SAS® EVAAS

POLICY BRIEF

Key Research Findings

Introduction

Over two decades ago, a team of statisticians and researchers at the University of Tennessee initiated a new way to view student learning. Rather than focusing on the *achievement level* of students as a measure of effectiveness, the future EVAAS team focused on the *growth* of students over time, following each individual student across subjects and grades. While the application to education represented a paradigm shift for educators and policymakers, the analyses themselves drew upon established statistical models, which overcame many significant challenges concerning the use of student testing data to assess educators' effectiveness.

Over the years, the EVAAS value-added approach—and the conclusions drawn from its research—have been reviewed, validated, and confirmed by a variety of public and private sector experts.[1] This document summarizes EVAAS' key findings regarding value-added modeling and student growth.

Key Research Findings from 1982 to 1999

Led by Dr. Bill Sanders at the University of Tennessee in Knoxville, the early work of the team focused on research that established many of today's basic understandings about student learning. Key findings between 1982 and 1999 include:

- **Teaching matters.** The differences in student learning among teachers have a highly significantly effect on the rate of student academic growth.[2] These effects are greater in Math than in Reading comprehension.
- **Teaching matters *a lot* because students' low growth cannot be compensated for in future years.** Teacher effects were found to be cumulative and additive with very little evidence of compensatory effects.[3] In other words, if a student had two very ineffective teachers in a row for the same subject, then there is very little evidence that a subsequent teacher could make up that loss in growth. Furthermore, the sequence of teachers that a student has (and whether those teachers are effective or ineffective) greatly affects the possibility of that student passing a high-stakes test.[4]
- **Students' backgrounds do not matter in terms of their *growth*.** White and black students both make significant growth with teachers who have high value-added measures, and the ethnic composition of a school is a poor predictor of its effectiveness in terms of academic growth. In other words, students can make significant growth regardless of their race or ethnicity.

Milestones in EVAAS Development

- During the 1990s, EVAAS released District, School, and Teacher value-added reports to all districts in Tennessee (1993, 1994, and 1996, respectively). These were the first releases of educational value-added reports in the nation. With these releases, it was possible to confirm that there is virtually *no* relationship between a student's background (demographics) and cumulative academic growth.
- In 1997, the statistical methodology underlying the multivariate, longitudinal methodology used in EVAAS was published in the open literature.[1]

Key Research Findings from 2000 to Present

Through a variety of federal, state, and local initiatives, there has been an ever-growing awareness of and importance placed on identifying effective teaching. EVAAS' research on student growth has continued to break new ground. Key findings since 2000 include:

- **Most of the differences in the rates of student growth can be attributed to classrooms within schools within districts (rather than districts or schools within districts).** This reinforces the importance of teachers on their students' academic opportunities.
- **Teaching effectiveness is related to years of service, with measurable improvement for up to 10 years.** Teachers who leave after one or two years of experience typically have *lower* growth measures than those who stay.
- **When teachers change schools, the teacher's effect measured in the school *before* the move was found to be similar to the teacher's effect measured *after* the move.**[5] This was true even when teachers moved to schools that were very different in socioeconomic status from their original school. This suggests that the teacher's effects is primarily related to the teacher rather than their schooling environment.
- **A robust statistical approach using multiyear estimates yields highly reliable teacher value-added reporting.** With the EVAAS methodology, the repeatability correlation is about 0.70–0.80 for three-year teacher value-added estimates.[6] This suggests that a teacher's estimate is primarily related to the teacher's effectiveness rather than any year-to-year variation. Furthermore, value-added estimates for beginning teachers (again based on three years of data) indicate that those with high effects will continue to have high effects three to five years later. About half of beginning teachers with low effects will improve to become average teachers in the future.

Milestones in EVAAS Development

- In 2000, EVAAS moved from Knoxville to SAS in Cary, NC. Moving from a university to a software company enabled EVAAS to
  - ▶ expand its services beyond Tennessee
  - ▶ deliver reports in a secure hosted web application
  - ▶ provide new reports to support educators and policymakers
- After 2000, EVAAS began providing individual student projections to future tests. These projections, even when made three years into the future, are more reliable than looking at a student's most recent test score in the same subject. This information offers an opportunity to minimize inequities that often occur in student placement to more advanced courses and to improve differentiated instruction.
- EVAAS added an application to refine student-teacher linkages and enable teachers and administrators to verify rosters within the hosted web application. Using this application, educators can capture the correct percentages of instruction delivered by each teacher for each tested subject for each student. This flexibility helps to ensure that the verified rosters contain accurate information for generating teacher reports.

[1] See, for example: J.R. Lockwood and D.F. McCaffrey, "Controlling for Individual Heterogeneity in Longitudinal Models, with Applications to Student Achievement," *Electronic Journal of Statistics* 1 (2007): 244. Also, see: D.F. McCaffrey and J.R. Lockwood, "Value-Added Models: Analytic Issues." Prepared for the National Research Council and the National Academy of Education, Board on Testing and Accountability Workshop on Value-Added Modeling, Nov. 13-14, 2008, Washington DC.

[2] R.A. McLean and W.L. Sanders, *Objective Component of Teacher Evaluation: A Feasibility Study*. Working Paper No. 199. (Knoxville: University of Tennessee, College of Business Administration, 1984).

[3] W.L. Sanders and J.C. Rivers, *Cumulative and Residual Effects of Teachers on Future Student Academic Achievement* (Knoxville: University of Tennessee Value-Added Research and Assessment Center, 1996).

[4] J.C. Rivers, "The Impact of Teacher Effect on Student Math Competency Achievement" (PhD diss., University of Tennessee, Knoxville, 1999).

[5] W.L. Sanders, S.P. Wright, and W.E. Langevin, "The Performance of Highly Effective Teachers in Different School Environments," in *Performance Incentives: Their Growing Impact on American K-12 Education*, ed. M.G. Springer (Washington, DC: Brookings Institution, 2009).

[6] J.T. White, S.P. Wright, and W.L. Sanders, Unpublished report, 2011.