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Using Data: The Math's Not the Hard Part

In this issue brief, author Craig Jerald highlights research collected in the July 2005 special issue of the Journal of Education for Students Placed at Risk *to argue for collecting and* using *data to increase student achievement.*

By Craig D. Jerald

For many years, experts have counseled school leaders to obtain and analyze data as part of their school improvement efforts. But a big obstacle stood in the way: Essential data were very difficult to collect, maintain, and obtain. Some schools made valiant attempts to do so, and their efforts often paid off in better planning and greater progress. But most schools simply did not have the time and knowledge to collect or chase down the data they needed.

Recently, however, those old obstacles have begun to crumble. During the last five years, states and districts have invested millions of dollars to do a better job collecting and storing valuable data. And, just as importantly, they are investing still more money to provide teachers and administrators with easy-to-use websites and software programs offering free and easy access to a much wider range of valuable information on their students, their classroom, and their schools.

Better access to data offers an unprecedented opportunity for educators to become problem solvers, using hard evidence to analyze student performance and craft data-driven school improvement plans. But information is just a tool, and, like any tool, it is only as powerful as the use to which it is put. Many schools are not capitalizing on the newly available data at all, and still others seem to be missing the point entirely.

Power and Possibility

Until recently, technical barriers have prevented the wealth of data collected by many school systems from being put to practical use. According to Jeffrey Wayman, an education data expert at the University of Texas at

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Austin, "Although schools have been 'data rich' for years, they were also 'information poor' because the vast amounts of available data they had were often stored in ways that were inaccessible to most practitioners."[1] Even when data were made available, too often they were in a form that made the information hard to understand and manipulate.

But that is rapidly changing. During the last decade, education officials have invested huge sums of money to develop or purchase software that can put information at teachers' fingertips in ways that make data—including assessment results generated by more frequent testing required by No Child Left Behind (NCLB)—easier to understand and use than ever before. Two thirds of states now provide educators with access to interactive databases full of school-level information, and about half of them offer tools that permit teachers to access student assessment results over time.[2] Districts are beginning to invest heavily as well. According to *The Dallas Morning News,* "Several vendors sold more systems [to districts] last year than in all previous years combined."[3]

And that investment seems to have paid off. Stories about how schools have begun to use these new tools are slowly beginning to accumulate, and some offer tantalizing glimpses of the positive things that can happen when schools use data well.

Two examples from Boston schools illustrate this point. In one school, teachers tested a hunch that low scores on standardized assessments were probably the result of high absenteeism among some students. But the analysis showed no relationship between test scores and attendance rates. "Reviewing the data and eliminating teacher assumptions that the problem was only an attendance issue allowed for more productive discussions about the content and quality of instruction provided to students, teacher expectations, and the ways in which the [school] might engage students more effectively in instruction as well as school attendance," say Mary Ann Lachat and Stephen Smith, who followed the school's progress as part of a case study.[4]

A team from Boston's McCormick Middle School analyzed student assessment results by classroom to determine whether some teachers were doing a better job helping students master particular mathematics topics. The answer was yes: "The students of one teacher excelled on questions dealing with graphs; for another teacher, it was fractions; for a third, prealgebra topics," say a trio of Harvard faculty members who helped lead the workshop during which the analysis took place. "A consequence of the workshop team's findings was that the math teachers decided to focus professional development in the next year on teaching each other their best practices."[5]

The benefits of data analysis can extend well beyond solving a particular student learning problem or instituting a new practice. Researchers have found evidence that when teachers and administrators examine data as part of the school improvement process, school improvement teams become more efficient and effective, decision making becomes more collaborative, teachers develop more positive attitudes about their own and their students' abilities, and educators begin to feel more in charge of their own destinies.[6] Perhaps the biggest benefit is the change in professional culture. "We've always based solutions on hunches," says Darrell Brown, an administrator in Beaumont, California. "No more. Now there's a districtwide culture of inquiry."[7]

Missing the Boat

Unfortunately, along with all of the positive examples, there also is evidence that other educators are failing to capitalize on the new data at their fingertips.

Some schools are using the data only in nominal or symbolic ways to comply with requirements. For example, many districts have begun requiring schools to analyze data as part of the school improvement process. But some principals comply with such requirements by simply appointing a "data person" who knows enough about the software to generate a few charts and graphs to include with their written plan. Kathryn Parker Boudett and Liane Moody describe how conversations about "doing the data part" too often conclude: "I'm pretty familiar with the software they're asking us to use and I think I can run a bunch of analyses and get that improvement plan drafted before school even starts."[8] That approach often leads to using data to justify decisions that have already been made or to support, rather than investigate, a set of prior assumptions about achievement.[9]

Schools that use data in such nominal or symbolic ways might be "complying" with expectations that they analyze information as part of crafting improvement plans, but they are doing so in ways that will not actually make those plans better. Such schools fall far short of the deeper analysis that can help clearly define problems and lead to appropriate solutions, and they never develop the "culture of inquiry" that is at the heart of the continuous improvement process.

Other schools are finding ways to make more instrumental use of data but not necessarily for schoolwide improvement planning. Researchers conducting training sessions on data analysis for educators from one school district found that for some teams, "the link to instruction was […] elusive, and the intention to 'game the system' seemed to take precedence over making constructive changes in how students were taught." The researchers observe, "This led them to focus their attention on students whose scores fell just below the minimum passing score and to analyze what types of questions these students answered incorrectly" so that they could provide those students with extra test preparation.[10]

A group of researchers studying use of a popular data software system in New York City public schools observed the same phenomenon. "One group of learners who often figured prominently in teachers' interviews were the students who had scored just above or below the edge of proficiency," they said. "This population was often referred to as the 'bubble kids' because of their statistical location in a bubble of scores near the cutoff point." Administrators spoke "quite frequently" about such students and strongly encouraged teachers to use the software to identify and provide those students with extra help, often in the form of drill and test preparation.[11]

Some New York City administrators appear to be taking that approach to a questionable extreme:

> A deputy superintendent described a district policy that had been in place for 1 year that he termed "moving test scores": The district identifies students who are near the proficiency level (at the top of Level 2 but just under Level 3) and requires principals to target this small group of students, placing them with the best teachers and extra supports.[12]

Setting aside the ethical implications of such policies (should the *best* teachers really go to near-proficient rather than lower performing students?), using data analysis software primarily to target extra resources to move a handful of test scores represents a wasted opportunity. A small number of students in the school will benefit, but what about next year's students—and students the year after that? Using data only to target "bubble kids" for extra help without digging deeper to investigate *why* student achievement looks the way it does will not lead to schoolwide improvement. Educators who use data this way might help their schools meet NCLB's

accountability targets—at least until the number of "bubble kids" diminishes as state proficiency targets increase—but they will be complying with the letter of the law rather than its spirit.

Helping Schools "Seize the Data"

Rather than simply assuming that schools will use data well, district leaders and assistance providers should begin to work proactively to ensure that teachers and administrators leverage data for long-term, schoolwide improvements. While there is no single formula to guarantee that schools will use data well, researchers and expert practitioners have identified several strategies that can help.

USE DATA COACHES. Mandating that schools use data is insufficient. "We've learned that when you do a district directive, you get resistance to it," says Darrell Brown of the Beaumont Unified School District. "So we trained people who want to use it, then when they see the value of [the data system], they sell it to their colleagues."[13] Some districts have found that training an in-house "data coach" can be an effective stepping stone to better data use among the rest of the staff.

PROVIDE BETTER TRAINING. "Training that schools provide for their teachers and administrators in using data tends to focus on how to use software," warn Harvard researchers Nancy Sharkey and Richard Murnane. "Although this training is necessary, our experience has demonstrated that teachers and administrators also need to learn a more difficult set of skills: how to ask instructionally relevant questions of data and how to answer such questions."[14]

ADDRESS FEARS. School culture factors might need to be addressed. In conducting case studies of data use in urban schools, Mary Ann Lachat and Stephen Smith found that, "Even when teachers are given training and time to think about using data to inform their practices, they may be reluctant to do so in a culture where they feel threatened or fear they will be attacked for something they are doing or not doing in the classroom. Effective data use requires a culture that is driven by inquiry, not fear."[15]

In a study of three schools that had effectively involved entire faculties in data analysis, researchers Jeffrey Wayman and Sam Stringfield identified a method they call "nonthreatening triangulation of data"—using multiple assessments of various kinds throughout the year to gauge student progress rather than relying only on scores from annual standardized tests.[16]

District leaders and assistance providers also can help teachers overcome their fear by working with principals to establish an open, nonthreatening climate for examining data. Some experts also recommend using established questions and formal processes to frame data discussion until teachers become comfortable enough to pursue open-ended conversations.

DEMONSTRATE LEADERSHIP. Strong on-site leadership is another key to successful data use. Wayman and Stringfield found, for example, that "teachers in each school explicitly singled out their principals as a major factor in the success of their data initiatives."[17]

On the other hand, principals who are not enthusiastic about using data to solve problems themselves can dampen the enthusiasm of teachers and even prevent good analyses from having a positive impact on practice. Researchers have found that even when a data team embraced data analysis and promoted data-driven instruction, "Lack of support from school leadership meant that the team's work was not likely to make a difference in school practices."[18]

PROVIDE SUFFICIENT TIME. Even with good training and strong leadership, teachers need enough time to learn to use data thoughtfully and additional time to practice what they learn. Ethan Minz, Sarah Fiarman, and Tom Buffett found that, "Pressed to solve significant problems quickly, many educators take the swift route: look at a table or two, make a judgment based on what they already think is true, and decide to address a problem that they can solve easily and that doesn't require much change on their part." Time constraints can create a "stuck point," where teachers become frustrated and blame students when assessment results do not improve,[19] but solving the problem of too little time is complex and will require creative solutions.

Wayman and Stringfield describe several such solutions employed by principals of the three schools they studied:

> While noting the difficulty of finding time to give teachers for data use, administrators and principals also voiced the importance of finding ways to do it. Principal C described a system for creatively working the contractual planning time into her data initiative. Principal B was infusing data use into school teaming structures and sometimes used faculty meeting time to explain data methods. Principal A used a variety of meeting structures already present in the school to use data for learning decisions. All three principals used staff development days to help teachers learn methods and examine student data.[20]

MODEL. Finally, districts and assistance providers should look for opportunities wherever they can find them to model thoughtful data use. Educators often need to see this new way of working in action in order to understand it fully—and also to believe that district administrators are serious about it themselves. School improvement teams that are just beginning to use data should be given the opportunity to observe how teachers use data in schools that are ahead of the curve. And districts should establish their own data teams that allow system administrators to publicly model how to identify educational problems and solutions using data.[21]

Conclusion

American education stands at the brink of its own information revolution. But the revolution will not be automatic. Educators will need plenty of support, not just to decipher the statistics and operate the software but to link data to instructional problems and solutions. How much help they get will determine whether the new tools get used simply to push a few test scores over the proficiency line or to enable whole schools to establish the "culture of inquiry" that forms the cornerstone of continuous improvement.

This is the fifth in a series of issue briefs to be written for The Center for Comprehensive School Reform and Improvement during 2006. These commentaries are meant to help readers think beyond simple compliance with federal law or basic implementation of programs: What unacknowledged challenges must educators and leaders confront to help schools operate more effectively and to sustain improvement over the long run? In what ways does the conventional wisdom about teaching, learning, and school improvement run counter to current research and get in the way of making good decisions? What are the emerging next-generation issues that educators will face next year and five years from now? Readers can visit **www.centerforcsri.org** to obtain other papers in this series and to access additional information on school reform and improvement.

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