An MPR/NCEA Policy Brief · September 2005

# Judging Student Achievement
## Why Getting the Right Data Matters

**Good data make it possible to arrive at fair, accurate judgments about student and school performance and to make better decisions about how to deploy resources to improve schools. This policy brief describes the elements of a comprehensive state student data system that can provide richer and more meaningful information of use to policymakers, educators, parents, and the public.**

States are engaged in serious efforts to raise student achievement, paying particular attention to narrowing the **achievement gap** between high- and low-performing students that has persisted in our public schools for decades. The achievement gap is particularly troubling because, all too often, those at low achievement levels are minority, special education, or limited-English-proficient students.

The federal *No Child Left Behind* (NCLB) act has given added impetus to efforts to close the achievement gap. States are now testing all students in specific grades in mathematics and reading, using standardized state assessments aligned with state academic standards. Statewide, district, and school test scores must be disaggregated to show results for various groups of students, so that average test results cannot hide continuing lower achievement by specific student subgroups. Schools failing to make **adequate yearly progress** over time face increasingly strict sanctions.

Efforts to close the achievement gap are as diverse as the 50 states, and many educators are struggling to implement school improvement strategies and find adequate and appropriate measurements to see if these strategies are working. *NCLB* offers a useful framework for thinking about the kinds of data needed to identify students having difficulty meeting standards and to document school progress in closing the achievement gap over time.

## THE DATA WE HAVE NOW

**Cross-sectional data are the norm in states.**
At present, most states rely on cross-sectional data to document changes in academic achievement among students and schools. Cross-sectional data produce a "snapshot" of academic achievement at a fixed point in time and provide important information on a variety of school and student outcomes, including achievement gaps among student subgroups in a school, district, or state. Compared to other types of data, cross-sectional data are also fairly easy to collect and inexpensive to maintain.

One significant limitation of cross-sectional data is that they do not track individual students over time. For example, cross-sectional data cannot reveal whether students are actually improving their academic skills as they move through school, nor do they account for vital information, such as prior student achievement, that can help educators make diagnostic decisions about which students need which kind of help. Without longitudinal data, educators and policymakers lack valuable information that can help them chart the most promising course to improving student learning.

## THE DATA WE NEED (NOW)

**Longitudinal data permit powerful analyses of student achievement.**
To obtain the most accurate and useful data, state data systems will need to be reorganized to gather longitudinal data for individual students. States will need to develop and maintain centralized, longitudinal databases and assign unique statewide identifiers (such as a Social Security number or other code) to children that will permit matching of individual student records over time and across education databases. The advent of *NCLB* has made this need even more imperative.

### What the right data can help us do

The right data make it possible to:

- Evaluate the effectiveness of schools and programs in improving student achievement.
- Identify consistently high-performing schools so that educators can learn about promising practices.
- Intervene in a timely way to help students who are struggling.
- Determine how well schools are preparing students to complete high school and enroll in postsecondary education.

## BENEFITS OF LONGITUDINAL DATA

In contrast to cross-sectional data, longitudinal data can provide a wealth of information to help schools and districts assess student performance over time and to monitor progress in closing the achievement gap. Truly useful education data should be able to answer, at minimum, a series of critical policy and evaluation questions, including those related to:

- **Assessing individual student academic growth and proficiency over time**, the best measure of schools' impact on student achievement.
- **Monitoring student mobility, retention, and attrition**, all factors that are related to student achievement and school performance.
- **Examining prior achievement for all student subgroups**, since prior achievement is a solid predictor of future performance.
- **Predicting future student achievement**, so that educators can determine whether they are adequately preparing students for future success.

With longitudinal student data, educators and policymakers can better understand how their students are performing over time and how their schools are doing in addressing the academic needs of all students. The next section provides answers to specific examples of the types of questions that longitudinal student data can address.

## ASSESSING STUDENT ACADEMIC GROWTH AND PROFICIENCY OVER TIME

Sample questions that longitudinal data can answer:

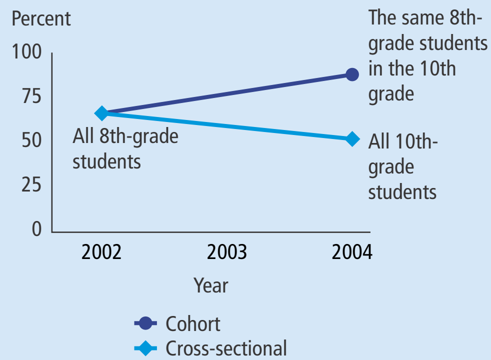
- **What percentage of last year's less-than-proficient students achieved more than a year's growth in academic achievement this year?**
- **Are students who have been taught the new mathematics curriculum improving their achievement on the state assessment over time?**
- **Are this year's achievement gaps narrower than would have been predicted by last year's achievement gaps for the same students?**

Using longitudinal data, educators can track changes in the achievement gap for specific groups of students as they progress through school. This permits more accurate measurement of the impact of schools in closing the achievement gap—for example, one group of English language learners may have started out behind native English speakers, but the school is making exceptional progress in helping them catch up.

Figure 1 documents how tracking a single cohort of students over time can provide more reliable data than comparing performances for different populations of students. Without longitudinal data on student outcomes, comparing different populations of students may give the appearance that students are backsliding, even when performance differences result from external factors, when in fact performance is actually improving.

**Figure 1**

Percentage of students meeting or exceeding state mathematics standards, cohort vs. grade level performance: 2002 and 2004



## MONITORING STUDENT MOBILITY, RETENTION, AND ATTRITION

Additional sample questions that longitudinal data can answer:

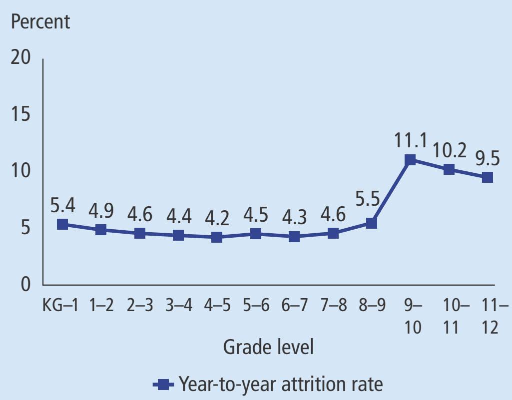
- **What percentage of at-risk 7th-graders subsequently dropped out?**
- **What percentage of 9th-grade students participating in remedial reading programs obtained their high school diploma?**
- **How many of the highest performing students are leaving the lowest performing schools?**

With longitudinal student data, states can identify students who leave and enroll in another public school in the state, as well as those who leave the state's public education system. With this information, states can get a more accurate picture of dropout rates. For example, by taking the average percentage of students who leave public schools in grades 1 through 7, the state can establish a benchmark for "normal" attrition. Attrition in excess of this ("excess attrition") can be viewed as a rough estimate of the dropout rate in later grades, as shown in Figure 2.

As shown, the dropout rate of students who were in grade 9 in the prior year is likely to be at least 6 percent (11 percent attrition for that year, minus approximately 5 percent normal attrition).

Attrition can also affect high school test scores. If the lowest performing students drop out, a school with a higher dropout rate might show improvement in state test scores based on the proficiency levels of the remaining students. Consequently, it is not possible to assess the relationship between school-level attrition and high school proficiency rates on state tests without longitudinal student-level data.

**Figure 2**
Attrition: Statewide percentage of students enrolled in 2002 but not enrolled in 2003



## EXAMINING PRIOR ACHIEVEMENT FOR ALL STUDENT SUBGROUPS

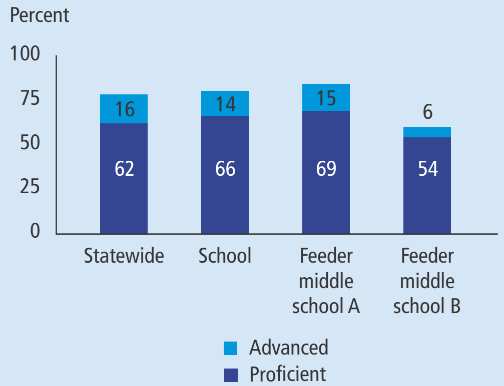
Other questions that we can use longitudinal data to answer:

- **How many 8th-grade proficient and advanced students passed at least one Advanced Placement (AP) exam in high school?**
- **How many 8th-grade less-than-proficient students graduated from high school in four years?**
- **Which instructional programs in middle school prepare low-performing students for the high school curriculum?**

Since academic knowledge is cumulative, students' past performance can usually predict future results. Unique student identifiers can track students' performance retrospectively to see if there is a pattern over time. For example, student test scores below state thresholds in the current year may be the result, in part, of skill deficits apparent years earlier but never remedied. With longitudinal data in hand, school administrators can identify earlier grades or specific programs where educational intervention might be needed.

Longitudinal data can also be used to assess whether certain students, such as those who attended a specific feeder school, are affecting school-wide or subgroup performances. As Figure 3 illustrates, although school-wide test results may exceed state standards, more detailed analysis reveals that students' test scores are at least partly a function of the middle school they attended.

**Figure 3**
Percentage of 10th-grade students meeting or exceeding state mathematics standards, statewide and by feeder school: 2004



## PREDICTING FUTURE STUDENT ACHIEVEMENT

Longitudinal data can also provide answers to these questions:

- **How does participation in advanced high school courses affect college success?**
- **Do remedial reading programs improve students' chances of passing exit exams required for graduation?**
- **Are specific school characteristics, such as instructional program, teacher qualifications, size, or attendance rates associated with success in narrowing achievement gaps over time?**

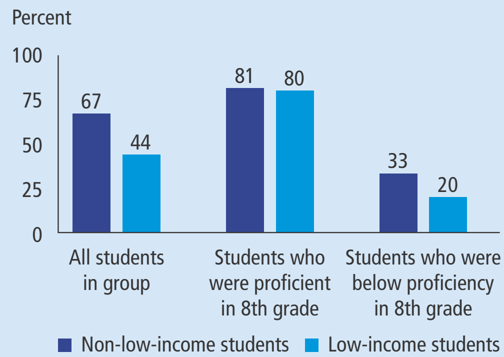
Linking student performance over time can enable educators to make cause-and-effect connections between students' prior abilities and subsequent academic performance. This information can be used to identify students at high risk of school failure, enabling school administrators to target resources more effectively to those in greatest need.

Prior achievement is a powerful indicator of which students are most at risk, and a high school's performance with students who entered with low 8th-grade scores is a good indicator of the school's performance with at-risk students. For example, Figure 4 shows that students who achieved mathematics proficiency in the 8th grade were much more likely to pass 11th-grade mathematics. The figure also shows a much wider achievement gap for low-income students who were below proficient in the 8th grade, indicating that the school may need to sharpen its focus on intensive mathematics instruction for low-performing, low-income students.

Other predictive measures that can provide a more nuanced view of performance include examining the relationship of student test scores to their completion rates for state-required or AP coursework or the SAT or ACT exams.

State administrators can also use student identifiers to track graduates once they leave the public school system and enroll in a state postsecondary institution. States using a student's Social Security number as a unique identifier will be able to access state unemployment insurance (UI) wage records to determine if there is a link between school achievement and subsequent labor market success.

**Figure 4**
Percentage of students passing 11th-grade mathematics, by 8th-grade mathematics proficiency and income



## OTHER ADVANTAGES OF COMPREHENSIVE STUDENT DATA SYSTEMS

Besides enabling states to fulfill *NCLB* requirements, a comprehensive student data system offers other advantages:

**Consistent data definitions.** Consistent definitions make it possible to analyze an issue across databases, districts, and even potentially across different states.

**Consolidation of data.** Once a comprehensive student data system is in place, it should be possible to eliminate redundancy in data collection across state, district, and local databases.

**Flexibility to meet changing federal and state requirements.** As states and the federal government monitor student achievement, changes may be made in programs, regulations, or other requirements that necessitate new data or analyses.

**Improved evaluation of programs and better data quality.** Adding other measures to cross-sectional data collection will enable states to pinpoint more precisely how well students are doing and to find optimal points of intervention in the education process. Such data will also provide a more reliable and valid basis for policy decisions.[1]

## WHAT INFORMATION IS NEEDED FOR A COMPREHENSIVE DATA SYSTEM?

A comprehensive student data collection system must start with a unique student identifier, such as a Social Security number or code assigned to each individual student. These identifiers enable states to track students over time and to link with other state databases, such as those maintained by postsecondary institutions or state employment agencies. Twenty-four states currently have statewide student identifiers.[2]

State education departments will need to collect student-level data on state test scores, fall enrollment, subsidized school lunch eligibility, limited English proficiency, racial or ethnic background, and special education status, as well as other student demographic and program participation information. These data have proven significant in previous research on student achievement and are the basic foundation of a comprehensive student data collection system.

### The key elements of a comprehensive state student data system

According to the National Center for Educational Accountability (NCEA), whose mission is to help state leaders use data to monitor, analyze, and improve student and school performance, the following ten elements are essential for an adequate statewide data system:

1. Unique statewide student identifier.
2. Student-level enrollment data, including demographic characteristics and program participation.
3. Student-level state test data amenable to disaggregation by individual test items and objectives.
4. Information on untested students, including reasons why those students were not tested.
5. Student-level course completion data.
6. Student-level SAT, ACT, and Advanced Placement (AP) test results.
7. Student-level graduation and dropout data.
8. State data audit process to ensure the accuracy of data submitted by districts.
9. Capacity to match K–12 and postsecondary education data.
10. State data audit system.

For more information on these elements, see *Measuring the K–16 Pipeline: Ten Essential Elements of Statewide Data Collection Systems* on the NCEA website at www.nc4ea.org.

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1 Smith, N. J. 2003. Benefits of Linking Student Records, Education Data Systems for No Child Left Behind Reporting. Council of Chief State School Officers, Chiefs' Summer Institute Pre-Conference Session, Lake Tahoe, NV, July 26, 2003. http://www.ccsso.org/whats_new/3072.cfm?printthispage=1& (accessed: October 28, 2004).

2 Alabama, Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, Nevada, Oregon, South Dakota, Tennessee, Texas, Vermont, Washington, West Virginia, and Wyoming.

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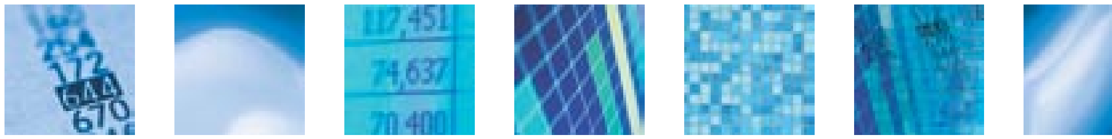

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National Center for Educational Accountability

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