The State Data Analysis Gap: A Threat to Education Reform

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The Growing State Data Capacity

Ever since the 2001 passage of the No Child Left Behind Act (NCLB), states have faced a federal mandate to improve their ability to collect and analyze education data for the purpose of tracking and reporting the progress of their education reform efforts. With the assistance of federal funds, virtually all of the states are developing comprehensive state data systems that track students' academic progress longitudinally throughout their primary, secondary, and even post-secondary careers. The Data Quality Campaign, an independent national organization, has played a complementary role in supporting states' efforts to improve their student data systems. [See sidebar.] Beyond student assessment, the comprehensive data systems developed by most states also enable them to correlate the academic gains of their K-12 students with their assignment to particular teachers and thus to assess the effectiveness of individual teachers as well.

> The U.S. Department of Education provides substantial funding - $500 million through FY2011 – to state educational agencies to design, develop, and implement statewide P-20 longitudinal data systems to capture student data from preschool to high school, college, and career. These data systems can support decision-making and continuous school improvement at all grade levels.

The role of the federal government has gone beyond simply requiring states to increase their data collection and reporting capacity, however. Under the Statewide Longitudinal Data Systems Grant Program, the U.S. Department of Education has contributed more than half a billion dollars to the states to better understand what policies, investment strategies, and school intervention efforts are working or not working, and why. In other words, the push is on for state education agencies to do more than monitor compliance and report out data; increasingly, states are expected to strengthen their ability to do research on the programs and policies they implement.

Beyond reporting out education data and making it meaningful and actionable, it is also important for states to be able to use their ever-more sophisticated data to analyze the impact of the various policies and programs they have implemented in an effort to improve student and school performance. Indeed, accountability-conscious policy-makers and the public have increasingly come to insist that education policies and programs be evidence-based – a demand that is directly related to the increased amount of data presumed to be available to provide the evidence expected. Although states appear to have become increasingly adept at using the data at their disposal for administrative purposes, it is far from clear that many states successfully use their data to undertake the kind of research and analysis that evidence-based policy development requires.

States' Data Analysis Gap

Several commentators who have tracked the implementation of NCLB indicate that although state officials are complying with the monitoring and reporting requirements of the act, they are unprepared for the new challenges of developing and implementing policies and strategies that are evidence-based. In a 2006 paper,[1] Gail Sunderman and Gary Orfield write that "Requiring states to intervene and force change in schools and districts requires a very different sort of capacity and expertise than that required for monitoring or funneling funds to local districts." Similarly, an Education Sector column online[2] noted that "despite states' and districts' tremendous progress in building data systems, policymakers are not yet routinely using these new data to improve accountability systems, support performance management processes, evaluate programs, or influence resource allocation decisions." If this trend continues, then similar reports on the reauthorized Elementary and Secondary Education Act (ESEA) are likely to find that most states and local education agencies are maintaining massive comprehensive longitudinal education data systems but that their efforts at data-driven decision-making rarely involve sufficient analyses.

This inability of states to make the most effective use of the growing amount of education data they collect is not due to any lack of appreciation for the potential of data and research to inform or to the lack of competence of state personnel. Rather, it is an issue of inadequate state research and analysis capacity. The unprecedented – and increasing – amount of education data that states are now required or encouraged to collect imposes a huge human resources demand on states. Simply maintaining comprehensive statewide educational data systems, let alone doing research that uses their data, requires a significant number of highly skilled staff, including individuals who are expert in analyzing and interpreting complex data releases.

It is easy to blame inadequate federal funding and tight state budgets for the insufficient research and analytic capacity in so many state education agencies. But while more funding undoubtedly would be helpful, it is likely that part of the analytic capacity problem can be attributed to administrative priorities that end up sustaining outdated organizational structures. Many state education agencies are concerned, first and foremost, with demonstrating compliance with recent state reform mandates. In meeting this priority, they seem to have focused on building school and district capacity at the expense of investing in research. This is an unfortunate irony; in an era when building

capacity largely requires the choosing and/or modifying policies and programs based on evidence, a commitment to research must be regarded as central.

State education officials are aware of the importance of such a commitment. A 2007 Center on Education Policy survey conducted by Angela Minnici and Deanna Hill[3] reported a common view among state officials that insufficient numbers of staff, lack of in-house expertise, and inadequate federal and state funding were the major impediments to implementing the requirement to provide technical assistance to schools in need of improvement. In particular, the survey found that "close to half of the states interviewed emphasized the need for federal technical assistance (and often funding) to help states and school districts develop the capacity to collect and analyze the complex assessment and other data required by NCLB." A 2008 Government Accountability Office (GAO) survey[4] corroborated the CEP survey finding, reporting that officials in the vast majority of states believe that they could benefit from more technical assistance and analytic support, such as more information on promising improvement practices and "what works." And another 2008 report to education leaders by CEP [5] noted, "In terms of central capacity issues, states are telling us … we don't have sufficient numbers of staffing and we don't have the right staff to do the job that we need to do... States not only lack the proper staff to assist at-risk schools, but they also lack the resources to properly assess the effectiveness of the policies when they are in practice, as well as the effectiveness of strategies and programs that are aimed at improving performance."

The technical support that state education agencies require to carry out such assessments goes well beyond the kind of off-the-shelf help that is readily available. States need customized information and sustained assistance to address their specific priorities, economic condition, political culture, and state educational agency capacity. Direct and ready access to highly-qualified researchers and scientifically-trained analysts will be critical if state agency heads are expected to overcome the gap between states' aspirations – and the public's expectations – for data-driven analysis of policies and programs and the limitations of their present capacity.

To meet the near-term challenges associated with "doing more with less," state and local policy-makers will need more and better analysis of the data so far collected. However, making evidence-based decisions often requires sophisticated use of statistical techniques, policy simulations, and cost-benefit analyses, as well as the "art" involved in the recognition that the data in state data systems are neither perfect nor comprehensive. Thus, for example, the analysis needed might involve the development of metrics to monitor the effects of increased class size or to indicate how the performance of

individual schools and their students can influence teacher workforce decisions. Seriously tackling these questions will require the science of estimating statistical models of the progress schools are making relative to the changing federal educational performance standards. But it also will require the art of translating the outputs of models into policies and helping education policy-makers make informed judgments about tolerable risks and tradeoffs – including costs – in continuing, altering, or curtailing programs. Unless states have this sort of multi-dimensional research and analytic capacity, they simply will not be able to take full advantage of the data systems they are building and will be unlikely to develop and implement the policies and programs that will address their education needs most effectively.

Compromising Reforms

This analysis gap threatens to compromise the success of a wide range of current education reform efforts. There are a number of current initiatives, for example, to develop and implement innovative teacher evaluation and teacher compensation systems. These include the federal Race to the Top (RTT) program, the Gates Foundation's Partnership for Effective Teaching, and other independent state or district programs. Most of these initiatives involve an assessment of teachers' effectiveness on the basis of their students' performance on state achievement tests and other measures of teachers' skill. For this to be possible, states require not only adequate data but also the resolution of a number of highly technical and important issues such as the following:

- Which model of value-added assessment is the most reliable and appropriate for the states' student assessment and data systems?
- Are the states' student achievement tests, including scoring standards, sufficiently rigorous and sensitive to reflect true student abilities and learning gains, even at the very low and high ends of the scoring spectrum?
- What additional measures can be validly employed in assessing teachers' effectiveness, and how should the different measures (including student achievement test performance) be weighted to produce a combined assessment?
- What important patterns do the results of the teacher assessments show, e.g., about the characteristics of the teachers who are evaluated as most effective or about the success of various teacher preparation programs in producing capable teachers?

Although many state education officials are aware of the need to address such considerations, the reports previously cited suggest that most states have not addressed them as deeply and concretely as they should.

Another result of a state's limited capacity to research and analyze its data might be a misreading of state education conditions or a misdiagnosis of underlying problems. An effort to embark on a new and ambitious teacher recruitment program, for example, might be based on teacher attrition data that paint a much bleaker picture than is, in fact, the case. This would be the result, for example, of a failure to distinguish between teachers who transfer from one district to another and teachers who move out of state or leave the profession – not an uncommon data limitation. The result would likely be an over-production of teachers and a waste of funding (e.g., on teacher recruitment incentives).

Similarly, low student achievement scores in eighth grade mathematics may be attributed to poor teacher preparation programs when the deeper, unrecognized problem is that a state's requirements for K-8 licensure – which often guide preparation program requirements and curricula – are insufficient to ensure that eighth grade teachers' mathematics knowledge is adequate. Or, on the other hand, a state in fact may have increased the mathematics course requirements for K-8 teacher licensure, but with no appreciable impact on students' performance on the state mathematics assessment because the deeper problem is that the academic standards at many of the universities that prepare the state's teachers are too low to ensure that graduates have an adequate grasp of the subject even with additional coursework.

Finally, inadequate analysis and research related to an important state education reform effort can result not only in the failure of the effort to reach its full potential but in unforeseen harmful consequences. A classic example is California's decision to reduce K-3 class sizes in 1996, with the result that the overall quality of the teacher workforce declined even as education expenditures increased, and student achievement failed to rise as was anticipated. In the current push to equalize the distribution of effective teachers among the states' schools, there are certainly possibilities for negative consequences if the effort is undertaken without an adequate analysis. Particularly in subjects with shortages of teachers (such as science and mathematics), it may be impossible to have enough effective teachers to go around, and attempts to achieve equal distribution by lowering the overall average teacher effectiveness of some schools to raise it in another could simply reduce student achievement in the schools from which effective teachers were drawn away. In addition, such a scenario might have the further consequence of alienating the students and their parents at the adversely-affected schools, undermining trust and confidence in the district, and leading parents to transfer their children to private schools or even move out of the district.

Expanding States' Research Capacity

Much is at stake in ensuring that states have the capacity they need to meet the demands and opportunities for research and analysis that their powerful data systems provide. This capacity must be sustained over time so that states can continue to maintain the quality of their data, monitor their education climate and the long-term impacts of policies and programs, and remain well-informed about the promise and limitations of various education strategies they might be interested in adopting or scaling up. Such a state research and analysis agenda can almost never be sustained in-house; in the best of economic times, few state officials – even those in state education agency research departments – are called upon to engage in rigorous research. Even as states modernize their state education agencies, they are likely to require assistance from external resources in meeting the level of research and analysis that will serve their needs.

In some states, their major research universities may have faculty and staff capacity that could help states address their research-related needs in education. Other states may have access to smaller nonprofit organizations that engage in state-specific education research. The research agendas of the major universities and the other nonprofits may not completely match the priority research needs of state education agencies, however. And, in any case, states may not have sufficient funds to engage external researchers even if they are available to address state education research priorities.

Federally funded research and technical assistance organizations, and particularly the Regional Education Laboratories (RELs), can be expected to play an important role in facilitating states' ability to meet their needs for research and analysis. The RELs make available the services of expert researchers whose mission is specifically to focus, on request, on identified state and local needs for assistance with research and researched-based analysis. Being external to any public or private state agency, these researchers are not invested in specific outcomes or points of view and are not beholden to particular state stakeholders. Thus, they can provide a completely independent analysis for the states they serve.

Our own organization, CNA, houses one of the regional educational research laboratories, REL Appalachia, which serves the states of Kentucky, Tennessee, Virginia, and West Virginia. CNA embeds a highly-trained field scientist in the state education agency of each of these states for the purpose of assisting state policy-makers and program

managers to more effectively analyze, disaggregate, and use data on the performance of schools and students in the state. The field scientists assist their assigned states in improving their education data systems and expanding them to incorporate workforce and post-secondary education information. Providing an independent scientific research analyst to the states has proved to be very successful. The embedded researchers have been able to develop a solid understanding of each state's culture and its education and political picture and also to gain the trust and respect of state officials to whose technical assistance needs the researchers can readily respond.

The ability of the RELs to serve in such a capacity could be further enhanced by a modification of their mission to incorporate a greater responsibility for conducting independent analyses of state and local educational performance data and for helping states with their "everyday" needs for evidenced-based decision-making. Currently, the RELs engage in research on three different levels:

1. Multi-year random controlled trials at the most rigorous extreme of the research spectrum
2. "Fast Response Studies" in the middle of the spectrum, which last for up to a year, are rigorously peer reviewed, and allow a variety of research methods to be employed
3. Shorter-term, research-based briefs that provide much more immediate responses to specific requests from state officials, either in the form of reviews of relevant research literature or targeted analyses of state data.

All three of these kinds of assistance are valuable, but there needs to be much more support and facilitation of the RELs' role in providing less formal, shorter-term assistance that can respond to immediate state needs for analysis .

Regardless of how states attempt to address the growing need for research and analysis to meet federal mandates for collecting and using sophisticated data, the states will require additional resources to be able to do so. Continuing federal incentives will serve to strengthen the capacity of states' data systems, and the upcoming reauthorization of the Elementary and Secondary Education Act (ESEA) is an opportunity to boost the payoff of those data systems. Ensuring that states have greater resources to interpret and analyze the increasingly complex integrated data systems should be a priority in ESEA reauthorization, and that priority should be manifest not only in new dollars for state-level research and analysis but also in incentives to carry out the specific kinds of research that are of greatest state benefit.

A number of options to accomplish this can be considered within the framework of the ESEA reauthorization. State education agencies could be given a new discretionary set-aside authority, for example, that allows a state agency to devote a very small percentage of its total state allocation – for ESEA, Individuals with Disabilities Education Act (IDEA), and Carl D. Perkins Vocational and Technical Education Act – to employ independent researchers and analysts. No matter where the dollars originate, however, they should be appropriated specifically for activities designed to increase the ability of state agencies to make and use evidence-based decisions. Congress could require the oversight needed to ensure that these funds are spent on appropriate activities (e.g., for new analytical studies and not to supplement current administrative activities), while still allowing states the flexibility they need to address their ongoing and emerging decision-making needs.

Federal officials responsible for authorizing the programs directed to improve elementary and secondary education need to acknowledge that, without addressing states' needs for expanded research capacity, not much of the anticipated $40 billion annual appropriation will result in "evidence-based" decisions. Few state and local educational administrators have the time or skills to determine the effectiveness and impact of programs based on a systematic analysis and interpretation of school and student performance data. Although surveys suggest that state and local school district officials are doing an adequate job in responding to the requirement for collecting and accumulating educational assessment data, the present prospect for making productive use of these data is less encouraging.

The possibility for improving that prospect rests with those responsible for crafting and updating federal education laws. If they can incorporate new provisions that allocate a portion of a state's set-aside for evaluation and technical assistance – especially by a cadre of independent researchers and analysts – they can greatly increase the likelihood that states' school improvement and intervention initiatives will be solidly evidence-based and rest on solid scientific ground. To be sure, providing states with such additional resources to close the analysis gap will not overcome all of the challenges associated with school improvement. It could, however, help states improve their ability to choose policies and school intervention investment strategies that are supported by independent research and analysis.

Several years after the enactment of the Elementary and Secondary Education Act in 1965, a Harvard University researcher found that the massive infusion of federal education dollars had little effect on strengthening state departments of education. He noted that the federal funding initiatives did not stimulate a rethinking of priorities or

promote a thorough overhaul of activities and failed to promote basic institutional change.[6] The Harvard report and more recent studies suggest that it is time to recognize that some states may not have the research and technical expertise readily available to guide the adoption and implementation of research and evidence-based school reform.

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