

The 2017 NAEP Results in ELA and Math: Some Caution Advised¹

An EMBARGOED Technical Analysis²

from the Johns Hopkins Institute for Education Policy

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The Johns Hopkins Institute for Education Policy conducted a preliminary analysis of the relationship between the changes in NAEP scores³ (from 2015 to 2017)⁴ and states' prior experience with online testing. Compared with states whose students had had prior experience with online testing, states whose students had *not* had prior experience⁵ witnessed a larger reduction in average NAEP scores from 2015 to 2017 in 4th-grade ELA and math and in 8th-grade ELA. These differences are statistically significant. We find that the relationship between previous experience with online testing and changes in NAEP scores is stronger in the 4th grade than in 8th grade, and stronger in ELA than in math. These results suggest that prior, in-school computer experience—i.e. taking a computer-based state test and the in-school practice leading up to the computerized test—is particularly important for younger students. This might be because many younger children do not otherwise gain the kinds of skills necessary for online testing. These results also suggest that in-school computer experience is especially important in ELA, possibly because of the typing and editing skills required by the ELA exams.

Our analysis shows that in 4th grade, only one state that had used paper-and-pencil state testing in 2016 experienced any gains in ELA (Tennessee), and only one such state in math (Wyoming), between 2015 NAEP and 2017 NAEP. This is striking when compared to the 19 states in ELA and 14 states in math that *had* used online state testing in 2016 and registered gains on the 2017 NAEP. In fact, the average differences in scores on NAEP from 2015 to 2017 were approximately 2 points higher in ELA and 1.6 points higher in math in

¹ *The opinions expressed in this memo represent solely the judgments of The Johns Hopkins Institute for Education Policy and do not necessarily reflect the views of The Johns Hopkins University, The Johns Hopkins School of Education, or the Maryland State Board of Education.*

² This technical analysis is embargoed until the NCES releases the 2017 NAEP results. The Institute continues to refine this analysis and reserves the right to change aspects prior to lifting the embargo if further information enables greater accuracy.

³ Note that at the time of writing, NAEP has not yet released the 2017 data. Therefore, this analysis was conducted with preliminary data that shows changes in scores rounded to the nearest quarter of a point. When NCES officially releases the 2017 NAEP scores, we will update our analysis.

⁴ Note that all “change in NAEP scores” or “gains on the NAEP” refers to the point change in a state’s score from the 2015 NAEP to the 2017 NAEP in the same subject and grade level.

⁵ Defined as 30% or less of students took computerized exams in 2016. A list is provided in Table 1. We made every effort to confirm the accuracy of this data, including contacting every one of the 50 state education agencies and Washington, D.C., and conducting multiple web searches. We took a conservative view of state allocation. For example, we understand that Alaska administered some tests online in 2015, prior to a highly truncated online test administration in 2016. We thus counted the state as having had experience with online testing, even though including it as a paper-and-pencil state would have strengthened our findings.

states that had used online testing in 2016 compared with states that had used paper-and-pencil state tests. We find that the relationship between prior state-testing mode and NAEP gains is robust: the association remains statistically significant and stable⁶ across different models that control for various state characteristics.⁷

A visual representation of the relationship between states' 2016 testing mode and 2017 NAEP gains is shown in Graph 1 below. *Note that in 4th-grade ELA, whether or not a state had used online testing prior to the 2017 NAEP predicts roughly 15% of the variation in NAEP score changes. Students' prior online state-testing experience explains approximately 11% of the variation in 4th-grade NAEP math-score changes.* By contrast, a state's poverty level is not significantly related to changes in 4th-grade NAEP scores and predicts less than one percent of the variation in 4th-grade NAEP score-changes, as shown in Graph 2. We similarly find that none of the other state characteristics we included in our models produced similar magnitudes and statistical significances, or explained as much variation in 4th-grade NAEP score-changes, as did prior experience with online testing.

The relationship between 2016 state-test mode and 2017 NAEP score gains is neither as strong nor as consistent in 8th grade.⁸ Students with prior experience with online state testing do, on average, have approximately 1.1 larger gains on the 8th-grade ELA NAEP test, and this relationship is stable⁹ and generally statistically significant when other state characteristics are controlled for.¹⁰ However, there is no significant relationship between state test mode and 8th-grade math NAEP gains. Graph 1 shows these weaker relationships. Approximately 5% of the variation in the 8th-grade ELA NAEP test changes are explained by state test mode in 2016. Test mode explains no variation in the 8th-grade math NAEP changes.

⁶ The estimated association between states with experience in computerized testing in 2016 and changes in the 4th-grade ELA 2017 NAEP test, range from 1.9 to 2.1 across multiple models, depending on the other state controls we include, and are all statistically significant at a 1% level. The estimated association between computerized testing in 2016 and the change in the 4th grade math NAEP test range from 1.5 to 2.2 across multiple models and are all statistically significant at least a 5% level.

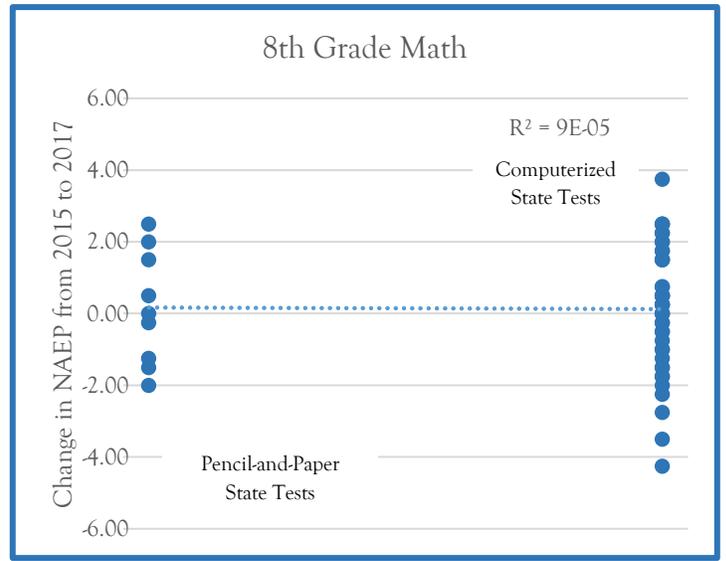
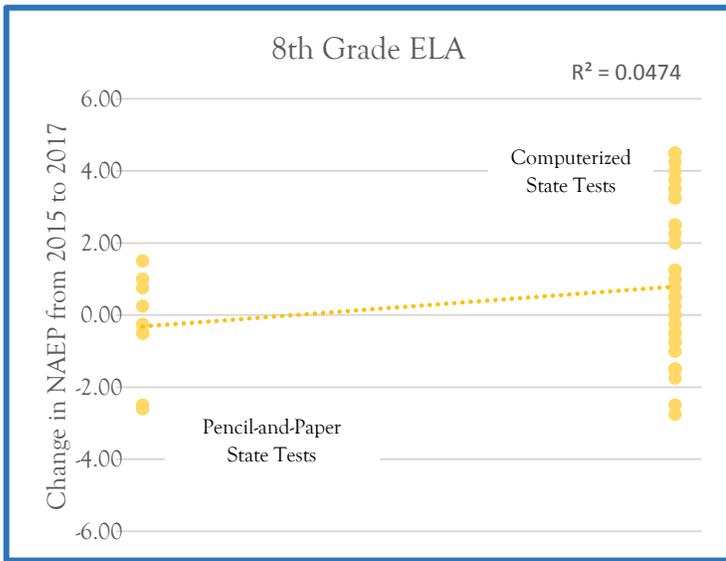
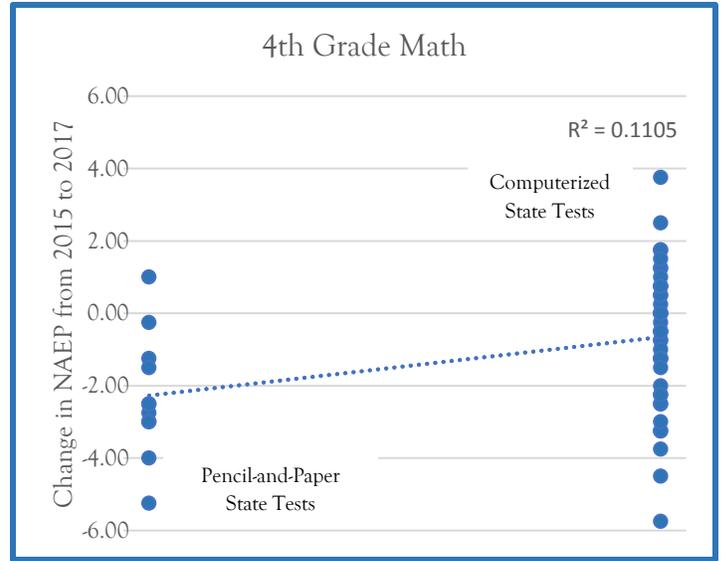
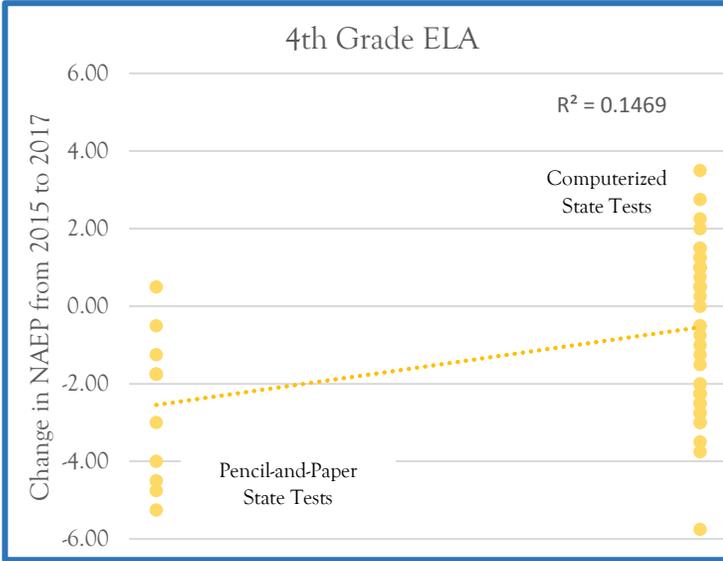
⁷ Including the state's 2016 poverty rate, the percentage of black students in the state, the percentage of Hispanic students in the state, pupil-teacher ratios, the number of students in the state, and the number of charter schools in the state.

⁸ As it is in 4th grade.

⁹ The estimated association ranges from 1.1 to 1.7.

¹⁰ Including the state's 2016 poverty rate, the percentage of black students in the state, the percentage of Hispanic students in the state, pupil-teacher ratios, the number of students in the state, and the number of charter schools in the state.

Graph 1: 2017 NAEP Scores and Computerized State Tests



Graph 2: 2017 NAEP Scores and State Poverty Rates

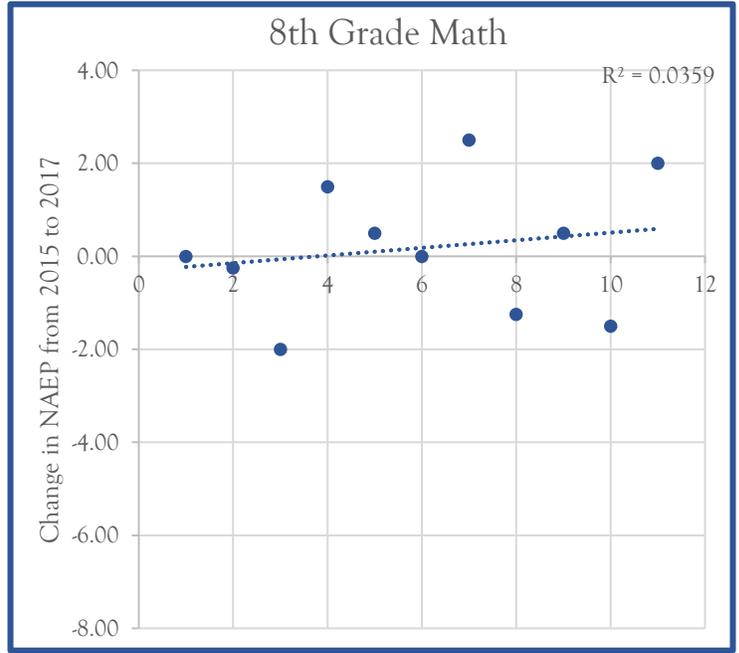
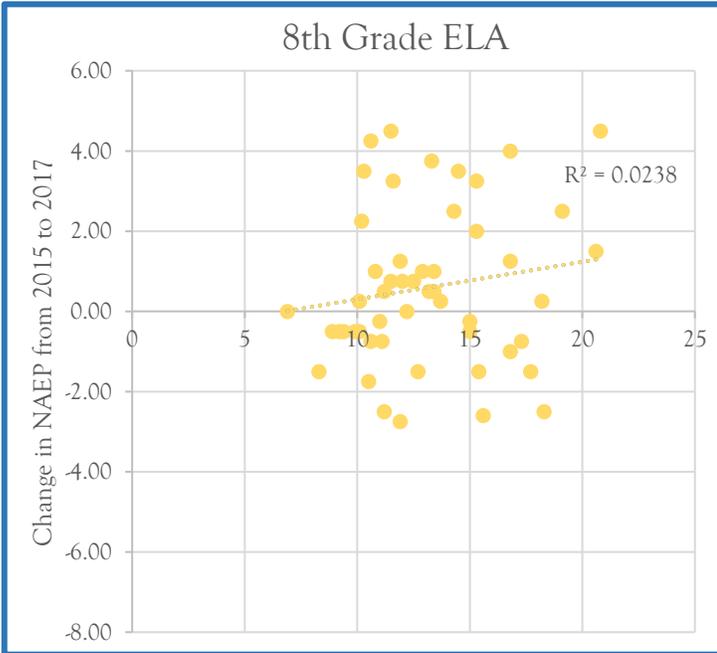
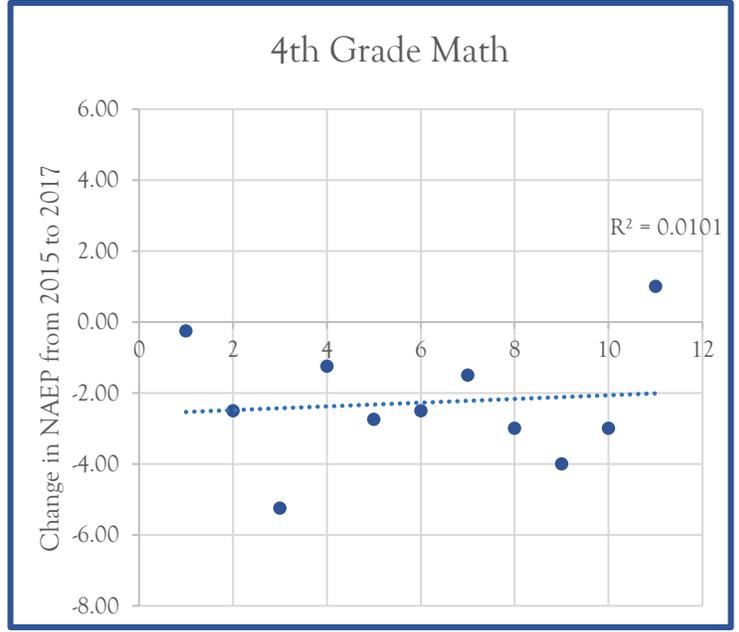
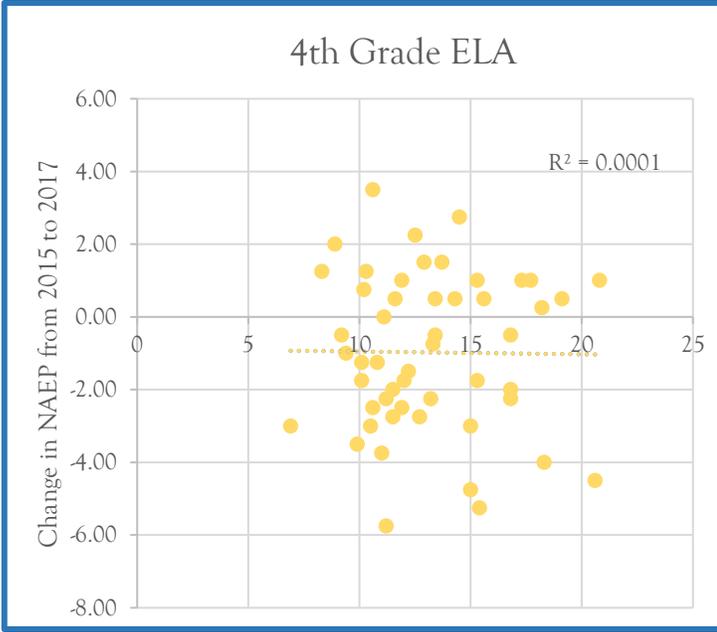


Table 1: States with Paper-and-Pencil Based Tests in 2016	
Elementary	Middle School
Iowa	Iowa
Kentucky	Kentucky
Louisiana	Louisiana
New York	New York
North Carolina	Pennsylvania
Oklahoma	South Carolina
Pennsylvania	Tennessee
South Carolina	Texas
Tennessee	Wyoming
Texas	
Wyoming	