

Hands On!

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TERC

Test Scores: What Can They Tell Us?

By Diana Nunnaley

You have your end-of-year test data for grades 3, 6, and 10; you have sorted the data by poverty levels, race, ethnicity, disability, and limited English proficiency to determine whether you are leaving some students behind.

Now what do you do?

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Inside...

**On the Road
With Math**

Storyline

**Darwin's
Journals, and
Yours**

As educators seek to raise student scores on annual assessments mandated by the No Child Left Behind (NCLB) Act of 2001, they have access to data on who is struggling, but they often lack data to help explain why. Under NCLB, states conduct annual reading and math assessments between grades 3–8, and at least one assessment between grades 10–12. The law requires that assessment results be disaggregated, that is, results are to be sorted and reported by poverty levels, race, ethnicity, disability, and limited English proficiency. The process aims to identify who is having trouble and what content areas are problematic but offers little insight into what causes low scores. In a search for answers, many schools and districts begin by examining their curriculum: Is it aligned with the standards? With the state test? Their search can only take them so far since important information is missing: Data on what is actually being taught in the classroom.

Seeing what is taught through data

A new set of tools, the Surveys of Enacted Curriculum (SEC), is helping to fill this data gap by providing a way to identify and visually represent the content taught and the instructional approaches used in classrooms and across grade levels. The survey system and its reporting and analysis tools display these data and data gathered from state standards and assessments in a way that allows educators to compare what they are teaching with what they should be teaching, what is being tested, and how students perform on the tests.

The survey system allows educators to compare four areas of curriculum data: intended curriculum, enacted curriculum, learned curriculum, and assessed curriculum. (See Figure 1.) Intended curriculum, encompasses what is to be taught as defined in state curriculum framework content standards. Enacted curriculum refers to the content actually presented in the classroom. Assessed curriculum is the content that is tested, and the learned curriculum is measured by the scores students receive on the tests.

Teachers provide the data for the enacted curriculum. They complete a survey (either online or with paper and pencil) that takes about an hour to complete. They provide input on the curriculum topics they teach, how much time is spent on each topic, and the variety of instructional approaches they

use, such as time devoted to whole class instruction, hands-on activities, or small group work. They also identify what students are expected to do in a lesson. For example, to what extent does the lesson ask students to memorize, perform procedures, reason and analyze, communicate understandings, or solve problems.

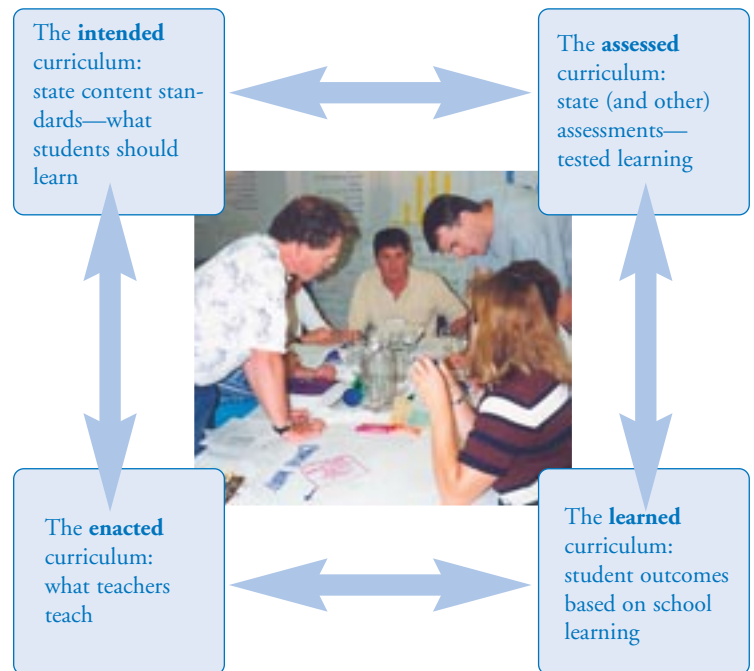
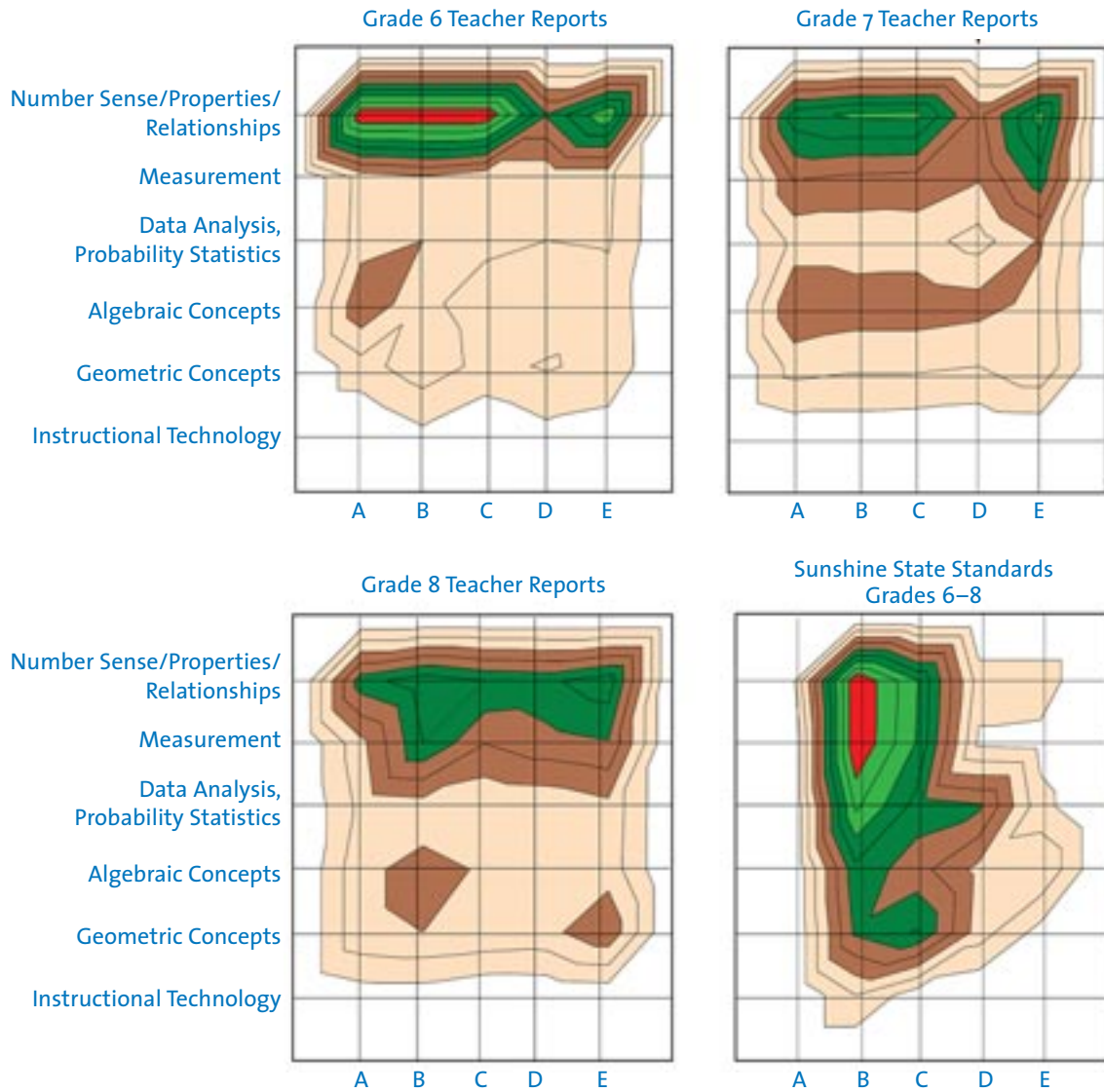


Figure 1: Surveys of Enacted Curriculum

The researchers who developed the tool code the teachers' data as well as data gathered from the content standards, assessment items, and assessment results for each grade in order to generate content and instructional maps. Figure 2 shows examples of content maps: three are generated from teacher data and one from content standards. The maps plot the amount of time spent on a subject area (listed on the vertical axis) and the amount of time the students are required to engage in specific cognitive activities (listed on the horizontal axis). The amount of time is indicated by color with red showing the highest percentage of classroom time and green, brown, beige, and white indicating decreasing amounts of time. With these maps, teachers and administrators get a snapshot of what is happening in the classroom and can compare their enacted curriculum maps with the intended, assessed, and learned maps and charts.

Content Maps



A=Memorize • B=Perform Procedures • C=Communicate Understandings • D=Reason/Analyze • E=Solve Novel Problems

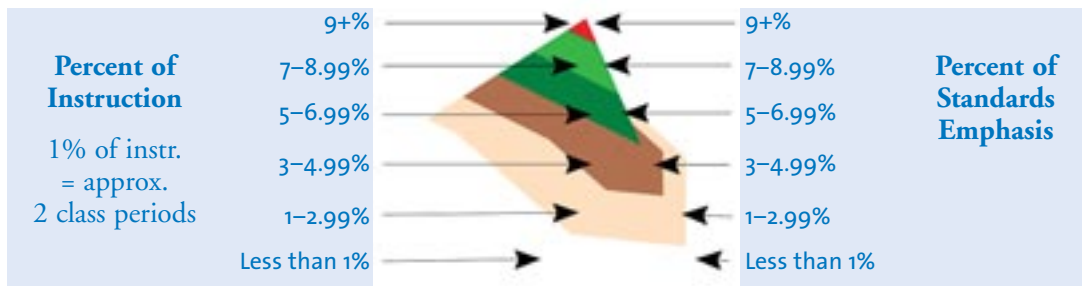


Figure 2: These content maps were some of the first maps Homestead Middle School teachers in Florida viewed during their professional development sessions on using data. They eventually studied many more charts and

graphs representing their survey data, including data on assessment practices, teacher preparation, use of technology and homework, and beliefs about student learning and professional collegiality.

Surveys of Enacted Curriculum

Tools for Aligning Instruction, Standards, and Assessments

The Surveys of Enacted Curriculum (SEC) offer a practical method for collecting, reporting, and using consistent data on instructional practices and subject content taught in classrooms. The survey instruments and reporting tools provide an objective approach for schools, districts, and states to analyze instruction in relation to content standards.

The surveys were developed by a collaborative of state education specialists and researchers led by Rolf Blank, director of education indicators at the Council of Chief State School Officers (CCSSO). The survey instruments and data reporting designs are based on research conducted by Andrew Porter of Vanderbilt University (former director of the Wisconsin Center for Education Research [WCER]) and John Smithson, senior associate at WCER.

Data on Enacted Curriculum Project

TERC and Learning Point Associates (formerly NCREL), working with CCSSO and WCER, have developed resources to help states, districts, and schools administer and interpret the survey. Forty schools from five urban areas are participating in a research program designed to help teachers and administrators use the SEC data to improve instruction. In the program, teachers learn how to collectively examine and analyze the data as a way to set a course of action to improve student learning. In the process, teachers and administrators discover the types of data they need to monitor progress and examine practice. The collaborative approach allows teachers to look reflectively at their own practices as well as share and learn from colleagues.

For more information see www.SECsurvey.org and www.ra.terc.edu/DEC.

Using data to improve teaching

Homestead Middle School in Florida is one of several schools using the SEC tools. Like many schools working to establish their systems for demonstrating adequate yearly progress under NCLB, Homestead uses annual test scores to determine which topics in the curriculum are most troubling for students and to identify which students are having the most difficulty. Unlike many schools that get stuck guessing at the root causes for low student achievement, Homestead is involved in a research program that is helping the teachers work together to analyze their SEC data, generate questions

for further investigation, and take action to improve student learning based on their findings.

The maps in Figure 2 are some of the first maps that Homestead teachers viewed during their professional development sessions on using data. There were several observations the teachers made just from these maps. They saw that overall the sixth grade math teachers were devoting most of their time to teaching number sense, properties, and relationships, with the bulk of instruction calling for students to perform procedures. This emphasis seemed to repeat in grades 7 and 8. Looking at their learned curriculum maps (not shown) they saw that their students performed better than the state average for this strand, prompting the group to ask if there was a connection. They also could see from their learned curriculum maps that students were having the most difficulty with data analysis and probability. They asked if that was directly linked to instruction time. When the teachers compared the intended curriculum map with the enacted curriculum map they saw that the maps were not aligned. The teachers observed that most of the content strands in the enacted maps are sketched in wide bands of beige across all three grades. Some teachers wondered whether this was a visual representation of the “mile-wide, inch-deep phenomenon” in which teachers cover a wide range of topics in little depth.

Equally revealing and as provocative to the team as their content charts were the SEC data about instructional practices. Data charts highlighting the type and degree of instructional practices applied by all math teachers indicated wide variation in the approaches teachers were using. They also observed that more whole-class lecture occurred in classrooms with higher percentages of lower-achieving students. They began to question why this was occurring and whether they needed to change some of their practices, asking themselves whether they were making any assumptions about why standard-level classes should get more whole-class instruction.

Together, assessment results, content alignment maps, and instructional practices data shed new light on the teachers' root-cause analysis of student achievement. Working with their administrative support team—Homestead assistant principal Deborah Montilla, instructional specialist Cecelia Magrath, and science department chair Kelly Gibson—Homestead's teachers designed their professional development release days to dig further into their data to compare curriculum across the grade levels and to examine best practices in math instruction. Curriculum mapping activities determined that across the three grades, teachers were using almost identical materials. Their findings validated the SEC data. This was an important realization for the teachers, who had believed that they were following the curriculum and allowing students to build on previous knowledge.

During the summer break, following Homestead's initial foray into a collaborative inquiry process for using school data, grade-level teams gathered to identify critical unmet standards and strengthen curriculum content and teaching practices to meet these standards. After two years of basing changes in practice on their continued analysis of data, including monthly Saturday sessions where teachers visited one another's classrooms to examine materials and talk about teaching strategies, Homestead teachers are seeing results. Their students have made significant achievement gains, raising the school's standing on the state report card system.

Teachers at the Hanes Middle School in Winston-Salem, North Carolina, are also gathering to analyze their SEC data. In reviewing what the system calls "fine grain" maps which further divide content topics into smaller categories, they discovered their teaching of geometry was not very well aligned with their math standards and their end-of-year assessment. One math teacher said to his colleagues in the data analysis group, "I thought I knew what was in middle grades geometry. I'm not sure I believe that now. I want to take a closer look at the standards and see just what the content is." The collaborative process for examining the data created a safe environment for the math teacher to voice his doubts and concerns about his own teaching. At the high school in Winston-Salem, science teachers noted wide variations in what was being taught and how. No two biology classes were

covering the same content in the same way. Specifically, honors courses covered a different scope of content than standard classes. The finding prompted a teacher to cover the same content with the standard-level class as he covered with honors-level students. The standard-level class went on to ace their quarterly assessments.

The teachers involved in using a collaborative inquiry process to examine the SEC data are moving beyond simplistic explanations for low student achievement. They begin with the data, looking for clues and generating questions to investigate. In the process, the teachers grapple with philosophical and pedagogical issues. They go beyond reviewing the lists of topics in their standards and ask what students are required to do to demonstrate their understanding of those topics. They seek additional data as a way to monitor their efforts to change instruction, including analyzing student work.

Many schools around the country are learning that gaining access to useful data is only one part of the challenge. How to use the data—how to engage an entire staff in the analysis of the data and how to act on the results of their analysis collectively—is more challenging and also more productive. The Surveys of Enacted Curriculum are somewhat like having infrared glasses to make things visible in the dark. Graphically displaying data about their enacted or taught curriculum and being able to compare that to standards and to the assessed curriculum offers teachers the ability to scrutinize their assumptions about how and what they are teaching. The process can allow teachers to collectively address inequities in their schools and to ensure that all students are getting what they need to achieve.

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Photo page 4: Molly Singen Richter