MATHEMATICA Policy Research

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Developing and Enhancing Data Systems

This brief focuses on considerations for **developing and enhancing data systems.**

Data-driven decision making has been a catchphrase in education for the past decade. Everyone is for it, and who could object? Most agree that decisions from the classroom to the central office and the state education agency should be informed by good data. In practice, however, it is all too easy for data to leave educators and policymakers unmoved—or, worse yet, to drown them in extraneous information, rather than drive decisions that will improve classroom instruction, school performance, and student achievement.

This series of briefs offers recommendations and strategies for state officials, district-level staff, and system developers who seek to promote effective data use by decision makers and educators at any level of the education system. This brief focuses on considerations for developing and enhancing data systems. The other two briefs focus on developing a coherent plan for effectively using data and on supporting the effective use of a data system.

INTRODUCTION

Successful development of data systems by state or district education agencies requires the collaboration and participation of multiple stakeholders. For example, to build a longitudinal data system that captures preschool through postsecondary data in order to examine students' long-term education trajectories, state education agencies must work with preschool programs, community colleges, and university systems to collect the necessary data and link them via a centralized system or network. These disconnected agencies may already have the right data, but encounter challenges in sharing them. Efficiencies can be achieved by establishing data-sharing methods. Furthermore, formally including multiple agencies in conversations about data system implementation will ensure that all players have consistent expectations about how the data will be used. This brief provides recommendations to address these challenges.

TAKING ACTION

State or district education agencies aiming to build or enhance their data systems should consider the following four recommendations:

1. **Have a plan.** An implementation plan that clearly identifies action steps, responsible parties, and timelines should guide the development or enhancement of any data system. The implementation plan should detail each step in the plan, who is responsible for each step, deadlines for completing the work, and methods for evaluating progress and completion. The plan should also include opportunities for stakeholders to communicate throughout the process to address challenges and consider revisions to the plan.

2. **Know who will be involved, and when.** The implementation plan should spell out who needs to be involved at each stage, including designating a logistical lead to manage the entire process. It is important to include the following categories of stakeholders:

   • *Staff who possess technical skills and understand all components of the planned data system.* These individuals offer technical expertise and deep knowledge about how a well-functioning data system should work.

   • *Agency directors, assistant superintendents, or other staff who liaise with leadership and understand the policy goals that the data system attempts to satisfy.* These stakeholders typically help craft and execute higher-level policies and offer insight about how the data system will be used to fulfill reporting requirements or inform key decisions.

   • *End users of the data system.* Gathering input from districts or schools on their needs and concerns related to a data system helps cultivate buy-in and enthusiasm for using it. However, after providing input, these end users may not need to be involved in subsequent stages of the process.

3. **Define data governance and data-sharing terms early.** Articulating the processes for collecting, managing, and linking the data takes time, so beginning early is critical. This work entails defining data terms (such as unique student and teacher identifiers, courses, daily attendance, data links, assessments, and outcomes data) and developing policies to ensure the system functions effectively and yields the desired results.

Having a common set of rules and processes ensures an agency exercises positive control over how staff who work directly with data (that is, data stewards and data custodians) handle it. These common rules might include methods for collecting, cleaning, managing, securing, linking, and releasing data. In addition, data from different sources often are stored in distinct locations and are subject to distinct rules and regulations that govern the process for sharing individually identifiable information between local and state agencies. If data are to be used for a purpose other than their original intent, stakeholders must develop formal agreements to address parameters for secondary use. Agreements should explicitly state the amount and types of data shared, the ways the data will be used, and data security procedures.

DATA SOURCES

This brief is based on interviews conducted by Mathematica with program staff and with state, district, and school-level staff about the first year of implementation of four strategic data use initiatives that were funded by the Bill & Melinda Gates Foundation:

• **The Strategic Data Project (SDP)** partners with state education agencies, school districts, and charter school networks to transform the use of data in education to improve student achievement. The program places and supports skilled staff in partner agencies for two-year fellowships.

• **Education Pioneers (EP)** mobilizes and prepares a national network of talented leaders, managers, and analysts to transform education into the best led and managed sector in the United States. The program places early- or mid-career professionals from multidisciplinary backgrounds in leadership, management, and analytic roles in education agencies for 10-month fellowships.

• **The National Student Clearinghouse (NSC) PILOT** sought to develop high quality, actionable reports linking K-12 and postsecondary data that can be used by schools, districts, and states to improve the college readiness of their students.

• **The Teacher Student Data Link (TSDL)** project aims to improve the validity and reliability of K-12 teacher-student data links, to enable states and districts to better measure teachers' contributions to the achievement growth of their students.

Reports on implementation of these initiatives can be found at http://mathematica-mpr.com/Education/strategicdatause.asp.

4. **Work with partners or external vendors.** Even in times of scarce resources, involving partners with expertise, software, and tools that are not otherwise available is important for supporting the development and implementation of the data system. Partnerships with external vendors offer opportunities to acquire the software and expertise needed for data visualization tools, data dashboards, and data warehousing. As technology rapidly evolves, agencies may need to allocate resources for a specialized vendor to provide these tools rather than create them from scratch.

Partnerships that enhance staff technical skills are also critical. Building internal analytic and technical capacity allows an agency to leverage its own staff to create, sustain, and improve analysis tools, to find useful ways of examining data collected through pre-existing systems, or to work directly with an external vendor.

THINKING AHEAD

Critical components for developing or enhancing a data system include having a plan, selecting stakeholders who will work together, articulating data governance procedures and defining data elements, and working with external partners. In addition state or district agencies should also plan for the following three activities, which will support any future developments or enhancements to the data system:

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Plan to:

- Pilot the system.
- Plan and budget for ongoing system revisions.
- Provide professional development.

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1. **Pilot the system.** Involving districts and schools in piloting new data systems, or changes to existing systems, can help identify problems that would otherwise delay implementation and adoption. Formally evaluating the pilot, seeking input from early adopters on areas for improvement, and reflecting on lessons learned may help agencies anticipate future needs and avoid pitfalls during scale-up efforts.

2. **Plan and budget for ongoing system revisions.** Developing or upgrading data systems is not a once-and-done event. Ongoing discussions should address system challenges and changes in policies and programs. Users should be invited to share ideas for revisions and improvements, and system architects should review and incorporate user feedback throughout the life of the system.

3. **Provide professional development.** Training staff to effectively input data into the system will help increase the accuracy of data, and therefore the accuracy of data analyses and reports. Providing context to the data system is an important, but often overlooked, part of training and development. Training helps users build familiarity with the data system, encourages them to adopt new tools and technology, and addresses why the system was developed, how it is used, and what kinds of decisions resulting data analyses will inform.