Value-added modeling (VAM) in education

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The concept in general

Value added refers to "extra" feature(s) of an item of interest (product, service, person etc.) that go beyond the standard expectations and provide something "more" while adding little or nothing to its cost. Value-added features give competitive edges.

Educational context

Teacher's evaluation is a
difficult, sensitive, subjective
and multifaceted issue.

Evaluate teachers based on students'
"progress-improvement" during a certain
time period (usually a school-year)

Why VAM?

Measuring the annual student progress instead of a fixed grade enables the researcher to isolate other variables such as school environment, socioeconomic status and focus on teacher's work.

VAM features

- No Child Left Behind Act (NCLB)
- Funding based on each school district's "Adequate Yearly Progress" (AYP)
- Many states have used empirical data to allocate funding and have also developed quantitative tools
- VAM combines statistically adjusted test score gains achieved by a teacher's students. Teachers are then compared to other teachers in the district based on these adjusted aggregate gains.
- Statistically demanding procedures, need to develop understandable guides for policymakers.

Educational Value-Added Assessment System (EVAAS)

Running in Tennessee since 1993 and in many other states. The basic model is an equation that expresses the score of a student at the end of a particular grade in a particular year as the sum of three components:

Student score   = District average +
                        Teacher effect+
                        Error term

So

Teacher effect≈Student score-District average

EVAAS in the next year

Student score
the next year   = District average +

Teacher effect+

Teacher effect from
previous year +

Error term

EVAAS – final step

If we subtract the first-year score from the second-year score, we obtain the gain made by the student. According to the model, this must be the sum of:

- Average gain for that grade in the district
- Teacher effect of the second-year teacher
- The two error terms

That is, ignoring the error terms, the teacher effect in the second year is the difference between the gain experienced by the student in that year and the average gain in the district for that same year.

Points of concern (1)

- At the conclusion of a value-added analysis, a number is associated with each teacher. This is a measure of teacher effectiveness (or teacher effect?)

- Problem with causal interpretation of the specific measure

- To achieve causality, the researcher needs to apply randomization (experimental procedure)- difficult in practice

Points of concern (2)

- Inappropriate attribution: Teachers with seniority are given more choice in the schools and classes they teach, parental influence
- Context effects: Student learning during the year is not just a function of a student's ability and effort, and the teacher's pedagogical skills. It is also affected by such factors as peer-to-peer interactions, overall classroom climate, resources.
- Missing data
- Not much data for every teacher especially in small districts, thus imprecise estimates

Final thoughts

- VAM moves the discussion about teacher evaluation to increased student learning as the primary goal of teaching.

- VAM introduces quantitative tools isolating other factors

- Help policymakers identify teachers most likely to require professional development and who should be interviewed and/or observed to determine the particular kinds of support that would be most helpful.

- Help policymakers identify underperforming schools

- VAM results should not serve as the sole or principal basis for making consequential decisions about teachers-very good at screening but include other measures for overall understanding and final decisions.