A Response: All "Thinking" Paths Lead to the Brain

The allure of thinking skills will fade when educators concentrate on brain-compatible learning theory.

Ahh, "thinking skills"! What an inspiring buzz term. Who could possibly be such a meanie as not to feel the heart leap at the prospect of millions of youngsters being taught to think better? What a pity that the editor has asked me—a person with something less than complete enthusiasm—to do a bit of "critical thinking."

I do indeed feel pulled both ways. As David Perkins says in his "Conversation with Ron Brandt," thinking skills are "clearly getting to be a bit of a fad." I see the rush of interest in thinking skills the same way, as one more of the many fads that sweep over and distract education, only to vanish in a couple of years. Like Perkins, I am concerned that something of value be left behind.

As I shall make clear shortly, I suspect that this focus, however blurry (no two of the articles attribute the same meaning to "thinking skills"), can introduce a lot of thoughtful people to ideas that in time may bring them closer to my particular emphasis—making use in schools of what we know holistically about the human brain.

But I am also among those who consider education and public schools to be immeasurably important to our democracy, our free society, and our ability to be a great, leading nation. The flood of studies and reports issued in the last three years alone seem to leave no reasonable doubt that our schools are critically inadequate and have lost much of the support they formerly could take for granted. As the population ages, for example, only a minority of families now have children in school, and still fewer have them in public schools. Another example is the increased direct interest business executives now take in schools, and their escalating impatience with the quality of graduates they have to hire. I would hate to be charged with explaining to a hardbitten CEO of a large company that the schools are now going to stress thinking skills. I can imagine a response such as "Oh? The schools that can't successfully teach the basics are going to succeed at teaching thinking?" Let someone else be the messenger.

As Perkins observes, "Learning is a process full of pitfalls, and the learning of higher-order mental skills may be all the more so." Is this really the time to hope that many people will turn from their own priority assignments to plunge into a chaotic and complex field for which most of them have little or no training? Do we need such a diversion of energy?

Perilously Glib Thinking

We have some two million teachers, most of them operating in classroom boxes that make them hard to talk to, let alone retrain. We are far from
having any agreement, or any substantive evidence, to support a program for training in thinking skills. I would go further and say that we do not know that such skills (as distinct from some moderately useful strategies) even exist. My many years of work on learning make me highly dubious. Skills can be a glib, treacherous term.

I am further alarmed by the apparent narrowness of the main stream of speculation. Few of those who write or speak seem to be familiar with a flourishing field of investigation called cognitive science,\(^1\) largely based on fairly recent advances in psychoneurology. Fewer still seem aware of the huge, mainly Pentagon-financed effort in artificial intelligence,\(^2\) at which some of the ablest scientists have been working for many years to understand thinking by trying to develop "intelligent" computers. They haven't got very far yet, but our understanding of the human brain (and awe of its powers) has most assuredly progressed. Information theory\(^3\) is another, more abstruse, ignored field.

Then there is the brain itself, which can be approached with the aim of finding out, from great recent advances in neurobiology, neuropsychology, anthropology, ethnology, and other disciplines, what the brain is "for," its main architecture, its natural ways of functioning, and how (holistically) it learns and stores learning. In this issue, and in previous issues of Educational Leadership, heavy on thinking skills, the brain has had scarcely a mention. Does anyone claim that thinking is not a brain function? How can we ignore the incredible organ where thinking occurs, or—I would hold—not begin with exploring what we now know about it and can use immediately? To be sure, in the article by Marzano and Arredondo, and in the Perkins pieces, I found a good many ideas and statements I thought compatible with the brain approach, though the brain is not mentioned.

Where Science and Education Meet

To go the brain way is to tie in with a staggering amount of solid scientific research that has been accumulating for more than 30 years and that is tightly related to actual human tissue, the brain. In contrast, most of the thinking skills writing I have seen consists of words (some very interesting and stimulating) floating in limbo, rarely linking outcomes or established research with a scientifically acceptable base. The research or articles given in footnotes often are, in turn, lacking in this kind of substance. Our insights into the brain, however, not only touch tissue but are supported by a network of established principles, many of which have been accepted in relevant fields for years. I meet educators who have arrived somehow at these conclusions but who are astonished to discover how much top-flight research buttresses them. Not too many educators get into labs and research centers, or keep in touch at one remove through scientific publications. Although I am hardly the first to lament the gap between science and education, I am happy to have made some effort to bridge it, and to have seen interest in the brain as the organ for learning steadily grow.

That is why I feel some pull toward an enthusiasm for thinking skills. In

many cases, interest in thinking skills will lead to the realization that the brain is where we must look. For a parallel example, consider the many people who began with simplistic, even fanciful, interest in "left brain/right brain" investigation and who have become far more sophisticated and holistic in their approach.

The Penalty of Being Human

Permit me to speculate a bit on the thinking skills fad, and why if such it be, it has galloped ahead. One of the results of the National Assessment of Educational Progress tests sticks in my memory. This NAEP item asked 17-year-olds to find the area of a square, given the measurement of one side. More than half, 58 percent, couldn't do it—one of many hair-raising findings about math learning NAEP has reported.

Now, we can explain this dismaying performance in various ways: (1) the math teaching must have been horrendously bad; (2) the students couldn't read the question, which would make the teaching of reading look terrible (I am not blaming teachers, who, I feel, are more often victims than culprits); or (3) the students lacked thinking skills. The first two explanations are brutally untactful. The third is far easier to swallow; it hints that the fault lies with the students, and that maybe more funds should be obtained to hire

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more people to teach thinking skills.
Is it possible that, when pressures grow on school people to produce learning, "thinking skills" is a convenient way to avoid facing the harsh realities? I fear so. I find much resistance to focusing on pedagogy, on what goes on in the classroom. Plainly, classrooms don't work. They force teachers into nonproductive and counterproductive rituals that many fear to change. The faults have been endlessly identified, but the classroom and its methods stay in use.
Look again at Marzano and Arredondo. They point out that most textbooks and classroom oral presentations do not make it easy for students to detect patterns. A bit later they refer to Pearson and Tierney and four undesirable factors in teaching reading. True, true—I agree. But does this call for adding in thinking skills somehow? Or getting good texts, or not using texts? Correcting the damaging teaching of reading? If the roof is leaking, shall we get it fixed, or provide "supplementary collection equipment" (pails) to catch the water? In their conclusion, Marzano and Arredondo still call for "restructuring" through the teaching of thinking skills, not by ripping out and changing what they correctly observed is wrong and harmful. This seems a clear instance of shying away from reality.

Making Learning a Priority
Educators are human, and it is human to avoid hard choices and confession of failure no matter how visible they are. But to tolerate obvious faults in schools (Perkins names some, too) and to propose that thinking skills will cover them up seems to me as unwise as it is impractical. Even if we had reason to believe that teaching thinking skills works, it would seem poor policy not to make basic learning the top priority.
Traditionally, of course, schools have actively discouraged thinking. Students were expected to learn the official wisdom mostly by rote and

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without question, since it was church-blessed. Thinking could lead to a fiery demise at the stake. Schools still struggle to maintain some trace of the ancient authority needed to support "direct" or aggressive teaching, which boils down to "learn this because I tell you to."

All the reports, all the scores, all the criticisms, the cries for reforms, should remind us of the evidence-direct teaching works very poorly. When we turn to the brain, we see why. Knowledgeable researchers and theorists now fully agree that the brain is an enormously powerful instrument that will not be passive, that resists direct instruction unless it makes sense to that brain, that filters out most of what is presented to it, and that elaborately processes and reorganizes what it admits.

It can be hard on egos but good for outcomes to realize that the amazing human brain developed over millions of years and began to take its current "shape" some five million or more years ago. The brains of our ancestral cave-dwellers and hunter-gatherers 50,000 years ago were probably identical to our own. But schools as we know them have been around only briefly, even if we stretch the notion of formal teaching to go back 4,000 years. Long before that, humans had managed to develop tools, shelter, cooking, weapons, dance, art, religion, elaborate social systems, agriculture, music and instruments, pottery, animal husbandry, many forms of transportation, and much more, including, of course, language. It seems safe to state that the brain did not develop to fit classrooms and courses, or to do worksheets or regurgitate "right answers" on exams or standardized tests. If we observe children, we see that they learn magnificently and with joy—until they go to school and encounter aggressive teaching.

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The brain helps us to identify at a glance hundreds of people we know out of millions we don't. The brain handles all meaningful learning, emotions, and almost all behavior. It operates by "thinking" (closing or opening switches). Are we really going to maintain that this stupendous apparatus won't work properly until we educators devise courses and lesson plans to tell it how?

Indeed, some tricks and strategies and gimmicks have some use, especially at the secondary level and beyond; but their value is minor, and then, only after sound, fundamental learning has occurred. It seems almost beyond argument that education must focus on that learning.

The Need for Brain-Compatible Learning Theory

Never until now has education had an adequate theory of learning. Such a theory must relate to the brain, and only recently have we had the holistic understanding of the brain needed to build a theory. Around 1972 I began putting forward a brain-based theory called Proser Theory of Human Learning. Since then I have published about 40 articles on it, in addition to making some 200 presentations in the United States and Canada. It seems to be the only published, widely known theory today to have stood up well after a dozen years of exposure. The theory is based on two "feet": learning as the acquisition of useful programs, and program selection for use based on recognition patterns.

My theory emphasizes that instruction must be compatible with the nature of the brain, not brain-antagonistic like most conventional classroom teaching. The hypothesis is that brain-compatible instruction, in a nonthreatening setting that permits uninhibited use of the splendid neocortex or "new brain," will result in far better learning, climate, and behavior.

The first truly brain-based project, at East Windsor, New Jersey, is now in its third year and appears to support strongly that hypothesis. It also demonstrates, even if on a small scale, that teachers can readily absorb Proser Theory, and learn to work from it surprisingly quickly. It takes time for staff to fully convert from classroom to brain-compatible techniques, but learning soars almost at once, and the students become eager, aggressive learners who achieve beautifully.

If we will humbly approach the awesome brain to learn its nature, rather than arrogantly to "teach" it, I believe we will emerge on solid ground, better able to meet real and immediate needs. We have available hard, new, valuable knowledge of the brain. We should use it; I suggest, rather than chase after a fad as fuzzy and far off as Halley's comet.

1. For a readable introduction, see Morton Hunt, The Universe Within (New York: Simon and Schuster, 1982).
4. In Educational Leadership, see especially "Brain, Language, and New Concepts of Learning" (March 1981); in Phi Delta Kappan, "The New Brain: Concept of Learning" (April 1978) and "The Three-Brain Concept and the Classroom" (March 1981).

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