Chapter 3: Contemporary Learning Theories: Problem Solving and Understanding

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The transmission view of knowledge doesn't lend itself to true understanding, but instead to memorizing random facts. Knowledge must be relevant and meaningful for children to acquire it and put to use. It seems like such an obvious strategy, yet I certainly never experienced it in school and do not know many who did.

—Lisa Trebasky
First-year teacher, science, grades 9–12

As politicians, scientists, and military leaders attacked the "flabby" school curriculum of the 1960s, the federal government responded actively to the education "crisis." In particular, the National Defense Act and the National Science Foundation distributed money, reports, and the views of scholars and scientists to spur a shift in teachers' beliefs about what American students should learn. Schools' emphasis on preparing literate and well-behaved citizens and workers was fine, but it was not enough to fight and win the cold war. What the nation needed, these voices argued, was a nation of problem solvers.

Learning as Thinking and Understanding

This new demand on the common school raised serious questions, for psychologists at least, about the adequacy of the behavioral theories that dominated schools. Jerome Bruner was among the psychologists who disputed the behaviorists' transmission theories and proposed that it was possible to know more about how thinking and learning actually happened. Given that the country now saw the thinking of leading scientists and creative people as the most valued and practical kind of thinking, Bruner proposed that it was how they thought as much as what they knew that made their contributions possible.

Instead of looking at the curriculum as a linear progression of adding facts upon facts throughout the grades, Bruner envisioned a spiral curriculum. He suggested that all subjects had certain essential structures that children could learn at some appropriate level of sophistication at nearly any age. For example, children can begin learning fundamental ideas in physics even in the earliest grades, if teachers embed these concepts in concrete activities. First-year teacher Erik Korporaal's acts on Bruner's ideas as he engages his students with the concept of wave formation, in a way appropriate to their age.

When learning about wave formation, the students engaged in an activity where they used their mouths to blow puddles of paint around on a piece of paper. The students then observed the tiny waves in the paint that resulted.
Then, I deliberately connected the students' hands-on experience with wave creation to the ways in which wind forces create waves on the surface of the ocean.

—Erik Korporaal
First-year teacher, grade 6

Bruner's ideas influenced how people thought about science and mathematics and, eventually, other school subjects as well. His contributions foreshadowed, popularized, and even brought into public policy new theories of thinking and learning.

As teachers struggled to engage students with the rigorous academic concepts and complex thinking, they too discovered that teaching all the components of a subject did not add up to sophisticated learning—just lots of parts that frequently “turned off” students from the subject. Many teachers took readily to new curriculum materials that approached subjects from perspectives of large problems and hands-on projects. At the same time, psychologists tried to explain the processes people actually use to understand concepts, think critically, and solve problems. No longer were the invisible workings of the brain off-limits. Today we call this period of intellectual ferment the “cognitive revolution.”

What’s Going On in the Mind?
The most fundamental shift from behavioral psychology was that the cognitivists paid attention to what goes on at the very moment of learning instead of looking solely at what happens before and after. It is often easy to see the results of learning. For example, we can watch a child sloppily bake his first cake and identify at least a few of the many stimuli for this learning. We might credit the cake-baking modeling provided by parents, the child’s sweet tooth, the attraction of a complex challenge, and the prospect of pleasing those who will eat the finished cake. But identifying such stimuli and suggesting that they “cause” the learning leaves unanswered many questions about how the learning actually happens.

Cognitive theorists see children as active agents of learning—making sense, understanding, and creating knowledge—rather than passive receivers or observers of outside events. Cognitive theorists also certainly consider how environmental conditions and biology affect those mental processes. But, suddenly, knowledge is not “out there” in the world, waiting for us to nibble away in pieces until we are filled up. Knowledge is us; we make it as we experience the world.

This powerful idea is of tremendous consequence for teachers, because the focus of education shifts to children's thinking; the teacher's instruction is no longer the only variable we have to pay attention to. Now, the learner is at least an active, and some would say controlling, partner in acquiring school knowledge.

Learning Is Active

A focus on learning as a process of making sense out of one’s experience was not a new idea in the 1960s. At the turn of the century, philosopher John Dewey argued that children's learning is essentially problem solving, especially when they are engaged in devising their own experiments, building equipment, and cooperating with others in planning and doing projects. In the article “How We Think,” published in 1910, Dewey railed against “the complete domination of instruction by rehearsing second-hand information, by memorizing for the sake of producing correct replies at the proper time.” Although Dewey didn't discount the importance of information, he maintained that information was acquired as children solved problems. Dewey's work provided a foundation for considering children's learning as an active mental process. However, it was radical for its time and failed to give adults in the twentieth century the sense of order and control over children and knowledge that modern adults seemed to crave. Not until the 1960s did a theorist with similar ideas to Dewey capture the interest of psychologists and pique the curiosity of educators.

In the 1950s, at nearly the same time that B. F. Skinner was creating so much enthusiasm for behavioral studies, a group of American psychologists interested in child development had “discovered” French biologist Jean Piaget’s work. Piaget stunned them with his model for what humans actually did with all those inputs and stimuli that behaviorists discussed. He argued persuasively that behavioral psychologists were asking the wrong questions, and that even Dewey’s suggestion that learning was a process of sense-making through action did not go far enough.

Learning Is the Construction of Meaning

Piaget had begun to observe children, including his own three, in the 1920s. Based on these observations, he developed learning theories that accounted for both human biology and experience. Piaget proposed that children are born with the drive—the curiosity—to construct new meanings. Learning or constructing new knowledge was the result of the mind’s work, not an outsider’s (whether the environment generally or a person in particular) manipulation. According to Piaget, children, like “little scientists,” investigate and learn pretty much on their own, using the environment as their laboratory. Like real scientists, their explorations are partly self-directed and partly random or unplanned.

Throughout childhood, they are curious and inclined to experiment. They not only take advantage of learning experiences but also create these learning opportunities for themselves.

For Piaget, it was not sufficient to explain children’s increasingly sophisticated behavior simply on the basis that people have more pieces of knowledge from which to work as they grow older. Rather, much more complex mental changes must occur. He argued that thinking and learning processes develop through particular stages at which points children think about the world in fundamentally different ways.
Learning Reorganizes Our Minds  To explain mental processes or structures of learning, Piaget proposed the interrelated ideas of schemes, assimilation, and accommodation. We can think of a scheme, roughly synonymous with a template (a pattern or mold to guide new work), as the mental framework that we use to organize our perceptions and experiences. Later “scheme theorists” propose that schemes enable us to connect the details of prior knowledge that are related in some potentially useful way. For example, schemes allow us to identify particular objects we have never seen before by connecting them with our experiences. We can identify chairs we have never seen before as chairs because we have a scheme that allows us to recognize an essential set of characteristics—general size and shape, suitability for sitting, and so on. In short, we have a sense of “chairness” that relieves us of the need to do elaborate figuring before we take a chance and sit down. It does not much matter if it is a rocking chair, a backless chair; or a leather, green, or broken chair. As soon as there are enough recognizable chair details that fit our chair scheme, recognition is accomplished—we make a meaning. We make the object into a chair.

Piaget saw assimilation and accommodation as the processes through which children develop and alter their schemes. When we ask children “What did you learn today?” we seem to ask what new facts they added to their existing ones. Piaget called this adding on, or blending, assimilation. It is much less common for us to ask, “How did you change today?” And, of course, this is a much harder question to answer. For example, compare these two questions and the answers you are likely to get: (1) “What did you learn about the Civil War?” and (2) “How do you understand the Civil War differently?” The first question asks, in effect, for added knowledge. The second question presumes that additional knowledge requires alterations in what the student already knows. This second process—the changing or altering of schemes to accept new experiences—Piaget called accommodation. While assimilation and accommodation follow from experiences, experiences may include one’s own thoughts. Just sitting and thinking can generate new (mental) experiences and trigger assimilation and accommodation.

A familiar example may help make this a bit clearer. You probably have a scheme for driving. That is, you have lots of driving information (e.g., traffic rules, judgments of space and speed, recognition of sounds, and the feel of the wheel and road). You learned and now remember and make use of all these bits and pieces of information when you need them only because you have them organized or packaged into a driving scheme. So when you get into your car, you simply drive off without thinking consciously about all of the judgments you make and specific operations you perform. If you drive a different but fairly similar car, you could use your existing driving scheme by assimilating a few new bits of information about the new car. The turn indicator switch might be in a different spot, the steering wheel might be a bit more or less sensitive, and the brake pedal might be a somewhat further reach. But your driving scheme does not have to change. Now, consider what would happen if you were an English beginner, struggling and even the motivation (and sometimes resistance) to relearn to drive by assimilating, just as we approach a tolerable balance we may seek to set off to a higher, more difficult level (more tension). The second process—the changing or altering of schemes to accept new experiences—Piaget called accommodation. While assimilation and accommodation follow from experiences, experiences may include one’s own thoughts. Just sitting and thinking can generate new (mental) experiences and trigger assimilation and accommodation.

Learning Unsettles Us  Consider those people who love the challenge of their job, or working a puzzle, or going to a higher, more difficult level (more tension) in a computer game. A boring job is one that provides little new information to either relieve tension or create new challenges. Piaget used the concepts of disequilibrium and equilibration to explain the energy, tension, sense of balance and imbalance, and even the motivation (and sometimes resistance) that drives the whole cognitive process. Just think about how you would feel as you were adjusting to driving a manual transmission in England. Uncomfortable. Unbalanced! That same process happens as children develop new ways of thinking about the world. Needless to say, no good is served by having children flounder in the midst of unsuccessful problem solving. Unless resources are handy to support the problem solving, a student might learn to avoid problems. However, disequilibrium in children may needlessly “trick” well-meaning adults to step in and smooth the waters—get rid of the discomfort. It is important for schools to help students identify the tension of “not knowing” as curiosity or a “drive” or a need to know. This is a productive and necessary element of learning and is probably what most people experience as “motivation.”

Equilibration is the lessening of tension as more information is acquired, and as the balance between what one knows and needs to know stabilizes—perhaps a point when the job or game starts to get boring. Fortunately, new information is just as likely to set off a new imbalance as it is to put all questions and tension to rest. So, once again, just as we approach a tolerable balance we may seek more information, see more complex problems, accept new challenges. Confident learners identify disequilibrium as something positive—even addictive.

When everyone including our supposedly “best” student is struggling, we tend to think that we are expecting too much from them. I asked students not only to recite the formula, but also to derive it and understand where it came from. It was no longer enough just to memorize the formula. Students had to make sense of the formula. I nearly succumbed to the belief that the lesson was too difficult for them. Then, I realized that I was not thinking about Piaget’s theory. When I did, I realized I was not expecting too much from them, just something new.

—Marilyn Cortez, First-year teacher, mathematics, grade 9
Old Meanings Can Get in the Way  Humans can get very set in their mental ways and erect barriers to further learning. Since firmly fixed schemes do not easily change to accept new experiences, people often alter their perceptions to make them compatible with their existing schemes. For example, most children and adults have incorrect but fixed schemes for many of the physical laws of the universe. They naively experience the sun as moving across the sky instead of attributing the apparent motion of the sun to the earth's rotation. It is so difficult to develop a practical or experiential scheme for the earth spinning (none of our physical sensations support this) that we continue to perceive the sun as moving.

Stubborn schemes extend to social phenomena as well. For example, teachers often develop needlessly narrow, even prejudicial, schemes for forming conclusions (making sense or meaning) about who will be successful or unsuccessful students. A teacher might notice the race, language, dress, friends, standardized test scores, school label (“gifted” or “regular”), or initial assignments of a student. Any one or combination of these observations might be “enough” information to make sense of that student’s prospects for success. Informally, we might call this jumping to a conclusion, especially if we disagree or feel that much important information has been left out.

Once the teacher has made sense of the student, let us say as a low achiever, the teacher is likely to notice additional characteristics that fit the teacher’s scheme or “frame of mind” for low achievers (i.e., “This kid is absent a lot—just like the rest of them”). On the other hand, what happens to information that contradicts the scheme, such as a high grade on the first test or perfect attendance? Initially, the contradictory information might cause disequilibrium—tension that needs to be resolved. Because schemes are difficult to recognize and difficult to change, perfect attendance might simply pass unnoticed or be dismissed as not important; a good grade might be seen as one exception to the scheme or cause to wonder if the student cheated.

Minds Develop in Stages

Can you bring to mind medieval paintings that portray children with adult faces on top of chubby child bodies? If so, you have an idea of how people understood learning well into the twentieth century. Historically, society thought children had the same mental capabilities for learning as adults—they just weren’t as good at it. Even today, many adults look at children and see miniatures of themselves.

One of Piaget’s most important contributions was his theory that children think in fundamentally different ways from adults and that their thinking develops as they make sense of experiences. Children represent the world differently as they proceed through developmental stages. They do not simply accumulate knowledge and get faster at figuring things out. It might help to think about a caterpillar transforming itself into a butterfly. A butterfly is not simply a larger, qucker, more complex caterpillar; it is a fundamentally different creature. So, too, with the fundamental differences Piaget saw in children’s cognitive transformations between one stage and another.1

Consider a child’s experience in the sandbox—pouring sand back and forth between a small pail and a larger one. This experience adds to the growing understanding of conservation, a fundamental physical law that says that altering the shape or position of something does not change its volume or quantity. Piaget used this law as an example of an understanding that cannot take place until the child is developmentally ready. A younger child will conclude that a small pail filled to overflowing contains more sand than a large pail only partly filled. This child will not conclude that the amount of sand remains the same whether it fills a small container or half-fills a larger one. Only later, when he is old enough and experienced enough, will he develop the concept of conservation.

Piaget argued that making new meanings—developing schemes—requires a complex interplay among broad concepts (such as conservation), small bits of information (sand filling or not filling the pail), as well as sufficient age or maturity. An 18-month-old will not “get” conservation because she does not yet have the right kind of biological apparatus to acquire that mental understanding—just like the caterpillar can’t fly and the tadpole can’t hop. But simply maturing physically does not fully account for development. The child’s experiences and social interactions also play powerful roles. Taken together, new biological capacities and information set into motion the imbalance/balance tensions of equilibration, and the child learns from physical and social experiences when she is ready. Regarding the concept of conservation, an 18-month-old needs time (age). And she needs experience with sand and pails, water and buckets, getting into a full bathtub, trying to squeeze an extra toy into a suitcase, and the like. She also needs to feel all the possible attendant emotions—playing with sand is fun, approved by parents, feels good, and so on.

The Cognitive “Revolution”

Since the 1960s psychologists have modified and refined Piaget’s work. In a manner of speaking, the field of psychology took inspiration from Piaget and ran off in several directions, gaining more or less distance from behaviorism. Even so, cognitive psychology continues to reflect Piaget’s observations about fundamental mental processes. All now agree that learning is developmental, though the stages are much less clearly defined than people first understood them to be. And all agree that learners are active creators, builders, or constructors of their own knowledge, rather than passive receivers.

The consequences of this constructivist model of learning are significant. Learning is much less a process of passively accepting knowledge that has been transmitted by teachers or through experiences than it is a process of selecting and transforming new information to serve new information needs. Drawing on Dewey and Piaget, contemporary constructivists—including teachers—focus on how new information and novel situations affect what we already know, and how we apply what we already know to novel situations. First-year teacher Maria Hwang speaks from this constructivist perspective.
Most emphasize that individuals call upon multiple processes, which vary in individuals because of differences in their development, experience, and biological disposition. Some claim that differences in intelligence stem from the speed, power, or efficiency of mental processes. Others credit intelligence differences to different experiences that people have or do not have that promote development.

Racial Differences Are Irrelevant Generally, cognitive psychologists disagree with The Bell Curve’s authors and others who use IQ test scores as evidence that people of different races inherit more or less thinking ability. They consider that conclusion scientifically unwarranted and socially irresponsible. They find human thinking a far richer and deeper collection of abilities than IQ can explain, even if there were to be widespread agreement on the meaning of IQ. Poverty and oppressive social conditions (factors that do vary in the United States according to race) significantly affect the few abilities that IQ tests purport to measure. Jerome Bruner reports an interesting cross-cultural example of the interplay between social conditions and IQ: Korean immigrants scoring fifteen points lower on average on IQ tests in Japan than they score in the United States. Bruner attributes this gap to the two cultures’ treatment of the Korean immigrants: In Japan, they are denigrated as ignorant; in the United States, they are stereotyped as smart. Other differences, addressed later in this chapter, can be attributed to social and cultural differences not associated with poverty or oppression.

Intelligence Is Multidimensional A number of contemporary psychologists have developed theoretical models of multidimensional intelligence. For example, Robert Sternberg proposes three types of intelligence that vary in strength among people. One intelligence promotes analytical and critical thinking, one leads to the development of creative new ideas, and one enables humans to respond quickly and productively to everyday events and experiences. Together, these intelligences include many more cognitive abilities than are captured in the concept of IQ. Sternberg argues that intelligence which is not encompassed in IQ may be more important for success at school and on the job. He suggests that rather than being strictly innate, these intellectual skills can be taught “to at least some of the people, some of the time.”

Howard Gardner moves even further than Sternberg from the idea that intelligence is a trait. Like Sternberg, Gardner discounts a single intelligence and emphasizes the many mental abilities and intelligences we all use. Gardner identifies intelligences that include but are not limited to language, mathematics and logic, visual and spatial perception, control over one’s own movements, sensitivity to others, and knowledge of oneself. He considers these intelligences as mastery of competencies or skills, rather than underlying abilities or the quality of one’s mind. His theory of multiple intelligences stresses the flexibility and variety of children’s proclivities for learning.

Gardner suggests that everyone inherits the capacity to develop each of these intelligences, although individuals vary, and he notes that different cultures and subcultures stress certain kinds of intelligence. In the school culture,
for example, survival and success depend more on language and mathematical abilities than on other abilities. Out of school, other domains are often as or more desirable than the skills that earn success in school. The most successful corporate CEO, schoolteacher, or surgeon may have gotten the very best test scores in school, but school success typically does not predict one’s ability to seize a business opportunity, ask a good question at just the right moment, or hold a scalpel steady.

Children Learn to Be Intelligent in Multidimensional Classrooms These cognitive theories tell us that students learn to be intelligent as they experience the world. This is extraordinarily positive and reaffirming for teachers. Classroom experiences that allow for meaning making in the variety of ways that students have available to them do help students become smart. However, theories of multiple intelligence have sent educators off in two directions. The more sensible of the two is to develop complex, realistic, multidimensional assignments and projects so all children can discover and combine their particular strengths with areas where they are not strong or lack experience. The other direction is to search for a student’s particular kind of intelligence and prepare activities that tap into that intelligence. But treating these multiple intelligences as traits that characterize children is ridiculous. Cognitive psychologists disagree among themselves about many things, but they shudder collectively when they hear teachers talk about their “spatial” children or their “bodily kinesthetic” learners.

Learning Is Social and Cultural

Learning, remembering, talking, imagining: all of them are made possible by participating in a culture. (p. 166)
So, in the end, while mind creates culture, culture also creates mind. (p. 166)

—Jerome Bruner

Culture and Education, 1990

The cognitive learning theories we have considered so far emphasize learning as an individual activity that takes place in the mind. According to these theories, individuals may differ in the particulars of what they learn, but mental processes are essentially the same across individuals and cultures. However, a growing number of psychologists, anthropologists, and linguists are finding these theories inadequate. Their work shows how cognitive processes differ in cultures that stress different kinds of knowledge, values, social organization, or work. Their sociocultural theories argue that society and culture determine learning as much as mental activities, or rather, learning and mental activities are cultural. These scholars go beyond simply saying that culture influences thinking. Like Bruner, they maintain that society and culture are indistinguishable from learning or thinking. People cannot separate how thinking takes place from what knowledge is available in the place where learning happens. Drawing primarily from cross-cultural studies of learning (comparing how people think and solve problems in different societies), sociocultural theories fuse learning, intelligence, and culture into a single entity.

Families, Communities, and Cultures

It is easy enough to recognize that different cultures teach different knowledge in different ways. Within our own society we have an abundance of ethnic, regional, and neighborhood cultures in which common knowledge, customs, and how people express themselves are very different. If learning and intelligence were independent of culture, we could conclude that all knowledge is equally accessible to everyone, and a single standard for learning, ability, achievement, and merit would be warranted. But what happens when a theory of learning integrates culture with thinking processes? In that case, being smart by the standards of one culture is not comparable to being smart by the standards of another culture. Therefore, students can reach society’s highest standards for knowledge and skills only when schools allow them to use all the knowledge (from all the cultures) they have experienced. If we try to teach students by separating what and how they learn from their family’s culture or history, these students cannot be smart.

Building on Students’ Cultural Knowledge Why not start, then, with the student’s culture? Students must be able to use their own social and cultural thinking processes to make sense of any new knowledge, especially new cultural information. Schools must not accept as a given that a student’s existing cultural tools for learning or solving problems are inferior to those of the dominant (or school) culture. If we do not encourage students to develop and use all the cultural background they possess, we deny them, according to sociocultural theories, a substantial part of their available intelligence.

Again, cross-cultural comparisons provide some of the clearest examples. A child from a culture that does not have a formal number system would not think about quantity in the same way as a child from a culture with such a system. That is, those difficult-to-budge schemes for numbers and quantity, established early in life, might not easily accommodate Western mathematics. Western mathematics can be learned, but the people cannot be thought of as less intelligent because of their difficulty. Similarly, Americans and British who are used to politely waiting their turn in lines have great difficulty understanding the “crowd and squeeze” methods in many other societies. It is not unusual to hear American tourists pronounce an entire society “rude” because of the jostling they receive at an airport.
Culturally sensitive teachers keep in mind that important cultural differences often go undetected. For example, the degree to which students ask questions or remain quiet and observe can be a culturally shaped trait. However, many teachers might view constant questioning as aggressive or dependent behavior or interpret a reflective, observing child as withdrawn or slow. It is typical for white, middle-class, school-minded parents to constantly ask their children questions that they already know the answers to: “What do you call this?” “What kind of a car is that?” “What is this color?” “Is this my nose?” Children with other backgrounds may not be used to an adult asking questions unless the adult does not know the answer. In some cultures, if adults want to find out whether a child knows something, they are likely to be more imperative and business-like: “Tell me which foot this goes on.” Show me how you do this problem.” Imagine the potential for such a child’s bafflement (and a teacher’s misperception) when a teacher says “And where do we go now?” “And how are you going to leave” instead of “It’s time for recess. Please do not run until you are on the playground.”

Whose Culture Is Best? A Political, Not a Learning Issue

Sociocultural theories integrate social, historical, and cognitive processes. They recognize multiple ways of thinking and multiple definitions of important knowledge; they support a wide range of cultural perspectives and practices in the school curriculum; and they justify using social interaction as the primary medium of instruction. Suddenly, the political implications of sociocultural theories leap out at us. Sociocultural theories threaten those who want schools to represent only one culture’s view of the world-only one group’s shared ways of knowing and making sense. These theories also call into question traditional teaching practices such as lecturing and having students work alone. Sociocultural theories of learning and intelligence open the door for sociocultural interpretations of merit and progress, to admit a diverse range of hardworking, socially productive, creative, and very smart people.

A Socially Just Learning Theory

Sociocultural theories are important at the turn of the twenty-first century, because they shift the burden of low achievement from culturally and linguistically diverse groups of children to where it belongs: on schools and the larger society. The strength of sociocultural perspectives is that social theory and learning theory at last converge in ways that will allow differences among Americans to strengthen, rather than weaken, our social, economic, and political life. Currently, students outside the dominant culture carry the greatest burdens of schools that ignore the social and cultural elements of learning, but white and middle-class students do not escape damage. They, too, are victims of narrow and limited conceptions of learning and intelligence.

Sociocultural theory supports teachers who believe their job is to help all students develop the understanding and problem-solving skills necessary to fill important roles in a diverse and democratic society. No longer must these teachers endure the charge that they are naive idealists who ignore the real-world lessons of “scientific” theory. Instead, teachers and others are now obliged to confront traditionalists with the obvious and documented failures of traditional theory and practice. They can now “answer back” with a theory of their own, one more consistent with their moral and ethical convictions and more relevant to today’s practice.

In 1896, philosopher John Dewey wrote an essay for The School Journal called “My Pedagogic Creed.” In it, Dewey ties children’s learning to the social context in which they learn. Dewey wrote:

I believe that all education proceeds by the participation of the individual in the social consciousness of the race. This process begins almost unconsciously at birth, and is continually shaping the individual’s powers, saturating his consciousness, forming his habits, training his ideas, and arousing his feelings and emotions. Through this unconscious education, the individual gradually comes to share in the intellectual and moral resources which humanity has succeeded in getting together. He becomes an inheritor of the funded capital of civilization. . . . I believe that the only true education comes through the stimulation of the child’s powers by the demands of the social situation in which he finds himself. . . . Through the responses others make to his own activities, he comes to know what those mean in social terms. . . . I believe that the psychological and social sides are organically related and that education cannot be regarded as a compromise between the two, or a superimposition of one upon the other.

Today’s sociocultural theory is built on the scholarship of a century’s worth of attempts to explain what happens when real people learn in real-life settings—outside psychologists’ laboratories. John Dewey’s words echo in the work of sociocultural psychologists at the end of the twentieth century.

Learning Through Participation

No matter how student-centered the classroom may be, I still have an important job to facilitate discussion and cognitive conflict by asking a tough question, or challenging their conjectures. In knowing my students and where they are, I must know how to support the “stretching of their minds.” I know I need experience. One never knows how students will respond—that is the excitement of education.

—Juliana Jones

First-year teacher, mathematics, grade 6

Innovative Soviet psychologist Lev Vygotsky was born the same year as Jean Piaget—1896. However, most of his work was not translated or published in English until the late 1970s, when it sparked the interest of American psychologists and educators. Like Piaget, Vygotsky devoted himself to understanding how children develop cognitively. However, Vygotsky was especially interested in the social origins of children’s thinking. He saw learning as a process of children “appropriating” their culture and making it their own.
Whereas Piaget saw the child as very much an independent learner, already equipped to draw in and make sense of the environment (including relationships with others), Vygotsky stressed a much more essential and interdependent relationship between child and adult. Vygotsky focused on the role of social opportunities in learning, blurring the distinction between social experiences and mental processes. He emphasized learning and solving problems as that which happens between a learner and others, rather than something having a direction as with the teacher-to-learner transmission model of behaviorists and some cognitive psychologists. Social participation does not simply provide external stimulation for one’s own thought; it is part of and in some respects indistinguishable from one’s own thinking process. Vygotsky claimed that all meanings stem from interactions.

To explain why some social environments and interactions—including classrooms and learning opportunities—support learning far better than others, Vygotsky proposed the zone of proximal development (ZPD). He conceptualized this zone as containing the knowledge that a student can learn when assisted by or collaborating with an adult or more knowledgeable peer. The zone’s boundary on one side is the knowledge the student already has or the problems she can solve alone. On the other side of the zone is knowledge and problem solving for which the student is not developmentally ready. Students who are within but close to this “edge” of the zone might be able to participate in an activity, but they need involved and active assistance. For example, the student with beginning writing skills might benefit from a question such as “Is there something important that this sentence needs at the beginning?” or he might benefit from straightforward information such as “This sentence says, ‘ran home’ but I could understand it better if it told who or what ran home.” As skills develop, the adult models increasingly sophisticated questions and problem solving. Some call this learning relationship scaffolding, because it provides a temporary structure around the “construction” of the student’s learning and helps hold concepts together during the early stages of “sort of” knowing something, but not having it “all together.”

Like Dewey, Vygotsky places great importance on the teacher’s role of arranging activities and social groupings that keep students stretching within their zone. Obviously, the student who does not enter her ZPD only engages with problems she can already solve; the student who is beyond her zone cannot learn well in spite of the help available. Sabrina Pick identifies an example of scaffolding that occurs at the instant the opportunity arises. This is the type of interaction that ought to be second nature to experienced teachers. It cannot occur in this immediately relevant way outside a social relationship.

In a conversation with Professor Lisa Oakes, a developmental psychologist at the University of Iowa, she recalled a scaffolding conversation with her niece, 6-year-old Emily:

Emily told me she was reading a book on Thanksgiving in school. I asked her what it was about. She said, “Pilgrims.” If I had left it at that, it might seem that she couldn’t remember or retell stories. I asked her if they ate something special, and then she launched into a description of what they ate—turkey, corn, and so on. I then asked her if they invited special guests, and then she talked about the Indians. “Scaffolded” her storytelling—helped her remember details, and let her know what points are necessary for the listener. Importantly, I hadn’t read that particular version of the story, so I was just prompting her based on our shared cultural knowledge of the holiday, stories, and adult-child relationships.

Vygotsky proposed that learning and cognitive development were nearly indistinguishable from interactions with others—that learning occurs “out there” as much as inside the head. More precisely, Vygotsky viewed thought as the internalization of experiences in the social context. Thus the “location” of Emily’s Thanksgiving learning and knowledge cannot be specified as being in her head, in her aunt’s head, in the book, in the culture at large, or in the relationship. It is, in a word, sociocultural. The internalization of the social interaction becomes the cognitive process.

Social learning is not random. Relationships that can enhance or inhibit learning are organized or structured by families, schools, the workplace, and so on. In other words, when we organize a classroom and the interactions within, we are structuring learning. As explored in following chapters, many teachers, following Vygotsky, have come to think of their classrooms as “learning communities” where they pay special attention to relationships that give students access to adults and knowledgeable peers who scaffold one another’s learning. For example, history teacher Mike McBride uses both peer and teacher scaffolding as he engages students in constructing their own understanding of historical events.

I hope that I’m creating a new community in which my students will acquire historical literacy by interacting with others in activities. For instance, the students go through a simulated immigration process at Ellis Island. They
Learning Is Becoming Part of a Community

Psychologists today continue to explore the fusion between social settings and mental processes. As they do, they have returned to Dewey's notion that children learn as they participate in social settings—not as they interact with knowledge but as they interact with their culture's use of knowledge. Jerome Bruner has become increasingly convinced that people create and transform meanings (learn) as members of particular cultures.8

Becoming Somebody Cognitive development has much to do with developing one's social identity. The roles and competencies we gain depend on acquiring the knowledge, ways of thinking, and behaviors of more mature members of the community. For example, college students—even successful ones—take a long time to develop as scholars. Some never do. Only gradually do they come to see themselves as serious, knowledge-hungry students who live, work, study, and associate with others in the "community of scholars." When that happens, the nature and quality of their learning and much else is quite different from their "preschool" period. Equally important are the impressions and acceptance of and interactions with others who do or do not see these students as scholars. Both "developments"—that which occurs within the person and that which involves the social or cultural acceptance—are interdependent. Whether it is taking oneself seriously as a student, parent, teacher, or even friend, cognitive development requires a community of others who support a person in that role. When that happens, mastering the particulars of "how to act" is much enhanced.

An Apprenticeship Some sociocultural theorists view the learner as an apprentice—a cognitive apprentice. A cognitive apprenticeship guides a novice learner toward mastery of intellectual tools through social activity and relationships. It provides appropriate situations in which learners get help and are challenged by increasingly sophisticated skills and responsibilities until they are "mature" members of a culture and community. Novices learn as they participate in the actual work, beginning with small, even peripheral contributions that are nevertheless a real part of the task at hand.9 Learning through such apprenticeship is, at its root, "identity construction." As anthropologist Jean Lave puts it, "Crafting identities is a social process, and becoming more knowledgeable skilled is an aspect of participating in social practice. By such reasoning, who you are becoming shapes crucially and fundamentally what you "know."10

Ayub, whose Pakistani family had just moved here from Hamburg, spoke only German. As a first-year teacher, I felt I was shortchanging him because I had little time for planning sheltered lessons [special attention to visuals, limited vocabulary, simplified text]. Yet now he speaks many words and sentences in English and speaks all day long. I had the same success at the beginning of this year with a Spanish-speaking child. I kept trying to figure out why this was happening. Our class is a tight-knit community, and students make choices in learning giving them opportunities for interactions. During "centers," students must ask for help from each other because I am often working with a group, and students rely on each other's guidance more than the teacher's. These open-choice activities also allow for increased interaction.

One of our class rules is that we make people feel good. Any teasing or belittling behavior is not allowed. This creates a safe environment for Ayub to take linguistic risks. Ayub knows that everyone is looking for his successes, not his slipups.

Cognition Is Cultural Good places to search for insights into cognition are cultures with social conventions that are most different from our own. For example, cultural psychologist Michael Cole studied Kpelle farmers in West Africa. Cole and his colleagues found that when asked to sort objects into groups that made sense to them, the farmers placed a hoe and a potato together and a knife with an orange. The farmers explained that these were the groupings that a "wise" person would make.11 Of course, these groupings differed from the ones Americans typically consider wise. Americans are more likely to put the foods together in one group, and the tools in the other; the Kpelle farmers considered those arrangements ones that only "fools" would make. Therefore, a fundamental human mental process, grouping, makes sense according to the context and culture.

Moreover, Europeans who learned their mathematics in schools considered these same Kpelle people mathematically inept. However, the Kpelle were highly skilled at measuring, estimating, and calculating when conducting their business of buying and selling rice. In fact, they outperformed comparison groups of American workers and students on mathematics tasks related to their cultural practices.12 Likewise, street children in Brazil who have never been to
school learn and use sophisticated mathematical processes in order to support themselves as vendors of candy, coconuts, and other commodities—processes they cannot perform successfully as school mathematics problems. Similarly, American math students who were successful in the classroom performed poorly when asked to solve simple practical problems “on their feet.” Clearly, while mathematical problem solving may be universal, the contexts in which people can apply mathematical problem solving are not.

Researcher Luis Moll assessed the enormous knowledge resources that Mexican American children had available to them outside their school. Because of the low expectations held for children of poor and working-class parents, these Tucson, Arizona, children performed “as expected.” They had low achievement, and they found in school little relevance to their lives. As Moll studied the children’s extended families, however, he found rich funds of knowledge. Each household was a place that developed expertise in particular domains (Moll identified nearly fifty, including soil irrigation systems, minerals, renting and selling, budgets, design and architecture, first aid, folklore, moral knowledge, and ethics, etc.). Together, the households formed a community for the exchange of information and resources. Children participated in the exchange, by doing tasks and chores, all the while observing, asking questions, and being assisted by adults. For example, a son may indicate interest in fixing a car by asking his father questions. The father, taking his cue from the child, decides what level of participation is appropriate. Although the son’s help may be minimal, such as helping to put in screws or checking the oil, he feels he participates in the whole task, because he is allowed to attempt tasks and to experiment without fear of punishment if he fails. In such families, learning and questioning are in the hands of the child. Moll believes that schools could use these cultural funds of knowledge and practices to enrich both culture and intelligence, instead of the current practice, which is to see cultural knowledge as not useful or as an obstacle.

Who Is Intelligent?

Typical conceptions of intelligence do not hold up well in sociocultural theories. Why bother trying to figure out intelligence differences between a Kpelle farmer and an American accountant? Considering evidence from the studies of Kpelle farmers or of Brazilian street children, our faith in the measures we use to assess people’s abilities surely must be shaken. If those who cannot perform complex arithmetic calculations in formal testing settings actually perform them quite skillfully in other contexts, how can we be confident that any particular test or measure given in any particular context will capture the abilities the test presumes to measure? It makes more sense to pay attention to a person’s particular competencies.

Intelligence Is Culturally Specific Intelligence is hard to pin down, changing as it might from activity to activity and culture to culture. Moreover, intelligence does not operate “inside the head” but develops in specific cultural contexts as people interact with others using the tools and symbols of their culture.

Although innate and universal predispositions may enhance the development of some abilities, most people are more concerned about whether or not children develop those abilities and values of the culture wants. For example, Americans are learning to value people who can troubleshoot a crashed computer. The ability to do it well makes one intelligent in that matter, and there are many people with that intelligence. On the other hand, we can hardly be called less intelligent because very few people can make up long narrative stories to tell to their families. If and when the culture truly values storytelling, more would do it. In the meantime, the few people who tell stories well are especially prized for the uniqueness of their talent.

Again, it is instructive to look at cross-cultural examples. Middle-class Americans often associate problem-solving speed with intelligence; Ugandan villagers, however, describe intelligence with words such as slow and careful. The Chinese place a high value on the ability to memorize facts; Australians consider this trivial. Middle-class Americans consider intelligence to encompass technical and abstract skills; Kenyans and Mayans see intelligence as comprising social and personal responsibilities as well as cognitive skills. Ugandans and the Ifaluk people of the western Pacific consider intelligence to include both knowing socially responsible actions and actually acting that way. Researchers Harold Stevenson and James Stigler illustrate how intellectual capacity is constructed differently from culture to culture. Comparing American, Chinese, and Japanese cultures, Stevenson and Stigler show that American culture constructs intelligence as a function of innate ability far more than do Asian cultures that emphasize effort and persistence in explaining what accounts for being “smart.” Clearly, different cultures see the relationship between effort and ability differently, and in America’s diverse culture there are distinctly different views. Some see effort and ability as unrelated. Some see effort as something that compensates for lack of ability (the prevailing American view—as when one says, “Yes, she gets A’s, but the poor thing has to work so hard”). Some see effort as something that increases ability (the prevailing Asian view, and one that is most consistent with cognitive and sociocultural theory).

Intelligence Is Distributed Whatever else intelligence might be, an especially useful concept for teachers is that intelligence is distributed throughout a person’s social world—home and community, the workplace, and school. If a preliterate or tribal culture has its shaman, competent hunters, a storyteller, and a rich cultural tradition that includes getting along with others, providing food, and so on, then it has all the necessary competencies and, collectively, quite a lot of intelligence. Similarly, the productivity of a typical American workplace may depend less on highly knowledgeable individuals than on the productive social arrangements that make it possible to use all that intelligence. Finally, a classroom that has a helpful teacher, social structures that allow for productive interactions, and students with different backgrounds and knowledge who can be called together to solve academic and other problems might be seen as a class with lots of intelligence distributed across many people. As Jerome Bruner puts it, intelligence includes the “toolkit” of reckoning devices and
heuristics and accessible friends that the person could call upon ... the reference books one uses, the notes one habitually takes, the computer programs and databases one relies upon, and perhaps most important of all, the network for friends, colleagues, or mentors on whom one leans for the feedback, help, advice, even just for company."18

I have five students in my class who speak only Spanish and are working to acquire English as their second language. My challenge is to create a community where these five students are not seen as inferior or less intelligent because of their inability to speak English but are respected and admired as individuals who are pushing and challenging themselves to take on a learning task. One day I brought in two different books, both written in Korean. One was a very visual picture book with simple words and phrases, the other was a Korean novel with no pictures and sophisticated writing. I asked the class to imagine that they were just starting to learn Korean and that they had to choose one of the books in order to begin. I told the class which one they thought would give them more understandable information, and all of them said that the picture book with illustrations and simple phrases. I then asked the students if choosing the easier book in any way made them less intelligent or incapable, and they said no. Since they were only beginning to learn Korean, it would be impossible for them to read anything any more advanced. I told them that our five language learners were not any different. They, too, would be reading picture books in English with easy words and lots of pictures while the rest of the class would be reading novels and chapter books.

—Amy Lee
First-year teacher, grade 6

Sociocultural theories emphasize the inextricable connectedness of the mind and culture. Along with cognitive understandings of constructed sense-making, these theories offer a promising, but for many an unsettling, concept of learning. As we discuss more in the next section and in the chapters to follow, the implications of these ideas for teaching in culturally diverse societies are enormous.

Why Do Children Learn?

One of the wonders of being human is that we learn so much so easily and have so much fun doing it—outside of school, anyway. Children naturally feel competent. They tackle difficult tasks on their own and have no natural inclination to feel discouraged by mistakes. Just think of the number of times that small children try new and difficult tasks. From climbing stairs to buttoning clothes to making sentences, they keep plugging away until they get it right. Indeed, patience seems far more natural than impatience. A child’s face lighting up spontaneously as he masters a task reminds us of the sheer pleasure learning brings, and how learning can be its own reward. Perhaps most important, neither psychologists nor teachers can predict with much accuracy who will accomplish what and when. History abounds with stories of early-blooming Mozarts and late-blooming Einsteins.

Intrinsic Motivation

When explaining why people learn, cognitive theorists, in contrast to behaviorists, emphasize intrinsic motivation (that which comes from within) rather than extrinsic motivation (i.e., rewards and punishments). They see intrinsic motivation as tension, a sense of imbalance, the drive or desire to make sense of something that is confusing, to bring order to a mess, to fit in or find acceptance where acceptance is not complete. This is not the negative tension that we associate with psychological stress; it is perhaps closer to curiosity, but so much more. Cognitive theorists reason that if such productive tension is present in lessons, children will work hard even without consistent outside reinforcement. Think about reading a novel and wanting to know how it ends. Consider the fun of learning and figuring something out—apart from the instrumental goal of passing a class. Performing acts of charity, keeping oneself studying hard day and night while some classmates are not, working with others cooperatively, and so on require resources from within. External rewards can help, but they can’t carry the whole motivational load. Rarely can students draw on their full measure of resources if they attribute their successes to conditions beyond their control rather than resulting from their own volition and efforts.

Self-Concept, Identity, Motivation, and Learning

We can’t separate children’s feelings about themselves, that is, their self-concept, or their identity from their other cognitive processes. We use the term self-concept to include students’ global judgments about themselves: “I am good,” “I am competent,” “I am clumsy,” “I am skilled at having people like me.” Self-concept has much to do with our sense of efficacy—whether we think we can have things go our way. Students draw these conclusions from their experiences at home, at school, and at play and use them to guide their future actions: “Since I am a likable person, I will introduce myself to those strangers and make new friends.” With identity, we refer to slightly more external and specific roles: “I am a student and therefore act in studentlike ways.” “I am a goof-off, so I make a joke in class.” “I am going to be an engineer.” “I am the team captain.” “I am a 'hot date.'” Here, we are looking at cultural categories of behavior that are accompanied by a set of behavioral standards. We all use these identities to guide our behavior.
identity and self-concept are powerful organizers of people's lives. People could hardly get along if they had to stop at every moment to think, What am I good at? How should I act as a new member of this group? Will I succeed? Like a powerful magnet, our own sense-making draws us to situations that fit our self-concept and identity. Similarly, we are cautious or resistant if we cannot make sense of our participation. The desire to be in situations and act in ways that fit one's identity is an important motivator.

But how can we account for successful students and adults performing many tasks with enthusiasm and competence even when the task itself is not pleasurable or satisfying? Traditionalists often ridicule intrinsic motivation—calling it overrated in importance and asserting that little would get done if everyone waited to "feel like" doing life's necessary, if unpleasant, activities, especially those in school. Some psychologists who have studied these processes in classrooms use the concept of achievement motivation to describe a more general enthusiasm for acting with competence just for its own sake, rather than a drive that is necessarily related to either extrinsic rewards or to pleasure derived from doing a specific school task. Traditional theorists may acknowledge this more general drive as an individual, family, or cultural trait; those with a cognitive perspective, however, see high achievement motivation as something people learn—something very close to having developed an identity as a "high achiever.

Students with high achievement motivation feel competent and in charge; they expect valuable successes, and they exert the time and energy to learn. Children who don't feel competent often assume that no amount of effort will lead to success. They often display a learned helplessness. That is, not being successful makes more sense to them, so even when the teacher or others can demonstrate that they are competent, these students treat their success as an exception or mistake.

Motivation and Relationships
As we might expect, sociocultural theorists add a social dimension to motivation, although they rarely use the term itself. Learning through interaction with others is a central part of becoming a member of the community, and such dispositions as achievement motivation do not develop in a social vacuum. Cultural theorists Jean Lave and Etienne Wenger note, "Acceptance by and interaction with acknowledged adept practitioners make learning legitimate and of value from the point of view of the apprentice." Learners know that learning to do what the more capable members of a community do is the only route to becoming one of them. When learning takes place through apprenticeship—younger members working alongside older ones—those conditions happen naturally. The actual tasks that the learners do are real, and they contribute something of value, however small, to the group's work. Wanting to do work the community values, by any other name, sounds a lot like motivation.

Unfortunately, much, perhaps most, schoolwork bears no resemblance to what anybody does outside of school, and most schools are not based on a community social structure. Think about the last time you divided a fraction or looked up definitions of words for which you didn't have an immediate use. No wonder teachers resort to jars of jellybeans, stickers, detention, and "F's" and other extrinsic rewards to "motivate" children into learning.

Cognition, Culture, and Teaching to Change the World
Students who are free from serious neurological disorders can learn rich and challenging knowledge and skills at school. Yet some students achieve very well while many others barely achieve at all. These differences in school success—which cannot be explained by innate intelligence traits or cultural differences—tell us far more about how teachers and schools respond to students than they tell us about how capable the students are.

The path is rocky for teachers and schools pursuing sociocultural theories of learning. To appreciate the obstacles, it is worth keeping in mind this rule of thumb: When a promising theory comes along, people will try to understand it in terms with which they are most familiar. A less generous statement of this "rule" is that the dominant culture in society will try to discredit the theory or use the theory to maintain the status quo. Some parents, policymakers, and even other educators demean the idea of socially constructed knowledge as something that is "just made up"—not factual, or not based on scientific evidence.

Cognitive and sociocultural theories do argue that students' social interactions within their culture shape what they know and how they come to know it. But that doesn't mean that American students do not need to learn the "facts" of science, mathematical algorithms, the conventions of formal and informal language, and other school knowledge. Much of this knowledge is not negotiable if one wants to participate fully in the American culture. However, new learners in each generation can make the knowledge and the facts they are presented personally meaningful through interactions with peers or teachers, or through experience.

All cultural knowledge has been constructed at some point, over time, and is always subject to revision. It may be helpful to remember that after the best and wisest scientific minds decided that the earth was not flat, it took a very long time before most of the world could make sense of or reconstruct this "fact." Concepts of race and gender superiority are examples of societal constructs we hope are collapsing today. Still, people are uneasy because they fear that if each person makes sense anew of the culture's knowledge and beliefs, society will lose its venerable values and the knowledge of the ages.

American schools emphasize fitting children's ways of knowing to the needs of the culture, and the culture is not so ready to adjust to fit the needs of its diverse members. But in the twenty-first century, people will be increasingly challenged to make sense of diverse knowledge and in diverse social settings. Changing the world might well begin with changing views about whose culture belongs in "the" culture, whose intelligence is valuable to us all.
Digging Deeper

You might want to read work by researchers currently investigating the social and cultural dimensions of learning and intelligence. Their work can help you think deeply about the implications of the sociocultural perspective for teachers presented in this chapter.

Stanford University psychologist Albert Bandura developed social-learning theory that draws both from behavioral and cognitive theories. Social-learning theory focuses on the consequences (including rewards and punishments) of experiences; however, it steps outside the behavioral realm to suggest that people engage in a meaning-making process as they observe—a cognitive view. Social-learning theory has been used to explain why children are likely to do well in school if they grow up around adult role models who turned their own school achievements into high-paying jobs. Bandura’s book Social Foundations of Thought and Action (Englewood Cliffs, NJ: Prentice-Hall, 1986) provides a good overview of his work.

Jerome Bruner, research professor of psychology and senior research fellow in law at New York University, has a long and distinguished career. His work investigates how cognitive psychology and child development can inform teaching so that all children can become highly competent and fully participating members of their cultures. Books you might want to read include The Process of Education (1960), Toward a Theory of Instruction (1966), The Process of Education (1971), Acts of Meaning (1989), and The Culture of Education (1996)—all published by Harvard University Press. Bruner’s most recent books are helpful for thinking about the shortcomings of cognitive psychology, especially when it fails to account for the importance of culture in thought, language, and learning. Bruner suggests the possibilities for schools and teaching that derive from these sociocultural perspectives.

Stephen Ceci, professor of psychology at Cornell University, argues in A Biocultural Perspective on Intellectual Development (Cambridge: Harvard University Press, 1996) that traditional conceptions of intelligence ignore the role of society in shaping intelligence and underestimate the intelligence of non-Western societies. He offers a “biocultural” framework of individual differences built on studies of how children’s prior knowledge and familiarity with a context affect how they process information intelligently.

Michael Cole, a professor of communication and psychology and the director of the Laboratory of Comparative Human Cognition at the University of California, San Diego, has conducted cross-cultural research on cognitive development. Cole currently leads a project called UC Links that pairs undergraduate students with elementary school children in after-school activities, including working with computers, telecommunication, and educational games. Building on cultural psychology, Cole hopes the partnership will create a context that supports and motivates learning and gives underrepresented minority children resources and impetus for pursuing higher education. You might want to read Cole’s latest book, Cultural Psychology: A Once and Future Discipline (Cambridge: Harvard University Press, 1996), and an earlier work with Peg Griffin, Contextual Factors in Education (Wisconsin Center for Educational Research, University of Wisconsin, Madison, 1987).

Mihaly Csikszentmihalyi, a professor of human development and education at the University of Chicago, studies how the experience of learning becomes its own reward—a state he calls “flow.” His work is devoted to examining how flow comes about and how it can be facilitated. His books include Optimal Experience (Cambridge University Press, 1988) and Flow, The Psychology of Optimal Experience (New York: Harper and Row, 1990).


Stanford anthropologist and sociolinguist Shirley Brice Heath spent several years living in two unnamed poor communities—one largely white, the other largely black—in a rural mountain area near a southern mill town. In her book Ways with Words: Language, Life, and Work in Communities and Classrooms (New York: Cambridge University Press, 1983), Brice Heath documents differences in the way the two communities used questions, telling stories, rearing children, and using toys and reading material. In a more recent book, Children of Promise (Berkeley: University of California National Center for the Study of Writing and Literacy, 1991), written with teacher Leslie Mangiola, she provides practical ideas for classroom teachers who want to develop activities that can help all students to achieve their full potential.

Jean Lave, a professor of anthropology at the University of California at Berkeley, has developed theories of “situated” cognition, and learning as identity development. Her studies contrast the informal (and usually productive) ways that people learn skills with how schools teach. For example, she compares the math calculations Americans do when buying groceries or figuring their Weight Watchers’ diets with the formal algorithms learned in school. She has studied the effectiveness of apprenticeship training including that of tailors in West Africa. Her most recent available book is Situated Learning: Legitimate Peripheral Participation (with Etienne Wenger, Cambridge, England: Cambridge University Press, 1991).


Barbara Rogoff is a professor of psychology and education at the University of California, Santa Cruz. She studies how children's development occurs in the context of their relations with other people (especially parents and peers) as they participate in activities of social and cultural origin. She also investigates the variation and similarities across diverse cultural communities, as well as schools, children's museums, and families. Rogoff's book *Apprenticeship in Thinking: Cognitive Development in Social Context* (New York: Oxford University Press, 1990) provides an in-depth look at how social context affects thinking and learning.

At Yale, psychologist Robert J. Sternberg develops models of multidimensional intelligence. His Triarchic Theory of Intelligence includes "componential" intelligence—the linguistic and logical-mathematical abilities that most traditional intelligence tests assess; contextual intelligence (the source of creative insight), and experiential intelligence (the "street smarts" of intelligence). He argues that the latter two are of enormous value, yet are not given much opportunity to develop in traditional classrooms. His books include *Beyond IQ: A Triarchic Theory of Human Intelligence* (1985) and *Metaphors of the Mind: Conceptions of the Nature of Intelligence* (1990). Cambridge University Press publishes both.

Deborah Stipek, a professor of educational psychology at the University of California, Los Angeles, is director of the Corrine A. Seeds, University Elementary School. She conducts research on developmental issues related to achievement, motivation, and achievement-related emotions, including the development of children's perceptions of competence, their perceptions of the cause of achievement outcomes, and their understanding and experience of such emotions as pride and shame. Her achievement motivation research focuses directly on preschool and elementary school-aged children, and classroom conditions that affect effort and interest in academic tasks. Her book, *Motivation to Learn* (Needham Heights, MA: Allyn & Bacon, 1993) provides a thoughtful overview and discussion of motivation and school learning.

Following are some classic works that spawned much of the interest in cognitive and sociocultural theories. You may want to read them in the original.

**John Dewey**


*Experience and Education.* New York: Macmillan, 1938

*How We Think.* Boston: D.C. Heath, 1910


**Jean Piaget**


**Lev Vygotsky**


Notes

1. In his book *Cultural Psychology: A Once and Future Discipline* (Cambridge: Harvard University Press, 1996), psychologist Michel Cole relates that one of the founders of the discipline of psychology, Wilhelm Wundt, proposed, in fact, two psychologies. The first would address the mind in the manner of other respected scientific endeavors. In this case, "the mind, it was believed, could now be measured and explained according to the canons of experimental science" (p. 6). The "second psychology" would have the task of understanding how culture enters into psychological processes" (p. 6).

2. By contrast, behavioralists' insistence on "objective" observations of behavior leads them to distrust for scientific purposes the mostly unobservable events of the mind. Consequently, behavioral approaches are likely to emphasize how the teacher teaches—manipulates the environment with particular stimuli—rather than how the students are learning (not to be confused with tests of what the students have learned).


4. In babyhood, what Piaget called the sensorimotor stage, children make sense of the world in terms of behavioral representations. For example, let's return to the example of chairs. Babies in modern Western cultures probably develop a chair scheme at a young age. However, Piaget argued that at this early stage that babies only think about, or "represent," chairs in terms of how babies behave in relation to the chairs. They conceptualize chairs as things to sit on. Later, as toddlers, children enter what Piaget calls a preoperational stage where they can begin to think about or represent things symbolically. That is, they can close their eyes and imagine a chair that is in front of them. A bit later, about the time they begin school, children develop the ability to perform concrete operations; that is, they can mentally rearrange things that they've actually seen. For example, a child in a living room with a red plaid couch and a plain green chair could imagine what the chair would look like if it were reupholstered with the red plaid fabric. Sometime in early adolescence, children enter the stage where they will
remain as adults—a stage Piaget called *formal operations*, when logical and abstract thinking develop. A child at this stage would be able to imagine chairs in all sorts of configurations, even those highly unlikely in the real, concrete world. For example, an adolescent could conjure up a chair made of ice cream—a logical, but hardly realistic possibility.

8. Bruner, *Culture and Education*.