

Education and Mind in the Knowledge Age

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Preface

Here we are in the information age, relying on a theory of mind that is older than the wheel. Every other folk theory—folk physics, folk biology, folk economics—has had to yield to more powerful theories, better equipped to address the problems of an adventurous civilization. According to one story, this has also happened with theory of mind. Something called ‘cognitive science’ arose in the 1950s and developed rapidly. Its most conspicuous manifestations have been in artificial intelligence and robotics, but it has had a significant and sometimes revolutionary effect on all the behavioral sciences. Although it may be true that most of the world’s business is still conducted according to folk theories of mind, this may be only a matter of cultural lag, which will be overcome as cognitive science takes hold.

The trouble with this story is that for most purposes the effect of cognitive science has not been to replace folk theory but to reinstate it, after its exile by behaviorism. I do not mean to discount the accomplishments of cognitive scientists in expert systems, language comprehension, and the like. But the cognitive science that produced these accomplishments has been rooted in the same basic conception of the mind that has been with us at least since Plato’s time, and that children in the Western world pick up spontaneously by the age of six. It is this folk conception, along with its formalizations in cognitive theories, that has recently started to be challenged.

What is being challenged is the basic conception of the mind as a container of objects—beliefs, desires, conjectures, remembered events, and the like—which the mind works on in cognition. The challenges have been on various theoretical grounds. The plausibility, coherence, and explanatory adequacy of folk theory and its derivatives have been called into question. Critics typically concede that

in practical applications folk theory does just fine. For most uses, that is true and for good reason. Our social institutions all embody the folk theory. We could hardly make it through a day—indeed, could hardly make it across a busy street— without decisions based on beliefs and intentions that we attribute to others.

Folk theories of all kinds characteristically work well for everyday purposes, however. Medieval physics lives on in the baseball park, where fly balls have “legs” that may or may not be sufficient to carry them over the outfield wall. Expert gardeners get along believing they are providing food to the plants. But if the task is launching a missile into orbit rather than over the left-field fence or doubling the yield of rice paddies, folk theories are not up to the task. Folk theory of mind lives on, I believe, because it has never been put to severe tests.

Until now. How might a nation or an organization double its rate of knowledge production? How do we educate a populace to be knowledge workers? How does an organization become a learning organization? These questions pose novel challenges, which our ancient theory of mind has never had to wrestle with. Also, they involve queer juxtapositions of terms—knowledge production, knowledge work, learning organization—resulting in expressions whose meaning is unclear. These expressions don’t, in fact, make much sense under a theory that has knowledge consisting of objects in people’s minds. Yet there is a widespread conviction that they refer to very important things. This is not a happy state of affairs. To correct it, I believe, we need a new theory of mind.

Better to say, we need a new way of thinking about knowledge and the mind. What I have been calling, following a common usage, “folk theory of mind” is not actually a theory. It is just a way that we commonly think about knowledge and mentation. Correspondingly, what I try to develop in this book is

not a theory, either. It is a different way of thinking about the mind. New ways of thinking about knowledge and mind are much in evidence these days. A recent issue of *Educational Psychologist* was devoted to six of them, identified as information processing, cognitive psychology, situated cognition, constructivism, social constructivism, and connectionism. I draw to some extent on all of these, plus the thinking of philosophers like Daniel Dennett, who do not belong to any particular camp. Above all, however, I am concerned with developing a way of thinking about the mind that works for the new challenges faced by education.

One need not be a thorough-going pragmatist in order to adopt a pragmatic attitude toward theory of mind. Brains are material things, and if someone says the average human brain weighs ten pounds, you can check and see if this is right. But mind is pretty much whatever we decide to make it out to be. If you say the mind contains propositional representations of beliefs and I say it doesn't, that the mind only has dispositions to agree with certain propositions, neither of us can prove the other wrong. All we can do is see how well these competing notions work out in practice. For most everyday purposes, your notion will work better than mine. But my notion will work better for designing an education system or a knowledge-creating organization. That, at any rate, is what I hope to be able to show.

In taking this pragmatic stance, I open myself to questions of the "So what?" variety, which can be avoided by those who stick to the theoretical high ground. In compensation, I am spared having to deal with questions along the lines of "What's your evidence?" "What is it really?" and "How do you explain...?" Or ought to be spared. Such questions tend to arise regardless. They are the basic tools of critical thinking and people look for occasions to use them, just like the proverbial child with a new hammer. So I do try to deal with these questions, but

only to the extent necessary to keep people from shaking their heads and walking away. It is not my main purpose.

Dealing with the “So what?” question is challenge enough. In studying scientific revolutions, Paul Thagard observed that the people who most stoutly resist a new theory are not the fuddy-duddies but are the scientists most accomplished in getting results with the old theory. His example was Joseph Priestley, artfully demonstrating the virtues of phlogiston theory long after other chemists had given it up. B.F. Skinner defending behaviorism may serve as a modern example. If you peruse his published notebooks you find him time and again responding to some finding from cognitive research by showing how it can be explained without bringing in mental events. He was amazingly good at it. The meager principles of operant behavior worked well for him as explanatory tools, and he went to his grave still clutching them, while many of his less skillful followers had given them up in favor of the high tech tools of cognitive science. When it comes to theory of mind, we are all Priestleys and Skinners. Having practiced assiduously since early childhood, we are consummate artists in using folk psychology to predict and explain human behavior. It takes a lot to convince us that we need a new tool, especially since the new tool will at first be unwieldy, unreliable, and just won't feel right.

Important advances are taking place in pedagogy. For the most part they are being conceived and articulated within the framework of folk theory of mind. I believe, however, that they are headed toward a limit that cannot be passed without a better theory of mind and knowledge. In recent years I have had the unusual opportunity of being part of a project in which three different innovative research groups tried to get together in designing an educational program that would synthesize their three approaches. The groups were the Fostering Communities of Learners project at Berkeley, the Cognition and Technology

Group at Vanderbilt, and the CSILE/Knowledge Building team at Toronto (which I belong to). Although a very worthwhile model program emerged from this effort, I think all the participants would agree that the looked-for grand synthesis never occurred, indeed never even got on the table. We had a good vocabulary for discussing our similarities, and that was enough to get things going at a practical level. It was, roughly speaking, the vocabulary of social constructivism. But we had no vocabulary for discussing our differences. These have come to seem profound, but there has been no mutually comprehensible way of articulating them. I do not think such a way can be found within a conception that treats knowledge as stuff in people's minds and learning as a process that produces it there.

Knowledge is the pivotal idea in this book. The main faults I find in folk theory of mind are in its treatment of knowledge. How important the issues raised here seem to readers will, accordingly, depend on the importance they attach to knowledge. But here is a Catch-22 that is, I believe, one of the most serious barriers to progress in educational thought. Folk theory of mind affords such a limited and incoherent conception of knowledge that people in the grip of folk theory cannot be expected to appreciate the importance of knowledge from an educational standpoint. It will be difficult for them to think of it as anything more than the rapidly obsolescent contents of a mental filing cabinet. So, while they may concede that there is some value in having such a filing cabinet and updating its contents periodically, they will not find this a very exciting prospect and they will likely recoil from any proposal that seems to them to suggest that education's main mission should be stuffing students' filing cabinets. As well they should. But the alternative should be to develop a richer conception of what it means to be knowledgeable, not to rush off in pursuit of chimerical 'higher-order thinking skills' or the fostering of 'multiple intelligences.' Developing a

richer conception of knowledgeability, however, depends on adopting a view of mind that can support such a conception. The new conception of mind that has been taking shape in cognitive science in the past decade, and that I hope to advance here, is not easily adopted as a way of thinking. It takes work, and the motivation to do such work is hard to drum up if you cannot appreciate the point of it until you have done it. That is the Catch-22.

All I can hope to offer as a way out of this bind is enough in the way of secondary insights to keep readers engaged long enough that the major insights may start to take hold. Although its focus is education, particularly as it is carried out in schools, I have written this book with a larger audience in mind. It includes not only educators and people with a keen lay interest in education but also those who are caught up in and not entirely at ease with ideas such as 'knowledge society,' 'learning organization,' and 'knowledge management.' To accommodate such a diverse audience, I must at times belabor points that will strike some as obvious and oversimplified. What I am about, however, is not so much offering the latest ideas or a novel program as offering a way of thinking that is new to everyone, including this author. It takes work, but I hope readers will come away from the effort feeling that they have a better grounding for the ideas they care most about, that they have shed some moribund ideas that it had not occurred to them they could do without, and that they see new ways to move forward.

This book has been a long time in the making, and so I cannot begin to credit all the sources of benefit I have drawn on along the way. I will settle for acknowledging just two: The first is Marlene Scardamalia, my wife and closest colleague. There is scarcely an idea in this book that has not been affected by her imaginative and inventive mind and her endless drive to go beyond the prevailing catchwords to powerful and, in her word, 'improvable' ideas. I should

mention that our discussions on conceptual issues do not always end in complete agreement, and so she should not be held accountable for the construals I put on some of the terms that we jointly use, such as ‘knowledge building’ and ‘understanding.’ The other acknowledgement is to the Telelearning Network of Centres of Excellence, which for several years supported a project on “Cognitive/Epistemological Models for Knowledge Building,” of which this book was the principal product. That a federally-supported program to advance the development and use of learning technologies should have devoted a part of its funds to research on the most fundamental issues of what such an enterprise is about is a rarity; I hope the result in this case will show it was not a mistake.

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