

"On the Brain" with Dr. Mike Merzenich, Ph.D.

About Brain Plasticity

A great resource for a general understanding of dyslexia, and its human and societal impacts

David Boulton's "**Children of the Code**" is a wonderful, general resource for educating yourself, a class, a teaching staff, your professional assistants — or any other group with a need to know — about the miracle of reading. A second, very enlightened focus of Boulton's opus is on the origins of, and the great personal and societal costs, of impairments in reading.

David's basic strategy was 1) to record beautifully guided conversations with more than a hundred scholars, scientists and educators who have something useful to say about reading and reading failure; 2) to collect a large series of straight-from-the-heart interviews with less-than-proficient and busted readers; then, as a skilled documentarian, 3) to summarize the wisdom represented by our leading experts and by kids struggling to master the incredibly complex skill of proficient reading in a series of beautifully crafted DVDs summarizing different aspects of the science and sociology of reading (the 'code'), and of reading failure. These DVDs are GREAT teaching tools. I have personally especially enjoyed Boulton's treatment of the origins and expressions of dyslexia, the emotional dangers of reading failure, and its enormous societal costs. When David Boulton's treatment extends into my own scientific subdiscipline, his treatment passes muster, for accuracy, and for balance.

I have also enjoyed reading transcripts of Boulton's interviews, which can be accessed (free of charge) at www.childrenofthecode.org. They are special because this large group of world-class experts are all adroitly guided by David to express their overall perspective about how their science or professional experience relates to the 'great issues' of reading science and of the individual and collective impacts of reading success and reading failure on American society. This is great stuff, full of wisdom, rich in insight, the whole a LOT greater than the sum of its parts! I've read more than sixty of these interviews over the past months, and each time I take another bite at this feast, I learn a little more about reading and dyslexia. I'm readin' 'em all! If language or reading is within your range of interest, check it out.

<http://merzenich.positscience.com/?p=76#more-76>



Michael Merzenich, Ph.D.

For more than three decades, Dr. Merzenich has been a leading pioneer in brain plasticity research. In the late 1980s, Dr. Merzenich was on the team that invented the cochlear implant, now distributed by market leader Advanced Bionics. In 1996, Dr. Merzenich was the founding CEO of Scientific Learning Corporation (Nasdaq: SCIL), which markets and distributes software that applies principles of brain plasticity to assist children with language learning and reading. Dr. Merzenich has published more than 200 articles, including many in leading peer-reviewed journals (such as Science and Nature), received numerous awards and prizes (including the Ipsen Prize, Zülch Prize, Thomas Alva Edison Patent Award and Purkinje Medal), and been granted more than 50 patents for his work. Dr. Merzenich is often covered in the popular press, including the New York Times, the Wall Street Journal, Time, Forbes, and Newsweek. He has also appeared extensively on television, and his work was featured on the PBS specials "The Brain Fitness Program" and "Brain Fitness 2: Sight and Sound." Dr. Merzenich earned his BS degree at the University of Portland and his PhD at Johns Hopkins. He retired from his long career as Francis A. Sooy Professor and Co-Director of the Keck Center for Integrative Neuroscience at the University of California at San Francisco in 2007. He was elected to the National Academy of Sciences in 1999 and will be inaugurated into the Institute of Medicine this year.

Some Prerequisite Reading

 February 7, 2011 By [Joshua Hoffman](#)

I had a fascinating conversation last week with **David Boulton**, founder of Learning Stewards and an expert of educational and organizational learning systems. Mr. Boulton and I had a lengthy talk about the role of feedback in learning: not only as we grow and progress through traditional educational systems, but also as we move into the business world, where hopefully, we continue to learn.

I'm going to tell you much more about our conversation in a longer post coming up soon, but first I wanted to give you something of a homework assignment (appropriate, I think, given how much we're going to talk about learning!)

My conversation with Mr. Boulton was brought about by a post on his website called "**The 3 Laws – The Role of Feedback in Learning Oriented Systems.**" This post – and it's beautiful in its simplicity – should be required reading, not only for every market researcher, but for anyone who ever wants to benefit from the answers that market research can provide.

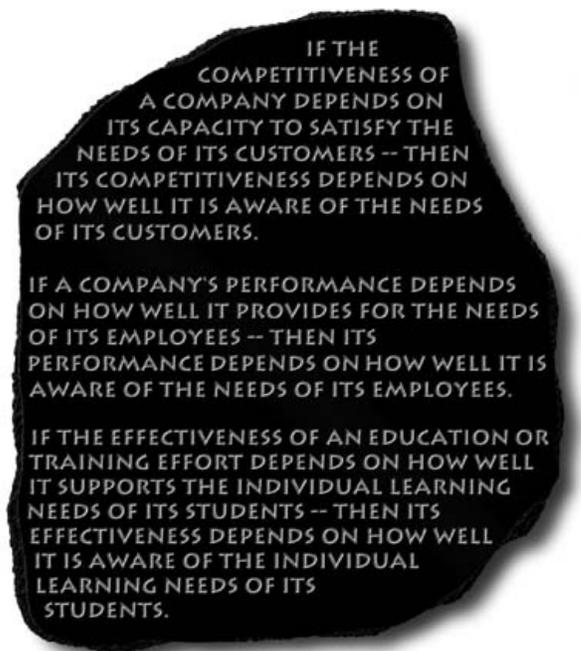
Go read it now: <http://www.implicit.org/3laws.htm>

Also worth your time are a series of short videos that Mr. Boulton has shared on YouTube, encompassing his core ideas about how we learn, why it's important, and the role of feedback in the process.

Take a look at this material in the next few days, and I'll be back with more about my conversation with David Boulton, which caused me to come to the conclusion that we have no idea how to listen.

Joshua Hoffman

<http://researchaccess.com/2011/02/some-prerequisite-reading/>



From: <http://www.implicit.org/3laws.htm>

Connecting with...

David Boulton, Producer, Children of the Code

Q: What is the Children of the Code Project?

DB: The mission of the Children of the Code project is to catalyze and resource a transformation in how our society thinks about the “code” of our written language and the “challenges involved in learning to read it.” I think we’re living in the “Stone Age of Literacy.” Our lack of understanding of what is involved and what is at stake in acquiring literacy is wreaking havoc on the lives of our population, including children.

At its core, the Children of the Code is a social education project. Some of the aspects of the project include a three-hour Public Television documentary series, a ten-hour professional development DVD series, and a series of teacher and parent presentations and seminars. We’ll also make available about 150 hours of video-audio transcripts on our Web site that will be indexed so that everyone can join in the conversation from any direction — neuroscience, the history of the code, social pathology, juvenile justice, or just about any other angle they’re interested in.

Q: Why are you so keenly interested in pursuing the topic of how people learn?

DB: A long time ago I asked the question, “What aspect of our lives is not profoundly affected by how well we are learning? What aspect of our emotional or cognitive development isn’t either constrained or enabled by our learning?” I came to feel that learning is where the most practical and the most profound acts of being human intersect with one

another. And that “turning up the learning” was the most minimally presumptuous and maximally relevant thing we could do for anyone — or for all of us.

Q: Why is this something you personally have taken on?

DB: About 25 years ago, I went on a year-long learning binge. I became interested in all kinds of things I wasn’t interested in during school — anthropological studies, brain science, comparative mythology, history, etc. And what I discovered is that somehow I’d grown up thinking that somebody out there “knows.” What I found though is that on the edge of anything that is important today, any scientific or philosophical inquiry, there’s a raging debate! What’s most important is the learning, not the knowing.

I realized that I could learn anything that I was interested in if I had the right resources — and so could anybody else. That’s what opened the door for me. Over time, my focus became connected not only with academic learning, but also with emotional well-being and cognitive well-being — to the total functioning of myself or anybody.

Q: What kind of impact do you hope Children of the Code will have on literacy and families?

DB: Well, the first thing I hope is that it changes the mental lens through which parents and teachers see struggling learners. I want them

David Boulton, co-producer and creator of the Children of the Code, is a learning ecologist, activist and technologist. His articles on



learning have appeared in *The Brain-Mind Bulletin*, *In Context*, *The California School Board’s Journal*, and *The American Music Teacher*, among others. Articles about his work have been featured in journals and books including *The Journal of Developmental Education*, *Poisoned Apple: The Bell Curve Crisis and How Our Schools Create Mediocrity and Failure*, *Working Wisdom (Timeless Skills and Vanguard Strategies for Learning Organizations)*, and *Schools Out: Hyperlearning and the End of Education*. David’s K-12 educational orientation and vision have been presented or referenced at gatherings including: the World Futurist Society, The 21st Century Learning Initiative, at both the California and National Education Summits, the Ontario (Canada) School Board Association, and The Chinese Ministry of Education, and have won the Teacher Information Network Gold Award and the Innovative Teaching Concepts Award of Excellence.

David has founded five companies and been awarded four patents. He is a past member of the 21st Century Learning Initiative and the Dialogue Research Project at M.I.T.’s Organizational Learning Center. He has been an advisor to the Chair of the California Senate Education Committee and is a member of the U.S. D.O.E.’s Gateway Project.

See <http://www.implicit.org> for more information on David Boulton’s educational vision and writings. See <http://www.childrenofthecode.org> for the story behind his work on the Children of the Code project.

Continued (over)...

Connecting with David Boulton... Continued

to see someone who is struggling as somebody who is struggling with an artificially confusing technology (written language) and somebody who is in significant emotional and cognitive danger. What I hope is that people realize that if children and adults struggle too long with the process of acquiring literacy, it can seriously affect how they develop and grow and learn. Struggling to read causes many, many people to grow up feeling ashamed of their mind. And so, I want to get that across.

If you look at the entire history of history, there's no more significant invention than this code — the alphabet. We are all children of it in a way. And yet there is a massive part of our population that is struggling to become proficient in using this code. They are truly the Children of the Code and their lives are at risk because they are not getting through it. Even their potential has been scarred because of the confusions and difficulties they've encountered in learning to read and

because of the fact that, collectively as a society, we really don't understand learning to read well enough to help them with it.

Q: Does there seem to be a commonality among the experts you've interviewed—a shared understanding of literacy and learning?

DB: At the broadest level, yes, I would say there is. For the most part, most of the people we've talked to have a common sense of the importance of literacy both to each individual's life and to our society as a whole.

At the detail level, there are a lot of differences. But as a whole, I think that the hopeful thing that we see is a growing awareness that the cognitive confusions and challenges associated with learning to read have a direct connection to people's self-esteem.

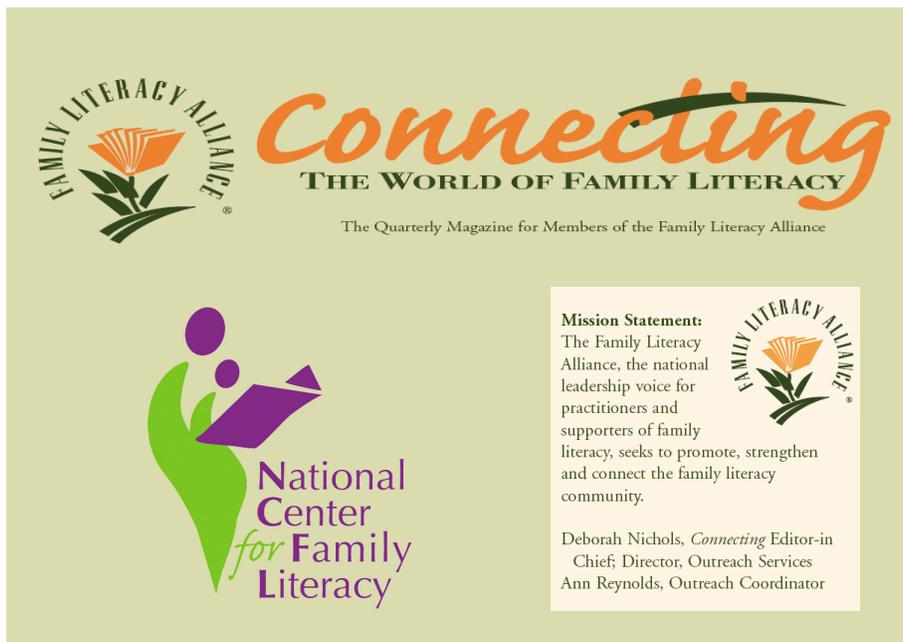
There's also a pretty common understanding for most people that this is an artificial challenge—a challenge created by human beings that has no

parallel in the natural evolutionary processes that brought us here. If we step back with today's scientific perspective, we can see that this is brand new in terms of our species. This has just happened in a blink of an eye. And it's a different kind of challenge than what our brain has organized itself to deal with, and we as a society have not yet caught up with that kind of thinking.

Q: What is your vision for the future of learning?

DB: My sense is that how well children grow through the traumas, challenges and disadvantages they experience depends on how well they learn. A few generations from now, our planet, our nation, our society, culture, economy, our families will be the result of how well our children are learning. So my sense is that, just like the Copernican inversion — where we came to understand that the Earth revolves around the sun instead of the other way around — we need to have a flip of that magnitude about learning itself.

Learning isn't just the utility for acquiring knowledge, skills and experience. Learning is the process of how human beings become human beings. It affects everything. And so our mission as adults, as parents, as teachers is above all else to be stewarding the health of our children's learning. My vision is that this is matter of aligning our behaviors and actions to demonstrate the value case for making that happen. ■



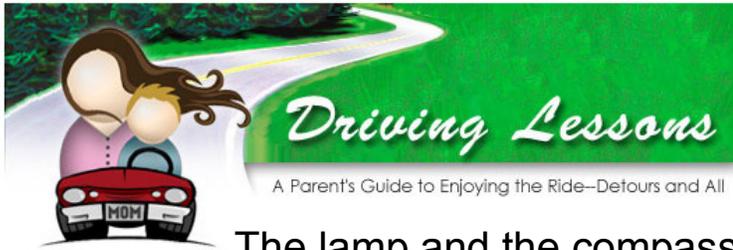
Connecting
THE WORLD OF FAMILY LITERACY

The Quarterly Magazine for Members of the Family Literacy Alliance

National Center for Family Literacy

Mission Statement:
The Family Literacy Alliance, the national leadership voice for practitioners and supporters of family literacy, seeks to promote, strengthen and connect the family literacy community.

Deborah Nichols, *Connecting* Editor-in-Chief; Director, Outreach Services
Ann Reynolds, Outreach Coordinator



The lamp and the compass

October 8, 2009 by Lu Hanessian

I couldn't sleep.

I had been reading quite a bit recently on praise, motivation, and how the two don't go well together at all in a child's brain. Carol Dweck's work on motivation has suddenly (even though she's been doing this work for 25 years plus) become the topic of discussion since **Po Bronson's** and **Ashley Merryman's** new book exploded onto the scene in recent weeks.

"Nurture Shock: New Thinking About Children"

Their first chapter was printed in New York magazine, "The Inverse Power of Praise." In it, they discuss Dweck's work and studies in which she and her colleagues discovered how praise drains a child's motivation.

Bestselling author of "A Whole New Mind" **Daniel Pink** does a wonderful talk on TED.com about how rewards and incentives lower performance—in kids and adults.

He distinguishes between rewards for a mechanistic task (performance intact, because task is menial and simple) versus rewards for coming up with, say, a creative solution, in which case, rewards and incentives dull the mind, making it difficult for us to think.

I wanted to connect the dots further, so I looked at the effects of shame on motivation too. And so, that sleepless night recently, I surfed online for articles and research and stumbled entirely unaccidentally on the work of a man named **Donald Nathanson, M.D.** an author, psychiatrist and expert on how shame affects our brains and everything we do as a result.

He wrote several books, one of which grabbed me by the frontal lobe, called "Shame and Pride."

I read **David Boulton's** long, brilliant interview with him and watched videos on shame and motivation on www.childrenofthecode.org a website of resources for parents, educators, therapists and anyone else who is interested in the vast information gathered here. <http://www.childrenofthecode.org/>

Here, in my groggy wee morning glassy-eyed curiosity, I delved into a fascinating world where phrases like "Shame Disabled" is commonplace. Shame cognitively disables us and kills motivation.

Nathanson came up with The Compass of Shame, as a way of explaining how we build internal defenses to "deal with" our shame.

Avoidance — Withdrawal — Attack self — Attack others

My mental wheels began whirring as I thought of all the shame-inducing practices that still live in our current parenting and educational mindsets: ultimatums, isolation, humiliating threats, removal of privileges, imposed consequences, punitive and reactive approaches to often innocuous or age-appropriate behaviors. Behaviors that could be understood in context, as opposed to being seen as a character flaw or sign of potential immoral development.

My friend's 3 year-old son was "put in a chair" last week at pre-school after he laughed during a game of musical chairs. He was told he could "come back to the group" when he was ready to "behave."

"Mommy, we can't talk to anyone or laugh at school," he explains.

Adults rationalize that kids must be taught a lesson.

"He has to learn," we often hear.

Learn what?

How to behave.

Not to laugh?

Not to laugh when it isn't time to laugh.

What if something is funny? And you're three? And you are not, say, running with scissors and wielding them maniacally at the class gerbil? And if you were, would there not be something to look at there... something deeper than "misbehavior?"

Brene Brown, PhD, author of "I Thought it Was Just Me (But It Isn't)" is a shame researcher, and when I called her to connect about collaborating on a future interview, she explained something so interesting and breathtakingly clear about the difference between shame and guilt:

"Guilt is "I did something bad" but shame is "I am bad." Yes! [www.brenebrown.com] How are we instilling these notions of "bad" self in our kids without knowing it, without intention, without malice—without any sense of how our own shame is driving our perceptions of and our actions with our kids?"

I contacted Dr. Nathanson a couple of days ago to ask for an interview and we ended talking (and laughing) for more than an hour, at which we forged a new friendship and agreed to film an interview about the role and effect of shame in parenting and educational practices.

"I can tell you that in 95% of all cases where people express rage, behave violently, aggressively, angrily, and lash out," he said to me, "they have experienced feelings of humiliation which have led them to react that way." He says we (in this country especially) are taught to attack or lash out at anyone who we think has humiliated us. Think about it. Every time you lashed out at someone, a stranger who you found exasperating, a sibling or parent or friend or spouse or student whom you felt incited your wrath, in many cases, did you feel a sting of humiliation leading up to it? A sense of feeling "offended" or dismissed or treated in such a way that you interpreted it as reducing you in some way?

He wasn't listening to me, so I screamed at him. She was ignoring me, so I hit her. He didn't talk to me like I was important, so I cursed at him and told him I would never do business with him again. She was fooling around, so I ordered her to the hallway and then asked her if she would rather go to the principal's office. He looked at me like I was stupid, and so I cut him down with my words. Or worse.

These are, in most cases, not what is actually happening to us, but what we perceive is happening. In other words, we see things through our own filter, our own story, our own unmet needs and old sore spots. That goes for everyone, parents to Presidents to professors to pastors.

Far-reaching implications for how to approach conflict resolution, violence and self-destructive behaviors in our kids—and ourselves. It paints even nail-biting in another light—a compassionate light—where we can see our kids' habits or reactions as potential clues for where the first seeds of shame may be growing.

And then, as David Boulton said to Nathanson, "use our shame as a lamp."



About the Author

Lu Hanessian is author of the acclaimed book *Let the Baby Drive: Navigating the Road of New Motherhood* (St. Martin's Press, 2004), a former **NBC anchor**, host of "**Make Room for Baby**" on **Discovery Health Channel**, and national speaker and parent educator. She is the author of a new children's book about connection called "*Picnic on a Cloud*" (Spring 2011), and her second parenting book "*Return to Tender*" due in early summer. As a parent educator, she is the founder of Parent2ParentU.com, leads unique integrative work-

A Vision Learning to Happen

A Dialogue with David Boulton

Spring 1993

QUANTUM LEAP

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"The best thing he did for us had nothing to do with artistic matters - it was about learning, which he used to say is the only thing that the mind never exhausts, never fears and never regrets - learning - its the only thing that will never fail us."

Cesare da Sesto on Leonardo Da Vinci

In every age there are people who somehow transcend their contemporaries, people whose insights serve to change reality for the rest of us.

Copernicus, Newton, Darwin, and Einstein were such people. What set them apart and gave them the clarity and strength to so challenge the accepted *notions of reality*, was that they learned to trust their own learning process. Rather than being learning-bound to what was known, they learned to follow the necessities and insights which arose in their own learning. In short, with respect to their work these people were *learning oriented* rather than *knowledge oriented*.

David Boulton envisions a world populated with learning-oriented human beings. He passionately believes that there is nothing we can do for our children, ourselves, our organizations, or our species that is as relevant to solving our problems and facilitating our potential, as becoming learning-oriented. By learning-oriented, he means *learning to 'sense' our own 'live' learning process and orienting our living and working towards sustaining its engagement*. For Boulton, this includes everything from effective problem solving to how our sensing, feeling and thinking shapes our experience of the world and, in fact, shapes the world.

This may seem altruistic and philosophical and Boulton is the first to acknowledge that: "While I don't want to deny the profound implications, the most compelling reasons for what I am advocating aren't altruistic at all. They're driven by practical necessity."

Where The Practical Meets The Profound

The business of business is education [and] the business of education is work.

Nan Stone, Harvard Business Review, March-April 1991

Precisely because it is no longer clear what knowledge and skills will be relevant to the rapidly changing needs of business and hence to the preparation of today's young people, what is clear is that *business will need better learners*.

Throughout the theoretical and applied organizational sciences, and from the Fortune 1000 meeting rooms to the business schools of every major university, the emerging paradigms center on improving organizational and individual learning. As organizations struggle to improve quality, responsiveness and efficiency amidst change and uncertainty, they are coming to realize the practical implications of W. Edwards Deming's insistence that the only sustainable advantage [of any organization] is learning.

Concurrent with the emergence of the learning movement in business, and driven by the enormous pressure to "reform", new approaches for facilitating learning are being tested in education: Collaborative Learning, Learning to Learn, Critical Thinking, Self-Esteem, Multiple Intelligences, Accelerated Learning and many more. These movements, together with various branches of cognitive science, developmental and humanistic psychology, are leading us toward a massive shift in the very mission of education:

"Empowered by a growing alliance with business and a host of new insights into how human beings learn, a new educational system is emerging. Of the many challenges it must face, I think its most significant one will be this: to learn to facilitate people who will be capable of learning in ways, and about things, that cannot be reliably predicted at the time of their education. Therefore, the most significant difference between today's education and tomorrow's will be the emphasis placed on each person's capacities for ongoing learning."

David Boulton, 1991

"If this is indeed the case," Boulton proposes, "if we see that learning is where the practical meets the profound... if we see that what is most generally relevant to our lives and times are our capacities for learning (not just what we have learned), then what we require now is a Copernican-like inversion in the way we think about learning."

Inverting The Paradigm

"Whereas in the past we have viewed our capacities for learning as the 'means' through which we acquire the 'ends' of knowledge, skills and experiences, we must now see that extending our capacities for learning is the 'end' and knowledge, skill, expertise and experience are the 'means'."

When we arrive at the necessity for such an inversion, the real work can begin. Some things don't happen serendipitously — we wouldn't have landed on the moon if we hadn't intended to. "Once education and business see the necessity of developing our human

capacities for learning," says Boulton "we can begin learning what they are and how to facilitate their extension."

A New Sense Of Learning

Before we can extend our capacities for learning we must first make our experience of learning more vividly conscious. *We can't get better at something we aren't aware of*. But how does the fish recognize the water? For Boulton this is close to the heart of the matter:

"In learning to walk our 'sense' of beginning to 'fall' informs the movements that sustain our balance. Similarly, if we can develop a 'sense' for 'falling' out of learning — if we can learn to sense ourselves 'dropping out' or 'disengaging' — it can form the basis from which we sustain and extend our awareness of, and participation in, learning."

Boulton illustrates this by drawing on everyone's common experience of reading: "How many times have you been reading along, highly interested in something, and yet, despite that interest, suddenly found yourself 'waking up' to the fact that you have moved ahead many paragraphs or pages and cannot recall what you have just read? The drift that occurred could have been caused by any number of things that you couldn't really do anything about, but anything you *could* do, would begin with your becoming aware that you were beginning to drift. *You can't do anything about something you've not even aware of*. This same 'drifting' or 'falling out' occurs all the time in equally subtle ways when we are learning. So, if we are going to become conscious of, and able to participate in extending our capacities for learning, we will have to develop a sense for 'drifting' out of learning."

Now we arrive at the core of Boulton's work. Based on his research and personal experience, he believes that "falling out" results from having encounters with content (words, terms, phrases, concepts, ideas, sounds, languages, pictures, presentation styles, etc.) that "miss" or simply do not make meaningful connections. Such "misses" cause spikes of uncertainty, curiosity or creativity ("meaning needs" he calls them). Because these environments (classrooms, textbooks, computers, etc.) are unable to respond to the "meaning needs" they provoke in us (at the 'same time, same place' level of our needs), they insidiously teach us to ignore them. When we ignore our own needs for more meaning, we become prone to following poor inferences and tan-

gents, our 'attention span' is unnecessarily dissipated, and soon we 'fall' or 'slip out' of learning."

"Our meaning needs arise from the deepest and most authentic activity of our learning process — when we learn to ignore them, no matter what else we may be learning 'about', we cut ourselves off from the fountain-head of our capacities for learning."

David Boulton, 1991

Mutually Learning-Oriented Relationships

"We wouldn't learn to swim in a desert or walk in outer space. We only learn to extend our capacities in environments that support and feedback to us — allow us to sense ourselves — on the very 'edge' of our experiencing. If we want to help people learn to extend their capacities for learning we must meet them on the 'edge' of their learning. To do this, we must first be able to respond to their meaning needs."

David Boulton, 1991

With these statements and the following three questions, Boulton challenges us to participate in a radically different way of looking at learning:

- "How can learners learn to extend their capacities for learning without first learning to trust their own 'meaning needs' as the primary compass from which to orient their participation?"
- "How can learners learn to trust their own 'meaning needs' without a learning environment which is responsive enough for them to experience those needs in the first place?"
- "How can environments ever evolve that will be capable of responding to learners at the level of their 'meaning needs', unless the educator's goal in designing them is that they become the 'scopes' or 'two way mirrors' through which the educators themselves learn what those 'meaning needs' are?"
- "How well a person learns depends upon the responsiveness of the environment to their 'meaning needs' (to their 'immediate' needs for a deeper, broader grasp of, and participation in, what is going on.) And, how well the environment can respond depends upon how well it was designed to learn about and respond to those needs."

From *Here to Implicitly*, David Boulton, 1989.

David Boulton calls environments that exhibit the web of interdependencies *Mutually Learning-Oriented Relationships*. He believes that any sustainable approach to reforming education or making businesses more efficient begins here.

A Vision Learning to Happen

"Why not cherish each child as if she or he were the key to the future of mankind, as if each had the capacity to become an Einstein, Curie or Michelangelo?" Boulton asks.

"And why not view each business organization as having the capability of making profoundly new contributions to human social and economic well being?"

What illuminates Boulton's work is this: like a fish that did discover the water it swims in, he arrived at the insight that learning itself is the central dynamic of the human being and that which can assure survival of the human community.

David Boulton has spent the past decade developing insights and technologies focused on radically extending the innate learning capacities of children and adults. All of his work has a central unified mission: assisting schools, businesses and individuals in creating the kind of highly responsive, mutually learning-oriented environments, in which learners may thrive.

<http://implicit.org/quantum.htm>



The Gateway has been serving teachers continuously since 1996 which makes it one of the oldest publicly accessible U.S. repositories of education resources on the Web. The Gateway contains a variety of educational resource types from activities and lesson plans to online projects to assessment items.

Articles by or about David Boulton

Learning to Learn <http://www.implicit.com/learning.htm>

Description: This site gives a general introduction to David Boulton's theories on learning. It presents his idea that until now people have been taught with the goal of accumulating knowledge when what they really need is to learn how to learn. He maintains that traditional education teaches students to ignore their learning needs which causes them to "slip out" of learning." His work is centered on a system called DIACOM: "In essence, it will provide each learner an "interface" that will enable them to become more conscious of and able to apply their own learning and meaning needs to achieving mastery over educational objectives."

Education level: **ALL** - Price: **Free** - Beneficiary: **Students, Teachers**, - Provider: **Implicit/David Boulton**

From Here to Implicit <http://www.implicit.com/implicit.htm>

Description: In this site, the author uses a walk and conversation with his then five-year-old son about the child's latest invention- a "radar-helper" - as a starting point for an essay on learning techniques. His son said that when he focused the device on something, "...he would get pictures and sounds and be able to ask questions and immediately understand whatever it was he was curious about." The author combines this idea with a study he did to try to identify "...what made the Nintendo experience so engageable for children." He concluded that "...the cycle of relevancy, challenge, frustration, and resolution - all happening in real time compatibility with the ACTUAL child's attention..." was what keeps a child involved in such a game. He added to this the observation that most readers do not stop every time they come across a word that they do not know, but train themselves to ignore this information need. "In order for a learning environment to facilitate learning it must be responsive enough to the actual individuals' needs for meaning to encourage him or her to employ those needs in driving the learning process." Mr. Boulton concludes by saying that he is currently working on the development of a "learner-interface" which would use computer technology to provide something like his son's "radar-helper."

Education level: **ALL** - Price: **Free** - Beneficiary: **Students, Teachers**, - Provider: **Implicit/David Boulton**

The Most Important Subject <http://www.implicit.com/tmis1.htm>

Description: This article uses several illustrations to show the reader that knowing how to learn is more valuable than knowing specific facts or skills. "Learning to improve your ability to learn is much more like... "learning to walk or to swim "...than it is like learning about math or science or literature. Though learning about math or science or literature or anything else, for that matter, can become the "swimming pool" or semnasium™ " "SEM' is the root of the word semantics which means the study of MEANING. 'NASIUM' is something I borrowed from GYMNASIUM which means an environment you exercise in. So, I am saying, SEMNASIUM™ is an environment for sensing and exercising in meaning and, SEMNASTICS™, like gymnastics, is the inner discipline of the exercise. "

Education level: **ALL** - Price: **Free** - Beneficiary: **Students, Teachers**, - Provider: **Implicit/David Boulton**

A Vision Learning to Happen <http://www.implicit.com/quantum.htm>

Description: This site promotes the idea that it is better to be "learning oriented" than to be "knowledge oriented" for practical as well as altruistic reasons. Copernicus, Newton, Darwin, and Einstein are placed in the category of learning oriented people because they trusted their own learning process. Boulton's premise is that businesses have more need for learners than for skilled workers.

Education level: **ALL** - Price: **Free** - Beneficiary: **Students, Teachers**, - Provider: **Implicit/David Boulton**



Journal of Developmental Education: **CUTTING EDGE: GOING BEYOND NINTENDO** by James E. Conner—Volume 16, Issue 2, Winter 1992

If David Boulton can pull off what he envisions and has constructed, the educative process, as we now know it, will, at its deepest structure, be in for a complete overhaul -- from cradle to grave, from schools to universities to work-places to homes. And, in the process, the educator's heretofore unattainable dream of individualized learning will become a palpable reality. Needless to say, the impact on literacy training will be incalculable.

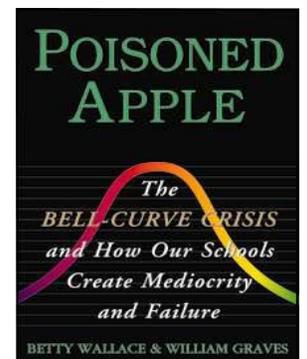
I confess that when I first heard David Boulton address a group of so-called futurists, I was reminded of the great 13th century Italian poet, Dante Alighieri. You may recall that Dante's description of hell proved so vivid that local citizens could only look upon him in awe, proclaiming that he, of all mortal, earthly creatures, had actually gone to and returned from the terrifying lower reaches. When I hear and peruse David Boulton (1990, 1991, 1992a, 1992b), I experience awe in a very different context. I get the impression that he is (very much at home) in the future, conceptually and physically, while the rest of us are stuck in some sticky time warp, looking on, in awe or perplexity or, more probably, both. I believe that Boulton is not only in the future, he has invented what will be the future in education. And on a scale as large or greater than that of Steve Jobs and Steve Wosniak who upon seeing the connection between computer and video went on to invent the personal computer.

First and foremost, Boulton is a revolutionary, albeit atypically, a quiet-spoken, hyperbole-eschewing one. He seems completely satisfied to move his audience with the sheer power of his ideas, demonstrations, and images. Boulton (1991) evolved his theory of learning by observing how 3- to 5-year-olds were engaged in, and learned from, Nintendo games. Thus he was to enter the child's world in much the same way that Alice walked through the looking glass. In seeking "to understand what made the Nintendo experience so engaging for children", he discovered the "cycling rhythms of challenge, frustration, creative resource application, and renewal." (for more of this see: <http://www.implicit.org/conner.htm>)

A growing number of educators like Boulton believe the primary mission of schools should no longer be to convey knowledge but to help children develop their capacity to learn.

Responsiveness is the key, Boulton says. The machine can respond to each individual's "[meaning needs](#)" with [a] scope and precision that classroom teachers could never find time for, he says. Students quickly begin suppressing personal needs for meaning in traditional classrooms, because their teachers can't possibly meet them. Gaining understanding in school is like trying to learn to swim in the desert, Boulton believes. To learn, the student must be immersed in the water of knowledge and feel it respond to individual probes and strokes. Without this water, there is no feedback, no way for learners to draw conclusions from their inquiries.

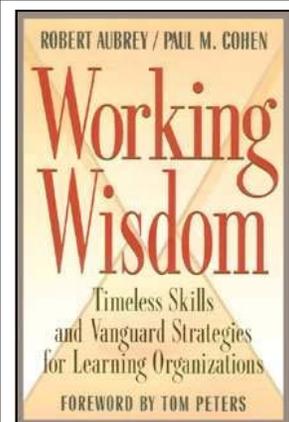
"Our education system is fundamentally, tacitly teaching us to ignore the core of our capacity for learning," Boulton says. "It is an [insidious process](#) we don't recognize." (for more of this see: <http://www.implicit.org/papple.htm>)



To be blunt, if you haven't got a plan for phasing technology into your learning strategy, you're shortchanging your future.

In today's learning organizations, linking wisdom to technology is vital. How do these two resources fit together? DiaCom Technologies, a software startup in Scotts Valley, California, has tried to answer that question. DiaCom has created what could well become a new software standard for learning, based on continuous, real-time feedback.

David Boulton founded the company with the aim of creating a technological environment for individuals that would sustain their motivation to learn by giving learners a structure for navigating through text, images, and sound. The design of the system was based on Boulton's observations of his son and friends playing Nintendo games. How did these kids stay engaged? What motivated them to work through a game for hours, making mistakes and learning as fast as they could to reach a more advanced level of play? Boulton's keen insight was that kids had a tacit trust in the game. They knew the resources were there to overcome the obstacles; all they had to do was find them. They were challenged, but had an amazing ability to overcome the frustration of making mistakes and losing games. (for more of this see: <http://www.implicit.org/wwisdom.htm>)



...Performance solutions are not the final goal conceived by leading learning scientists such as David Boulton of DiaCom Technologies, Inc. of Seattle, Washington. DiaCom's system is a learner-centric system and it is user controlled. In essence, each learner has an interface that enables him or her to achieve mastery over learning goals. The emphasis is placed on each learner's capacity for ongoing learning....

Mr. Boulton has created a general-purpose electronic, learning-oriented environment that allows learners to explore any body of knowledge in a variety of ways according to their "**learning needs**." The computer system responds to the learner's curiosity, learning style and achievement level. Thus a learner that is exploring computer-based training might encounter performance support systems, become interested in delivery of interactive media content over networks and end up exploring broadband networking technologies such as ATM and Gigabit Ethernet.

We are witnessing an evolutionary path that is, to some degree, moving toward the master/apprentice form of learning. In this case, the 'master' is the collective knowledge and experience of the organization and is made available through computer technology that responds to the individuals intention to pursue a particular line of inquiry. Thus the learning experience follows the best path for the particular individual rather than a generic curriculum established for a large class. Computer-based learning systems, such as CBT or EPSS, have focused in augmenting specific tasks and/or functions, and not on '**mediating the intelligence of the humans involved**.' (for more of this see: <http://www.implicit.org/fetterma.htm>)

