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You Can Teach for Meaning

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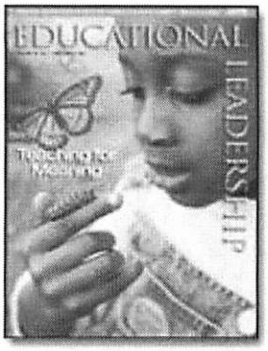

Teaching for meaning is an engaging idea, but many teachers find it problematic in this age of mandates and standardized tests.

Teaching is more than covering content, learning is more than merely taking in, and assessment is more than accurate recall. Meaning must be made, and understanding must be earned. Students are more likely to make meaning and gain understanding when they link new information to prior knowledge, relate facts to "big ideas," explore essential questions, and apply their learning in new contexts.

Consider the following classroom scenarios (Tharp, Estrada, & Yamauchi, 2000). A 6th grade teacher asks students to collect data from home on the height and weight of various family members. Students discuss the following questions in groups: How could we represent these data? What is the most effective way? Students decide on specific approaches and share them with the class. A spirited discussion takes place on the best approach.

A 4th grade teacher asks students to explore the Eskimo culture through research and discussion. Using the textbook and multiple resources, the class tackles the following question: What makes Eskimo life similar to and different from your life? Students define and describe ideas about Eskimo life, using a graphic organizer to make connections between concepts and facts. In small groups, they develop a project on an aspect of Eskimo life, conduct research, organize data, and draw conclusions that compare Eskimo life with their own lives. The teacher has shared a rubric identifying the key features of successful project work. She regularly collects samples of student work to provide feedback and offer suggestions for improvement.

These two examples illustrate a curricular and instructional approach that we call *teaching for meaning and understanding*. This approach embodies five key principles:

- Understanding big ideas in content is central to the work of students.
- Students can only find and make meaning when they are asked to inquire, think at high levels, and solve problems.
- Students should be expected to apply knowledge and skills in meaningful tasks within authentic contexts.
- Teachers should regularly use thought-provoking, engaging, and interactive instructional strategies.
- Students need opportunities to revise their assignments using clear examples of successful work, known criteria, and timely feedback.

Teachers who regularly use this approach center their planning on three recurring questions that should be at the heart of any serious education reform: What are the big ideas and core processes that students should come to understand? What will teachers look for as evidence that students truly understand the big ideas and can apply their knowledge and skills in meaningful and effective ways? What teaching strategies will help students make meaning of curriculum content while avoiding the problems of aimless coverage and activity-oriented instruction?

Such an approach to teaching and learning is more apt to engage the learner and yield meaningful, lasting learning than traditional fact-based and procedure-based lecture, recitation, or textbook instruction. Yet when well-intentioned teachers and administrators are asked to put these ideas into practice, it is not uncommon to hear a chorus of *Yes, but*s. The message? Teaching for meaning is fine in the abstract, but such ideas are impractical in the real world of content standards and high-stakes testing. The current focus on state and local content standards, related testing programs, No Child Left Behind, and accountability have strengthened the view that we must use more traditional teaching approaches to produce high levels of achievement.

Ironically, a key lever in the standards-based reform strategy—the use of high-stakes external tests—has unwittingly provided teachers with a rationalization for avoiding or minimizing the need to teach for meaning and in-depth understanding. Teachers are more likely to spend time practicing for the test, covering many facts and procedures and using traditional lecture and recitation methods in the hope that more students will become proficient.

Two key *Yes, but*s interfere with the promise of teaching for meaning: Yes, but . . . we have to teach to the state or national test. Yes, but . . . we have too much content to cover. Both are misconceptions.

Misconception Number 1: We have to teach to the test.

Many educators believe that instructing and assessing for understanding are incompatible with state mandates and standardized tests. Although they rarely offer research to support this claim, these educators imply that teachers are stuck teaching to the test against their will. They would teach for meaning, if they could. The implicit assumption is that teachers can only safeguard or raise test scores by covering tested items and practicing the test format. By implication, there is no time for the kind of in-depth and engaging instruction that helps students make meaning and deepens their understanding of big ideas.

We contend that teachers can best raise test scores over the long haul by teaching the key ideas and processes contained in content standards in rich and engaging ways; by collecting evidence of student understanding of that content through robust local assessments rather than one-shot standardized testing; and by using engaging and effective instructional strategies that help students explore core concepts through inquiry and problem solving.

What evidence supports these contentions? A summary of the last 30 years of research on learning and cognition shows that learning for meaning leads to greater retention and use of information and ideas (Bransford, Brown, & Cocking, 2000). One avenue of this research explored the differences between novices and experts in various fields. Psychologists learned that experts have more than just a lot of facts in their heads: They actually *think* differently than novices do. According to the researchers, "expertise requires something else: a well-organized knowledge of concepts, principles, and procedures of inquiry" (p. 239). This finding suggests that students, to become knowledgeable and competent in a field of study, should develop not only a solid foundation of factual knowledge but also a conceptual framework that facilitates meaningful learning.

Data from the Trends in International Mathematics and Science Study (TIMSS) also challenge the premise that teaching to the test is the best way to achieve higher scores. TIMSS tested the mathematics and science achievement of students in 42 countries at three grade levels (4, 8, and 12). Although the outcomes of TIMSS are well known—U.S. students do not perform as well as students in most other industrialized countries (Martin, Mullis, Gregory, Hoyle, & Shen, 2000)—the results of its less publicized teaching studies offer additional insights. In an exhaustive analysis of mathematics instruction in Japan, Germany, and the United States, Stigler and Hiebert (1999) present striking evidence of the benefits of teaching for meaning and understanding. In Japan, a high-achieving country, mathematics teachers state that their primary aim is to develop conceptual understanding in their students. Compared with teachers in the United States, they cover less ground in terms of discrete topics, skills, or pages in a textbook, but they emphasize problem-based learning in which students derive and explain rules and theorems, thus leading to deeper understanding. A recent TIMSS analysis of data from seven countries indicates that all high-achieving countries use a percentage of their mathematics problems to help students explore concepts and make connections, whereas U.S. teachers tend to emphasize algorithmic plug-in of procedures instead of genuine reasoning and problem solving (Hiebert et al., 2003; Stigler & Hiebert, 2004).

Compatible findings emerged in an ambitious study of 24 restructured schools—eight elementary, eight middle, and eight high schools—in 16 states (Newmann & Associates, 1996). The research showed that students improved their performance in mathematics and social studies and that inequalities among high- and low-performing students diminished when the curriculum included sustained examination of a few important topics rather than superficial coverage of many topics; when teachers framed instruction around challenging and relevant questions; and when students were required to provide oral and written explanations for their responses.

Two additional studies of factors influencing student achievement were conducted in Chicago Public Schools. Smith, Lee, and Newmann (2001) examined test scores from more than 100,000 students in grades 2–8 and surveys from more than 5,000 teachers in 384 Chicago elementary schools. The study compared teachers who used interactive teaching methods with those who used noninteractive teaching methods. The researchers then looked at subsequent achievement in reading and mathematics.

The researchers described interactive instruction methods as follows:

> Teachers . . . create situations in which students . . . ask questions, develop strategies for solving problems, and communicate with one another. Students are often expected to explain their answers and discuss how they arrived at their conclusions. These teachers usually assess students' mastery of knowledge through discussions, projects, or tests that demand explanation and extended writing. Students work on applications or interpretations of the material to develop new or deeper understandings of a given topic. Such assignments may take several days to complete. Students in interactive classrooms are often encouraged to choose the questions or topics they wish to study within an instructional unit designed by the teacher. Different students may be working on different tasks during the same class period. (p. 12)

The study found clear and consistent correlations between interactive teaching methods and higher levels of learning and achievement.

In a related study (Newmann, Bryk, & Nagaoka, 2001), researchers in Chicago systematically collected and analyzed classroom writing and mathematics assignments given in grades 3, 6, and 8 by randomly selected schools and control schools for a three-year period. Researchers rated assignments according to the degree to which the work required authentic intellectual activity, which the researchers defined as "construction of knowledge, through the use of disciplined inquiry, to produce discourse, products, or performances that have value beyond school" (pp. 14–15). The study concluded that students who received assignments requiring more challenging intellectual work also achieved greater-than-average gains on the Iowa Tests of Basic Skills in reading and mathematics and demonstrated higher performance in reading, mathematics, and writing on the Illinois Goals Assessment Program.

Misconception Number 2: We have too much content to cover.

Teachers from kindergarten to graduate school wrestle with the realities of the information age and the knowledge explosion: There is simply too much information to cover. In theory, the standards movement promised a solution to the problem of information overload by identifying curricular priorities. Content standards were intended to specify what is most important for students to know and be able to do, thus providing a much-needed focus and set of priorities for curriculum, instruction, and assessment. In practice, however, content standards committees at the national, state, and district levels often worked in isolation to produce overly ambitious lists of "essentials" for their disciplines. Rather than streamlining the curriculum, the plethora of standards added to the coverage problem, especially at the elementary level, where teachers must teach standards and benchmarks in multiple subjects (Marzano & Kendall, 1998). The matter is further complicated by teachers' propensity to focus on overloaded textbooks as the primary resource for addressing their obligations to the content standards. U.S. textbook publishers try to cover the waterfront to appease state textbook adoption committees, national subject-area organizations, and various special-interest groups. Project 2061's study of mathematics and science textbooks (Kesidou & Roseman, 2002; Kulm, 1999) found few commercial texts that were not "a mile wide and an inch deep."

Teachers confronted with thick textbooks and long lists of content standards may understandably come to the erroneous conclusion that they must cover huge amounts of content. They feel that "if it is in my book, it has to be taught." The perceived need to "cover" is typically based on two implicit assumptions that we think are unfounded. The first assumption is that if a teacher covers specific material—that is, talks about it and assigns some work—students will adequately learn it for tests. The second is that teachers should typically address standards one at a time in lesson planning.

We know of no research that supports the idea that a coverage mode of instruction increases achievement on external tests. In fact, current research suggests that "uncoverage"—focusing on fewer topics and core understandings—is more likely to increase student achievement. The TIMSS research that demonstrated lower achievement scores for U.S. students found that U.S. mathematics and science curriculums were unfocused and included too many topics (Schmidt, McKnight, & Raizen, 1997). In contrast, high-achieving countries offered fewer topics at each level, coupled with more coherent and focused content. This concentrated focus enabled teachers and students to gradually build more complex understandings in mathematics, to delve deeply into subject matter, and to attain higher levels of achievement (Schmidt, 2004; Schmidt, Houang, & Cogan, 2002).

Recent studies on mathematics reform curriculums described by Senk and Thompson (2003) also support using an "uncoverage" approach to improve student achievement. All the mathematics reform curriculums that Senk and Thompson studied were designed to help students understand fundamental mathematical concepts and ideas. Longitudinal data from middle schools show that students using understanding-based mathematics curriculums demonstrated superior performance in both nonroutine problem solving and mathematical skills. Other studies on high school mathematics reform programs showed that students in these programs developed additional skills and understandings while not falling behind on traditional content.

The second misconception—that content standards and benchmarks should be addressed one at a time through targeted lessons—is often reinforced by state and national standardized tests that typically sample the standards and benchmarks one at a time through decontextualized items. Thus, the presentation of both tests and standards documents often misleadingly suggests that teachers should teach to standards one bit at a time. From this point of view, teachers certainly do not have enough time to address all standards.

We suggest clustering discrete standards under an umbrella of big ideas. This approach renders teaching more efficient while applying a principle of effective learning derived from research. Bransford and colleagues suggest that

> Experts' knowledge is not simply a list of facts and formulas that are relevant to the domain; instead, their knowledge is organized around core concepts or "big ideas" that guide their thinking about the domain. (2000, p. 24)

Similarly, the use of complex performance assessments enables students to apply facts, concepts, and skills contained in multiple standards in a more meaningful way while enabling educators to assess for true understanding, not just for recall or recognition.

Implications

Teaching for meaning and understanding leads to more lasting and significant student learning. Although we have made a strong case against two widely held objections to this approach, we realize that educators must test, debate, and explore these claims in their respective settings.

We therefore encourage you to conduct ongoing action research at the school and district levels that compares the kind of curriculum, assessment, and instruction described here with teaching that focuses on covering content or practicing for standardized accountability tests. Are students more engaged when you frame content in provocative essential questions? Do students show increased understanding when they have some choice in the manner in which they demonstrate their knowledge? Is performance on traditional assessments compromised when learners have the opportunity to apply their knowledge in authentic situations? Do inquiry-based and problem-based instruction energize teachers?

Let the results speak for themselves. We hope that by "uncovering" some of these unfounded claims, we will encourage educators and district leaders to take a more proactive stance and focus on what they *can* do to improve learning in today's standards-based world.

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