

## The Value of Effective Teaching: Research & Policy Implications

### Introduction

Over two decades ago, a team of statisticians and researchers at the University of Tennessee, Knoxville initiated a new way to view the effectiveness of educators. Rather than focusing on the *achievement level* of students as a measure of effectiveness, the future SAS EVAAS team focused on the *progress* 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.<sup>1</sup> This document summarizes key milestones and findings regarding value-added assessment and teaching effectiveness.

### Key Findings from the Early Years (1982 – 1999)

Led by Dr. Bill Sanders at the University of Tennessee, Knoxville, the work of the team in the early years focused on research that established many of today's basic understandings about teaching effectiveness. These include:

- **Teaching matters.** The differences in teaching effectiveness have a highly significant effect on the rate of student academic progress.<sup>2</sup> These effects are greater in math than in reading comprehension.
- **Teaching matters a lot because ineffective teaching cannot be compensated in future years.** Teacher effects were found to be cumulative and additive with very little evidence of compensatory effects.<sup>3</sup> 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 progress. 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.<sup>4</sup>
- **Students' background does not matter in terms of their progress.** White and black students both make significant progress 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 progress. In other words, students can make significant progress regardless of their race or ethnicity.

During this time—for the first time in the nation—district, school and teacher value-added reports were released to all Tennessee districts in 1993, 1994 and 1996 (respectively). With these releases, it was possible to confirm that there is virtually *no* relationship between students' background (demographics) and cumulative academic growth. Furthermore, in 1997, the statistical methodology underlying the multivariate, longitudinal methodology used in PVAAS was published in the open literature.<sup>5</sup>

### Since The Early Years (2000 – Present)

Moving from a university to SAS Institute Inc. enabled the EVAAS team to expand its services beyond the State of Tennessee and to improve its delivery to include a user-friendly, secure hosted web application, which could provide a variety of reports beyond the value-added estimates to support educators and policymakers. In the early years of No Child Left Behind and then subsequently with Race to the Top, there is an ever-growing awareness and importance placed on identifying effective teaching.

In these years, the SAS EVAAS team sustained its roots in research to continue to learn about effective teaching. This research has continued to provide insights from the earlier findings as well as to break new ground, particularly with respect to teaching. These include:

- **Most of the differences in the rate of student progress can be attributed to classrooms within schools within districts (rather than districts or schools within districts).** This reinforces the importance that teachers have on their students' academic opportunities.
- **Teaching effectiveness is related to years of service, with measureable improvement for up to ten years.** Teachers who leave after one or two years of experience are typically *less* effective than those who stay.
- **When teachers change schools, the effectiveness of the teacher measured in the school *before* the move was found to be similar to the effectiveness of the teacher measured *after* the move.<sup>6</sup>** 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 effectiveness is primarily related to the teacher, rather than his or her schooling environment.
- **A robust statistical approach using multi-year estimates yields highly reliable teacher value-added reporting.** With the SAS EVAAS methodology, the repeatability correlation is about 0.70 – 0.80 for three-year teacher value-added estimates.<sup>7</sup> This suggests that the 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 highly *effective* teachers will remain effective three to five years later. About half of beginning *ineffective* teachers will improve to become average teachers in the future.

During this time, SAS 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 immediate prior 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 with more reliable data.

## SAS Projects and Research Efforts

In 2002, SAS EVAAS collaborated with a group of districts in the Commonwealth of Pennsylvania to provide PVAAS district and school reporting to its educators. Since then, the reporting has expanded statewide and now includes many more reports. However, the interest in gaining insight to teaching effectiveness continues beyond the traditional value-added estimates for districts, schools and teachers. SAS EVAAS collaborates with a variety of its education partners across the U.S. to further knowledge in this field. Recent examples of EVAAS projects and research efforts include:

- **Program Evaluation**, such as Striving Readers, the EAP tutoring program, SES tutoring programs and Teacher Advancement Program (TAP)
- **Linking teacher effectiveness to teacher preparation programs**, such as the annual Higher Education Report Card in Tennessee and other analyses on what additional measures contribute to teacher effectiveness
- **Relationship between value-added and student surveys**, with a pilot project currently underway
- **Relationship between value-added and expenses**, such as the per pupil expenditures and program costs
- **Relationship between value-added and teacher retention rates**, such as which teachers stay and leave
- **Relationship between value-added and the special education population**, with an exploratory analysis in Pennsylvania in development.

<sup>1</sup> See, for example: Lockwood J.R. and D.F. McCaffrey (2007). "Controlling for individual heterogeneity in longitudinal models, with applications to student achievement." *Electronic Journal of Statistics*, Vol. 1, p. 244. Also see : McCaffrey, D. F., Han, B. and Lockwood, J. R. (2008). "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 D.C.

<sup>2</sup> Reference: McLean, R.A., & Sanders, W.L. (1984). *Objective component of teacher evaluation: A feasibility study*. Working Paper No. 199. Knoxville: University of Tennessee, College of Business Administration.

<sup>3</sup> Sanders, William L., and June C. Rivers (1996). *Cumulative and Residual Effects of Teachers on Future Student Academic Achievement*. Knoxville: University of Tennessee Value-Added Research and Assessment Center.

<sup>4</sup> Rivers, June C. (1999). *The Impact of Teacher Effect on Student Math Competency Achievement*. Unpublished doctoral dissertation, University of Tennessee Knoxville.

<sup>5</sup> Sanders, W. L., Saxton, A. M., and Horn, S. P. (1997). *The Tennessee Value-Added Accountability System: A Quantitative, Outcomes-Based Approach to Educational Assessment*. Pages 137-162 in J. Millman (Ed.), *Grading Teachers, Grading Schools: Is Student Achievement a Valid Evaluation Measure?* Thousands Oaks, CA: Corwin Press.

<sup>6</sup> Sanders, W. L., Wright, S. P., and Langevin, W. E. (2009). "The Performance of Highly Effective Teachers in Different School Environments." In Matthew G. Springer (ed.), *Performance Incentives: Their Growing Impact on American K-12 Education*. Washington, D.C.: Brookings Institution.

<sup>7</sup> White, J. T., Wright, S. P., and Sanders, W. L. (2011). Unpublished report.