

DIFFERENCES IN MATH ACHIEVEMENT: UTILIZING SUPPLEMENTAL  
COMPUTER-BASED INSTRUCTION AND TRADITIONAL INSTRUCTION

by

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A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University

February, 2014

## Overview

This study investigates the impact of active learning, adaptive learning, research-based methods and sound pedagogy on mathematics achievement on Georgia's Criterion Referenced Competency Test (CRCT). Using a casual-comparative design, the study sought to establish gains in mathematics achievement with the implementation of Classworks supplemental math program. Classworks instruction was shown to have a sizable impact on results by doubling gains in mathematics on the CRCT for the 2009-2010 school year.

## Study Design

407 seventh grade students' 2009 CRCT results were analyzed. Matching procedure was utilized to rule out possible influence of extraneous independent variables, and an independent t-test was used to examine the difference in achievement. Of those students, 258 were selected to establish the control and treatment groups. This ensured the curriculum and previous achievement for students were statistically controlled and that subjects were starting on an equal playing field.

The control group consisted of 129 students who received traditional math instruction covering the Georgia Performance Standards. Learning took place in classrooms using traditional methods and practices including lectures, hands on activities, small groups, and assigned homework. The treatment group was made up of 129 students who received 40 minutes per week of Classworks math instruction in addition to the traditional math instruction of the control group. Teachers in treatment group received three hours of professional development where they learned to implement program, teach students the program, utilize tools, and read and utilize reports.

After completion of instruction, CRCT results from 2009 were compared to results from 2010 to calculate which group made the most gains and which group had a higher mean score on the mathematics portion of the CRCT. Students' 2009 CRCT mathematics scores were the covariate. A one-way analysis of covariance was used to find violations of normal distribution for both the control and experimental groups in regards to previous achievement, and outliers and extreme values were removed. Adjusted mean scores were calculated to account for covariate resulting in control group mean score of 817.36 and treatment group mean score of 830.64.

## Outcomes

The treatment group, those using Classworks, showed a 27.22 point increase from previous achievement (3.42%) while the control group showed a 12.37 point difference (1.52%). This established a statistically significant difference in seventh grade math students' math achievement and self-efficacy.

With 40 minutes per week of Classworks math instruction, seventh grade students more than doubled their percent gains. Classworks can be integrated throughout the school day, during before and after school programs, and even as online homework to promote achievement for all students.

View the full study: <http://digitalcommons.liberty.edu/cgi/viewcontent.cgi?article=1843&context=doctoral>