

Using Data to Guide State Education Policy and Practice

Executive Summary

States and local school districts are building and improving data systems that track students, staffing, and expenditures. Significant amounts of data are now available to parents, educators, researchers, and policymakers; however, the full promise of gathering and analyzing data to guide education policy and practice has yet to be realized. Although the technical aspects of the systems are largely in place, data analytics continue to be used sparingly, mainly because they have limited utility for educators and policymakers. Even when data are analyzed to inform policy and practice, it is difficult for educators and policymakers to act on the results. The data largely sit in distinct silos, requiring individuals to jump through multiple hoops to access the information they need.

It is up to governors to ensure that continued investments in data systems are directed in ways that promote the greater use of the data. Governors, chief state school officers, board members, legislators, and educators can realize the promise of data to guide policy and practice if states:

- Collect more actionable data designed to meet identified stakeholder questions, such as information on students' mastery of standards, the impacts of academic interventions, and a clearer link between school and district expenditures and student performance;
- Link multiple data systems through the adoption and use of common, open data standards; and

- Provide new tools for aggregating and analyzing data that ease educators' ability to offer individualized instruction and support and policymakers' ability to monitor performance.

The Perils of Education Data to Date

From test scores to teacher evaluations, data are everywhere in education. In fewer than 10 years, states and districts have taken bold steps to build and improve systems that collect data on students, staffing, and expenditures. States have gone from having little data about students or their performance to having an abundance of data on demographics, attendance, standardized assessments, and graduation. The amount of data available to educators, policymakers, and the public has increased exponentially. Those systems were built to meet two goals: enable administrators and policymakers to make performance management decisions and guide educators in the personalization of instruction and support for students.

Unfortunately, to date, the promise of using data to improve educational outcomes has not been fully met. Critical data remain elusive and obstacles impede policymakers' and educators' ability to act on the data. Although in the past 10 years there has been a sea change in the availability of data—and in stakeholders' attitudes regarding the use of data—the challenges have led many observers to characterize states as “data rich but information poor.”

Critical Data for Policymakers and Educators Are Not Available

The federal government alone has spent nearly \$500 million over the past five years to help states create sophisticated education data systems that can track the flow of individuals from early childhood through higher education and even into the workforce. When those systems were created, they were largely intended to serve as compliance mechanisms to track funding for programs and hold schools and districts accountable for performance.¹ Although large amounts of data were collected, often the specific data elements collected were in response to a reporting requirement rather than to help guide instruction or decisionmaking. For the most part, the systems facilitated the flow of data in one direction: up—from school to district to state to federal agency.

States were particularly good at building such compliance-driven systems. In fact, in six years, the nation went from having no state meet the Data Quality Campaign's 10 Essential Elements of Longitudinal Data System to 36 states meeting that standard. At the end of 2011, all states had the data to answer policy questions about important issues such as enrollment, assessments, and graduation rates. Although the technical aspects of the systems are largely in place, data continue to be used sparingly, because critical elements are not collected. For instance, only 11 states annually match and share K–12 and workforce data, limiting policymakers' ability to monitor the entire education pipeline.²

Because critical data elements are not yet collected and links between data systems are not in place, governors are still unable to answer these and other important policy and program questions:

- Which middle schools are most effective, as measured by student transcripts, at preparing students to succeed in rigorous high school courses?
- Which teachers are more productive with which types of students?
- Which professional development programs have the greatest impact on the effectiveness of teachers, as measured by student performance?

- What are the earnings of various types of college graduates once they are in the workforce?

The data systems that states have built thus far serve some useful but limited functions. They capture operational data, which allow school and state leadership to track how many low-income students have dropped out. The data can also support organizational decisions by, for instance, identifying which students would benefit from extra support. Yet significant gaps remain in the data collected. In fact, the McKinsey Global Initiative finds that the education sector ranks in the bottom 20 percent in its ability to harness the power of large data sets.³ States and districts do not collect data that capture how students behave and interact with academic resources. For instance, currently available data might tell a teacher *who* needs extra help, but the information does not provide insight on *what* is wrong academically or *why* the student may be struggling. Without access to that information, educators are limited in their ability to make decisions about individualized instruction and support.

At the same time, state policymakers have little to no comparable information about school or district resource use. For example, most states do not have a clear idea of which school districts are most productive when it comes to spending education dollars. Only a few states, including **Florida** and **Texas**, currently have the capability to calculate return on investment (ROI) in education. Without those metrics, policymakers and the public cannot determine whether education dollars are well spent within their states or benchmark their fiscal efficiency and effectiveness across other states. A recent analysis by the Center for American Progress found that school districts with below-average productivity spent over \$950 more per student than did above-average school districts. The total estimated cost of that inefficiency to the nation's school systems is \$175 billion per year.⁴

Available Data Are Difficult to Access and Use

Even when data are available, they are difficult for policymakers and educators to access and use. Notwithstanding the great technical advances states have made with their data systems, the Data Quality Campaign has found that no state has taken all of the necessary actions to ensure that education data are actually used.⁵ In most states, there is no single education data system that collects information on students, educators, and expenditures across the education pipeline; rather, multiple systems exist that cover the areas of early childhood, K–12, and postsecondary education. Often, those distinct data systems are stand-alone, proprietary applications from a particular vendor, which

can make it difficult for the systems to interact. As a result, volumes of information are often isolated from each other in silos.

Data sitting in silos leads to inefficient or incomplete reporting and inhibits their use as individuals struggle to obtain the information they need. In such cases, a student’s information can appear in many places, but the data fields may not be identical, or practitioners may have incomplete or inaccurate information. For instance, the insights gleaned from tutors in after-school programs cannot be shared with regular classroom teachers. The most extreme manifestation of the problem is between early childhood and K–12 systems, where kindergarten teachers cannot see what students

Using Data to Monitor Progress

Governors can use data as the basis for regular conversations with system heads to make policy decisions and improve their state’s performance on a variety of education metrics. For example, in **Maryland**, Governor Martin O’Malley uses his Delivery Unit, a component of the StateStat process, to systematically improve performance. Ten state agencies regularly send in data that are analyzed and turned into briefing memos for the governor and his executive team. In education, this process has become known as StudentStat. Governor O’Malley has set a broad, strategic goal of improving student achievement and school, college, and career readiness by 25 percent in 2015. The K-12 state superintendent, Secretary of Higher Education, representatives of the public two- and four-year colleges, independent universities, and other key stakeholders, meet quarterly to review the 7 strategies and 31 data metrics associated with the strategic goal. Among the many targets the Delivery Unit tracks progress on are:^a

- The number of students who enter kindergarten meeting the state’s Model for School Readiness Standards. Over the course of the unit’s discussing this effort, the percentage of students who meet the standards has risen from 67 in 2006-07 to 81 percent in 2010-11. As a consequence, the Delivery Unit has set a new target of 92 percent fully ready by 2014-15.
- The number of STEM degrees awarded at Maryland 2- and 4-year public and independent universities.
- The number of career and technical education (CTE) graduates earning industry certifications and/or licenses related to their program of study.

^aThe full Maryland Education Delivery Unit plan can be accessed at <http://www.statestat.maryland.gov/GDU/2EducationDeliveryPlan.pdf>.

have been doing in other programs to get ready for school. It is as if they are running a relay race, but there is no “data baton” to hand off to teachers in the next educational phase.

States, districts, and schools lack a broader platform that would allow different data-analysis tools and software applications to be interoperable.⁶ In many cases, a teacher cannot go to a single portal for all the information needed on a student and must instead string together data from at least three different sources by logging on to a state system, an in-school grade book, and then a district-run site that contains links between data and learning tools.

How States Can Achieve the Promise of Education Data

If data systems and the analysis they permit live up to their promise, they could become a fundamental component of a well-functioning education system. Investments in sophisticated longitudinal data systems can have long-term positive benefits. It is up to governors to ensure that the investments are directed in ways that promote the greater use of data. Governors, chief state school officers, board members, legislators, and educators can realize the promise of data and analysis to guide policy and practice if states:

- Collect more actionable data;
- Link multiple data systems and design them to be interoperable; and
- Create new tools for aggregating and analyzing data.

Collect Actionable Data

Data systems can be built to answer many of the questions that parents, teachers, and policymakers ask. However, most education data systems were built to facilitate compliance rather than answer pertinent instruction and policy questions. To ensure that the data available are useful, states should bring together educators and policymakers to clearly define their data needs. Defining the “killer questions” that educators

and policymakers seek to answer will help the individuals managing the data systems target technology upgrades and make changes to data-collection guidelines. To remain current and efficient, states should also annually evaluate the type and amount of data that educators and policymakers can access.

Educators desire more information on the usefulness of particular instructional practices, programs, and supports. For instance, only 12 and 18 states, respectively, collect attendance and discipline data daily.⁷ Without that information, it is difficult for an administrator to monitor whether a dropout-prevention program is successful for particular students. The information is critical for forming the foundation of an early warning data system and for monitoring interventions. Similarly, information on students’ content mastery would help educators offer support to struggling students before they fall off track to graduation. As student learning shifts to using more digital tools and platforms, a flood of keystroke data from games, simulations, virtual environments, end-of-unit quizzes, and adaptive assessments could be fed into a data system. The ability to learn about students in this way, and then use analytics to customize their learning, could be one of the most important education developments of the decade.⁸

Policymakers require more financial information on schools and districts for performance management decisions. Governors can gain more actionable financial information by requesting ROI data, which can lead to new conversations across the state about effective resource allocation. Those conversations can include determining the optimal size of school districts as well as ways to share services, find purchasing efficiencies, and improve business operations in areas such as food service and transportation. When **Delaware** engaged in such conversations, the analysis showed that the state could save about 13 percent through shared services.⁹ The Council of Great City Schools has developed a list of indicators for districts to use across

functions such as human resources and technology. The council found that a typical urban district in the bottom quartile on those functions could save from \$20 million to \$50 million per year by moving closer to the median performance of their peers.¹⁰

The standardization and collection of financial data are critical for performance management. States can create a common financial reporting system for all schools, districts, and the education agency to use; **Rhode Island** recently did this through its Uniform Chart of Accounts.¹¹ Having a common method for categorizing expenditures will enable the state to more easily and accurately benchmark school and district expenditures and calculate productivity. The process of creating a standard financial reporting system will take time. Meantime, states can quickly begin to calculate ROI by requiring districts to disclose average per-pupil expenditures at the school level. Currently, the differences in expenditures from school to school (usually based on differences in actual teacher salaries) can vary by as much as \$1 million per building. By showing the differences in spending in schools across districts rather than burying those differences in district-wide averages, states will be able to highlight spending inefficiencies in new ways.

Link and Make Data Systems Interoperable

Data from many different systems are necessary to make informed instruction and policy decisions. To take advantage of the data they collect, states need to design their systems to be interoperable (that is, able to integrate data from one system with data from a different system) across agencies and institutions. Creating interoperable data systems is important because it would allow education stakeholders to compare data; facilitate collaboration among state agencies, institutions of higher education, and school districts; and, ultimately, provide better answers to a broader set of policy and practice questions. For instance, in a state that has interoperable K–12 and postsecondary data systems, educators and policymakers can receive information on the numbers of students enrolling in re-

medial education in the state’s higher education system from a particular high school. That information may lead a teacher to redesign a writing curriculum or a policymaker to tighten graduation requirements.

States can facilitate data sharing by adopting common, open standards for data and assessment systems. The Common Education Data Standards (CEDS) support exchange of a specified set of the most commonly used education data elements that track students’ transition between educational sectors and levels.¹² States will likely find value in sharing data with other states when the standards become more commonplace. For example, in areas with high levels of cross-state mobility, such as Kansas City, neighboring states may be interested in answering questions such as how former high school students from **Kansas** are performing in postsecondary education and/or the workforce in **Missouri**.¹³ Partnerships among states can help policymakers monitor the performance of their education and workforce systems and make policy changes to counteract any issues the data highlight.

Implementing interoperability standards will generate at least three benefits for states. First, doing so will provide incentives for vendors to develop applications that generate new insights from data across systems that currently do not speak to each other. For example, an application could combine attendance data with academic and social services data to provide schools and districts with a much more sophisticated understanding of who is dropping out of school and why. Second, states will not be locked in to a single application or a single vendor, a practice that can inhibit innovation and prevent states from enjoying the benefits of price competition among vendors. If tests are stored in a common format, it becomes easier for states to put their testing contract out to new bidders. Third, the common, open data standards will help reduce costs, especially on data integration, and will help ensure consistency across testing platforms.

Provide Easy-to-Use Tools for Data Aggregation and Analysis

If data are to help inform day-to-day instruction and improve outcomes, states must provide a single portal in which test data can be integrated with teachers' classroom data (such as instructional approaches and grades), along with micro-level data from embedded formative assessments and digital instructional tools. States can integrate all of that disparate information by building learning management systems (LMS)—platforms that aggregate data from multiple sources for easy access and use.

An LMS offers several advantages. First, it operates as the foundation for linking the Common Core State Standards and the new assessments. In an LMS, teachers will be able to see a visual depiction of learning paths across all content areas as well as which lessons, digital learning tools, and test questions link to which standards. With the administration of online tests, the LMS will generate immediate scores for teachers and students to see. Second, the LMS will function as a warehouse for instructional resources and the delivery of job-embedded professional development. Teachers will be able to access videos of other highly effective teachers and model lesson plans created by master teachers. Third, principals will be able to use the LMS to add information for a teacher's evaluation. States and districts will develop interactive reports demonstrating teacher effectiveness by grade, subject area taught, years of service, classroom and summative student test data, and graduate degree attainment. Finally, the LMS will contain tools that streamline the school and district improvement planning process and reduce all data reporting burdens.

To date, large urban school districts have led most of the efforts to construct the first generation of LMSs. New York City's Achievement Reporting and Innovation System (ARIS) allows teachers in inquiry teams to

analyze student performance against the state standards and tailor their instruction accordingly.¹⁴ **Texas** is an example of a state that is working to facilitate intrastate interoperability by developing a more flexible information system platform. The platform will offer smaller districts a shared, state-sponsored student information system and make it easy for districts with existing systems to provide seamless data reporting. For example, districts will only enter attendance data once, reducing their reporting burdens. That information is then available to teachers and administrators in real-time dashboard formats, where it helps to flag students with potential problems. If successful, the new system will not only reduce costs and streamline existing state accountability processes but also equip educators with relevant information they can use to help their students.¹⁵

Beyond building new platforms, states can create tools that allow educators and policymakers to more easily interpret data and make decisions. **Colorado** has developed a web-based portal (www.schoolview.org) that enables teachers to track individual students' test scores over time and gauge their progress. **Arkansas** has developed a set of data portals for use by multiple stakeholders, from parents to policymakers. Each stakeholder is granted a different level of access depending on his or her role. The state has also developed Hive (<http://hive.arkansas.gov>), an online community that enables educators to construct and discuss visualizations using state data.

Conclusion

State governments face a productivity challenge in education. They must improve performance so that more students are ready for college and careers than ever before, but do so in an era of flat revenues. Schools, districts, and states are under pressure to operate more efficiently and more effectively. To meet this challenge, states need to harness the power of data to inform decisions from the classroom to the statehouse.

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(Endnotes)

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- 2 Data Quality Campaign, “States Could Empower Stakeholders to Make Education Decisions with Data . . . but They Haven’t Yet,” (Washington, D.C.: 2011). Available at: <http://www.dataqualitycampaign.org/files/DFA2011%20Mini%20report%20findings%20Dec1.pdf>.
- 3 James Manyika et al., “Big Data: The Next Frontier for Innovation, Competition, and Productivity” (San Francisco, CA: McKinsey Global Institute, 2011). Available at: http://www.mckinsey.com/Insights/MGI/Research/Technology_and_Innovation/Big_data_The_next_frontier_for_innovation.
- 4 Ulrich Boser, *Return on Educational Investment: A District-by-District Evaluation of U.S. Educational Productivity*. Washington, DC: Center for American Progress, January 2011.
- 5 Data Quality Campaign, “States Could Empower Stakeholders to Make Education Decisions with Data . . . but They Haven’t Yet.”
- 6 Common standards for interoperability, such as the HTML protocol for the Internet, enable anyone with a web browser to view the content on any website. The current problem for education data systems is akin to every state having a different browser that allows access to some but not all websites. And, if a state wanted to switch to a new and improved browser, it would have to abandon the current one and all of the websites it could previously view with the old browser.
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- 9 Jill Corcoran, Reginald Gilyard, Lane McBride, and Jamal Powell “Large-Scale Cost Cutting and Reorganizing,” in *Stretching the School Dollar: How Schools and Districts Can Save Money While Serving Students Best*, ed. F.M. Hess and E. Osberg (Cambridge, MA: Harvard Education Press, 2010)
- 10 Michael Casserly, “Managing for Results in America’s Great City Schools,” *Stretching the School Dollar: How Schools and Districts Can Save Money While Serving Students Best*, in ed. F.M. Hess and E. Osberg (Cambridge, MA: Harvard Education Press, 2010).
- 11 For more information, see Rhode Island Department of Elementary and Secondary Education, “New Financial System Provides Unprecedented Data on School Spending,” <http://www.ride.ri.gov/Finance/funding/Uniform%20Chart%20of%20Accounts> (accessed February 1, 2012).
- 12 For more information on CEDS, see the Institute of Education Sciences website, <http://nces.ed.gov/programs/ceds>, accessed February 1, 2012.
- 13 This is one of two questions that **Hawaii, Idaho, Oregon, and Washington** are trying to resolve in the Western Interstate Commission on Higher Education’s data-sharing partnership. For more information on this project, see <http://www.wiche.edu/longitudinalDataExchange>.
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- 15 Bill Tucker, “Texas Tackles the Data Problem,” *Education Next* 11, no. 1 (Winter 2011).