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EVALUATION  
AND MEASUREMENT

THE EFFECTS OF COMPUTER ALGEBRA SYSTEMS ON STUDENTS'  
ACHIEVEMENT IN MATHEMATICS (131pp.)

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This meta-analysis sought to investigate the overall effectiveness of computer algebra systems (CAS) instruction, in comparison to non-CAS instruction, on students' achievement in mathematics at pre-college and post-secondary institutions. The study utilized meta-analysis on 31 primary studies (102 effect sizes,  $N = 7,342$ ) that were retrieved from online research databases and search engines, and explored the extent to which the overall effectiveness of CAS was moderated by various study characteristics.

The overall effect size, 0.38, was significantly different from zero. The mean effect size suggested that a typical student at the 50<sup>th</sup> percentile of a group taught using non-CAS instruction could experience an increase in performance to the 65<sup>th</sup> percentile, if that student was taught using CAS instruction. The fail-safe  $N$ ,  $N_{fs}$ , hinted that 11,749 additional studies with nonsignificant results would be needed to reverse the current finding. Three independent variables (design type, evaluation method, and time) were found to significantly moderate the effect of CAS.

The current results do not predict future trends on the effectiveness of CAS; however, these findings suggest that CAS have the potential to improve learning in the classroom. Regardless of how CAS were used, the current study found that they contributed to a significant increase in students' performance.