PACE

COMMENTARY

What Do the California Standards Test Results Reveal About the Movement Toward Eighth-Grade Algebra for All?

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California's educational standards and assessments, as well as its accountability policies related to mathematics achievement, are designed to advance the expectation that all 8th-graders will take algebra. Then, like all California students in grades 2 through 11, they are assessed through state testing to determine the extent of student learning of the algebra standards, as part of the school- and district-wide accountability requirements. The State's accountability rules penalize schools and districts for having 8th- and 9th-grade students take the California Standards Test (CST) for General Mathematics, which assesses California mathematics standards in grades 6 and 7. As a result of this policy, the percentage of 8th graders taking the CSTs for Algebra I has steadily risen, from 32% in 2003 to 59% in 2011. But is this an effective policy for increasing student achievement?

In this study, we investigated CST results in grades 7 through 11 from 2003 to 2011. We found that the increase in 8th graders taking algebra is accompanied by increases in students in grades 9–11 taking higher-level math CSTs. However, this pipeline has a significant leak in it. We found that while there was an increase of 96,441 in the number of students (about a 19% increase) of 8th graders taking the CST for Algebra I between 2003 and 2008, there was a much smaller increase of 33,151 (about a 7% increase) in the number of 11th graders taking the CST for Summative High School Mathematics between 2006 and 2011 (the same cohort). That is, there is a 12% difference in the growth of the number of students taking these two different CSTs between the two periods of time. While one could expect a certain amount of attrition in the pipeline to higher level college preparation mathematics courses, the great expansion of 8th-grade algebra appears to have doubled the rate of the leak: among the 2003-2006 cohort, only 13% of students left the pipeline while 26% of the 2008-2011 cohort left it. We should note that it has been suggested that we include 7th graders taking algebra in the pipeline calculation. Since 2007, California has allowed 7th graders to take the CST for Algebra I if they take an algebra course. If we added 4.4% of the 7^{th} graders taking the CST for Algebra I in 2007, it would enlarge the leak of the pipeline because these students are already included in the number of those taking the CST for Summative High School Mathematics at 11th grade.

Our longitudinal study also reveals that 8th-grade students who scored below proficient on the CST for Algebra I only have a 9.61% passing rate on retaking the CST for Algebra I at 9th grade. However, if 8th-grade students scored proficient and above on the CST for General Mathematics, they have a 31.46% passing rate on taking the CST for Algebra I at 9th grade. These data show that students scoring below proficient on the 8th-grade algebra CST have a 69% [1-(9.61/31.46)] lower chance of passing the

algebra CST in 9th grade compared to students who scored proficient or above on the CST for General Mathematics in 8th grade.

The findings of our study point out the unintended consequence of the 8th-grade algebra policy whereby schools place apparently unprepared students in 8th-grade algebra, which likely results in having more students repeating algebra in following years and not passing the CST. Preparing students for algebra by raising their CST scores for Grade 7 Mathematics scores appears to be more effective in achieving their learning success than ushering more students into 8th-grade algebra classrooms and having more than half fail on the CST for Algebra I.

Because of the trends in the findings of our study, we recommend additional research to examine alternatives to the current 8th-grade algebra policy that could provide greater predictive validity in supporting students' future success in mathematics and in making them college and career ready. Policy alone, and the rewards and sanctions that often accompany policy requirements, may be unable to elicit the substantial needed changes in classroom practices necessary for student success.

The opinions expressed by Jian-Hua Liang are of the author alone and do not reflect opinion or policy of the California Department of Education. The full study is here (ungated): What Do the California Standards Test Results Reveal About the Movement Toward Eighth-Grade Algebra for All? Educational Evaluation and Policy Analysis, September 2012, vol. 34 no. 3, 328-343.

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