A new series of periodic updates to Congress on RAND’s work in education policy

In this issue: The promise and perils of using value-added modeling to measure teacher effectiveness.

HOT TOPIC
Over the last several years, the issue of measuring teachers’ effectiveness in terms of learning gains made by the pupils under their tutelage has been hotly debated. One of the most widely discussed (if not well understood) approaches is value-added modeling (VAM), which attempts to estimate how much teachers or schools add to the achievement of entering students.

The No Child Left Behind Act, with its emphasis on test-based accountability and teacher quality, has heightened an already growing interest in VAM. Although VAM may be a promising method for the longer term, its application poses substantial challenges that need to be addressed before it can be used on a large scale in educational accountability systems. Unfortunately, investigation and discussion of the methodological issues raised by the use of VAM in education have been fragmented, incomplete, and largely unpublished. RAND researchers recently undertook a systematic review and evaluation of leading approaches to VAM. Their newly-released RAND report, Evaluating Value-Added Models for Teacher Accountability, clarifies the primary questions raised by the use of VAM for measuring teacher effects, reviews the most important recent applications of VAM, and discusses a variety of the most important statistical and measurement issues that might impact the validity of VAM inferences.

VAM has garnered attention for two main reasons. First, proponents claim that it separates the effects of teachers and schools from the powerful effects of noneducational factors, such as family background. This isolation of effects is critical for accountability systems to work as intended. Second, early VAM studies purport to show very large differences in effectiveness among teachers. At this point, neither of these claims has been fully substantiated by RAND research.

Major Findings
Based on their reviews and original analyses, the authors conclude that:

- There is clear evidence of a “teacher effect.” Although the studies reviewed all have shortcomings, together they provide evidence that teachers have discernable, differential effects on student achievement, and that these teacher effects appear to persist across years.

- The teacher effect might not be as large as those generally reported by previous studies. The shortcomings of the studies make it difficult to determine the size of teacher effects, but it appears likely that the magnitude of some of the effects reported in the literature is overstated.

- Reported teacher effects are sensitive to assumptions underlying the statistical models, but this issue has been largely ignored in the literature. Estimating the effects of teachers by modeling longitudinal data on student achievement raises a number of important statistical and psychometric issues and requires decisions about how these issues are addressed. In this respect, VAM analyses of teacher effects are no different from other statistical models, estimates from which are often potentially sensitive to choices about the modeling approach.

However, the analyses used to estimate teacher effects are complex and challenging, and the potential sensitivity of results to modeling choices has not been well explored. In particular, the researchers point to several areas in which the choices made by the researcher can affect the size of the estimates of teacher effects in VAM. For example, student learning is influenced by factors other than teacher quality, such as characteristics of the school and school environment. If these influences are incorrectly modeled or are not modeled at all, the estimates of teacher effects are likely to be distorted. Further, in the case of VAM, researchers are often faced with incomplete data on individual students over time and incomplete information linking students to teachers. Dealing with these issues is among the greatest challenges facing VAM.

The Bottom Line
The authors caution that:

- The research base is currently insufficient to support the use of VAM for high-stakes decisionmaking.

- Any use of VAM estimates must be informed by an understanding of the potential sources of errors in reported estimates of teacher effectiveness.

They recommend that policymakers, practitioners, and VAM researchers work together to ensure that (1) research is informed by the practical needs and constraints facing users of VAM, and (2) implementation of the models is informed by an understanding of the kinds of inferences and decisions the research currently supports.

PROJECTS UNDERWAY
- Providing analytic assistance to the Carnegie Corporation’s new initiative on Adolescent Literacy

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