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Possibilities and Pitfalls: Using Data to Improve Teaching, Learning, and Outcomes for All Students

Craig D. Jerald, Break the Curve Consulting

National policymakers who advocate for greater accountability often paint a sunny picture of how the data produced by accountability systems will be leveraged by local educators to work in more efficient and effective ways. Clearly, educational data is an underused and potentially very powerful tool, and the strong national consensus around the need for more "data-driven decisionmaking" in education is a step in the right direction. But expectations that American education will rapidly or easily enter the Information Age might be naïve. Consider the following real-life examples, both drawn from research studies published in the same academic journal last year:

Example A. A large, northeastern urban school system has purchased a well-regarded commercial data system. Under pressure to improve test scores, many district administrators and principals are using the new system to identify what they call "bubble kids"—students who score just under the proficiency cutoff on the state test. An administrator tells researchers that the district has adopted a policy known as "moving test scores," under which the district identifies students who are near the proficiency level and requires principals to target this small group of students, placing them with the best teachers and extra supports.

Example B. Several hundred miles away, another big urban district also has provided its educators with access to a sophisticated new data system. At one of the district's secondary schools, a team of educators uses the data to examine whether some teachers are doing a better job helping students master particular mathematics topics. They find that one teacher's students excel on questions dealing with graphs, another teacher's on questions about fractions, and another's on pre-algebra topics. The math team decides to completely redesign its professional development plan for the coming year, creating more time for teachers to learn from one another.

Both scenarios represent perfectly legal ways to use data to improve outcomes under current federal law. However, while both are equally legal, few would argue they are equally desirable. The first will help only a handful of students (and, incidentally, not even those who need help the most), leaving day-to-day instruction largely unchanged. In contrast, the second scenario will improve the proficiency of *teachers* as well as students, help a greater number of students both now and in the future, and might ultimately establish a radically different, evidence-driven approach to strategic planning and professional development at the school.

Other positive examples are beginning to accumulate. To cite just a few:

- Some schools are beginning to use data to **evaluate organizational policies**, such as resource allocation and scheduling. A secondary school in Boston examined whether students who had math classes earlier in the day performed better than students who had math in the afternoon; the findings prompted a rearrangement of the master schedule to allow all students to take math in the morning. A student advocacy group at a midwestern high school used data to illustrate that administrators were allocating fewer resources to freshmen, a group that often needs the most support. Class sizes were larger in the lower grades, they found, and classes were more likely to be taught by less qualified teachers.
- A few districts are beginning to discover the potential power of data to **create better dropout prevention programs**. Using a sophisticated database that tracks "cohorts" of adolescents over time, a group of Chicago researchers can accurately predict *85 percent of eventual dropouts* in that city's public school system, based on just a few facts about the system's ninth graders. Using a similar database, analysts working with the Philadelphia Public Schools can now identify half of all eventual Philadelphia dropouts *as early as sixth grade*. Such tools could allow districts to much more effectively—and efficiently—target interventions toward students who are at risk of academic failure and dropping out.
- District administrators can **identify schools that are doing especially well or poorly** in specific areas. The same Chicago researchers conducted another analysis that found huge variations in dropout rates across the city's high schools—*even after* they took into account a host of individual risk factors like race, gender, prior academic achievement, family socioeconomic status, and whether students were overage when they entered ninth grade. State or district officials could use similar analyses to identify high schools that have an unusually negative—or positive—impact on whether students stay on track to graduate.

We should expect to see other positive examples as more schools, districts, and states become adept at using data for a variety of purposes ranging from focusing instruction to formulating policies. But to promote that trend, we must find ways to better address several major challenges.

Challenges

To take real advantage of the power of data for improving education, a number of major obstacles must be overcome.

A. Technical Challenges

i. *State Data Systems.* There is strong national consensus on the need for more sophisticated statewide data systems. In fact, nearly every state says it is developing a student-level, longitudinal data system—a kind of "warehouse" for maintaining information on individual students and groups of students as they progress from kindergarten through high school and into higher education (and in some cases, even beyond). There is also an increasing amount of support for these efforts—from the U.S. Department of Education, various foundations, and the Data Quality Campaign (DQC), a national coalition to improve the collection and use of education data. The DQC reports that many states already have the foundation of a robust longitudinal data system, others are making progress, and many states still have a long way to go. Some states are struggling to create systems that work—experiencing substantial cost overruns or receiving negative feedback from educators and other end users.

ii. *District Data Systems.* Many districts and even individual schools are developing or purchasing their own data systems, even as state officials rush to build theirs. While those district systems are more likely to be tailored to the needs of local educators, it's not clear how they will match up

with what is or will be available in the state systems. Optimally, district data systems would piggyback off of state systems, feeding from the data collected and maintained by state officials, while adding additional, locally available information that states do not collect. States and districts should work together to ensure that these systems are complimentary and not duplicative.

iii. *Range of Information.* The Philadelphia researchers found that classroom grades were much better predictors of whether students would drop out than standardized test scores. That means the information that is easiest for states to collect and maintain—often the data required for accountability purposes—is not always the information most useful for local diagnosis, intervention, and improvement efforts. Researchers also have found that teachers are much more likely to use data if they can "triangulate" across a rich variety of information and indicators about students, since standardized test scores alone cannot help them fully diagnose problems and educational needs.

iv. *Flexibility.* Teachers and administrators are often frustrated by inflexible data systems that do not allow them to group students into meaningful categories. Nearly all state and district systems allow users to disaggregate data for different demographic groups, but educators also want to be able to examine results for students who receive special assistance, or who are enrolled in various kinds of academic programs.

B. The Capacity Gap

i. *Skills and Knowledge.* All of the technical challenges described above pale in comparison to a much bigger problem—the massive gap in knowledge, skills, and dispositions necessary for educators to use data thoughtfully and effectively.

With the advent of easier-to-use software programs, the problem is not about technical skills. "Most users who can check the weather online or shop on the Internet can quickly learn how to access student data using [the newer] interfaces," a pair of experts recently observed. The bigger problem at this point is that many educators do not know how to frame good questions about the effectiveness of classroom instruction and school programs—nor how to use hard evidence to answer those questions. Moreover, many teachers are uncomfortable exposing their own practice and performance to public scrutiny via collaborative data analysis.

ii. *Time and Support.* Research has found that teachers are far less likely to embrace data when principals do not understand the value of data or provide strong support for using it. In addition, teachers often cite a chronic shortage of time to analyze, discuss, and act on data. A particular challenge is the need to change school culture and structure so that educators have the collaborative, evidence-based conversations that lead to data-driven decisions throughout the system.

The Federal Role

Currently, the federal government is helping to overcome those obstacles on two fronts. On the technical side, last November the U.S. Department of Education's Institute for Educational Sciences (IES) awarded $52.8 million in grants to fourteen state education departments for the design and implementation of student-level, longitudinal data systems. The administration has proposed $54 million for the program for 2007. On the capacity side, the National Science Foundation has funded a three-year "Data Use" project, which is being piloted in three school districts.

Although a very positive start, those programs are but a drop in the bucket, entirely inadequate to tackle the long-term technical and capacity-related obstacles to realizing effective data use. Few would disagree that the federal government should contribute more to the effort, but little thought

has been given to how, exactly, federal policy can help foster a true information revolution in American secondary education. There are several questions that should be considered as those advocating a federal role in this area explore policy options.

1. **How can federal support be structured so that it provides the necessary "scaffolding" to build sound data systems in all states, while also encouraging sustained state and local investment in the maintenance of those data systems over time?**

Given the difficulties many states are encountering as they attempt to build student-level, longitudinal data systems, an obvious solution might be to increase funding for the Institute for Educational Sciences (IES) program. However, policymakers should consider improvements to this program to prioritize states that have more extensive development needs; require grantees to provide a percentage of matching funds; and update the requirements of the grant to reflect the recommendations of the field.

2. **How can the federal government support state, district, and local efforts to train educators and build their capacity to use data?**

First, the federal government could help build the collective knowledge base about what good data use looks like, as well as the conditions that impede or foster it, by supporting and disseminating research about best practices in this area. Second, federal policymakers might consider an incentive grant program, providing funds to states that are ahead of the game so they can work with districts to align state and local data systems and establish the technical and human capacity to achieve "best case" scenarios at the local level.

3. **How can the federal government support and develop incentives for data use?**

We need to find ways for federal policies to foster incentives for educators to use data and, more than that, to use information thoughtfully and seriously—rather than in cynical ways aimed simply at "moving test scores." Policymakers might be tempted simply to require data use as a condition of receiving federal funding, but several studies have found that mandates are an ineffective approach. They do not encourage much enthusiastic buy-in, and, since administrators find it very easy to create the appearance of compliance without really changing the way they do business, they are difficult to enforce. Research suggests that a much stronger incentive is support itself—showing educators the benefits of using data and giving them the training and opportunities to do so.

"We've always based solutions on hunches," a California administrator told *Education Week* last year. "No more. Now there's a districtwide culture of inquiry." The time is ripe for federal policymakers to create the necessary supports and incentives to help all districts begin to work that way.