Roundtable Discussion on Value-Added Analysis of Student Achievement: A Summary of Findings

Hosted by
the Working Group on Teacher Quality

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Participants in the informal Working Group on Teacher Quality share information and explore critical issues in the area of teacher quality and compensation reform.

Members of the Working Group include:

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Roundtable Discussion on Value-Added Analysis of Student Achievement: A Summary of Findings

With the growing availability of student achievement data, schools and districts are now able to gain a better understanding of the connections between student achievement growth and school and teacher effectiveness. Methodologies that measure these effects are commonly called "value-added analysis." In general, value-added analysis of student achievement is a statistical technique that uses longitudinal student achievement data to obtain estimates of the impact schools or teachers have on student learning as measured by test scores. It is this impact that is considered the "value-added" by schools or teachers. Because of its potential power in measuring school and teacher effectiveness, and its implications for educational accountability systems, value-added analysis of student achievement has become an important issue in education reform.

Value-added analysis of student achievement confirms that teacher quality is the most important school-related factor influencing student academic achievement. Value-added analysis of student growth also provides fairer measures of school performance than measuring the numbers of students that score at the proficient level. Similarly, value-added data provides useful information to help educators tailor their instruction to meet different student needs.

Yet this type of analysis of student achievement is a relatively new idea, and many questions about its use remain. Critics argue that the methodology has technical limitations and, therefore, is not ready to be used, particularly for teacher accountability purposes. Others have been reluctant to implement it because the methodology is complex and difficult for the lay person to understand.

Given the promise and potential of value-added analysis of student academic growth and the questions that remain about its use, the Working Group on Teacher Quality (Working Group) hosted a roundtable discussion that provided an open forum for experts in research, policy and the practice of value-added analysis to share their insights. The main goal of the Roundtable Discussion was *to create a broader understanding of how value-added analysis of student achievement can be used as one indicator of teacher effectiveness and the implications this has for policy and practice.*

Specifically, this meeting discussed three main questions:

- What are the leading models for measuring student achievement gains, and what are the strengths and weaknesses of these models?

- How is value-added analysis being used in states and/or school districts today to measure teacher effectiveness? What lessons are we learning in terms of both models and implementation?

- What is the best way to explain value-added analysis of student achievement—and how it relates to teacher effectiveness—to various stakeholders, including teachers and the public? What are the common misperceptions and how can we address them?

Nearly 60 people participated in the discussion, including many researchers, policymakers and practitioners. These experts are listed at the end of the summary.

Value-Added Analysis Enables Measurement of Student Achievement Growth Rather than Absolute Achievement Level

Value-added analysis has provided educators and policymakers with fairer and more accurate measures of student achievement growth. It has also contributed to the development of more effective strategies for educating students by identifying effective teachers and teaching techniques. Both the insights of the experts at this Roundtable and the comments of the attendees affirmed how much value-added analysis has contributed to our understanding of what truly influences academic achievement and by how much.

Most current school systems judge school and teacher performance by looking at the percentage of students scoring at proficiency on their state test at the school or teacher level. This method does not take into consideration the initial achievement levels of students as they begin the school year. For instance, looking at the number of students that meet proficiency on the state test does not necessarily credit schools or teachers who were able to take students who were initially very low-performing and increase their scores by significant amounts, which may or may not meet the state's definition of proficiency. This traditional method does not account for the impact of successful educators working with low-achieving students, particularly in low-income, high-minority neighborhoods. Value-added analysis provides a powerful means to identify and acknowledge such teachers by considering the amount of achievement *growth* they are able to make with their students, regardless of how low- or high-achieving the students were in the beginning of the school year.

School-based practitioners noted that these new forms of analysis advance the field of education by providing teachers with accurate information and tools to assess the impact they have on their students. Dr. William Sanders, senior manager at SAS Institute, Inc., who developed the Tennessee Value-Added Assessment System, shared how he has "watched the evolution of the notion of following individual student progress" for the past 25 years. He reflected on how many of the issues and concerns people raised in the past are now no longer issues, and how he hopes that within another ten to 15 years, many of the current concerns will also be resolved. Dr. Sanders asserted his belief that "just looking at proficiency is not enough to get us to where we want to go, but [with value-added analysis this] will change over time."

Despite these benefits, value-added analysis has been criticized for its statistical limitations. This argument has been one of the major reasons critics have not supported the use of value-added results to make high-stakes personnel decisions (e.g., teacher performance-based compensation). Some of the limitations discussed during this meeting included:

- The potential bias in the makeup of teachers' classrooms because of the non-random assignment of students to teachers;

- "Noisy" measures of teacher effects on student achievement because value-added methodologies may not sufficiently account for other factors that also influence student achievement (e.g., the effect of district level policies);

- The inability to calculate value-added results for all teachers in a school because only a limited number of grades and subjects are tested; and

- Complexity and variation in instruction (e.g., team teaching, pull-out instruction, etc.) that are difficult to capture statistically.

Even with these limitations, researchers at the Roundtable agreed that value-added data provide useful information about individual teachers' effect on student achievement that should not be overlooked. Professor Thomas Kane of Harvard University stated that "the debate about the reliability of [value-added] data is far too simplistic. The data are not perfect and mistakes will be made. However, we need to ask, 'What is the data used for?' 'What are the types of mistakes [that can be made]?' 'What are the costs of these mistakes?' For instance, in the tenure decision, the cost imposed on kids of tenuring a poor teacher are probably much larger than the costs imposed on an effective teacher who is unfairly and incorrectly identified as a poor performer. We need to think in this framework. Even with noise, the information may be useful."

Some critics have argued against using value-added analysis because such calculations cannot be made for all teachers. Currently, under the *No Child Left Behind Act*, annual assessments are only required for grades three through eight and at least once in grades 10 through 12 in reading and math. Science assessments are only now starting to be required (2007–2008). Thus for many school systems, value-added results are only

calculable in these subjects and grades, or for the school as a whole. Because of the selectivity for whom such data would be available, particularly when the results would be considered as part of an accountability system, some school systems have refrained from calculating them altogether.

Participants at the Roundtable expressed their preference for using value-added analysis for whom it was available and using alternative assessments for whom it was not. For example, Professor Kane advised that "the [value-added] system doesn't have to be perfect to get started. A district could start with a combination of measures based on classroom observations, principal assessments and value-added. Then as we learn more about which of the classroom observation tools are most effective in identifying teachers with high value-added results, and as we improve the value-added measures themselves, we can more rapidly move forward, using value-added to improve the classroom measures and so on." Additionally, when comparing the use of value-added data to the alternative (i.e., rates of student proficiency), many agreed that value-added is the better choice.

Value-Added Data Empowers Teachers to Improve Their Instruction

In addition to providing a more accurate measure of student achievement, value-added analysis is valuable because of the quality and usefulness of the information it provides for educators to improve their instruction. Value-added analysis has allowed for a better understanding of the influences of the school and teacher on student achievement. Dr. Robert Mendro, who has used value-added methodologies to measure teacher effectiveness in the Dallas Independent School District, explained that "one of the values of value-added is in understanding how some of the things [e.g., programs, instructional styles and teacher characteristics] work that we never understood before… Before there was value-added to help sort this out, it was usually a mystery in terms of what has been most effective in helping kids learn."

Value-added information has led to two key changes in instruction. First, value-added analysis now allows teachers and principals to be better informed about the impact their instruction and performance has on their students' achievement. Participants were quick to point out that reliable information and having the necessary understanding of the data are essential for teachers to be able to use it properly. Educators around the room who had not used value-added analysis were interested in having such results. Jason Kamras, the 2005 National Teacher of the Year and special assistant to the chancellor of the District of Columbia Public Schools, expressed how "as a teacher, the ability to know how much impact I can have on students is exciting and empowering."

Second, teachers use their value-added data to modify their instruction and behavior accordingly. In his research, Dr. Sanders has observed how with appropriate feedback, "using value-added data induces teachers to look for ways to improve themselves." Teachers need tools in order to be successful, and many participants who work in schools agreed that value-added data is one such tool. James Mahoney, the executive director of Battelle for Kids, reflected on his work with school districts in Ohio and how value-added data has spurred discussions among teachers about what they can do to help improve teaching. Dr. Tonia Alexander, a principal in the Richardson Independent School District in Dallas, Texas, which is implementing the Teacher Advancement Program (TAP)™,

shared that with value-added analysis, "data is getting better and teachers are getting better at using data to guide them in what they do." Other teachers in the discussion agreed that they are now very excited to see their value-added results and to be able to use it to inform their instruction.

According to Dr. Sanders, "we are in a paradigm shift in American pubic education where [teachers] are changing from group instruction to individualized instruction." And individualized, value-added data for teachers' students has helped individualize instruction by allowing teachers to address the specific needs of different students.

Value-Added Analysis Must Be Seen as Fair and Understandable to Be Useful

One of the commonly cited criticisms of using value-added analysis of student achievement has been the lack of transparency of the calculations. Value-added analysis is a complex statistical method that is computationally demanding. Many school systems currently do not have the capacity (in terms of both hardware and human capital) to compute such data in-house. This complexity has raised concern that educators will be unwilling to use value-added—because educators do not understand how the results are calculated, they are unable to trust its results.

What many practitioners in the room shared from their experience, however, was that the lack of transparency or understanding of the calculations was not an issue in gaining educators' trust, as long as the results were viewed as fair. Brad Jupp, senior academic policy advisor to the Superintendent of Denver Public Schools, said that in order to build trust, one needs to create a system that produces accurate results or has "face validity." Drawing from his experience in implementing a teacher performance-pay system in Denver (ProComp), he stated that "transparency is actually overrated in debate, and it's trumped by face validity. If the methods being used can identify those teachers that already have the reputation of being higher performers, then transparency doesn't matter" because teachers will trust that the method is fair.

In addition to face validity, providing teachers with a simple way of understanding their student achievement data also builds trust in and support for using value-added. Experts who have used value-added analysis across the country (in states such as Tennessee, Ohio, Pennsylvania, Florida, Louisiana and Colorado) agreed that gaining the confidence of educators was not so much about the transparency of the methodology as it was about teachers having the understanding and skills to use the data. As James Mahoney noted, "Transparency isn't the problem—teachers [just] want to know how [value-added data] will help them help their kids." Gerald Zahorchak, Pennsylvania Secretary of Education, whose state uses the Pennsylvania Value-Added Assessment System (PVAAS), also stated that the issue "is not about the transparency of the PVAAS statistical methodology. What we see is that teachers and administrators just want to know if their students have made a year's growth or not; they do not want to know about all the technicalities related to the calculations that were done." Secretary Zahorchak shared how in providing PVAAS professional development across his state, "there is maybe only one out of 75 participants who want any level of detail on the statistics behind PVAAS reporting." Several practitioners provided examples of using tiers or colors (e.g., green for more than one year's growth; yellow for one year's growth; and red for less than one year's growth) to begin conversations with teachers about their effectiveness in the classroom.

In an attempt to provide greater transparency, some schools and districts have implemented or are implementing simpler student achievement growth models, such as taking the class average of the difference between pre- and post-test scores. Daniel McCaffrey, a statistician at the RAND Corporation who has written several reports on the use of value-added analysis, expressed his concerns with such decisions. He mentioned that he has seen "a lot of push to use simple methods, based on the argument that because they are simple, [school systems] can get them up and running fairly quickly, and they are transparent. But this is a problem because the overriding belief in the transparency of a simple model is based on conjecture and without any structured evidence. We are relying on transparent methods to the exclusion of other methods, which is a problem from a research [perspective]." Dr. Sanders had similar concerns, particularly regarding the possibility of "the misinformation that will emanate from some of the more simplistic approaches that are being offered…under the banner of 'transparency.'"

Additionally, many practitioners agreed that the complexity of the system is not necessarily what deters people from accepting value-added analysis of student achievement. Instead, as James Mahoney stated, "We don't need to take a complex model and make it simplistic; we need to make it simply understood." Similarly, Sue Taylor, the president of the Ohio Federation of Teachers, noted that, "people are willing to take complexity [as long as it] results in the right answer."

When gaining acceptance for using value-added analysis, whether for diagnostic or accountability purposes, it is therefore important to focus on *how* it is communicated to stakeholders. As Bess Keller, an assistant editor at *Education Week* covering teacher quality issues, advised, "People want to know something that is true, but they don't want to know the details…so go more memorable and, therefore, make what you are telling people more usable."

Value-Added Analysis of Student Achievement Is One of Many Measures of Teacher Effectiveness

In terms of implementation, many experts supported the idea of using value-added analysis as one of several measures of teacher effectiveness in order to provide a more comprehensive picture of a teacher's impact on student achievement. Using multiple measures also has practical benefits because it can build trust among educators and because lack of test data means that value-added measurement currently can not be calculated for many teachers (please see p. 4). Some suggested measures to use in conjunction with value-added analysis include performance evaluations, portfolios and other practice-based measurements. Mitchell Chester, former assistant superintendent for policy and accountability for the Ohio Department of Education and the newly named Massachusetts Commissioner of Education, outlined how Ohio uses multiple ways of measuring performance, including value-added. In sharing his final thoughts about the discussion, Daniel McCaffrey noted that "one way to bridge the gap between [using value-added data

for] diagnostic [purposes] and accountability is to think about using value-added in a broader scheme of measuring teachers, including evaluations. We need to look at how to combine value-added data and how to enrich the measure to help teachers understand instruction."

Value-Added Analysis Highlights the Need for Improvements in Tests and Timing of Tests

A final theme that emerged from the discussion was the need for better testing instruments and better timing of tests. The growing importance of data and advances in educational research have put a greater emphasis on standardized testing—yet there are still many limitations to the testing instruments being used. First, there are limited options for testing student performance in kindergarten through second grade. Second, there are subjects that have no standardized tests to measure student performance. In addition, more attention needs to be paid to the timing of tests at the beginning and end of the school year so that student growth can be accurately attributed to his/her teachers.

Several researchers expressed the need to put more effort into designing quality test instruments. Henry Braun, professor of education and public policy at Boston College, expressed his concerns that "the use of current tests as a part of value-added puts even more pressure on the kinds of tests we have…in terms of allocation of effort, we need to spend a lot more time on designing quality tests." Steve Glazerman, a senior researcher with Mathematica Policy Research, Inc., cautioned that "you have to be careful about how you conduct the test. But I think that [testing in early grades] is a problem that can be solved; we need to push back on test vendors [to meet these needs]." Additionally, Rob Meyer, director of the Value-Added Research Center at the University of Wisconsin-Madison, shared that "as we push more for the use of data, there needs to be a push from researchers and practitioners to consider changing the testing cycle so that growth can be measured over a complete school year, rather than March to March or January to January, for example. If the time of testing covered just one school year, we could use simpler value-added models to measure school performance (or we could avoid errors that result from ignoring the complexities that arise from mid-year testing)." As testing improves, value-added calculations will be more accurate, enabling teachers and principals to more accurately identify individual student needs and effective strategies to address these needs.

Next Steps

Value-added analysis of student achievement is a useful tool that is growing in importance in education reform. It is important not only because it allows for greater sophistication in measuring and analyzing key educational outcomes, such as student learning and teacher and school effectiveness, but also because

of how this analysis can be used to improve the education system. As was highlighted in the Roundtable Discussion, value-added results are not only impacting how teachers and schools are evaluated and the kinds of support and professional development educators are provided, but, perhaps most important, value-added results are empowering teachers to improve their instruction.

The Working Group will continue to explore these issues as they relate to teacher quality and compensation reform. In particular, the Working Group will focus this year on policies regarding career ladders, induction programs, professional development, evaluation systems and measurement of student academic growth, and how each of these elements can be combined to create comprehensive programs that increase teacher effectiveness.

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