in search of understanding

THE CASE FOR CONSTRUCTIVIST CLASSROOMS

WITH A NEW INTRODUCTION BY THE AUTHORS

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Honoring the Learning Process

From the White House to the statehouse to the schoolhouse, politicians and educators have been wringing their hands over the condition of education in our nation. Some excoriate our present educational system, citing reports that raise questions about the inability of American students to perform as well on content area tests as students from other nations. Others are troubled by the condition of education in our nation for very different reasons. For a growing number of educators, questions regarding understanding and meaning and the roles that schools play in encouraging or stifling the search for understanding are far more important than questions regarding achievement as measured by test scores.

Many promising proposals have been put forth to address the issues surrounding students' construction of meaning. These proposals suggest overhauling assessment practices to make them more relevant for students, establishing site-based management teams in schools, rethinking the efficacy of tracking and ability grouping, and freeing school districts from federal and state mandates. We applaud these efforts, but find that these proposals don't quite go deep enough. They don't speak openly enough about the education system's underlying suppositions about what it means to learn, about what it means to become educated. They don't reach the nucleus of education: the processes of teaching and learning that occur daily, relentlessly, inexorably in classrooms throughout the nation. Educational reform must start with *how* students learn

and *how* teachers teach, not with legislated outcomes. After all, the construction of understanding is the core element in a highly complex process underpinned by what appears to be a simple proposition.

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The Construction of Understanding

It sounds like a simple proposition: we construct our own understandings of the world in which we live. We search for tools to help us understand our experiences. To do so is human nature. Our experiences lead us to conclude that some people are generous and other people are cheap of spirit, that representational government either works or doesn't, that fire burns us if we get too close, that rubber balls usually bounce, that most people enjoy compliments, and that cubes have six sides. These are some of the hundreds of thousands of understandings, some more complex than others, that we construct through reflection upon our interactions with objects and ideas.

Each of us makes sense of our world by synthesizing new experiences into what we have previously come to understand. Often, we encounter an object, an idea, a relationship, or a phenomenon that doesn't quite make sense to us. When confronted with such initially discrepant data or perceptions, we either interpret what we see to conform to our present set of rules for explaining and ordering our world, or we generate a new set of rules that better accounts for what we perceive to be occurring. Either way, our perceptions and rules are constantly engaged in a grand dance that shapes our understandings.

Consider, for example, a young girl whose only experiences with water have been in a bathtub and a swimming pool. She experiences water as calm, moving only in response to the movements she makes. Now think of this same child's first encounter with an ocean beach. She experiences the waves swelling and crashing onto the shore, whitecaps appearing then suddenly vanishing, and the ocean itself rolling and pitching in a regular rhythm. When some of the water seeps into her mouth, the taste is entirely different from her prior experiences with the taste of water. She is confronted with a different experience of water, one

that does not conform to her prior understanding. She must either actively construct a different understanding of water to accommodate her new experiences or ignore the new information and retain her original understanding. This, according to Piaget and Inhelder (1971), occurs because knowledge comes neither from the subject nor the object, but from the unity of the two. In this instance, the interactions of the child with the water, and the child's reflections on those interactions, will in all likelihood lead to structural changes in the way she thinks about water. Fosnot (in press) states it this way: "Learning is not discovering more, but interpreting through a different scheme or structure."

As human beings, we experience various aspects of the world, such as the beach, at different periods of development, and are thus able to construct more complex understandings. The young child in this example now knows that the taste of seawater is unpleasant. As she grows, she might understand that it tastes salty. As a teenager, she might understand the chemical concept of salinity. At some point in her development, she might examine how salt solutions conduct electricity or how the power of the tides can be harnessed as a source of usable energy. Each of these understandings will result from increased complexity in her thinking. Each new construction will depend upon her cognitive abilities to accommodate discrepant data and perceptions and her fund of experiences at the time.

Student Learning in Schools

Accepting the proposition that we learn by constructing new understandings of relationships and phenomena in our world makes accepting the present structure of schooling difficult. Educators must invite students to experience the world's richness, empower them to ask their own questions and seek their own answers, and challenge them to understand the world's complexities. Duckworth (1993) describes her version of teaching thusly: "I propose situations for people to think about and I watch what they do. They tell me what *they* make of it rather than my telling them *what* to make of it." This approach values the students' points of view and attempts to encourage students in the directions they have charted for themselves. Schools infrequently operate in such a way, as they typically narrow the band of issues for students—and

teachers—to study, demand short and simple answers to questions, and present complexity as previously categorized historical eras, mathematical algorithms, scientific formulas, or pre-established genres and classes.

But schooling doesn't have to be this way. Schools can better reflect the complexities and possibilities of the world. They can be structured in ways that honor and facilitate the construction of knowledge. And they can become settings in which teachers invite students to search for understanding, appreciate uncertainty, and inquire responsibly. They can become constructivist schools. Noddings (1990) writes:

> Having accepted the basic constructivist premise, there is no point in looking for foundations or using the language of absolute truth. The constructivist position is really post-epistemological, and that is why it can be so powerful in inducing new methods of research and teaching. It recognizes the power of the environment to press for adaptation, the temporality of knowledge, and the existence of multiple selves behaving in consonance with the rules of various subcultures (p. 12).

Start Here →

Starting with What We Know

To effectively explore our educational system, we must first examine the core unit of the whole enterprise, the classroom, a setting we already know much about. First, the American classroom is dominated by teacher talk (Flanders 1973, Goodlad 1984). Teachers often disseminate knowledge and generally expect students to identify and replicate the fields of knowledge disseminated. In a flowchart of classroom communication, most of the arrows point to or away from the teacher. Student-initiated questions and student-to-student interactions are atypical.

Second, most teachers rely heavily on textbooks (Ben-Peretz 1990). Often, the information teachers disseminate to students is directly aligned with the information offered by textbooks, providing students with only one view of complex issues, one set of truths. For example, many teachers validate the textbook view of Christopher Columbus as an intrepid explorer in search of a new world. The revisionist view of Columbus' voyage as the cause of oppres-

sion of the Native-American population in North America is not frequently discussed in classrooms. Alternative interpretations of social phenomena are rarely considered.

Third, although there exists a growing interest in cooperative learning in America's schools, most classrooms structurally discourage cooperation and require students to work in relative isolation on tasks that require low-level skills, rather than higher-order reasoning. Think about, for example, the many elementary classrooms in which students sit alone for portions of almost every day completing workbook and ditto sheets.

Fourth, student thinking is devalued in most classrooms. When asking students questions, most teachers seek not to enable students to think through intricate issues, but to discover whether students know the "right" answers. Consequently, students quickly learn not to raise their hands in response to a teacher's question unless they are confident they already know the sought-after response. Doing otherwise places them at some risk.

Fifth, schooling is premised on the notion that there exists a fixed world that the learner must come to know. The construction of new knowledge is not as highly valued as the ability to demonstrate mastery of conventionally accepted understandings.

Perceived Success

The power and sanctity of the curriculum and the subordination of students' own emerging concepts are profound concerns. Many students struggle to understand concepts in isolation, to learn parts without seeing wholes, to make connections where they see only disparity, and to accept as reality what their perceptions question. For a good many students, success in school has very little to do with true understanding, and much to do with coverage of the curriculum. In many schools, the curriculum is held as absolute, and teachers are reticent to tamper with it even when students are clearly not understanding important concepts. Rather than adapting the curriculum to students' needs, the predominant institutional response is to view those who have difficulty understanding the unaltered curriculum as slow or disabled. These

students are often removed from mainstream classes, given remedial instruction, or retained.

Even students who are capable of demonstrating success, who pass tests with high marks and obtain "honors" diplomas, frequently don't connect the information they receive in school to interpretations of the world around them. Consider Gardner's (1991b) lament:

> I contend that even when school appears to be successful, even when it elicits the performance for which it has apparently been designed, it typically fails to achieve its most important missions. Evidence for this startling claim comes from a by-now overwhelming body of educational research that has been assembled over the last decades. These investigations document that even students who have been well-trained and who exhibit all the overt signs of success—faithful attendance at good schools, high grades and high test scores, accolades from their teachers—typically do not display an adequate understanding of the material and concepts with which they have been working (p. 3).

In many districts throughout the nation, students spend a good deal of time preparing for standardized tests or statewide exams. For example, in mathematics, a geometry teacher might help students memorize the formulas and proofs necessary to pass an exit or minimum competency exam. A few months later, however, when some of these same students are asked to apply geometric principles on a national examination, such as the National Assessment of Educational Progress (NAEP), only a small percentage of them might demonstrate the ability to do so (Schoenfeld 1988). In other words, although considered successful in a high school geometry course, many of these students cannot demonstrate facility with geometric principles, even when their learning was assessed in the same manner as it was previously assessed, specifically, on a multiple-choice exam.

Katz (1985) and Gardner (1991b) describe the discrepancy between perceived and actual success as the difference between learning and performance. In discussing this difference, Katz (1985) stresses that emphasis on performance usually results in little recall of concepts over time, while emphasis on learning generates long-term understanding. Students educated in a setting

that stresses performance learn that technique, rules, and memory matter more than context, authenticity, and wholeness. Therefore, rather than seeking deep understanding, these students seek short-term strategies for accomplishing tasks or passing tests. When asked, several weeks or months later, to apply what they supposedly had learned, most students can't.

Making a Difference

The debate that frames current conceptions of school reform was largely defined decades ago. Franklin Bobbitt (1924, p. 8) wrote: "Education is primarily for adult life, not for child life. Its fundamental responsibility is to prepare for the 50 years of adulthood, not for the 20 years of childhood and youth." The current critiques of American education emanating from business and industry certainly have their roots in Bobbitt's conception of the purpose of schooling. John Dewey (1938), however, argued that education as preparation for adult life denied the inherent ebullience and curiosity children brought with them to school, and removed the focus from students' present interests and abilities to some more abstract notion of what they might wish to do in future years. Dewey urged that education be viewed as "a process of living and not a preparation for future living."

Schools and the teachers within them can do both: they can be student-centered and successfully prepare students for their adult years by understanding and honoring the dynamics of learning; by recognizing that, for students, schooling must be a time of curiosity, exploration, and inquiry, and memorizing information must be subordinated to learning how to find information to solve real problems. Adult modeling and environmental conditions play a significant role in the development of students' dispositions to be self-initiating problem posers and problem solvers. When students work with adults who continue to view themselves as learners, who ask questions with which they themselves still grapple, who are willing and able to alter both content and practice in the pursuit of meaning, and who treat students and their endeavors as works in progress, not finished products, students are more likely to

demonstrate these characteristics themselves. Barzun (1992) writes:

> Anyone who has ever taught knows that the art of teaching depends upon the teacher's instantaneous and intuitive vision of the pupil's mind as it gropes and fumbles to grasp a new idea (p. 20).

Similarly, when the classroom environment in which students spend so much of their day is organized so that student-to-student interaction is encouraged, cooperation is valued, assignments and materials are interdisciplinary, and students' freedom to chase their own ideas is abundant, students are more likely to take risks and approach assignments with a willingness to accept challenges to their current understandings. Such teacher role models and environmental conditions honor students as emerging thinkers.

End Here.

Considering Developmental Principles

Students' cognitive developmental abilities are another major factor in the process of constructing understanding. It is crucial that teachers have some understanding of the foundational principles of cognitive developmental theory. For example, in one kindergarten class, children watched their teacher mold three buckets of clay into eight balls each and give one ball to each child. Most of the students "correctly" counted the twenty-four balls and acknowledged that each child got a "fair" share. Did the students actually *know* that when the teacher divided the clay each ball became 1/8 of a bucket and 1/24 of the total amount of clay? They were in the room and they saw it happen. But, the children in this kindergarten class were intellectually busy grappling with other relationships and understandings. They were engaged in notions of counting, distributing, and matching, important undertakings in the development of their concepts of number. Most of them didn't consider the ball of clay 1/8 of one total and simultaneously 1/24 of another total. They did not construct the concept that fractions imply relativity. They *did* construct and consolidate many other concepts. They seriated numbers and established a

one-to-one correspondence between students in the class and balls of clay, constructions meaningful to them.

To maximize the likelihood that students will engage in the construction of meaning, teachers must interpret student responses in developmental terms and must appreciate those terms. For example, in discussing how children come to understand number, Papert (1988) writes:

> Children don't conceive number, they make it. And they don't make it all at once or out of nothing. There is a long process of building intellectual structures that change and interact and combine (p. 4).

Teachers who value the child's present conceptions, rather than measure how far away they are from other conceptions, help students construct individual understandings important to them.

The Simple Proposition Revisited

The proposition that we construct individual understandings of our world and the assertion that schools must play an important role in this process does sound simple. But what sounds simple propositionally is quite difficult operationally. Consider this example of a first-year middle school teacher preparing for opening day in a school noted for its constructivist orientation. Her journal entries describe her lesson planning process:

> 9/2
> *Here it is, Labor Day, the day before I start my new job. I'm scared to death. Last week, I had a meeting with my team teacher. We talked about what we are going to teach for the first few weeks. It was very sketchy. She also talked about something called "the big picture." I'm not quite sure what she meant. She gave me an example. If only I could remember it now. We're starting the microscope unit. Oh, that's another thing. I always thought that we would just follow the textbook. She tells me to "start thinking in terms of units." If I could only get an opening to start this unit off with, I'd be a little more at ease.*

9/3

. . . Tomorrow with the kids I have to have a grabber lesson. Tomorrow, I'm THE TEACHER. My team teacher told me to get an idea of what the microscope unit is all about. Nothing has come to me yet. Perhaps, if I could only relax, I could think.

9/4

It happened! This morning around 4 a.m. I got an idea. A microscope "takes a closer look at life." My topic today was "Taking a Closer Look at Life." I paralleled a story about people wanting to take a closer look at what was happening at the scene of a fire to taking a closer look through a microscope lens. Not a very close analogy, but, in a sense, it worked. . . .

The teacher opened her first lesson with the question: What do you think life science is all about? A few students responded with one-word answers such as "living," "animals," "plants." She acknowledged each student with "Yes" or "That's right." She then read a story about a fire engine. Immediately upon finishing the story, she said to the students: "The point of the story is that you can see many things at a fire and you can see many things in science. Everyone come to the front and get your textbooks." After some administrative work took place, the teacher handed out photocopies of some well-known optical illusions and said: "In science, you have to develop a critical eye. Write down what you think you see." Her next questions were: "Who can see a vase?" and "Who can see two faces?"

The teacher's lesson plan had many of the elements of a constructivist approach, but her implementation of the plan did not. She opened the lesson with an umbrella question that asked students to share their current points of view. But she accepted one-word answers, asked for neither elaboration on the part of the speaker nor feedback from the group. She planned for an analogical discussion with students. But, she, herself, drew the analogy *for* the students rather than asking questions that would have allowed the students to generate their own analogies. She attempted to integrate her "science" topic with literature and art, encouraging the students to challenge their own perspectives. But *she* defined the range of perspectives by asking if the students saw