

Book review

Getting It Wrong from the Beginning: Our Progressivist Inheritance from Herbert Spencer, John Dewey, and Jean Piaget

Kieran Egan

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This review both supports and challenges the author's message that the root cause of today's schooling problems can be found in the ways-of-thinking that developed in the nineteenth century. It offers a set of additional questions that can be asked to "get it right" from now on.

RIGHT PARADOXES, WRONG PARADIGM "THINKING ABOUT" GETTING IT "RIGHT" FROM NOW ON

Lewis A. Rhodes

My purposes and process

Have you ever wondered why the educational process contains so many paradoxes, or why attempts to resolve them that seem to make sense, in the end, fail? If so, Egan's book is for you ... and for everyone committed to reforming the schooling process for all children.

This timely book, however, leaves a reviewer with two (no, actually three) unique challenges – one in style, the other content ... and one, for this reviewer, caused by the strange consequences of his success with the other two.

First, he presents his case via a conversational dialogue that engages a reader through the mind's embedded structures that serve to continually aggregate and disaggregate incoming information and store it in more accessible stories, metaphors, and other connected patterns. It is hard not to want to continue that personal conversation with him. (In fact he encourages it by leaving you with his Web address at the end.) I will attempt to maintain that story and metaphor approach here for two reasons. One, his approach feels so natural, and two, this

stylistic medium is part of his message ... It "walks" his "talk" about the role – in developing understanding – of the information-processing cognitive tools already embedded in each of our minds.

The content challenge is more difficult. How does a reviewer support, and at the same time challenge, a critical element of the author's message? How can I note the irony that in presenting his case for "Getting it Wrong from the Beginning," the author, too, turns out to be "wrong." That in his search for the root causes of schooling's present day problems, he did not look far, or actually deep, enough. That he, like the Progressivists, is not actually "wrong", only not totally "right."

He aims to shatter the lenses that trap educators and their publics in ways-of-thinking that have produced today's increasingly polarized "lose/lose" battles by making "the case that most of the beliefs most people hold about education today are wrong in fairly fundamental ways." He uses the time span from Spencer to Piaget as a way to "trace the roots of today's presuppositions – a way of trying to make strange what is so familiar that we find it hard to think about."

But the issues he raises did not start in the nineteenth century. Their roots, as he also acknowledges, can be found in writings of ancient Egyptians, Aristotle, Plato, Locke, Rousseau and Hume. In fact, any human who desired to help someone else learn, and noticing what worked and did not, would have, and did, raise the same questions. How can so many of us who have been so "right" for so long also be "wrong?" What have we missed that has us behaving as did the Blind Men around the Elephant who

*...disputed loud and long.
Each in his own opinion
exceeding stiff and strong.
Though each was partly in the right,
they all were in the wrong!*

And this creates the third problem. This is a review of his work, and not a forum for my ideas. Yet, I feel that in suggesting how he, too, may be "wrong," I need to first make clear the different "lens," and experience, I have used to view the same history and conditions he has. I need to make a case for a perspective that I believe can add another dimension of value to his important efforts

Therefore, I will tell a little of that personal story first, in order to frame the subsequent dialogue, leaving it for you to follow up if you want more information.

Then I will share some thoughts about his purposes and processes and the cases he makes for why the Progressivists like Dewey and Piaget, were "wrong." I will

focus on the thinking problem he is up against, what he does effectively to deal with it, and, possibly, what he misses. Finally, I will suggest what a different lens might reveal about the paradoxes he cites. And I will conclude with why this book is particularly timely and important.

Our mutual roles: asking why?

First, to help differentiate between where our two "stories" are coming from, I will share some similarities and differences in our journeys.

We have both been on the same why? – driven search through the paradoxes society accepts as the conditions of doing the business of schooling. This search is similar to the Japanese management technique that involves asking "why?" a problem exists five times – each time questioning the facts and assumptions that led to the preceding answer – to get to a condition's root cause. I am going to suggest later on that he, as well as the Progressivists he names, stopped too soon. They never got to the "elephant."

Where we may differ, is that a lens frames my case for an alternate theory that is ground more from experience than theory. For over 30 years I've asked the same general questions he does about why it should be so hard to do for all what we know is right about teaching and learning for each? But it has been largely in the past five years, that I have seen the fragmented answers come together in a way that can only be explained by a theory of schooling unlike the one currently framing the minds of most practitioners and, unfortunately, reform groups.

Specifically, during that time I have been involved with a major school system whose different, and more effective actions I found could only be understood (i.e. make sense) through a lens different from the one that currently serves as education's paradigm. I have observed closely a large urban US school system – a full district of 140,000 economically and socially diverse children – on a continuing journey that effectively addresses all of the accepted paradoxes Egan surfaces. Others who have noted what's been happening there express amazement at the unexpected "miracles" in structure and results they see, but then, through their present lenses, struggle to figure out why it should be happening in such relatively short time frames and at such wide scale (Rhodes, 2003).

I will try to make the case through this review's "dialogue" that their continuing successes and failures can only be understood if one has a paradigm-creating mental map that has at its center not the research on learning as a psychological and social process, but as a biological process. At this level, "brain" and "mind" can be functionally differentiated so, as with other "body parts," they can be understood as processing something a body

requires for its survival. In this case, the "product" of the brain's information processing is the knowledge the mind requires as input for its sense-making role.

Egan's primary premise that "what we think with determines what we think about" is biologically sound. But first we must acknowledge that the lens we see with shapes the nature of what we think with. This lens takes in information that enters a cycle of belief construction so that we continue to see what we believe and believe what we see. And this, in turn, affects the "meaning" of what we think about. This outer lens or paradigm creates the "boxes" we are supposed to think outside of and, as Kuhn noted, is the place where science, when it bumps into its outer edges, stops asking why?

Using such a lens in this review I will occasionally take on the role of Fiddler's *Tevia* suggesting "on the one hand" why he is "right," and "on the other," why (through this different lens) he is at the same time "wrong." Peering through this lens I will suggest alternative meanings for several of the terms or concepts that are key to his otherwise logical arguments. My intention is to suggest possibly more effective ways to attack his basic concern – our society's inability to create and maintain a sustainable organization that can tap into the biologically pre-wired "cognitive tools" that children bring to school with them from the first day, and then to challenge and develop them into a life-long capacity to continually learn.

As he does, I occasionally will use simple analogies or metaphors to make my complex case – two in particular.

1. The computer, to illustrate the brain-mind connection at its simplest level, – that is, the brain as "Operating system" (or OS) whose "simple rules" support and build the more complex "software" of the mind that that does the computer's work.

2. Medical practice, where acceptance of biology's "simple rules" of behavior support and make possible the more complex rules that drive the healing and curing processes. For example, these unquestioned basic biological principles are pictured on that chart in the doctor's office that portrays how the functions of each body part, internal and external, connects to everything else. And, in the end, practitioners use that common, unquestioned base of knowledge to respond to the just-in-time needs of each individual within a managed organizational setting that can respond to the just-in-case needs of all[1].

My motivation to use these metaphors comes not only from Egan's model but also from Peter Senge's thoughts about "The Art of Seeing the Forest and the Trees:"

the art lies in seeing through the complexity to the underlying structures generating change.

... it means organizing complexity into a coherent story that illuminates the cause of problems and how they can be remedied in enduring ways ...

What we most need are ways to know what is important and what is not important, what variables to focus on and which to pay less attention to ..."

His purposes and process

While the title might suggest this is an historical work, Egan's main concern is for the conditions of public education today. His "... topic is current education and how the persistence of powerful progressivist ideas continue to undermine our attempts to make schooling more effective."

He stops his search for answers at recent points in history where answers were being sought for how "state schools should go about educating all the children in society for the new World." He focuses on Spencer, Dewey and Piaget, not only because sees the late 19th century as where modern approaches for schooling everyone were put in place, but also his belief that there lie the roots of the ideas that shaped these new state schools into the forms we have lived with ever since. In particular, these are the ideas about children's minds and their modes of learning and development that have determined the curriculum and the organization of schools ever since.

He seeks to persuade

that progressivism got two connected things wrong:

1. ... the belief that in their early play and language acquisition and in picking up street smarts children demonstrate a kind of natural learning that should form a model of how teachers should engage them in learning in school; and

2. ... the belief that the scientific study of the nature of human learning will lead to principles for effective teaching."

He agrees they are "more than casually related." But while "nearly everyone agrees with first," he blames the "classroom contexts, curricular demands, and lack of time and energy (that) interfere with that desirable aim." "...In a pragmatic business like teaching, we learn to adapt and adopt practices on the basis of what works rather than on the basis of some theory."

Egan also blames a hidden enemy. "Spencer's ... principles for education ... have become the taken-for-granted folk wisdom of education today and profoundly shape practice". The real challenge he acknowledges is to force the reader to "think about what we do not think about" – a task that takes on increased importance today

when one recalls Alfred North Whitehead's thought that "Civilization advances by extending the number of important operations we can perform ... without thinking of them. Driving Egan's method is his premise: "What we think with determines what we think about." To affect that condition, he challenges the accepted paradoxes and the paradigms of practice. He uses paradoxes not just to raise practice-related questions, but also to create in a reader's mind sufficient cognitive dissonance to open cracks in the paradigms that shape how they think about practice.

And in the end, he offers tools to act on what we already believe about learning, teaching and schooling ... once one has a way-of-thinking that can totally frame those beliefs. His success overall will depend upon the extent to which this paradigm-loosening process helps create that mental model. Within it, one can better understand the under-utilized cognitive tools that each child brings to school each day, and the need to embed them in the "pragmatic business [of teaching]" – much as knowledge of how the body already works is embedded in medical practice.

Egan makes good use of the cognitive dissonance of paradoxes to help the reader think about conditions permeating today's education we seem to accept as part of the business. Here are some of them:

- ... dilemma of progressivist educators is conflict between how easy it ought to be to educate children successfully, given that nature is busy about their proper development all the time, and the conclusion of endless reports and task forces that we are not doing very well for most children ...

- ... progressivist ideas have become central to educational thinking and (yet it is) largely true that they have never been implemented on a significant scale ... How can curricula that most directly embody Spencer and Dewey's principles be such a mess in practice?

- Why is the school not good at doing what Spencer concluded are the most important preparation for adult life? ... so much educational research seems to have no discernable effects on education. Why does what research tells us "works" seldom work for long, and never for all.

- "Spencer's progressivist prescription for education's problem has not worked and cannot work ... In spite of all this ingenuity, effort, and money, the revolution has not shown much sign of occurring."

He might also have added:

- Why do policies intended to improve learning for all children end up making it harder for those teachers and parents accountable for individual children to do what they know they must do?

- Why have billions spent on specific curriculum reform for the past 40 years had little effect on the processes of instruction that are the vehicle of all curriculum "delivery"?

- Why do so many things that practitioner's hearts say must be done seem so counter-intuitive to their minds?

- And maybe the ultimate paradox: many of the paradoxes that seem to abound in education are not seen as paradoxes – just as-the-way – things-are.

Egan's story should help us ask why, if our best theories about the fundamental nature of all children are right, we are still not able to apply them for each child?

In a way, Egan and Copernicus are peers. He acknowledges that he is dealing with a paradigm problem in which facts are not in dispute ..." rather what shifts is the way the facts are seen, the context of meaning within which their relationships are established." He wants us to reframe our maps of the visible and invisible "system" we call "education" (but which I will refer to as schooling) in order to see the relationships and potentials he can see.

And, as did Copernicus, Egan is really calling for a map that has a different center point from which all relationships are determined. Consider that without Copernicus' map, NASA today – with all of its present technical expertise and technology – would find itself like many schools, ... doing everything right, and still not getting where they wanted to go.

For both paradigm-shifters, the "problem" is the same. To "see" possibilities already there, requires that the consequences of living with the paradoxes, and/or trying to resolve them one-by-one, get bad enough that people have little choice but to get out-of-the-box of their paradigm created unquestioned beliefs.

The Paradigms – Paradox connection

We generally understand "Paradigms" as the mental models, formed from fundamental beliefs that frame the way we perceive, and operate in, the world. Imprinted deeply in the human mind by experiences, they become a transparent lens framing and making sense of all that is seen and experienced.

"Paradoxes," on the other hand – by definition statements that are seemingly contradictory or opposed to common sense – are not as readily understood. First, it is often hard to recognize their relationship to the common sense-making paradigms within which they appear. And second, the solution to a classical paradox – one where pure logic leads to opposite and contradictory conclusions – usually involves finding something within the situation or paradigm

that isn't being accounted for – an unknown, yet logical X-factor.

Two conditions seem to have generated the paradoxes that are central to Egan's purposes. One, a condition of "complementarity;" the other, an insidious form of "common sense."

Complementarity. Many of the seemingly polarized conditions represented in the cited paradoxes actually reflect the both/and condition of complementarity. In physics, understanding the nature of this condition made it possible to accept that light can appear to be made up of "particles" at some times, and of "waves" at others ... but not both at the same time.

Similarly, in biology, understanding complementarity allows one to see "that organization and structure are mutually dependent (one cannot exist without the other), but distinctly different – one cannot be reduced to the other, either. This meaning of complementarity is another of our fundamentals – at times so subtle that it seems to have little importance, at other times so powerful that it seems as if everything else hinges around it" (Fell et al., 1994).

Yet in both sciences this is only a "recent" understanding. It had to wait for new theories to create paradigms within which these actual relationships could be "thought about."

As I hope to show later, without this way-of-seeing, the "pragmatic business (of teaching) conditions Egan cites will continue to get in the way of applying what science tells us about the nature of learning. Without it, we have lacked a way to portray the paradox caused by society's requirement that schools be structured and operated to respond to the needs of all students ... through the actions of individuals who can only do it through responding to the need of each.

And, without that way of seeing and then thinking, the "system" of education – like NASA – will continue to do what it "thinks is right," and not "get where it wants to go."

Sadly, the greater paradox is that society already knows how to do it. It is the core organizing concept for hospitals as sustainable work structures. The work of everyone within them responds to the needs of all who enter, by organizing the work inside it around the interactions required to respond effectively to the biological needs of each (Rhodes, 1993).

Common sense realism. Both Egan and Copernicus had to deal with the effects of Common Sense Realism – a theory the dictionary also calls "natural realism," or "naive realism." These are "theories that the world is perceived exactly as it is. Paradoxes like this occur when the mind

and the eye conflict – when what we see around us, does not fit with what we think we know and expect.

This form of sense making emerges from the nature of the brain's wiring and how the mind responds to it. We see it, and therefore believe it. Observable experience tells us it is so. The earth looks flat, it must be. The sun appears to move around the earth; therefore the earth must be at the center. When teaching young children these are termed "naive theories," and we expect a child to hold them until taught otherwise. For adults, on the other hand, the "teaching" (or unlearning) task is much harder because the roots of "common sense realism" go much deeper and have become entwined with other observable conditions that we "saw" because we believed.

This is why Egan's focus on the unquestioned "mental models" or "paradigms" is such a critical component of his message. Since we all are veterans or victims of schooling, they have been programmed by self-fulfilling cycles of seeing what we believe and believing what we see.

Nevertheless, this also is an example of how one can be both "right" and "wrong." On the one hand, he is so right about the nature of what's wrong. It is the assumptions and their supporting beliefs about how learning takes place – and how schooling must therefore support it, that slip beneath our consciousness and soon form the mental lenses we call "paradigms."

On the other hand, at the same time he is wrong about the source of the body of knowledge from which these beliefs, and then theories, are derived. In the worldview he presents, the "x-factor" at the center still seems to derive from the "sciences" of psychology and sociology.

Here is where the 5th *Why* needs to be asked. Why are not the "answers" offered from those sciences working? Egan asks this, but the status of his answers in this particular book suggests that he has not quite pushed deep enough to find a core nature that could explain everything else. This fifth level of understanding is even more important today as we increasingly recognize that when the unit of study involves "people," we are not in tune with what science is telling us about the nature of that core.

While he acknowledges the swamp he has arrived at is caused by the fuzziness of our understanding of the yin/yang of brain/mind, he seems to believe that it is "almost impossible to expose basic principles of natural learning." When we try, he says, " ... it becomes harder and harder to determine what it is as we accumulate-inmindate layers of cognitive tools." It is hard to understand ourselves as part of natural world – "Underneath our culture and our cognitive tools we are, of

course, parts of the natural world, but our prodigious cultural development has made it hard for us to understand ourselves in natural terms."

I am making this case here because many of Egan's arguments and metaphors are weakened by his failure to distinguish between mind and brain, and their relationship to each other. And his case for tapping children's cognitive tools depends on it.

Cognitive biology as the missing X-factor

Is there a science whose "simple rules" support the more "complex" sciences of psychology and sociology? My own 5th *Why*? search for answers that work for all in practice led me beneath the complexities of those sciences to biology – in particular, cognitive biology (Murray, 1994).

Wilson (1998) described a similar pathway to understanding.

Theory (the answers to why) comes from the next level – to understand culture, you have to understand mind, to understand mind, you have to understand the biology of the brain.

The natural sciences have lacked a theory. Education as a natural science has functioned relatively theory-free, relying instead on assumptions and beliefs generalized from direct observation, much as people in the hard sciences theorized that the earth was the center of the solar system.

Cognitive biology, instead of psychology and sociology, may resolve Egan's Copernicus-like paradoxes because both are rooted in how the brain functions as a biological organ, and at that basic level it shares certain common characteristics with other "vital organs" (Land, 1973).

For examples, like these organs, the brain produces a product each individual needs to survive. As lungs (respiratory system) process what the body needs from the air around us, and the stomach (gastrointestinal system) from the foods we intake, the brain (mind or mental system) converts external information into a product the whole body needs in order to survive – knowledge that offers meaning. Its primary role is as sense-maker. And the science that best informs us as to how this takes place appears to be cognitive biology.

Steven Pinker (Pinker, 1997) supports this view:

The brain's special status comes from a special thing the brain does, which makes us see, think, feel, choose, and act. That special thing is information processing, or computation.

There are millions of animal species on earth, each with a different set of cognitive programs. The same basic neural tissue embodies all of these programs, and it could support many others as well. Facts about the properties of neurons, neurotransmitters, and cellular development cannot tell you which of these millions of programs the human mind contains. Even if all neural activity is the expression of a uniform process at the cellular level, it is the arrangement of neurons – into bird song templates or Web-spinning programs – that matters.

... That does not imply, of course, that the brain is irrelevant to understanding the mind! ...

... My point is not that prodding brain tissue is irrelevant to understanding the mind, only that it is not enough. Psychology; the analysis of mental software, will have to burrow a considerable way into the mountain before meeting the neurobiologists tunneling through from the other side.

And in his latest work, *The Blank Slate: The Modern Denial of Human Nature* Pinker, makes the case more strongly – the world within in us is a biological "given":

But "[f]or millennia, the major theories of human nature [that] offer explanations for much of the subject matter now studied" are written on a "slate" informed "by psychology and social relations." And which leave us with a theory of human nature that is in effect a "blank slate" because it lacks a belief that "the human mind has no inherent structure" (Pinker, 2002).

We've been "going against the grain of the brain," as Abbott (1999) so delightfully described it. Schools require unnatural behavior of natural learners – both children and adults (Rhodes, 2000a). The unfortunate consequences are the conditions of the mind that Egan so well documents. The "nature" we have "denied" through our actions is that, from birth on, we all are biologically pre-wired problem-solvers. Our brains contribute this to the role the mind plays in personal, and then organizational, survival. They serve to develop the mind's capacity to deal with barriers to accomplishing our purposes.

Egan's concern for tapping into the power of the brain's cognitive tools may seem more relevant to student learning, but it also is the key to understanding why so many teaching and schooling practices appear to be "wrong." We have not been able to see how to use that embedded "operating system" in the organized work we ask adults to do in schools. Yet the "OS", and its programs that create meaning and guide purposeful actions, do not turn off. Instead the work setting often becomes the "problem" to be solved – the enemy of the nature of those who do the work.

My experience tells me that a paradigm with the x-factor of cognitive biology as its center point can erode the paradoxes of common sense realism that Egan addresses. Those caused by complementarity may be more difficult. Sometimes I find Escher's famous print of a hand drawing itself drawing itself a helpful visual metaphor for the task.

As Egan notes, "biology has supplied us with the tools to transcend biology." That is, certain "cognitive tools" that come "installed" with the brain when you get it, help the mind weave information and experience into knowledge, and then increase our capacity to continue to do it. This relationship is like the one a computer's operating system has to the programs whose use it enables. The cognitive tools, Egan notes, are what we use in thinking, but then can use to make further cognitive tools.

For me, picturing the mind trying to comprehend and fix itself is when Escher comes in handy.

Cognitive tools of the brain

Egan's discussion of the nature of "cognitive tools" goes well beyond my simple metaphors and is an important part of his case for getting it "right" from now on. His intent is to stop "wild swings" between "old alternatives:" at one end, those who maintain we do not need curriculum at all – let the child determine it; and at the other, those who believe the curriculum is the constant, and the child's engagement in the instructional process, the variable. He proposes (rightly, I believe) that the perspective offered by an understanding of cognitive tools can enable education to see the "both/and" complementarity that can "make the content and processes of knowledge accessible, meaningful, and engaging to children."

With the different perspective I took into my reading, the understanding of "cognitive tools" I took away from his broader knowledge of these concepts is that they serve as initial organizers and processors of the information our senses feed to the brain. At this level they provide the frames and connections for meaning. They are the "tools" the learner brings to the schooling table for processing the "content" being served there.

These tools, Egan notes, include:

“ use of oppositions to gain a conceptual grasp on the world, use of narrative to shape and connect experience into emotionally meaningful events. Metaphor recognition and formation, story structure recognition and formation, fantasy, forming binary structures and mediating them, forming mental images from words.”

My only problem, as noted earlier, comes from an inadequate distinction between "mind" and "brain," because what he often finds does not apply to the psychological processes of the mind, does apply to the biological processes of the brain. I will note some of the consequences of this in the next section because he "blames" progressives for "relying on the wrong science to justify their conclusions." They, and possibly Egan, may not have been totally "wrong," ...just partially right.

On the one hand Egan is "right" when he claims, "what is wrong (with Spencer's desire to change teaching to reflect natural learning) is the inadequate recognition of how human learning is affected by our cognitive tools." He's also "right" when he agrees that there is "some natural, spontaneous process ... that is the bedrock on which teaching, curricula, and all the structures of schooling must be built for the institution to succeed."

But, on the other hand, he is both "right" and simultaneously "wrong" when he correctly declares as "wrong from the start" the prior assumptions "that we need to locate that bedrock of development in a spontaneous psychological process which careful research will be able to expose in increasingly reliable detail" on the road to developmentally appropriate curricula. While he is right about the nature of that bedrock process not being psychological, it turns out that cognitive biology could offer a sounder base on which to build our theories that frame teaching, curricula, and all the structures of schooling.

Meaning through a different lens

How would "thinking with" a lens ground with cognitive biology as the x-factor at its center help make sense of the paradoxes in the present paradigm that Egan presents, and let educators "think about" getting on with the work of creating, sustaining, and operating schools that support – rather than deny – the nature of learning already-embedded in the human brains of students and the educators themselves? How might this paradigm help make sense of the psychological and social theories that develop from it?

Recognizing that cognitive biology, like all the relatively-new sciences dealing with the brain and mind, cannot have all the answers we'd like, it does seem that we know enough to begin to ask some different questions about the meaning of what we do know so far. For example, some of the terms Egan uses throughout the book take on different meanings when viewed through this lens, and directly affect the polarization that characterizes the paradoxes he presents.

Brain – Mind
Information – Knowledge

Teaching – Learning
Content – Process
Unit-of-education

Brain – mind

- On the one hand, Egan's right when he says, "we have good reason to associate mind with brain, and the brain is a biological organ that grows and develops as part of the body." But on the other hand, he does not turn to the nature and role of that biological organ in the individual's natural survival process called learning.

- He rightly finds fault with the "biologizing of the mind." And complains that this "biologizing of the mind has been mistakenly extended and has resulted in diminishing the distinctiveness of the mind's development ..." But then, at one point he makes a case for "looking at the mind as a biological organ subject to analogous developmental processes as the body." Both statements would be immediately true if he were referring to the brain in the latter.

- He acknowledges that "newborn humans come with a brain already organized to make sense of the world," but that how that happens "is still debated." Yet from this cognitive biology perspective, this is the rationale for the importance of the "cognitive tools" that do that job. These brain-embedded cognitive tools provide the processes that develop the capacity of the human mind to engage with the world and effectively learn from it.

- Again, he is "right" when he says he does not "want to deny at the simplest level, (that) we may observe empirical regularities in children's, schools', school districts', and principals' behavior and that we might draw implications for our future practice from such observations."

But in effect, he does deny it because his paradigm does not enable him to "see" the simple level of cause underlying the behavior of all the influencers on a child's learning that he cites. This is the built-in nature of the common "wiring" of their brains to support responsive, trial-and-error problem solving, not the more complex capacity of their minds.

- He is right when he concludes that the mind develops from the brain's interaction with the "culture." But, without more clearly distinguishing between "brain" and "mind" one might not understand how this relates to the conditions schools must address today in their work.

While the brain's wired-in processes or cognitive tools that manage that interaction may not have changed at all over the millennia, the capacities of the minds they create have. And this is largely due to changes in the nature, content and quantity of the interactions that feed it. And the "pragmatic business" of schooling is really about managing those interactions (Rhodes, 1994).

- If one believes it is education's job to embed these fundamental tools in the mind, then the claim that "Every Child Can Learn" seems to make sense. It is an outcome to be achieved "someday" if "we" work hard at it. If one

believes, on the other hand, that these tools are already "wired-in" the brain, – that "Every Child Does Learn" – then the processes of teaching and schooling start, each day, from a different place. And this directly affects the scope and nature of the "system" structured to support it (Rhodes, 1995a).

Information – knowledge

* In his metaphors, Egan seems to sense there must be something else influencing the entire process, but isn't sure we are there yet to see it.

"There may indeed be an underlying developmental process that determines what and how we can learn about the world. But I am sure that recent and current developmental theories are far from describing it adequately ... Knowledge just does not seem to have the same relation with the mind in a way that food does not constitute the body" ... It is "... an analogy that has commonly been taken as establishing greater similarity between the two processes than is warranted." "... to see the knowledge we accumulate as supporting psychological development as food supports physical growth seems equally implausible."

Yet, the food metaphor works for me if information – the product of the brain – is considered the "food" that feeds the mind's processes of knowledge construction.

Teaching – learning

• "Education," for some, means the process of teaching; for others, learning.

Egan makes a case that Traditionalists have concentrated on the "teaching" end and Progressives on the "learning." As a result, the single connected process of "schooling" is "thought about" as if it were two processes. Our present ways-of-thinking blind both "sides" to this fact: schooling involves one process – the management of "teaching" – that produces – "learning."

In this current paradigm, it is difficult to see the complementarity of the Traditionalist and Progressive arguments. Like a yin/yang, they each shape the other half of a whole that defines them both.

• With the alternative lens, one can find another analogy in medicine. If "teaching" is to "curing" as "healing" is to "learning", then the way we run schools at present is like doctors trying to cure without understanding how a body biologically heals.

• And when we confuse education, as teaching or learning it makes it practically impossible (as current controversies over testing demonstrate) to know whether the learning to be assessed is the knowledge product, or a wired-in-process whose capacity the school is supposed to develop (Rhodes, 1995b). Again, at a biological level, it

can be easier to understand how improving the capacity of the lungs to breathe is a different task than ensuring the quality of what it breathes and what it does with the continuing products of breathing.

• Today's "denial of human nature" comes from not enabling Egan's "cognitive tools" to be used effectively. What our eyes have led our minds to accept as "teaching" and "learning" in the common sense of common practice deny this level of understanding the "human nature" of both teachers and learners.

• Learning is the product of what happens in the minds of children. Teaching is the product of what happens in the minds of adults – and the biological nature of common wiring in their brains shapes both products.

Content – process

• The depth of the disconnect in the ways people think about schooling seems even more apparent in the two terms – "content" and "process." Egan sees the roots of this perceptual problem as the ways-of-thinking from Spencer on – the progressivist demand for freedom to explore and create in instructional processes vs. the traditionalist sense of the importance of curriculum-centered delivery of the content disciplines.

The "enemy" he rightly wants us to recognize are our unquestioned assumptions that prevent us from seeing and thinking about the integral nature of education's content and its process – its curriculum and its instructional processes – that still influence the either-or polarization of those who want many of the same common results for children.

• But the analogies he uses to support his case can take on different meanings in a biology-centered paradigm. For example, he criticizes those whose prescriptions for fixing education assume that "as physics is to engineering so psychology is to education; or as biology is to medicine so psychology is to education."

But then he says this:

"...can't be because psychology isn't a science like physics or biology, and while medicine has agreed upon standards for good healthy biological functioning, education's curriculum is still a contested mix of radically different ends and purposes."

But what if (as I am suggesting in this view) as biology is to medicine, it also is to education. Note that in the paradigms of engineering and medicine, the sciences of physics and biology provide the relatively constant core of "simple" principles from which initial relationships of practices can be seen. In this way, they serve as the center of a lens for determining the nature of effective processes for constructing any structure, or addressing the needs of any individual.

- Many of the conditions Egan's book calls attention to are, at their core, a paradigm problem caused by the "science" on which the psychological and social theories of learning and teaching are based. With biology as that core, instruction can be understood as a separate (and discipline-free) process. It could be "thought about" as a "manageable" process of interactive engagement based on diagnosis and prescription similar to medicine's.

In the end, teaching practice, like medical practice, is a science that is applied through an art – a craft that involves creative, informed interaction between a practitioner and another individual's needs. Yet why is this not accepted when thinking about education? One reason is that the art of teaching individuals so that they learn is not organizationally supported, as is the art of curing individuals so that they heal.

And the primary reason, as Egan's book stresses, is that we have had it "wrong from the beginning." The art has been supported by the wrong science – psychology. As in medicine, the underlying science that gives meaning to the core process of teaching is biology. Within this lens it becomes possible to "see" how Whitehead's belief that learning is a product of an interactive process of engagement can be embedded in a manageable teaching process.

The unit(s) of education

- * What is the core "unit" at the center of the paradigm within which adults create the structures to support development of student learning capacities?

Egan's right when he "suggests that failure to identify units of education is one key to understanding why so much educational research seems to have no discernable effects on education." And also that what we accept as the "Unit of Education" serves as the lens/paradigm for seeing the facts that are studied.

Many of Egan's paradoxes deal largely with how these structures reflect what we "think about." "Why," for example, "is the school not good at doing what Spencer concluded are the most important preparations for adult life?"

Many of his answers deal with the "unmanageability" of the environments in which teaching and learning take place. He notes that Spencer and Dewey had the right diagnosis for "formal" education but their prescriptions couldn't be made to work there – they were unmanageable. He maintains this because "there is something wrong with their solutions," Spencer's ideas about curriculum and Dewey's ideas about instruction "have not delivered anything like what was, and is constantly promised."

One reason could be that they do not address the manageability of the process of "formal" education (i.e. schooling) that provides the sustainable container for the processes of teaching and learning.

- Egan does not seem to press through to the 5th Why? Why cannot they be managed? What is our current lens keeping us from seeing that could enable schools to act on what they believe? Why cannot practices based on the natural ways children learn be managed? What is the relation of "teachers' roles" to their contexts – the "pragmatic business" of teaching? What is the nature of the work called teaching and the role called teacher?

What is that sustainable unit-of education? (Rhodes, 1995c). Or, might there be more than one "unit" that must be nested and connected in order for all of them to be sustained?

Once again, a confusion of terms blurs our vision. Our understanding of the "Units of Education" seems to get tangled in the lack of specificity again of a word – this time, "Education." Is it learning, teaching, schooling? And, regardless, who is responsible for the "management" of those processes?

Here is what some answers might be through this different lens.

- What is the unit of learning? The "unit" within which the management of learning takes place is the student's mind. As Vygotsky's work illustrates, while others may help co-manage it over time, the processes can only be embedded there.

- What is the unit of teaching? The "unit" within which the management of teaching takes place is the teacher's mind and the minds of others in the school and district who influence what the teacher thinks with and about (Rhodes, 2003).

And, of particular interest for Egan's cognitive tools argument, those who manage each of those units are traditionally not supported in the use of their own cognitive tools. And the manageable pathway for it happening for the children lies in it happening first for the adults (Rhodes, 1995d).

- Because of the way we have "thought about" teaching as a "job" for an individual teacher, it is hard to see how, and accept that, the teaching "role" includes its management as a process of connected acts that in the end support individual learning (Rhodes, 1997a).

The unseen dimension of this perceptual problem is society's requirement that schooling respond to the needs of all, through the action of individuals who can only do it through responding to the need of each.

Through the ages – even before Spencer et al. – the "system" of education always hit the wall of the paradigmatic "box" it cannot get out of, when it tries to apply the theories that, by definition, apply to all children through a process of practices that must, again by definition, respond to each. Here's where the aforementioned "either-or" issues and the gaps between policies and practices show up.

But this does not have to be ... if we have a way to see how we already deal with it as a management problem. With that as common denominator, we then can look for better alternatives (Rhodes, 1997b).

For example, in the present views, we assume that the ways to get closer to responding to individual student needs can be addressed primarily by reducing the size of the unit so it can be managed more effectively. We envision a school empowered through its smaller size to be self-managing, and smaller class sizes for teachers – all on a pathway to the ideal which has been known for thousands of years to be one-to-one – the student on one end of the log and the teacher on the other.

But when we can view it differently, we can think about it differently and ask a different question about the "units" being managed. Especially now that science (cognitive biology) tells us that "one-to-one" is not a future goal, but the already present nature of learning that we do not get to chose. Learning happens! It is where our thinking must start.

When our ways-of-thinking accept that, then the question is: how do we start there and develop a management system to support it? And education does not have to start from scratch. This concept of "management" is accepted practice for medicine as well as all other professions where the nature of the practice is based on individual interaction with those it serves. The information emerging from this informed interaction feeds a common process of diagnosis and prescription where appropriate knowledge is matched to an individual's unique needs and requirements.

I always find the medical metaphor particularly useful because healing is a biological and psychological process within each individual, but society still creates institutions organized for curing which applies knowledge of those intrinsic capacities and tools to a common purpose (Rhodes, 2000b).

Why is Egan's book important today?

Today, when the frantic search for answers in both policy and practice does not allow time to consider Einstein's admonition that – "Everything has changed but our thinking ... A problem cannot be solved with the same

mind that created it" – it is difficult for anyone to suggest that most people are asking the wrong questions. But the questions Egan raises have direct meaning for the seemingly fruitless, seesawing "dialogue" about how society can leave no child behind.

Especially timely, is his questioning of the science on which educational research is based since "research" is a foundation stone of the new federal *No Child Left Behind Act*. As a federal official noted recently:

"The phrase 'scientifically based research' appears 111 times in the No Child Left Behind Act. It is there with good reason. If teachers, schools and states are going to be held accountable for raising student achievement, they need the tools that will allow them to identify and utilize effective practices and programs. The only tried-and-true tool for generating cumulative advances in knowledge and practice is the scientific method[2]"

While it maybe easier to see this as problem cause by policymakers, I agree with Egan when he "blames" Progressives in the research community – which most often means academe – (Rhodes, 1998) who were, not wrong, but only partially right ... because they have been relying on the wrong science to justify their conclusions ... and continue to. This has unfortunate consequences down the line because major foundations – to protect their investments – base their reform efforts on what has been "proven" by research. And most of the major reform groups who had made systemic change their goal, have now dropped out of the game as their research results continually hit the walls of boxes created by the ways they think about schools, teaching, and learning (Rhodes, 2003).

Egan devotes one of his concluding chapters (*Research has Shown That ...*) to the problematic nature of our assumptions about research. "I would like to persuade you that (this) commonly used phrase ... is rarely justified in education. ... the most rigorous and reliable forms of research yield results that are less secure than is commonly believed; that other largely ignored forms can be more secure; and that the insecurity of the so-called reliable research is tied up with the flaw I have identified in progressivism and the security of the largely ignored research is tied up with the cognitive tools I have been alluding to."

And once again, he is "right" in his conclusion, but "wrong" because of a confusion of terms. Most of the research on "learning" (what student's do) is seldom connected to "education" – as-schooling (what adults do). Nevertheless, he seems to be calling for a better lens to see that relationship when he adds that:

“ present research approaches to analysis cannot see connections already there so waste time trying to establish empirical connections to things that are already conceptually tied.”

“Let us have more conceptions of education, then, and let us try to make those we have more elaborate and comprehensive. In *The Educated Mind*, I tried to show that we can, by climbing on the shoulders of giants and stealing their ideas, articulate a conception of education and derive from it a curriculum, an educationally relevant developmental scheme, and methods of teaching that encourage educational learning ...” (his italics) That is, shows how to realize in individuals a certain conception of education. Without some such conception, all the research findings in the world are educationally blind, and with such a conception, it is unclear what research findings have to offer.”

Finally, the best test of an author's effectiveness is the reader's learning. Will Egan's content and process successfully challenge your "why?" –asking skills? It did for me. I learned as much from his medium as his message because in this case the message is about the medium in which the human mind embeds understanding.

(Escher ... where are you now that I need you?)

Notes

1. I anticipate some possible pushback from those who think these suggest learning and teaching involves a computer-like mechanical process, or that schooling should be based on a "medical model" intended to fix what's wrong with children instead of building on and developing what is already right. Or that I am denying how much we still are learning about the brain and the mind, and the interface between them, when I maintain that there is enough we do know at the simplest biological level. We do not have to know everything about the lungs or digestive organs to know the role each of these other "systems" play in sustaining life. Or worse, that I do not take into account that teaching is an art and craft, not a science. But what if – like other professions applied through responsive, informed interaction with an individual's needs – schooling is at its core a science applied through an art and supported as a craft?

2. Grover J. Whitehurst, director of the Institute of Education Sciences, USED) (statement before House Subcommittee on Labor/HHS Education Appropriations).

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