

# How Data Can Help

*Putting information to work to raise student achievement*

BY JANE ARMSTRONG AND KATY ANTHES

What do you do with the reams of information your state sends every year, showing how your students performed on the state's student assessment program? Some school districts take this information—and add more of their own—to improve their curriculum, their teaching strategies, and their overall student achievement.

As researchers at the Education Commission of the States (ECS), we wanted to understand how districts can use data most effectively. So this past spring we set out to conduct interviews in six school districts in five different states (California, Colorado, Iowa, Maryland, and Texas) that had reputations as exemplary data users.

These districts had used data to dramatically improve student achievement, and in most cases their state assessment scores improved by 1 to 13 percentage points after instituting data-driven strategies. A California district increased the percentage of students scoring above the 50th percentile by 13 percentage points on the SAT-9 state exam. A Maryland district reported a steady climb in student scores on the state's performance-based assessment—12 percentage points over a seven-year period. These districts were also using data to fundamentally improve teaching and learning through various improvement processes that will be described in this article.

The districts, which we agreed not to name, varied in size, but most were low-income, had high student mobility, and had been struggling with low student achievement for many years. Over the past few years, these districts have used state accountability results, showing where they stood on student achievement in relationship to other districts in the state, to focus attention on areas that would produce improvement.

## Collecting the data

The districts we studied collected a variety of data, and not surprisingly, the types of data they collected determined the types of decisions that school board members, principals, and teach-

ers could make. We found three primary categories of data being collected: *Demographic* data includes background information—such as gender, ethnicity, number of years in the district, attendance, teacher certification, school enrollment—on students, staff, and schools. *Achievement* data includes student results on the state assessment, district-level tests, teacher-developed tests, and so on. *Instructional-processes data* includes records of the curriculum or programs the students experienced, classroom practices, student grouping, and the like.

The districts typically started their improvement efforts by asking important, overarching questions: As a district, how are we doing? How well are we serving all students? What are our relative strengths and weaknesses? Why are things the way they are? What are the implications of our data for improving teaching and learning?

When the districts set out to answer these broad questions, they found they had to go on a quest for more data and more specific analyses for the issues they turned up. They wanted to know: Are we closing the achievement gap between white and Hispanic students? In which schools? In which grades? How are students in one elementary school doing compared with students in another elementary school? Which standards have students mastered? Which ones are they having difficulty with? Which interventions are best for which students? Why are reading scores going down for middle school students? And what should we do about it?

## Using data to improve student achievement

The districts in our study used several different strategies to track student achievement, and they all acted quickly on the results. One Texas district took the state academic standards (usually in fourth and eighth grades) and “benchmarked” the skills students need to learn in first through third grades and in fifth through seventh grades to reach those standards.

This district used state assessment items (which had been

released to the public) and teacher-generated questions to create short tests that could be administered in each grade about every six weeks to predict and prevent student failure. Students who haven't mastered certain standards receive extra help, usually through flexible student-grouping strategies and additional instruction. The six-week intervals and the ability to get the data back immediately are crucial in allowing instructional decisions to be made in a way that can make a difference in student achievement. In this particular district, the students' scores increased 2.2 percentage points for all students in one year and 3.5 percentage points for the African-American students on the state assessment.

An Iowa district uses a computer-based "adaptive" test in three content areas—reading, language, and mathematics—to diagnose and place each student using fall data and to measure student learning using spring data. An adaptive test is one that changes test questions according to how an individual student has answered previous questions. If a student answers the first question correctly, for example, the test automatically asks a harder question, but if the student misses a question, the test generates an easier question. This process continues until there is a stable estimate of the student's knowledge

of the content area. Because they are computerized, these tests can be administered quickly—usually in 45 minutes—and scores can be provided to students and teachers at the end of the test session.

This particular district has calculated the test scores a student needs at each grade level to stay on track for receiving the district's Basic Academic Skills Certificate by 10th grade—one of the district's graduation requirements. A third-grader needs a reading score of about 197, for example, and a sixth-grader needs 217. Knowing how students score in relation to these performance targets helps determine class assignments and intervention strategies.

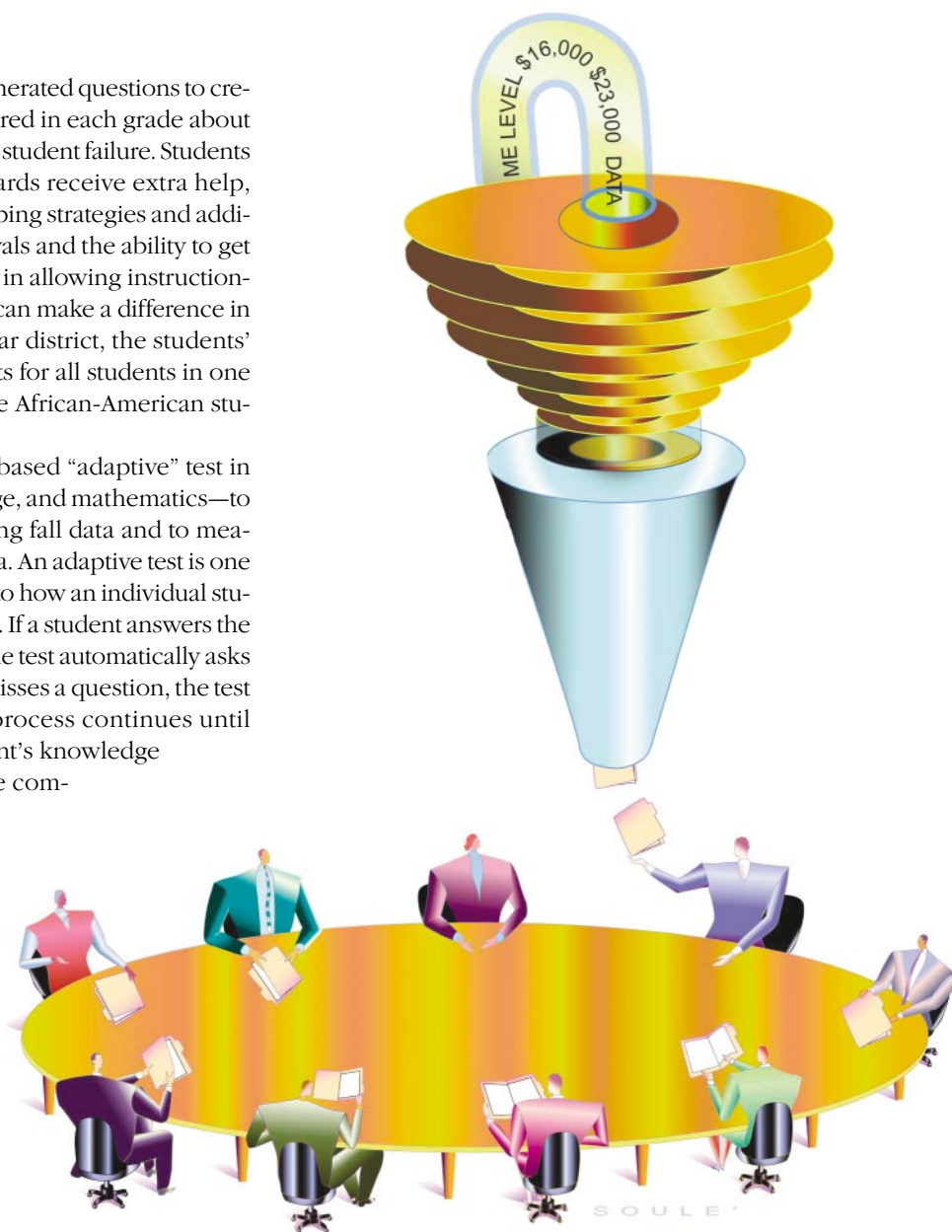
All students in this district have Individual Pupil Profiles containing their test scores and recommended learning plan. The district offers an array of extra learning opportunities for students, including summer school, an extended-day program, differentiated instruction, and a "Success Center"—a special center at the middle school where students who are not performing well academically get special help on a regular basis. This could include individualized help on learning study skills, help on homework, reviewing mathematics or other classroom skills, or even working through other issues that are keeping the student from experiencing success in school. Students can be reassigned to different classes at the end of each semester as they progress.

All students in this Iowa district have the opportunity to re-

ceive individualized instruction. Students who score above the grade-level performance targets can participate in enrichment and accelerated classes. Elementary school students who score high in math can go to the middle school to take mathematics, for instance, and middle school students can go to the high school for classes. Advanced high school students can earn college credits at the local community college.

### Data changes teachers' minds

One of the most intriguing ways schools use data, we found, is to change teachers' attitudes toward the potential success of previously low-performing students. In addition to reporting how well students in particular districts and schools meet state standards, many states also report how their results compare with those of demographically similar districts or schools. Seeing this information has convinced many teachers that if other



teachers can help students like theirs learn at high levels, so can they.

A Texas organization, Just for the Kids (JFTK), has taken these comparisons one step further. On its Web site (<http://www.just4kids.org>), JFTK compares every elementary school's results on the state assessment with the average of the 10 highest-achieving Texas schools with similar demographics. When most teachers look at this data, they realize that other schools and other teachers are doing a better job educating students *just like theirs*. JFTK has followed up with a study of these "beat-the-odds" schools to identify the practices they use to educate all students. (The JFTK model is currently being implemented in other states, including Arkansas, Florida, Georgia, Minnesota, New Jersey, Ohio, Tennessee, and Washington. For more information, see the JFTK Web site and other resources below.)

Several districts use student scores on state tests to support teachers' professional development. In the district that tracked student progress on benchmarked objectives every six weeks, principals concluded that if most of the students in a particular teacher's class missed a specific objective, that meant the teacher needed a new instructional strategy to teach that objective. The principal then requested professional development for the teacher from one of several sources: another teacher on staff who had successfully taught that objective, a content resource teacher, or a member of the district's professional development staff.

Another district, believing that "you can't supervise learning into people," suspended the annual teacher evaluation program for two years, instituting instead a professional development plan for every teacher. The district combined two sources of data—requests from teachers and measures of how well the district and schools were achieving their academic

goals, as determined by multiple assessments—to determine what development opportunities would be offered. A catalog of available courses was developed, and teachers were able to receive credit toward continuing education units and advanced degrees. Teachers were also encouraged to design and conduct their own action research study on a teaching and learning topic.

Members of the first cohort of teachers have completed their action research projects, and the district plans to continue this professional development strategy.

### Finding the right strategy

The most difficult aspect of using data, our study found, is linking it to an appropriate intervention. The challenge is not to provide more of the same, but instead to provide different instructional strategies to reach a variety of learning styles.

In the districts we visited, the strategies included computer labs and software, the use of manipulative materials in the classroom, and one-on-one student tutoring. These districts were just starting to collect data on their new instructional strategies—only time will tell whether they chose the "right" strategy. One of the most important actions a school and district could take regarding new interventions is to continue to collect data on them to see whether they are working.

Sometimes, data clears up false assumptions. One district in our study knew reading scores had been going down steadily for the past several years, and district administrators attributed the decline to an influx of new students into the district. But when the data was sorted into two groups—students who had been in the district for three or more years and students who had just arrived—administrators found the students who had been in the district longer accounted for the decline. This prompted district leaders to identify and invest in a new reading program.

## For more information

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### Lessons from our database

As we concluded our study, we drew up a list of attributes that seem to characterize districts that make a wise use of data:

■ **Strong leadership.** In these districts, the superintendent, central office, and school board are committed to collecting and using data for decision making and improvement. One superintendent told us, "In God we trust; all others bring data!"

■ **A supportive districtwide culture for using data for continuous improvement.** Data isn't used as a "stick"—it is made available to teachers, students, and parents to review and use to make improvements. The only negative consequence was if a teacher didn't use the data. In most of the districts we studied, teachers who chose not to use data to improve their classroom instruction were encouraged to transfer to other districts that didn't use data, where they would be more comfortable.

■ **A strong service orientation toward principals and teachers.** These districts made curriculum specialists available to schools and provided additional data analysis along with query software and training. District leaders often sat down with prin-

cipals to review every school's results and goals and to offer support in helping them meet their goals.

■ *Partnerships with universities, businesses, and nonprofit organizations.* The districts we studied joined forces with other groups to obtain additional technical expertise, technology (hardware and software), data analysis, and promising practices. One district partnered with two prominent computer manufacturers, sharing their strategies for using technology to improve teaching and learning in exchange for complementary equipment and software. Another district tapped a nonprofit organization and a nearby university to run additional analyses on their state accountability results to learn all they could from the data.

■ *A mechanism for supporting and training personnel to use data.* Most districts in our study have a person in every school whose job is to collect, analyze, and report student achievement data back to teachers and the principal. Frequently this person is also an exemplary reading or mathematics teacher and gives students who are having academic trouble additional instructional support. Most districts also have central office staff members who serve as liaisons to schools—linking them with curricular resources, promising practices, and improvement strategies. Additional resources for these positions frequently come from state resources earmarked for low-performing students and schools or from additional grants the central office secures from the state or foundations.

■ *Close accounting of every student's performance on academic standards.* One district gives tests every six weeks based on standards benchmarked to the state standards. Another uses state and local test results to develop learning plans for students and guide the school improvement process. A third district developed performance targets and used student test results to place students in programs that would help them meet the performance targets.

■ *A focused flexibility in how time is used.* Schools that keep their eyes on the data often use flexible grouping patterns for student instruction and restructure the school day so grade-level teams can plan together. Some districts use “vertical inte-

gration” teams, with teacher-representatives from all the grade levels, to coordinate curriculum and instruction from kindergarten through high school.

■ *A well-defined, data-driven school improvement process.* The schools in our study typically use data to identify problems, create an action plan to address the problems, and monitor the implementation and results to see how well the plan works. The results are then fed back into the next cycle for improvement planning.

### **Coming soon: Even better data**

Although we saw remarkable innovations using data in the school districts we studied, we know that existing and emerging technology will continue to make the use of data both more prevalent and more effective. An ECS report, *Smart Desktops for Teachers*, details how teachers will soon be able to sit at their desks and link to resources that allow them to, among other things, quickly interpret data and modify teaching strategies to fit the needs of individual students. Smart desktop technology offers new means for gathering and analyzing data within the classroom, throughout the school, across districts, and around states.

Effective use of data might change how districts are held accountable for student results. ECS staff members are using the results of our study to work with experts and school leaders to create new designs for accountability systems—ones in which accountability is distributed more evenly through the education system and more stakeholders are held accountable, and feel responsible, for results. We hope this approach will help districts use data more effectively to improve the education of all students.

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