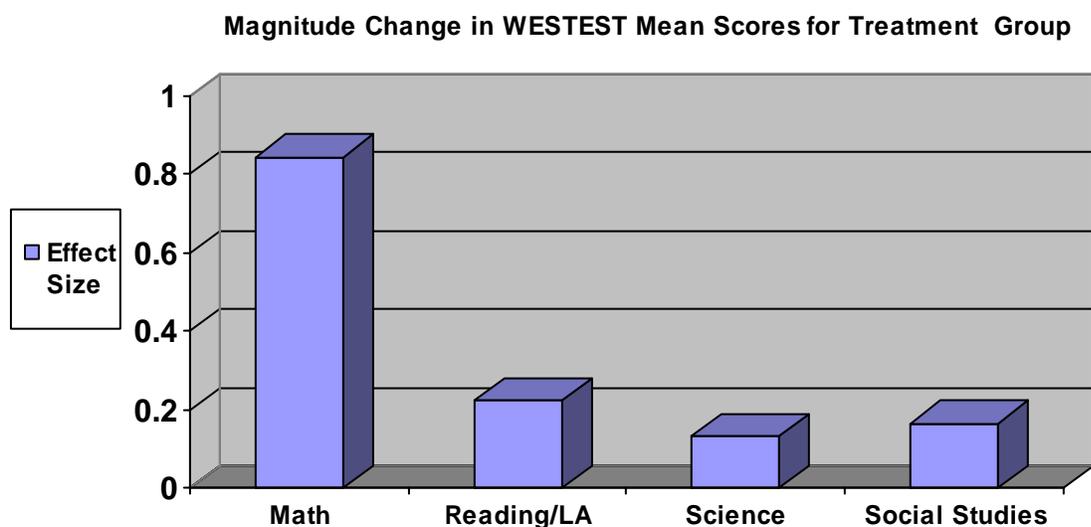
Questions Used to Guide the Study

Initial evaluations at three sites had shown that students using Merit Software made significant gains in their standardized test scores. For this new study, researchers considered the following:

- Was there any overall change between pre and post-test scores for 7th and 8th grade students at Horace Mann Middle School, as measured by results from West Virginia's statewide criterion-referenced test, the WESTEST?
- Did Merit math software have a positive impact on 7th and 8th grade students in the treatment group, as compared to their peers who received traditional instruction?
- Did socioeconomic variables, such as ethnicity and free-lunch eligibility, have any influence on WESTEST mean scores?

Results of the Study

- WESTEST math scores of those undergoing the Merit treatment averaged 16 points higher than WESTEST math scores for students in the control group.
- The treatment had an extremely large impact. An effect size of .844 was calculated for WESTEST math scores. Following established guidelines (small effect = .01; moderate effect = .06; and large effect = .14), a .844 effect size indicates a substantial increase in math scores from pre to post treatment.
- Educators can expect to replicate math gains at other schools 999 times out of 1000, based on a p value of .001.
- Positive results transferred to other areas of academic achievement: science, social studies and reading/language arts.
- Socioeconomic variables, such as ethnicity and free-lunch eligibility, were found to be a statistically insignificant factor in overall WESTEST outcomes.



Summation

The Merit Software research study, which was relatively short-term and non-intensive, yielded statistically significant positive results. The largest gains were seen in WESTEST math scores, and these gains transferred to other academic areas. Students of all ethnic and economic backgrounds showed similar gains while using the software.

These results confirm the outcomes of the previous two studies: that Merit Software is a remarkably useful educational tool for teachers and administrators facing the demands of high-stakes testing with limited resources. The new Merit Software research study also confirmed that improved learning among students in one academic content area correlates with improvement in other academic content areas.

About Merit Software

Merit Software (www.meritsoftware.com) is a leading publisher of educational software. Since 1983, Merit has focused on the core competencies for grades 3-12 and adult education. Merit is currently being used in thousands of educational institutions worldwide.