"You Can Teach For Meaning"

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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.

Teaching for meaning is more apt to engage the learner and yield more meaningful, lasting learning than traditional fact-based and procedure-based lecture, recitation, or textbook instruction.

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.

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 not time for the kind of in-depth and engaging instruction that helps students make meaning and deepens their understanding of big ideas.

We content 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 though inquiry and problem solving.

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 over-loaded textbooks as the primary resource for addressing their obligations to the content standards.

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. . . .[A] 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 to teach to the standards one bit at a time. . . .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.

"Facts or Critical Thinking Skills? What NAEP Results Say"

Harold Wenglinsky

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In the past 30 years, policymakers and educators have debated whether schooling should emphasize facts or critical thinking skills. Proponents of the first view argue that students need to know when the Civil War happened before they can accurately interpret its causes. Proponents of the second view counter than students will soon forget the exact dates of the Battle of Chancellorsville, but they will probably remember the insights that they gain from studying this battle's causes, leadership, military reasoning, and human costs.

Teaching for Meaning Practices Positively Associated with Student Achievement Scores on the NAEP

- Problems that involve multiple solutions
- Hands-on activities
- Real-world problems
- Project-based learning
- Learning metacognitive skills
- Service learning

For the most part, however, this debate has not been informed by actual empirical data. Fortunately, the National Assessment of Educational Progress (NAEP) offers relevant information. . . . By measuring the relationships between specific instructional practices and student performance, we can use NAEP data to compare the effectiveness of teaching for meaning with that of teaching basic skills. . . .When we examine various analyses, some published and some unpublished (Wenglinsky, 2000, 2002, 2003), a clear pattern emerges from the data: Across subjects, teaching for meaning is associated with higher NAEP test scores. Although students must learn basic skills and facts at some point, these results suggest that instruction emphasizing advanced reasoning skills promotes high student performance.

In mathematics, some educators advocate teaching students basic skills, such as the times tables, and reinforcing those skills through drill and practice. Others advocate teaching students mathematical reasoning, such as the principles behind algorithms for multiplication and division, and emphasizing such complex topics as data analysis and probably early in the curriculum. The NAEP data support the latter approach. Among U.S. 4th and 8th graders, teaching that emphasizes higher-order thinking skills, project-based learning, opportunities to solve problems that have multiple solutions, and such hands-on techniques as using manipulatives were associated with higher performance on the mathematics NAEP.

The NAEP data again suggest the benefits of teaching for meaning [in science]. Students tended to score higher on the 4th and 8th grade NAEP science tests when they had experienced science instruction centered on projects in which they took a high degree of initiative. Traditional activities, such as completing worksheets and reading primarily from textbooks, seemed to have no positive effect.

These analyses of NAEP results suggest that although basic skills have their place in pedagogy, critical thinking skills are essential. In mathematics and science at both the 4th and 8th grade levels, practices that emphasize critical thinking skills are associated with higher student achievement, whereas practices that emphasize basic skills are not. Apparently, students more effectively learn simple content, such as the times tables, if they understand the conceptual framework that lies behind that content. Educators do not need to choose between basic skills in math and science, but we should introduce advanced skills early to motivate students to learn the basic algorithms—which, let's face it, are not very interesting in and of themselves.

At the school level, principals need to encourage their teachers to spend more time teaching for meaning across subject areas—especially in math and science in the early grades.

"Knowledge Alive"

David Perkins

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Perhaps the broadest and most basic question for educators—before matters of method, testing, or grading—is "What should we teach?" And perhaps the most basic answer is "knowledge." Knowledge in the broad sense—facts, ideas, and skills—provides the mainstay of the school curriculum from kindergarten through college.

Fine for knowledge. But then there's the question of what you do with it. Education has always been more generous about exposing learners to large volumes of knowledge than about teaching them the diverse skills involved in handling knowledge well—the *knowledge arts.*

The knowledge arts include communicating strategically, insightfully, and effectively; thinking critically and creatively; and putting school knowledge to work out in what educators sometimes humble call the "real world." The knowledge arts bundle together deep reading, compelling writing, strong problem solving and decision making, and the strategic and spirited self-management of learning itself, within and across the disciplines.

We need to put the knowledge arts on the table—to celebrate them for the depth and power they provide and for the ways they make knowledge meaningful. And we need to worry about their neglect. . . .How well does schooling develop the knowledge arts of learners? The report card of business-as-usual schooling would look like this: Creating knowledge: D Communicating knowledge: B Organizing knowledge: C Acting on knowledge: D

The first D reflects the fact that in typical schools, investigative, inquiry-oriented activities in which learners create knowledge are sparse. Of course such activities occur here and there—for instance—but even then they often entail simply going through the motions of laboratory experiment rather than genuinely wrestling with ideas. . . .

Acting on knowledge also earns a D. We rarely ask students to do much with their learning outside school—except homework, of course. As a result, knowledge tends to become passive or inert. In both academic and practice contexts, learners fail to connect what they have learned to new situations or to act effectively on that knowledge (Bransford, Franks, Vye, & Sherwood, 1989). Students may memorize key information about biology for the science test but never ponder what the knowledge says about personal health care or public health issues.

Problems of transfer of learning have long plagued education (Bransford & Schwartz, 1999; Detterman & Sternberg, 1992; perkins & Salomon, 1988). Typical schooling does not even encourage students to carry their knowledge from one classroom to another. Science instructors often complain that the math from math class somehow evaporates in the science room. History instructors grumble that some cognitive Bermuda Triangle in the corridor between the English and history classrooms has sucked away students' knowledge of writing.

What does it look like to enliven teaching and learning through the knowledge arts? One way to advance the knowledge arts is to use *thinking routines* (Ritchhart, 2002) to make students' thinking visible, increasing their awareness of what goes into creating, communicating, organizing, and acting on knowledge.

For instance, Shari Tishman (2002) and her colleagues have explored a simple way to make certain kinds of thinking visible by asking two key questions: What's going on here? And What do you see that makes you say so? They adapted this approach from a procedure for examining works of visual art thoughtfully (Housen, Yenawine, & Arenas, 1991), but learners can apply these questions to many different objects—for example, a short poem or a satellite photograph of a hurricane. Or a history instructor might show a historical artifact like a crossbow, accompanied by the slight tweaked questions, How does this work? And What do you see that makes you think so?

One natural reaction to these examples –and others from ingenious teachers across the world—is that they simply illustrate good teaching methods. They show ways of teaching content that enhance student engagement and make knowledge more meaningful.

True enough, but the knowledge arts are more than just tools for teachers to teach with; they encompass ideas, skills, and attitudes for learners to learn—a second curriculum. Thinking of the knowledge arts in this way creates new responsibilities for educators. As teachers teach science, history, or literature, they should be able to specify what skills of inquiry, strategies of communication, methods of organization, and ranges of application they are striving to develop in students; how they are spending time on it; and how they are exciting students' interest and providing serious guidance. . . .Behind the second curriculum is a simple idea: Education is not just about acquiring knowledge, but about learning how to do significant things with what you know.

"To Be Intelligent"
John Abbott

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How Do We Create Intelligence?

The understanding of learning will become the key issue of our time. The creation of intellectual capital has been going on with every generation for millions of years, with perhaps one exception - and that is what has happened over the past five or six generations.

Until the early 1800s, people learned in real-life, on-the-job situations. Then our industrial society required people to develop no more than a range of functional skills (such as reading, writing, and calculation) that allowed them to fit into the dull routines of manufacturing. Schools ignored the more inclusive skills that enabled people to make sense of things for themselves in earlier ages. For much of the past century or more, the spontaneous, deep learning has existed largely outside the formal education system of Western industrial nations.

The ability to think about your own thinking (metacognition) is essential in a world of continuous change. Through metacognition, we can develop skills that are genuinely transferable. These skills are linked to reflective intelligence, or wits. As never before, the human race needs all the wits it can muster.

Being able to step back as a specialist and reflect - to honestly re-evaluate what you are doing from a general perspective - is naturally developed in the rich, collaborative, problem-solving, and uncertain world of the apprentice, as opposed to the tasks, schedules, and measurable activities of the formal classroom. Expertise requires much content knowledge - and metacognition. This deep reflective capability is what helps us develop new possibilities.

A New Model of Learning

A model of learning that could deliver expertise is ours for the asking. It would work on the basis of the biological concept of weaning - giving very young children plentiful help and direction, and then reducing this direction progressively as children master more and more skills. In this model, as adolescence ends, young people will already have taken full responsibility for directing their own learning. The age of 18 should mark not the beginning of independent learning but the age at which young people perfect that art and know how to exercise it responsibly.

Formal schooling, therefore, must start a dynamic process through which pupils are progressively weaned from their dependence on teachers and institutions and given the confidence to manage their own learning. Surely it should be the child who is tired at the end of the term, and not the teacher.

To achieve this model of learning, we must re-appraise the school system and its current use of resources and turn it upside down and inside out. Early childhood learning matters enormously. We must progressively show the youngest children that a lesson about American history, for example, can also be a lesson about how to learn how to learn and remember. As children grow older, they start to become their own teachers. The older the child becomes the more he or she becomes a productive resource of value to the community (Abbott 1994).

Our new understanding about learning is paralleled by radical developments in technology. The technological revolution holds the power to alter our education system, our work, and our culture. Indeed, this revolution puts learning and our traditional, conventional education systems on a collision course. The essence of the coming integrated, universal, multi-media digital network is discovery - the empowerment of the human mind to learn spontaneously, independently, and collaboratively, without coercion.

Such a new learning environment would be highly compatible with the natural functioning of the brain; with what we know about human aspirations; and, in particular, with the adolescent's need to feel involved and of value. It offers the greatest hope for an improvement in people's intelligence and the development of thoughtfulness. The current crisis in learning has originated not so much in the failure of our classrooms as in the failure of our communities to capture the imagination, involvement, and active participation of young people. A society motivated by a vision of thoughtfulness will quickly recognize that broadly intelligent young people will revitalize the whole community. We must escape from the 19th century assumption that learning and schooling are synonymous. Good schools alone will never be good enough - we need communities that think differently, work differently, and are even designed and built differently.

Such communities would make for a better, more exciting world in which living, working, and learning come together again and recreate vibrant, self-sustaining communities. I would love to live in such a world.