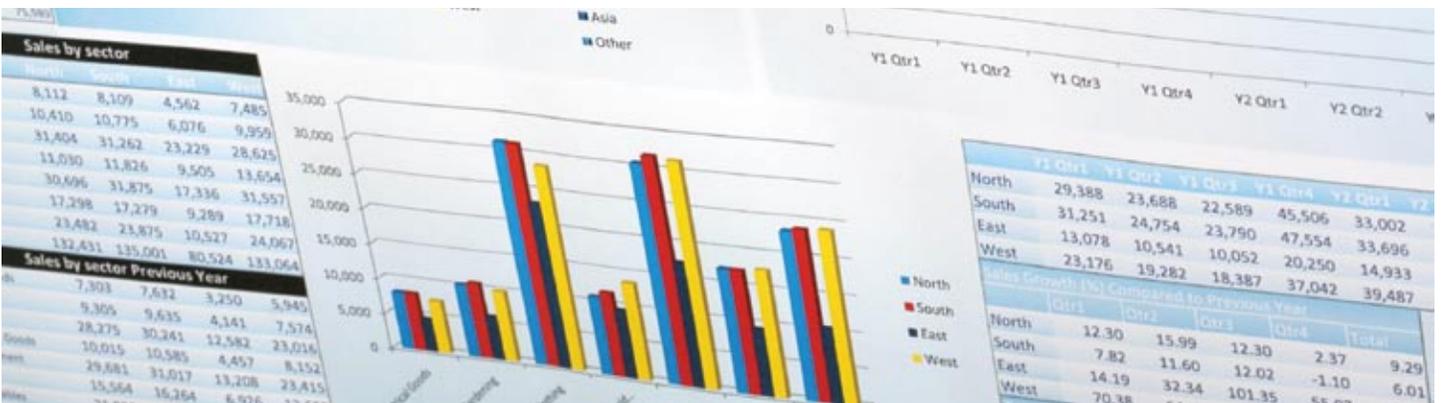




Education as a Data-Driven Enterprise

A Primer for Leaders in Business, Philanthropy, and Education

Prepared by the Alliance for Excellent Education, Civic Enterprises, and the Data Quality Campaign for AT&T, March 2011



Executive Summary

Education is on the road to a transformation into a data-driven enterprise. With better information shared with the appropriate stakeholders, individuals at all levels—teachers and parents, principals and superintendents, business and nonprofit leaders, and policymakers and practitioners—can accelerate their efforts to boost student achievement and to put in place the reforms, policies, and practices that strengthen education for all children. Although the U.S. education system increasingly produces and collects more data, that information often is not shared, or comes too late to prompt appropriate interventions and supports. Moreover, educators, policymakers, and other stakeholders such as parents, students, and community partners, lack the training and capacity to use that information to inform their decisionmaking.

Three developments in education data are positive signs that the education sector is in the midst of this transformation into a data-driven enterprise: longitudinal data that connects information about students from the time they start school until they enter their careers; early-warning data that predicts dropping out, such as poor attendance, bad behavior, and course failure, and prompt the appropriate supports; and college- and career-readiness indicators that demonstrate whether students are well prepared to advance their postsecondary education and successfully enter the workplace.

The next frontier is to ensure educators, policymakers, and external stakeholders are maximizing these new tools to improve decisionmaking and student achievement, and there is still much work to be done. First, data must be linked across states, districts, and multiple agencies, and among educational institutions and employers. Second, stakeholders must have access to relevant, timely, appropriate data, consistent with student privacy. Third, the capacity of all stakeholders must be built so they can use longitudinal data to improve decisionmaking and student achievement.

Leaders in business, philanthropy, and education must continue to play a key role in ensuring the success of the remainder of this transition and ensure that technology and data are used efficiently and effectively. These leaders can support the transition from snapshot data to longitudinal data, early-warning systems, and college- and career-ready indicators; support continued efforts to link data across systems; and help build capacity for data use while protecting privacy. With advances in research, technology, and assessments, and with a focused effort, the U.S. education system can lead the world in becoming a data-driven enterprise.

Introduction

For effective modern businesses, data drives decisionmaking from the cubicle to the boardroom. Without supporting data, new projects and products are not funded, additional personnel are not hired, and marketplace positions and conditions are not understood. Unfortunately, the same is not consistently true in the American public education system, where data is often not yet fully utilized to inform decisionmaking, improve student outcomes and guide instructional practice.

Meanwhile, the data we do have consistently tell the same story: America's public education system is struggling to meet the needs of many students, ultimately impacting society and the economy. A number of measures—state, national, and international assessments in math and reading; high school graduation rates; college entry, remediation, and completion rates; and employer surveys—show that too many students are leaving the K–16 system without having mastered the knowledge and skills they need for success in a globally competitive workforce.

Perhaps these outcomes should not be surprising. After all, the system was not designed to meet the challenges or goals of the twenty-first century. For example, most of today's high schools still reflect a fifty-year-old design: large, comprehensive schools that function as giant sorting machines for America's youth, with some students receiving academic preparation for college, careers, and managerial roles, and others not.

It is no longer enough to just ensure that all students are prepared to walk through the entrance doors of high school or college; nor is it acceptable to track students onto educational paths that limit their opportunities. In today's global and entrepreneurial economy, every student must also be able to walk out of the building with a meaningful diploma, prepared for success in the twenty-first century. The magnitude of this change in expectations should not be underestimated: we've shifted from educate *some* students to educate *all* students ... from *proficiency to college and career readiness* ... from *college access to college completion* ... from *preparation for the twentieth-century American*

economy to full participation in the twenty-first-century global economy.

These new expectations have been accompanied by a call for more efficiency and a reduction of burden. As state and local policymakers are being forced to do more with less given tight budgets, the education sector must become simultaneously more effective and more efficient. In light of these new demands, students, parents, states, and the nation—and, increasingly, businesses, foundations, and nonprofits—want to understand what progress is being made and what return they are getting on their investments. Making the education system more effective and efficient requires the strategic use of data to inform decisionmaking at every level—from the classroom, to the grant proposal, to the state capitol, to the congressional committee room.

The continued transformation of the public education system into a data-driven enterprise is necessary, but it will not be easy. It requires new tools, skills, and a new culture. Fortunately, innovations such as the development of statewide data systems that track individual students over time and the emergence of indicators that predict student and school success are supplying the system with vital information. More work needs to be done, however, to ensure that this data is used to guide decisionmaking. Meeting these challenges requires leveraging resources and expertise beyond the traditional players in the education system and government. More than ever, business and philanthropy are real partners in education reform efforts; they are stepping up to the plate and investing in, and advocating for, real solutions. These external partners need a solid understanding of the challenges the education system faces as it makes this transformation. They also require appropriate access to data and information that will guide their investments and efforts to be effective partners.

This primer will provide leaders from business, philanthropy, and education with background on these data issues, describe challenges that must be overcome, and make recommendations for moving forward.



The Benefits of a Data-Driven Enterprise in American Education

What would a fully operable data-driven education system look like? Consider these hypothetical examples in which various stakeholders leverage actionable information to alter policies, programs, and practices to spur continuous improvement at every level:¹

- **More transparent and actionable information to external stakeholders:** Prior to a parent-teacher conference, a *parent* uses a web portal to view information about her child, including an academic progress report, historical performance benchmarked against other students in the same grade in the school, an analysis of whether her child is on track to graduate ready for college, and a list of questions to discuss with the teacher. Twenty states now provide parents with timely access to their child's academic data through web-based portals or other mechanisms.²
- **Inform instructional changes and intervention decisions:** A *team of middle school teachers* develops interventions for entering students who have been identified as at risk of dropping out of school by an early-warning system that has been tracking attendance, behavior, course performance, and test scores. Sixteen states now produce early warning reports.³
- **Improved individual performance:** A *principal* uses value-added academic growth information to identify teachers who have been more successful with students who begin the year academically behind. The school leadership team works with those teachers to place such students in their classrooms and share their successful practices with their peers. Twenty-four states now produce growth reports.⁴
- **Information to guide difficult decisionmaking:** A *state legislator* who leads the appropriations committee uses longitudinal data about program effectiveness to inform decisionmaking about budget allocations.
- **Smarter future investments:** A team of *researchers* analyzes a foundation's investments in dropout-prevention models to understand the long-term postsecondary education and workforce outcomes for

participating students. As a result of the findings, the foundation adjusts the parameters of the initiatives to ensure future grantees will be more successful.

- **Informed policymaking:** Using an analysis of high school graduates' success in college, a *state board of education member* learns that significant numbers of students are passing high school exit exams but needing college remediation. The board works with the state's education leadership in K–12 and higher education to align high school graduation requirements with college entrance requirements. Nineteen states provide local high schools with high school feedback reports.⁵
- **Improved collaborations between sectors:** A state P–20 council—typically a governor-appointed body made of up *education and business leaders*

to collaborate on statewide human capital strategies—determines that the state's fastest-growing occupation is nursing. Through a longitudinal analysis of postsecondary and workforce data, the council determines the employability of nurses with AA degrees versus BA degrees and determines that there is not an actual nursing shortage, but an ineffective recruitment and placement strategy.

In the hypothetical examples above, the stakeholder was able to act because certain conditions characterizing a data-driven enterprise were in place. There was confidence in the quality of the data (it was valid and reliable), and there was appropriate, role-based access (the stakeholder had access to data in a way that was both appropriate to their role and respectful of student privacy).

NYC Uses Longitudinal Data to Develop a Systemwide Strategy to Address a Critical Problem

In 2006, the New York City Department of Education (NYCDOE) commissioned an independent longitudinal data analysis of its student outcomes. One big finding stuck out: nearly all dropouts (93 percent) were overage and undercredited (OA-UC), meaning they were at least two years off track relative to expected age and credit accumulation toward earning a diploma. Only 19 percent of OA-UC students graduated.

With the insight provided by the data analysis about the diverse nature of these students' academic and non-academic needs, the NYCDOE implemented a range of differentiated educational models—known as Multiple Pathways to Graduation—designed to help these students meet state graduation standards and graduate prepared for meaningful postsecondary opportunities, including:

- **Transfer schools:** Full-time day schools for OA-UC students who are already off track, but still young (fifteen to twenty-one) and far from graduation. They are small, personalized environments and focus on individual success.
- **Young Adult Borough Centers (YABCs):** Programs housed within traditional high schools that provide older students (seventeen to twenty-one) with a flexible way to quickly satisfy graduation requirements without compromising academic rigor.
- **Accelerated Achievement High School:** A school designed to address the fact that there is a significant eighth-grade population that is overage and low performing, and has been previously retained in middle school. In this school, the OA-UC ninth graders receive intense and targeted support to get them back on track to graduation.

These programs have significantly improved graduation rates for the OA-UC population—as high as 56 percent in the city's transfer schools. Since 2005, NYCDOE has dramatically expanded and refined this recuperative portfolio, increasing the number of students served and developing new models.

Vanda Belusic-Vollor, executive director of the NYCDOE team responsible for implementing these strategies, recently noted, "The knowledge we gained from the longitudinal study provided us with the tools we needed to successfully ... address the various needs of our students."

For more information on these efforts, see the Alliance's forthcoming publication, "Helping Students Get Back on Track: What Federal Policymakers Can Learn from NYC's Multiple Pathways to Graduation Initiative."

Is Education a Data-Driven Enterprise? ... Not yet.

Is the description of a data-driven education enterprise on the previous pages a fantasy or a reality? In many ways, the U.S. education system is awash in data. For many years, school districts have collected a wide range of information. The use of data to inform instructional and management decisions has long been a characteristic of high-performing, high-achieving schools, examples of which can be found in states and districts across the country. As an overall sector, however, education is not yet using data with maximum efficiency and effectiveness to manage, improve, and succeed, and is not always sharing appropriate data with stakeholders. Advances in research, technology, assessments, and other areas have paved the way for available data to fundamentally change the way business is done in education. This section describes three of the most critical types of information: longitudinal data; early-warning and intervention systems; and college- and career-ready indicators.

The movement toward longitudinal data

Over the last decade, there has been unprecedented focus on student performance information. This is due in large part to the No Child Left Behind Act of 2002, which required every state to publicly report state assessments in reading and math broken down by student subgroups (based on race/ethnicity, socioeconomic status, disability status, and English proficiency) and share this data with parents. Typically, the information about student performance is collected, reported, and communicated in ways that are known as *snapshot indicators* that provide information on students, programs, and systems at a moment in time. (For example, what percentage of this year's eighth-grade students passed the state math exam?).

Longitudinal data offers a way to complement snapshot indicators. Longitudinal data is information about individual students that is collected over time. Typically, longitudinal data systems use a unique student identifier to compile an academic history for each student. For students in the K–12 system, longitudinal data typically includes information about a student's:

- enrollment, including entry and exit by school attended;
- demographics, including eligibility for the federal free and reduced-price lunch program, race/ethnicity, gender, and age;
- transcript, including courses attempted, courses completed, grades, credits earned, and any instances of being retained in a grade;
- attendance;
- behavior grades or discipline records; and
- completion status, such as graduation or dropout.

The growing demand for longitudinal data has led to the development of statewide longitudinal data systems. While some districts and research entities have collected longitudinal data for decades, this is a relatively new role for states. In 2005, 10 national organizations^a founded the Data Quality Campaign (DQC) — a national collaborative effort to encourage and support state policymakers to improve the availability and use of high-quality longitudinal education data to improve student achievement. Since 2005, all states have made significant progress in building statewide longitudinal data systems. See the box on the next page for more information about statewide longitudinal data systems.

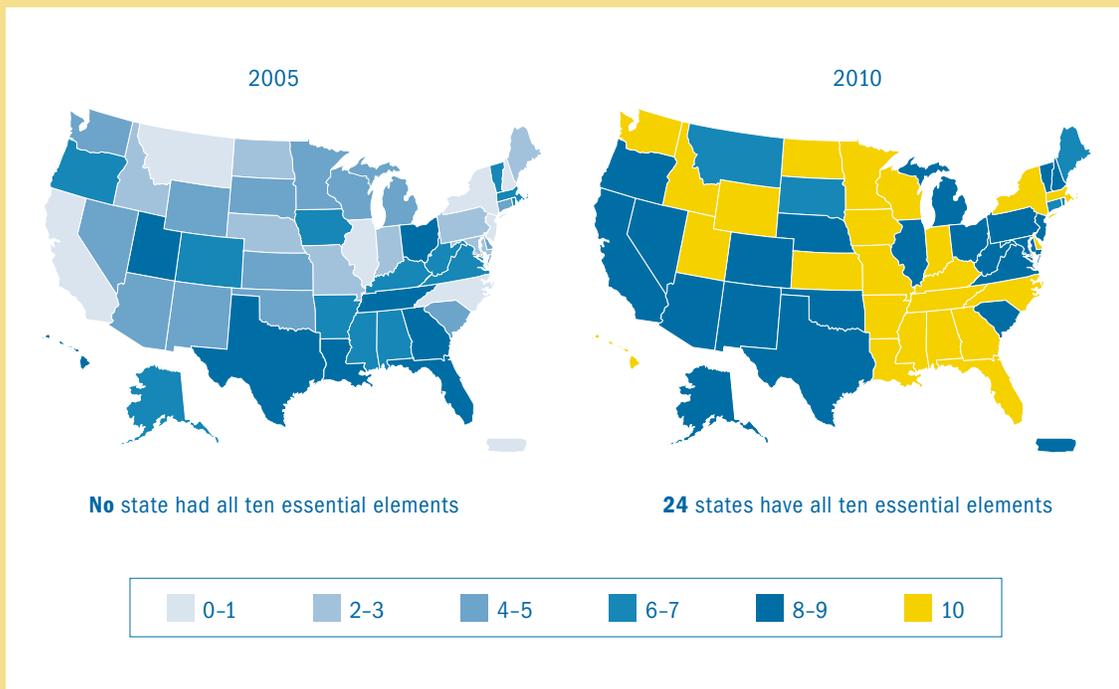
^aThe Data Quality Campaign's Managing Partners include Achieve, Inc., Alliance for Excellent Education, the Council of Chief State School Officers, the Education Commission of the States, the Education Trust, the National Association of State Boards of Education, the National Association of System Heads, the National Center for Educational Achievement, the National Center for Higher Education Management Systems, the National Conference of State Legislatures, the National Governors Association Center for Best Practices, the Schools Interoperability Framework Association, the State Educational Technology Directors Association, and the State Higher Education Executive Officers. The DQC also includes over 90 endorsing partners. For more information see www.Dataqualitycampaign.org.

Ten Essential Elements of a Robust Statewide Longitudinal Data System

The Data Quality Campaign (DQC) has identified the ten essential elements of a statewide longitudinal data system:

1. A unique student identifier
2. Student-level enrollment, demographic, and program participation information
3. The ability to match individual students' test records from year to year to measure academic growth
4. Information on untested students
5. A teacher identifier system with the ability to match teachers to students
6. Student-level transcript information, including information on courses completed and grades earned
7. Student-level college readiness test scores
8. Student-level graduation and dropout data
9. The ability to match student records between the P-12 and postsecondary systems
10. A state audit system assessing data quality, validity, and reliability

According to *Data for Action 2010: DQC's Annual State Analysis*, most states have made significant progress in building systems that address the ten essential elements.⁶ This progress is due in large part to the recent federal investment in these systems: since 2006, the Institute of Education Sciences' Statewide Longitudinal Data Systems (SLDS) grant program has been appropriated \$413 million. In four rounds of funding, forty-one states and the District of Columbia have received at least one SLDS grant. For more information from *Data for Action 2010: DQC's Annual State Analysis*, visit <http://dataqualitycampaign.org/stateanalysis/>.



Longitudinal data can reveal trends and provide actionable information to stakeholders at all levels. And because longitudinal data can be linked together, longitudinal data systems provide the opportunity for deeper analyses. This includes answering a broader set of questions that can be helpful in the monitoring of student and school progress, diagnosis of challenges and prescription of corrective strategies, setting of internal and external benchmarks for progress, prediction of future outcomes, and evaluation of the impact of programs and policies⁷ (see examples

below). Also, many critical questions and policies at the top of the federal and state policy agendas require longitudinal data. Most of the policies being debated for inclusion in the reauthorization of the federal Elementary and Secondary Education Act require the use of longitudinal data, including implementing growth models of school accountability, measuring teacher effectiveness based on student performance, and leveraging data-driven decisionmaking as part of districtwide improvement strategies.

Questions That Can Be Answered by Snapshot and Longitudinal Data		
	Snapshot Statistic	Longitudinal Statistic
For a parent	Did my child pass the eighth-grade mathematics exam?	Is my middle school student's academic achievement growing at a rate that puts her on track for success in challenging high school courses?
For a teacher or team of teachers	What percentage of the students in my eighth-grade classroom passed the state mathematics exam last year?	Are the students in my eighth-grade class who started the year academically behind progressing rapidly enough that they are likely to catch up in the next two years?
For a school	Did the percentage of students passing the eighth-grade mathematics exam increase over last year?	Which teachers in our school have been most successful with students who have had trouble with mathematics in prior years? How can we learn from, replicate, and leverage their success in other classrooms?
For a district or state leader or policymaker	How many of this year's eighth-grade students passed the state mathematics exam?	Which of our students' difficulties in math appear to be based on concepts not learned in previous years? How do we improve instruction in early grades to ensure that students learn those concepts?
For an external partner from business or philanthropy	Of the students participating in the dropout-prevention program we've funded, how many students passed the eighth-grade exam?	Of the students participating in the dropout-prevention program we've funded, how many graduated with a regular diploma within four years? How does this compare to graduation rates prior to the implementation of the program?

The emergence of early-warning indicators⁸

No education issue has received more attention over the last decade than the nation's high school dropout crisis. Oft-cited statistics proclaim that dropouts are more likely to be poor and minority, and to have had their education interrupted due to challenges such as mobility, homelessness, pregnancy, incarceration, or abuse. Research shows that “[dropping out of] high school represents a confluence of individual, social, family, cultural, socioeconomic, and institutional factors.”⁹ Unfortunately, the gloomy truth is that for practitioners on the ground, this information has had limited utility: most of these factors were perceived to be outside of their control or unchangeable. There also was not good data on individual students that could prompt meaningful early interventions until very recently.

The decision to drop out is rarely the result of a single life event,¹⁰ and many students exhibit warning signs years before they leave high school. As noted above, longitudinal data can be used for predictive analysis—examining the historical relationship between students' academic history and future academic outcomes. Using longitudinal data, researchers from Johns Hopkins University, the Consortium on Chicago School Research, and the Parthenon Group, among others, have examined the academic history of dropouts to identify their shared academic characteristics. This work has unearthed a number of early-warning data that can be used to identify potential dropouts as early as late elementary and middle school. Like the weather prediction systems from which they borrow their name, these early-warning indicators can be used to flag risky patterns and trigger actions that help individuals avert future disaster.

So what exactly are these early-warning indicators? There are a number of factors that continue to show up in studies on the subject:

- Students who dropped out usually had received a failing grade in core courses (especially in math or English), earned a low grade-point average, or scored low on achievement tests.
- They were often retained in grade because they had not earned enough credits to be promoted; as a result, many were older than the other students in their class.
- Also, as demonstrated by low attendance rates and disciplinary problems, these students were frequently not engaged in their education or aware of its importance to future opportunities.

When these likely suspects (attendance, course success, credit accumulation, literacy, and behavior) are analyzed in combination, these academic characteristics can provide strong indications of which students are at risk of dropping out. Consider the results in the box below as examples.

The Predictive Power of Early-Warning Indicators

- As early as fourth grade, future dropouts from a Fall River, Massachusetts study received lower grades than future graduates did. The early dropouts—those who would eventually drop out of school between seventh and ninth grade—generally earned a C- academic GPA and ranked in the twenty-fifth percentile of their fourth-grade class.
- Three out of four students who ultimately dropped out of Philadelphia schools had either a failing grade in math or English or attendance rates below 80 percent in the eighth grade.
- Seventy-five percent of the dropouts from the Boston Public Schools' Class of 2004 fit into one of four distinct categories: 1) students with multiple ninth-grade course failures; 2) students with one or more eighth-grade risk factors (attendance below 80 percent, two or more years overage, or failing multiple core courses); 3) late-entrance English language learners; or 4) special education students taught in substantially separate classrooms.
- Chicago Public Schools' eventual graduates and dropouts were accurately identified 80 percent of the time using an on-track indicator based on the number of credits earned and the number of failures in core courses by the end of the ninth grade.

The potential of early-warning data is significant. Waiting for state academic assessment data (which is usually provided once a year) or finding out that a student has already dropped out is similar to evaluating autopsy data—it describes what happened after it is too late to do anything about it. By comparison, early-warning indicators, like a rash or a fever, can serve as the trigger for further investigation, and a student's longitudinal education data provides educators with the background information—like a medical history—to contextualize the



College- and career-readiness indicators¹¹

As the nation embraces the new goal of college and career readiness for all students, there is increasing interest in measuring students' postsecondary readiness before they leave the public high school system. Doing so provides powerful information to stakeholders at all levels. For example, states and districts can help establish college and career readiness as the goal for all educators and students, improve policies, and better align K–12 and postsecondary expectations. At the school level, postsecondary readiness measures can help paint a picture of how well a school is preparing its students for the academic demands of postsecondary education. These indicators can be used to inform schoolwide practices by addressing course-taking patterns, improving instruction (such as through curricular mapping or professional development), or identifying which students are prepared and which might need additional support. At the student level, postsecondary-readiness measures can help students and their parents understand whether they are on track to meet their goals.

Below is a brief summary of college- and career-readiness indicators and the current ability of states to produce them.

- **Scoring college ready on a high school assessment:**

Postsecondary education institutions have long used assessments as tools for measuring prospective students' college readiness, including national admission tests like the ACT and the SAT and student scores on exams tied to college-level course work such as the Advanced Placement (AP) or International Baccalaureate exams. Because research demonstrates a strong correlation between performance on these assessments and success in college, educators can use results from these assessments as signals of which students are prepared for postsecondary success and which will require additional support before leaving high school. This data can also be translated into

current situation and inform their understanding of the problem, diagnosis, and treatment. This data can also be used to ensure that fewer students go off track by looking at information across the school or system to develop preventative strategies.

As the gospel of the potential of early-warning data has spread, schools, districts, states, nonprofit organizations, and vendors across the country have developed early-warning indicator and intervention systems to guide educators in the process from “data” to “actionable information” to “strategic decisionmaking” to “improved student outcomes.” More information on early-warning indicators and intervention systems can be found in the Alliance’s 2008 paper *Using Early-Warning Data to Improve Graduation Rates: Closing Cracks in the Education System*, and a forthcoming report from Civic Enterprises that will address the practical and policy implications of currently implemented early-warning indicator and intervention systems across the country.

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school-level indicators, such as the percent of students reaching a career- and postsecondary-ready threshold on such assessments. Forty-five states and DC collect information about students' results on ACT, SAT, and AP exams.¹²

- **Career- and postsecondary-ready course work:** Research shows that high school course work is a significant predictor of high school graduation and the greatest predictor of success in college, with a particularly strong influence on the likely achievement of poor and minority students. Data also consistently show that students benefit from participating in more rigorous courses regardless of their achievement in those courses. This is true for both students who participate in a full college- and career-prep course of study and students who participate in critical gateway courses—such as Algebra II—that have a particularly strong correlation with success in high school and college. Despite the clear correlations between participation in rigorous courses and high school and postsecondary success, too few high school students take such courses and there are significant gaps for such course selection among student subgroups. Information about student access to, participation

in, and success with college-prep course work can be captured by a number of school-level indicators, such as the percent of students completing a full college-prep course of study; percentage of students receiving a college- and career-ready diploma; percentage of students completing gateway courses (such as Algebra II); and percentage of students who attempt or pass an honors or advanced course. Thirty-seven states now collect students' course-taking information in their statewide longitudinal data systems.¹³

- **Requiring remedial courses in college:** An obvious way to measure a school's success in preparing students for college and careers is to observe the actual postsecondary participation and success of its students. There are numerous indicators of postsecondary success, including postsecondary institution enrollment, persistence, remediation, and degree completion; employment; military enlistment; and earnings. One of the most valuable indicators of students' readiness is whether, upon entrance to a postsecondary institution, they are placed into a remedial (non-credit-bearing) course in reading, writing, or mathematics.

Challenges for the Sector

Maximizing the potential of new data and tools such as longitudinal data systems, early-warning indicators and intervention systems, and college- and career-readiness indicators will require addressing a number of challenges. These challenges historically include the inability to link data (within systems and across systems); provide appropriate access to data (to individuals inside and outside the education system); communicate the relevance of data (beyond high-stakes accountability); and build the capacity of individuals to use data. Like a teenager experiencing a growth spurt, the system must adjust to the new conditions and push through the growing pains.

These growing pains can be frustrating for all stakeholders involved, including partners in business and philanthropy. It is critical that all stakeholders understand these challenges so that they can collaborate to address them.

Challenge 1: Ensuring that data can be accessed and used, consistent with privacy protections

The development of district and statewide data systems means that rich, meaningful longitudinal data now exists. In theory, stakeholders inside and outside the system should be able to more effectively and efficiently access data for a variety of purposes. External stakeholders—such as community-based organizations administering dropout-prevention programs, or a foundation’s researchers—regularly seek information about student progress and outcomes to evaluate and improve their efforts. Schools and districts already collect and report this individual student information to the state agency, which houses the information in statewide longitudinal data systems and links it to information collected from postsecondary education and workforce systems. The external stakeholders should then be able to access the necessary data from the statewide data systems, reducing the burden on schools and ensuring that the data is more complete and accurate.

Many stakeholders, however, still do not have timely access to this information in forms that are useful to them. The issue of access is complicated for four related reasons:

- **Ownership of data:** The advent of statewide longitudinal data systems has changed the role

of states in collecting and housing data. This has raised new questions about the ownership of data: Who has the authority to share data with whom? In what form? At what level of detail?

- **Student privacy:** The positive movement toward the use of longitudinal data means that the best information is about individual students. The sharing of student-level data, particularly data that is personally identifiable—meaning that it can be attributed to particular individuals—must respect students’ privacy. There is a need to update federal and state privacy laws to protect student privacy in this new context and to alleviate concerns and misperceptions of the law that unnecessarily inhibit data sharing.
- **Security in the digital age:** The digital nature of today’s society means that more information—in education and other sectors—is housed and shared online and in other forms that require protecting the security of the information.
- **Overwhelming the system:** Finally, the availability of new data can be overwhelming for stakeholders. There is a real need to contextualize data and communicate it in ways that allow stakeholders to understand and use it.

Providing role-based access: Not all stakeholders need access to all data. Nor does everyone involved in education need to become a data expert or statistician. Rather, teachers need information to teach, principals to lead, parents to ask questions and make decisions in the best interests of their children, policymakers to allocate resources, and external partners to inform their efforts and investments. States and districts are increasingly developing role-based access for different stakeholders, often in the form of a web-based “portal” accessed through a username and password that presents the information that is appropriate to that stakeholder’s role. Forty-seven states report they are providing stakeholders with timely and appropriate access to data.¹⁴ Also, states and districts are increasingly developing customized reports that provide stakeholders with already-analyzed data in a visible and easy-to-understand format. Role-based access is important in providing users with clean, understandable data while also protecting student privacy.

Protecting student privacy: In those situations in which personally identifiable student information is shared,

Example: One Foundation's Evaluation Journey

One corporate philanthropy has a large portfolio of grantees (seventy grantees serving 27,000 students) implementing diverse strategies to reduce high school dropout rates and improve college- and career-readiness success. As is common practice, it commissioned a nationally respected research firm to evaluate student outcomes across the grantees, roughly 40 percent of which are schools and 60 percent out-of-district grantees such as community-based organizations and universities. As a condition of funding, the grantees were asked to provide the outcome data necessary for the evaluation. Despite a robust training and support process, there were significant gaps in the data. For example, programs could not provide GPA for 67 percent of the students they served; absenteeism for 30 percent of students served; and information necessary to calculate grade retention and over-age status for 20 percent and 15 percent of students served, respectively.

And this is for the easy stuff! Outcomes relating to the funding objectives—college and career readiness—are more difficult to acquire and measure because there is no common standard for either.

Regardless of the reasons for the missing data, which are as numerous as the grantees themselves, this experience demonstrates that none of the external partners involved—the organizations administering the programs, the foundation supporting the work, and the researchers who conducted the evaluation—have easy, timely, and appropriate access to the data necessary to effectively and efficiently play their role in improving student outcomes.

ensuring the privacy of sensitive information is vital. To protect the privacy of student education records, the federal Family Educational Rights and Privacy Act (FERPA) was passed in 1974, imposing limits on the disclosure of student records by educational agencies and institutions that receive funds from the U.S. Department of Education. In the thirty years since FERPA was enacted, however, the data landscape and the state role in data collection, sharing, and use has expanded, which has raised new issues about how states' sharing and use of longitudinal data relates to student privacy protections. A lack of clarity and consistency in the interpretation of FERPA has created

some uncertainty and led to entities and individuals being denied appropriate access to educational data under the sometimes mistaken assertion that sharing the information would be “in violation of FERPA.” It is expected that in 2011 the U.S. Department of Education will propose additional FERPA regulations and that these issues may be addressed.¹⁵

Ensuring data security: In addition to federal clarification on FERPA, state leaders need to review their state-specific policies, practices, and laws to ensure that personally identifiable information is protected; that all information is secure; and that linking, sharing, analyzing, and using data across agencies is possible when appropriate and necessary. These policies and statements should address important issues, including who has access to what data, especially identifiable data; how the information will be used and linked; the justification for the collection of specific data elements; and for how long states will retain the information. The U.S. Department of Education has recently announced a number of resources to help states address these issues.¹⁶

Building capacity for data use: Many educators harbor negative perceptions of data because the use of data has too often been associated with accountability systems and punitive consequences for low-performing schools. To support a positive culture of data use around the kinds of activities discussed in this publication, states, districts, and schools should integrate the use of data into their daily practices. While states have made significant progress in their ability to collect the data for and produce these college- and career-ready indicators, there is still work to be done to ensure that these indicators become integral to education decisionmaking at all levels, including as part of state and district accountability systems, through school improvement planning tools, and as part of instructional improvement strategies.

Furthermore, there is a growing recognition that educators and education leaders need training and support to be able to use the data to which they have access. Ultimately, the education sector needs a better understanding of what it means to be “data literate” so that pre-service and in-service professional development opportunities can be leveraged to build that data literacy. When educators have the skills to use data effectively and are supported through a culture of positive data use, data can be leveraged as a flashlight—guiding the way—rather than a hammer. While forty-five states report they provide role-based training to educators on how to use and interpret specific reports from the state's longitudinal data system, there is more work to be done.¹⁷



Challenge 2: Linking data across systems

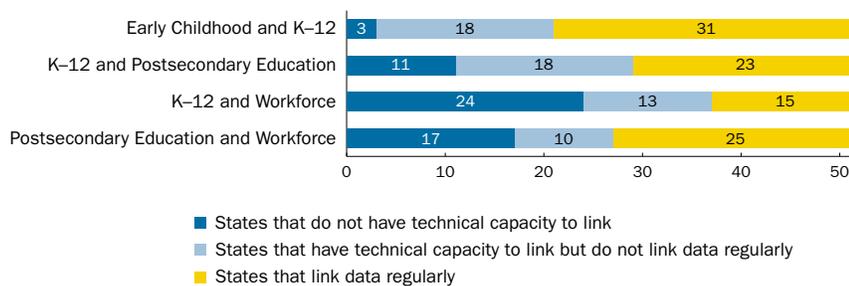
Increasingly, the important questions facing the education sector are ones that require data from multiple sources that span systems. This requires sharing and linking data across states, among multiple agencies; between districts and states; and from early childhood through K–12 education to postsecondary education and the workforce.

Students are mobile, moving between schools and grades and from state to state, and states must be able to link student data across traditional boundaries. Understanding the relationship between inputs and outcomes requires multiple types of information that may be housed in multiple systems, such as financial systems, program administration, and student information systems. Too often these diverse data systems are not able to link information due to incompatibilities in technology, policy barriers, or lack of human capacity.

Linking data across the P–20/Workforce Pipeline: Many leaders in business and philanthropy are focusing their education investments on efforts to improve students’ college and career readiness and need to understand how students fare in postsecondary education and the workforce. This information is necessary to measure the success of their grantees’ efforts, guide strategies to improve students’ preparation and eventual success, and inform future investments.

Typically, student data across the human capital pipeline exists in four distinct sectors: early childhood, K–12, postsecondary education, and the workforce. There is growing momentum behind state efforts to link data across the human capital pipeline from preschool through K–12 to postsecondary education and the workforce (known as the P–20/Workforce pipeline). According to *Data for Action 2010: DQC’s State Analysis*, states have made significant progress in developing the capacity to link data across sectors and agencies (see graphic below). Work continues to build capacity and create system linkages in remaining states.

States That Can and Do Link Data Across Sectors and Agencies¹⁸



*Analysis includes fifty states, DC, and Puerto Rico

Over the next year, states should achieve significant progress on this front. As a condition for receiving funds as part of the American Recovery and Reinvestment Act, every governor and chief state school officer committed their state to building statewide longitudinal data systems that can follow individual students from early childhood through K–12 and into postsecondary education by September 2011. Many states currently have federal grants they can use to address these issues, including through the Statewide Longitudinal Data Systems program (grants to aid state education agencies in developing and implementing longitudinal data systems) and the Workforce Data Quality Initiative (grants to state workforce agencies to design and develop longitudinal workforce data systems that are designed to link with relevant education data or longitudinal education data systems).¹⁹ The U.S. Department of Education, the Council of Chief State School Officers, and the Data Quality Campaign are each providing states with opportunities for technical assistance to implement these linkages.

Linking data across different information systems:

Leaders in philanthropy and business are typically interested in the concepts of system management: understanding and improving how inputs, process, and outcomes relate to each other and relate to overall efficiency and effectiveness of the system. When they partner with the education system, they often are frustrated by the lack of information to perform this type of analysis. While the metrics in other sectors more readily lend themselves to understanding the relationships between inputs and outputs, education is a complex social system with multiple measurable and immeasurable factors. There are also limitations to linking different data from different sources. Information about various aspects of system management—payroll and other human resource information, financial and other administrative data, information about school lunch and transportation services, enrollment and attendance data, student transcript information, information about students receiving special education or other services, assessment data, and so on—are often collected and housed in different data systems.

Adopting common data standards: The difficulty of matching, linking, and sharing data across systems is due in large part to the fact that they were often built in silos. As a result, the basic rules of the road or the data standards—the representation, format, and definition of each data element—are different in each system. Why is this a problem? It is similar to two people who speak different languages trying to communicate. They can exchange words, but until they can find a way to

Lessons from Other Sectors

In many other industries that rely on individual data from diverse systems, stakeholders have collaborated to find mechanisms for seamlessly and securely exchanging personal and sensitive information. Consider the following examples, some of which are adapted from a 2007 DQC publication.²⁰

- **Financial networks:** Every bank now connects to a single network—the ATM network—where data and currency are exchanged between thousands of banks and millions of consumers. However, the ATM network did not always exist; banks worked together to build it. Similar financial networks support the interoperability of credit cards, the availability of direct payroll deposit, and “speed pass” pay-at-the-pump gas cards.
- **E-ZPass™:** An E-ZPass™ electronic token enables a consumer to pay a fee electronically in place of currency and traverse toll roads and public parking lots more quickly and efficiently.
- **Motor vehicle registration and driver’s licenses:** Data interoperability standards permit law enforcement in any state to determine quickly the status of a driver’s license and vehicle registration and insurance. The system reduces vehicle theft and fraud and plays a role in abating terror threats. Its early-warning feature also saves the lives of unknown numbers of law enforcement personnel every year by alerting them to threats before they approach a car during a traffic stop.

interpret what the other is saying, they are unable to use the information or gain anything from their interaction. Without common data standards, vendors are forced to tailor products to each system or state’s specifications, increasing time and cost and inhibiting the development of new tools and services. And without common data standards, data quality is at risk. The goal is to move toward interoperability: an environment in which diverse data systems seamlessly exchange information with little or no additional effort. In interoperable systems, there is either common language or translation tools that allow for exchanges to take place.

Fortunately, there is momentum around the development and adoption of common data standards to address these problems. Common data standards would permit

1) increased comparability of data across state lines; 2) increased interoperability of data across systems; and 3) reduced collection burden on school districts. As a result, common data standards make it easier to transfer student data from one school or level of education to another, and permit states to learn how students fare as they move across institutions, state lines, and school levels—making the system more effective and efficient. In turn, this will facilitate smarter educational decisionmaking for all stakeholders—educators, policymakers, administrators, even parents—and fuel an information-driven education sector focused

on improving student outcomes. States and national leaders and the federal government have recently come together through the Common Education Data Standards (CEDS) Initiative to collaborate on the development, adoption, and implementation of voluntary, common data standards for a key subset of K–12 and K–12-to-postsecondary education transition variables. The U.S. Department of Education released the first version of the CEDS on September 10, 2010.²¹ It is now the job of state policymakers, institutions of higher education, and vendors to adopt and implement the standards.

Ten State Actions to Support Effective Data Use

To help support states' shift from *building data systems to using data systems* and address the remaining challenges described above, the Data Quality Campaign (DQC) has identified the ten state actions to support effective data use.

Link data systems across P–20 and the workforce to answer key questions

1. Link state K–12 data systems with early learning, postsecondary, workforce, and others
2. Create sustainable support for the longitudinal data system (LDS)
3. Develop governance structures to guide LDS
4. Build state data repositories

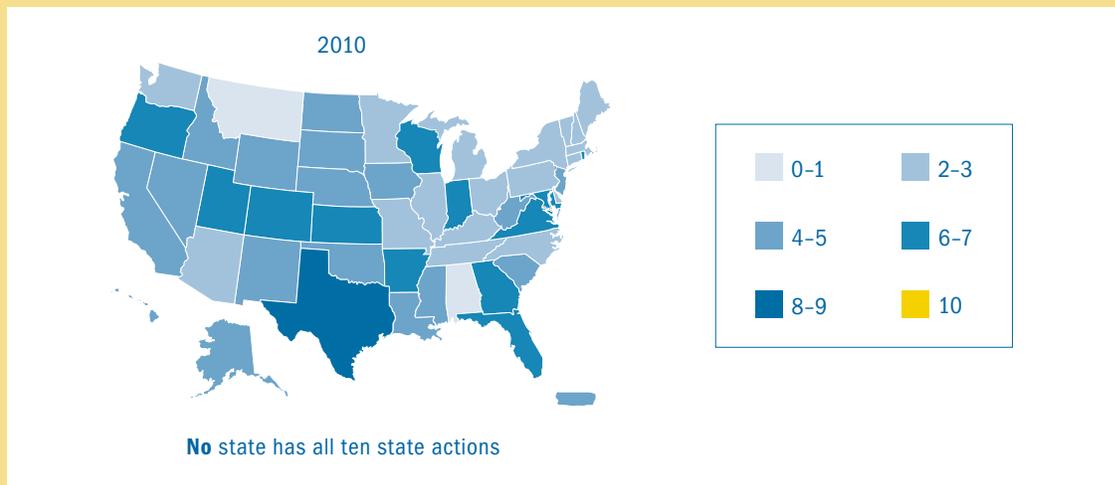
Ensure that appropriate data can be accessed while protecting privacy

5. Provide timely role-based access to data
6. Create progress reports with student-level data for educators, students, and parents to make individual decisions
7. Create reports with longitudinal statistics to guide change at system level

Build capacity of all stakeholders to use longitudinal data

8. Develop a research agenda
9. Implement policies to ensure educators know how to use data appropriately
10. Raise awareness to ensure all key stakeholders know how to access and use data

According to *Data for Action 2010: DQC's Annual State Analysis*, no state has implemented all ten Actions.²² For more information from *Data for Action 2010: DQC's Annual State Analysis*, visit <http://dataqualitycampaign.org/stateanalysis/>.



Business and Philanthropy: Critical Partners in Transforming Education into a Data-Driven Enterprise

Below are recommendations for how business and philanthropy can support the transformation of the education sector into a data-driven enterprise.

Support the transition from snapshot data to longitudinal data and actionable indicators such as early-warning and college- and career-readiness indicators.

- Build momentum around longitudinal data and actionable indicators by requiring all grantees to embed longitudinal indicators in their planning, decisionmaking, and evaluation processes.
- Require grantees to clearly articulate how these data systems will show the grantmaker a return on investment for particular measures of student achievement or institutional gains.

Support continued efforts to link data across systems.

- Demonstrate the demand for linkages by articulating the need for answers to critical questions that span systems and sectors.
- Ensure that grantees that administer data systems (including vendors, school districts, and states) adopt and implement common data standards, such as those released in September 2010.
- Consider investments in state-level activities designed to improve data linkages, such as the work of P-20/Workforce councils to identify how such linkages can provide answers to key questions across sectors, the development of governance policies for these linked data systems, and the technical and design support.

Help build capacity for data use while protecting privacy.

- Ensure that tools or services providing data to educators—such as early-warning indicator systems, software, or data-analysis tools—provide data in clear, easy-to-understand, actionable ways and protect student privacy.
- Require grantees to demonstrate how they will use data to inform decisionmaking.
- Offer grantees funding for data analysis.
- Consider investments designed specifically to build educators' data literacy.
- Ensure that evaluation of student data is carried out in compliance with student privacy.

Serve as a model of data-driven decisionmaking.

- Focus your own data collection on the critical questions.
- In establishing programs and initiating evaluations, proactively seek sharing agreements with longitudinal data systems at the state and district levels to reduce duplicative data collection and maximize the potential of the linked data.
- Continue to make bold investments in innovative approaches that embed data collection and evaluation strategies from the outset.
- Adopt longitudinal indicators as critical internal indicators for evaluating impact and informing future investments.

Conclusion

American businesses have long practiced data-driven decisionmaking, an approach that must be embraced by the education system. The education of generations of young people and the strength of our economy, society, and country are at stake. By supporting the collection, reporting, and effective use of data, business and

philanthropy can help encourage the production and use of information that will benefit students, parents, educators, administrators, policymakers, foundations, and other donors who share a common interest in creating a world-class education system.

Endnotes

¹ Adapted from Data Quality Campaign, *Inaugural Overview of States' Actions to Leverage Data to Improve Student Success—2009–2010 Progress Report on State Data Systems and Use* (Washington, DC: Author, 2010).

² Data Quality Campaign, *Data for Action 2010: DQC's State Analysis*, available at <http://dataqualitycampaign.org/stateanalysis> (accessed March 1, 2011).

³ Ibid.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

⁷ C. Dougherty, L. Mellor, and N. Smith, *Six Key Uses of Longitudinal Data* (Austin, TX: National Center for Educational Accountability, 2007).

⁸ This section is adapted and updated from L. Pinkus, "Using Early-Warning Data to Improve Graduation Rates: Closing Cracks in the Education System" (Washington, DC: Alliance for Excellent Education, 2008).

⁹ M. Janosz, I. Archambault, J. Morizot, and L. S. Pagani, "School Engagement Trajectories and Their Differential Predictive Relations to Dropout," *Journal of Social Issues* 64, no. 1 (2008): 21–40, <http://www.blackwell-synergy.com/doi/pdf/10.1111/j.1540-4560.2008.00546.x> (accessed March 3, 2008).

¹⁰ "The Silent Epidemic: Perspectives of High School Dropouts" (2006), a report by Civic Enterprises in association with Peter D. Hart Research Associates, was the first nationwide survey of dropouts themselves, married with decades of research. It indicates that the decision to drop out was often a slow process of disengagement from school and that most dropouts could have—and believe they could have—graduated from high school with more engaging and challenging course work and more support for academic, social, and real-life events.

¹¹ This section is adapted and updated from L. Pinkus, "Moving Beyond AYP: High School Performance Indicators" (Washington, DC: Alliance for Excellent Education, 2009).

¹² Data Quality Campaign, *Data for Action 2010: DQC's State Analysis*.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ For more information on FERPA and education data, visit <http://www.dataqualitycampaign.org/ferpa>.

¹⁶ For more information on the U.S. Department of Education's Privacy Technical Assistance Center, visit <http://nces.ed.gov/programs/Ptac>.

¹⁷ Data Quality Campaign, *Data for Action 2010: DQC's State Analysis*.

¹⁸ Ibid.

¹⁹ National Center for Education Statistics' Statewide Longitudinal Data Systems Grant Program, available at <http://nces.ed.gov/programs/slds/stateinfo.asp> (accessed August 10, 2010); Data Quality Campaign, *Leveraging Federal Funding for Longitudinal Data Systems—A Roadmap for States* (Washington, DC: Author, 2010), available at <http://www.dataqualitycampaign.org> (accessed July 15, 2010).

²⁰ Data Quality Campaign, *The Right Data to the Right People at the Right Time: How Interoperability Helps America's Students Succeed* (Washington, DC: Author, 2007).

²¹ For more information on the CEDS Initiative, visit www.commondatastandards.org.

²² Data Quality Campaign, *Data for Action 2010: DQC's State Analysis*.

