Renaissance Learning™
Advanced Technology for Data-Driven Schools™

Scientific Research

Quasi-Experimental

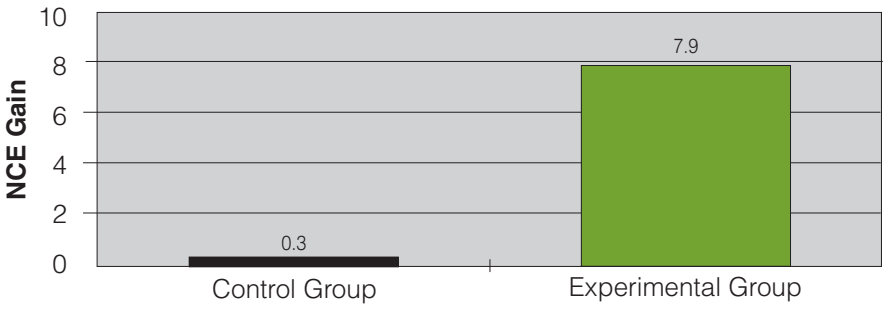
Title I Students Benefit From Use of Accelerated Math

Title I students using Accelerated Math gained significantly more than similar students in the control condition.

Introduction

An independent study conducted at the University of Minnesota shows that implementation of a curriculum-based progress-monitoring system (Accelerated Math) enhanced the math achievement of Title I students.

Graph 1: Gains in Math Achievemnt for Title 1 Students Who Used (Experimental Group) and Did Not Use (Control Group) Accelerated Math



Study Description

It has been shown that in a "typical" sixth-grade class in a large urban school district there is a range of math performance of 9.5 years. Teachers need access to tools that will help them meet the needs of such diverse groups of students in single settings.

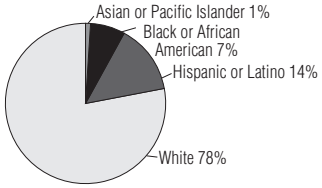
Accelerated Math is one such progress-monitoring tool that helps teachers match the learner's skill level to the instruction while also helping to monitor students' progress toward mastery of math objectives. It is based on a number of "Renaissance Learning Principles" that coincide with evidence-based principles of effective instruction as identified by Ysseldyke and Christenson (2002)[1] and that are consistent with components identified by Carroll (1963)[2] and Walberg (1984).[3] It has also been found to be effective in enhancing instructional outcomes for diverse students in elementary school settings (Spicuzza, Ysseldyke, Lemkuil, Kosciolek, Boys, & Teelucksingh, 2001[4]; Ysseldyke & Tardrew, 2002[5]).

Given these and other previous findings that this intervention was effective for students in general, this study examined the impact of Accelerated Math on the performance of students who are in Title I programs.

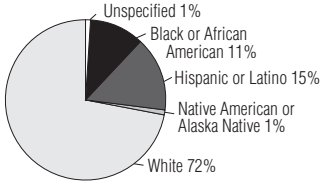
Main Findings

- Title I students who participated in Accelerated Math significantly outperformed those Title I students who did not.
- Title I students and non-Title I students who used Accelerated Math attempted about as many practice problems and test items, but the non-Title I students demonstrated significantly more accurate performance.

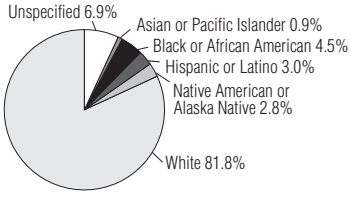
Demographics for Title I Control Students



Demographics for Title I Experimental Students



Demographics for Non-Title I Students Who Participated in Accelerated Math



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.

Summarized from: Ysseldyke, J. E., Betts, J., Thill, T., & Hannigan, E. (2004). Use of an instructional management system to improve mathematics skills for students in Title I programs. *Preventing School Failure, 48*(4), 10–14.

Independent research conducted during the spring semester of 2002

The two groups of students who participated in this study were a subset of students who participated in a large national experiment by Ysseldyke & Tardrew, 2002. The groups were made up of all students who were classified as being in Title I programs in the states in which they were enrolled and ranged from grades three through six. The STAR Math computer adaptive test of mathematics skills was used to provide a suggested starting position in the Accelerated Math libraries. Pretest and posttest scores were used to measure the level of growth each student obtained during the five-month length of the project.

A two-group pretest/posttest comparison approach was used to evaluate the hypothesis that students in Title I programming (n=132), whose teachers used Accelerated Math, will show greater gains in mathematics achievement than similar students in a Title I program (n=138) who received their regular math instruction.

In addition, the researchers analyzed the differences between the experimental group (n=132) and a different control group (n=600; non-Title I students who participated in Accelerated Math) on qualitative aspects of Accelerated Math.

Results

The researchers used an analysis of covariance (ANCOVA) model to compare the gain in math achievement of the Title I experimental and control groups. The model used posttest Normal Curve Equivalents (NCEs) as the outcome with pretest NCE as a covariant and had an R-squared value of 0.438. There was a statistically significant difference between the two groups ($p < .0001$). Students in the experimental group gained 7.9 NCEs; whereas students in the control group gained only 0.3 NCEs, a difference in gain of 7.6 NCEs. The effect size (Cohen's d) was 0.5 leading to the conclusion that the treatment had a considerable effect on student gains in math achievement.

The second analysis conducted was an analysis of variance (ANOVA) comparing the implementation factors for Title I and non-Title I students who participated in Accelerated Math. There was no difference between groups in the number of practice items attempted or in the number of test problems attempted. Non-Title I students had significantly ($p < .0001$) higher average percent correct on practice items and test items and mastered a greater number of objectives.

Conclusions

Under the most recent reauthorization—Public Law 107-110, The No Child Left Behind Act—Title I continues to provide funding to schools in high-poverty areas to support improvements in teaching and learning in an attempt to offer high-level services that help disadvantaged children succeed in school. The results of this study demonstrate that as school personnel search for ways to supplement the instruction of Title I students under the provisions of the No Child Left Behind Act, they should consider use of progress-monitoring systems such as Accelerated Math.

[1] Ysseldyke, J., & Christenson, S. (2002). *Functional Assessment of Academic Behavior: Creating successful learning environments.* Longmont, CO: Sopris West.

[2] Carroll, J. (1963). A model for school learning. *Teachers College Record, 64*, 723–733.

[3] Walberg, H. J. (1984). Families as partners in educational productivity. *Phi Delta Kappan, 65*, 397–400.

[4] Spicuzza, R., Ysseldyke, J., Lemkuil, A., Kosciolek, S., Boys, C., & Teelucksingh, E. (2001). Effects of curriculum-based monitoring on classroom instruction and math achievement. *Journal of School Psychology, 39*, 521–542.

[5] Ysseldyke, J., & Tardrew, S. (2002). *Differentiating mathematics instruction.* Wisconsin Rapids, WI: Renaissance Learning.

Renaissance Learning™
Advanced Technology for Data-Driven Schools™

For more information, or for additional copies of this report, contact:

Educational Research Department
PO Box 8036 • Wisconsin Rapids, WI 54495-8036
(800) 338-4204 • www.renlearn.com

L2235.0811.RLI.100
R35441