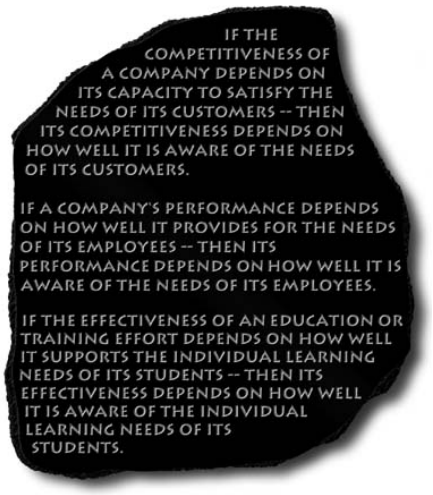
ARTICLES & BOOK EXCERPTS

*From Here to Implicity**

The California School Boards Journal, Fall 1991
and Management & Conjoncture Sociale (France) July 1994
- Appeared as *The Compass of Meaning*, In Context Magazine, Fall 1990 and The American Music Teacher Journal, Fall 1992
- Appeared as *Beyond Knowers*, Brain Mind Bulletin, April 1991

Learning to Learn

- New Horizons for Learning, Fall 1992



*A Vision Learning to Happen**

- Quantum Leap, The journal of the US-CHINA Educational Institute, Spring 1993

The Most Important Subject

- Young Scholar Magazine, August 1994

Book Excerpts

- Poisoned Apple, April 1995
- Working Wisdom, May 1995
- The Interactive Corporation, September 1997

Cutting Edge: Going Beyond Nintendo

- Journal of Developmental Education, Winter 1992

ESSAYS AND ABSTRACTS

Learning: The Central Dynamic of Human's Being – Essay 1987

- The Future of Education – Apple Computer International

*The Obstacles to Learning: Part 1—Information — Essay 1987**

- The Future of Education – Apple Computer International

*The Insidious Curriculum – Essay 1988**

- Cupertino Union School District

Training Wheels for Literacy – Presentation 1991

- World Futurist Gathering on Education N.C.

*The 3 Laws of Feedback and Miraculous Intersections – Presentation 1992**

- Carleton School Boards, Ontario Canada

Foundations of our Vision – Presentation 1994

- National Educational Summit

Notable Journal Entries

- Tides of Meaning – Meaning Being – Daaron - John

*** If you cant read them all but want to get the essence read these.**

From here to

A philosophical journey toward understanding the learning process

by David Boulton

The other night my 5-year-old son Daaron and I went out for one of our evening walks. We like walking at night. It blends energy and subtle-mindedness, and helps us tune into really being together.

Normally when we walk we avoid bringing any toys or things that may be distracting. Walking is a special discovery time and we both enjoy discovering who we are and whatever else we encounter as we trek around the neighborhood. But, on this particular night Daaron was rather set upon bringing his latest "construx" creation. He was very enthusiastic as he told me that he had "a new invention to share." So I said, "Ok, bring it along."

The "device" (his word) had a body like a jet cockpit, wing-like struts which proceeded from its sides, a small spinning cylinder for a nose and a curious handle connected to its rear end. On first sight I wondered if it was a space ship, a magic sword or, possibly, a PK valence meter (the Ghostbuster meter for detecting slime).

At first as we walked and talked he said nothing about his new invention. But, as we encountered a "roly-poly" bug, Daaron and his device sprang into action. Dropping into his curiosity crouch he placed the invention, as if it was some kind of magnifying glass, between his face and the bug. As he got closer, strange whirling and clicking sounds came forth and in Daaron's best imitation of synthetic speech, the invention began describing all that was known about roly-poly bugs. At points, Daaron stopped to show me "visuals" on the device's make believe display—how the bugs legs worked and how great the idea of rolling into a ball was...much better than a snail's shell.

As I crouched alongside rather speechless, Daaron went on to describe the Device as his "radar helper." He said that it would work on anything — telephone poles, cats, stars, trees — no matter what it was focused on he would get pictures and sounds and be able to ask questions and immediately understand whatever it was he was curious about.

For reasons that will hopefully become clear as this article progresses, I was delighted and stunned. Over the

David Boulton is founder of Learning Insights Inc. and special consultant to Apple University.

implicity

remainder of our walk Daaron stopped do ens of time to use his "radar helper" and, I think, make sure that I understood the significance of his invention — "Dad, don't you think every kid should have one these "

Jump...

About two years ago I used a C and microphone to record a group of - to -year-olds as they were playing Nintendo games. I wanted to understand what made the Nintendo experience so engageable for children. Having wired them up, I asked them to describe what they were doing and then became invisible.

From previous observations it was clear that themes (i.e., Batman, Turtles, etc...), whi y sounds and sophisticated color graphics were not the real issues. While they attracted the child's initial interest, some of the most apparently spectacular games were missing something that others far less so had — the ability to sustain the child's engagement. y hunch was that underneath all the multimedia whi -bang engagement was a relationship quality between child and game that emerged if the game's deeper rhythms of play were compatible with the child's nervous system.

What I discovered was that the most engagable Nintendo experiences shared certain "deep dynamics." They all involved moving through a matrix of challenges and obstacles, learning certain movement skills and dexterities, using one's "energy" or "lives" judiciously, and most importantly, learning when and how to free e the game playing, jump "off-line" to a resource screen, select a resource with which to overcome an obstacle, re-engage the play screen and employ the resource to move ahead (resources might be ladders, hammers, magic potions, jewels, rafts, money, food, a consulting wi ard, etc.).

I still remember how I felt as I started to see beneath the surface of the game playing. The conceptual dexterities of these kids were stunning — here they were manipulating a rich tapestry of logical types, levels of inference, multiple contingencies, numerous specific meanings—doing it all very dynamically — and all with an effortlessness that was breathtaking to behold. I couldn't help but think they were practicing the future—not the content—somehow, I felt, they were practicing the future process of processing. How was it that these kids could deal with so many interrelated contingencies and meanings at once

Asking that question and reviewing the tapes, I saw there were cycling rhythms of challenge, frustration, creative resource application and renewal that were at the core of why they enjoyed playing the games. es, the sound and graphic effects were important components, but it was the way the games allowed the children to creatively act upon their own frustrations—the cycle of relevancy, challenge, frustration and resolution—all happening in real time compatibility with the ACTUAL child's attention, that I found to be the key.

Small (Quantum) Jump...

Just as our eyes see optimally only a particular range within the frequencies of light and our other senses particular ranges within the frequencies of matter

— what if our nervous systems have an overall optimal range for resonating meaningfully with our environments? For *co-implicating* the not-nowness of our memories and the all-at-onceness of our senses into the stream of our consciousness? What if underneath all the issues of content, logic and pedagogy there is a more basic issue - the intrinsic dynamics of how a multiplicity of meanings implicate one another and punctuate the rhythms of engagement?

Jump...

About four years ago I began asking some of my friends: When you're reading a book and encounter a word or term that you don't understand do you a) put down the book and dig into your references or b) just move along and hope it's not to important or, that if it is, further reading will fill it in? In other words I asked: What do you do when you have a "need-more-meaning" impulse? I wasn't surprised to find them saying that if the material wasn't critically related to their jobs they just skipped over whatever they didn't understand. Stopping to look things up, even when the references are handy, is just to distracting

Questioning literate adults about what happens while reading a book is almost like asking about their breathing. So I took the point one step further, I had them remember back to when they were a child in school and asked: How many times did you raise your hand when you were curious or uncertain? Like my own memory of being in school, my respondents all said "not too often". I then asked, how often were you uncertain or curious in class. Again, like me, they tended toward "a lot more often then I raised my hand".

What I was fishing for was how these "learning environments" unintentionally stifled the expression of a person's curi- highly motivated learner I often found myself disengaged from learning. How was it that I could be moving along, engaged and full of interest one moment, and disengaged and drifting the next? I discovered that there were many reasons but that the only ones I could do anything about (short of food, sleep or a soundproof room) were ones related to how I resolved my own "meaning needs". If I didn't follow up on something I was uncertain or curious about, two things happened. First, I passed over something I arguably needed or at some level desired to learn. Second, and more importantly, in doing so I was tacitly *dulling* myself to **being** uncertain or curious. The more I thought about the latter point the more I was convinced something was wrong. How could I ask questions, how could I participate in my own learning process without a ***sharpened*** sense of my own uncertainties and curiosities? What other "compass" do I have?

Jump...

Today people on the cutting edge of organizational design, management theory, general systems thinking, representational democracy, whole person health care, peak performance studies, psychological and somatic therapies (and a whole lot more) are converging on one another. Today, the Rome that all roads lead to, the common and central dynamic that underlies performance and wellness in all individuals and organizations, is learning.

In other words, in the face of an unprecedented rate of change, cultural evolution is beginning to select "learners". From a purely pragmatic standpoint the reasons are simple: yesterday's knowledge doesn't consider today's contingencies, whereas learning today can include without being limited to yesterday's knowledge. From ever know about who we are, what we are, why we are, how to do things and how to change things, individually and collaboratively/collectively - we will have learned. **The greatest natural resources on earth are "learners".**

Paradoxically, the problems of education are in large part due to the fact that for hundreds of years the role of education has been to produce "knowers" instead of "learners". Facilitating the development of persons who are able to continually learn is a significantly different objective than producing people who can remember information or systematically repeat skills. Changed almost overnight by the advent of modern computer technologies, the world no longer needs human data bases or robots - it needs learners who can adapt their activities, including using these new technologies, to what is happening new each day.

No matter where in the spectrum of thought you stand, once you've seen learning's profoundly practical significance, learning to know and learning to do give way in priority to the deeper issue of learning to become ***learning oriented*** - the hallmark of a learner. The questions for educators and parents then become: how can we facilitate our childrens' capacities for learning and how do we help children dis/cover their natural appetite for learning to learn.

Jump...

It's 2010, your 7 year old grandchild has just returned from a vacation in Yosemite where she discovered the wonder of trees. She is watching a clip on environmental consciousness with her **INVISOR** when a beautiful tree in the background reminds her of the questions that flooded her mind at Yosemite. The invisor tracks what she looks at and so when her eyes pause to look at the tree, and she says "more", it knows exactly what she means. The invisor zooms in on the tree and informs her

through familiar icons that she can explore “trees in general” or explore this particular “kind of tree”.

By slightly moving her finger she selects “trees in general” and a new series of icons appears that offer her half a dozen ways to travel further. The “time machine” icon, she knows, will allow her to look at the broad scale evolution of trees or at the comparatively short scale growth and development of an individual tree. The “shrinking machine” icon will allow her to become a “virtual shrunken observer” and travel inside the tree examining its inner forms and processes. The “space ship” icon will allow her to examine the macro role of trees from a global - “orbital scan” perspective.

Just in case she doesn't want to explore such depths, three “advisor” icons allow her to watch and listen to a “storyteller”, a “scientist”, or a “tree expert”, who like “talking heads”, will walk her through the major significances, of in this case, “trees”.

After a quick jaunt through the time machine where she watches in time lapse the seed grow out of and into the ground - witnessing the intelligence of the tree as it grows in response to the sun and the terrain and other trees which make up its environment, she selects the “storyteller”. Because she is interested in practicing her Russian, she also sets her invisor for bilingual (Russian/English) operation. If she gets stuck in Russian the system will have an English “safety net” ready to help her. Moving on she sees that there are many stories and myths available. As she encounters the one entitled “gravity dancers”, the word gravity causes her to pause and when she says “more”, a new series of icons appear.

These new icons deal with different classes of reference support. One is for quick, concise help similar to an old dictionary or thesaurus, another is for elaborations similar to old encyclopedias, the “in context” icon will clarify the word's specific use and still another will cause the invisor to reorient itself and make “gravity” the central thematic domain. After having gravity pronounced (the voice in her head had trouble with it), she decides to really explore gravity and come back to trees later.

The “time machine”, she knows, will allow her to see gravity at the broad scale, evolutionary level…

There is great potential for David Boulton's ideas. The subjective meaning paradigm and theory of learning and (overall) direction ring true.

Michael G. Fullan, Dean, Faculty of Education
University of Toronto, Canada

This is “right -on” what has to happen to fundamentally change the nature of the learning situation.

Bob McKinley, Catholic Education Center

Co-Implication

By nature, whether for knowing, doing, or being, learning is a process of extending the capability to be relevantly present to what is being experienced.

We need to be careful about the distinctions we make between the roles of interpersonally facilitated learning and technology mediated learning. Being relevantly present (being present) to another human being is a significantly different process than being present to a continuum of abstract facts and concepts. To be present to another human being begins with an openness that can be characterized as minimally mediated. Being relevantly present to an algebra exercise implies an artificially constructed mediating context.

From a learners perspective, there are areas of the curriculum and more importantly life that are best facilitated by interpersonal and direct contact processes. Technology is not a substitute for (though it can at times augment) collaborative, co-mentoring, team teaching, group dialogue and of course, one on one, relationship processes. Similarly, actually contacting and caring for other forms

of life from flowers to animals is entirely different than learning about them in text books or on video disks. But just as there are aspects of learning we need to minimally mediate, there are aspects of knowledge which by its nature is so abstract that it is best facilitated through a technology-mediated relationship with information.

Traditionally, we tend to view educational technology in terms of its ability to augment and enhance what teachers and learners do. But this is a bit circular because what teachers and learners do, indeed what education at large does, has been ***framed, enabled and constrained*** by the technologies used in the past. It must be remembered that everything about our relationship with information is technological anyway. These words printed on the page you're reading, what they mean to me and what they mean to you, are all technological processes. You and I have both learned an "inner interface", an inner technology which transforms symbolic information (also a technology) into a process within us, wherein various past experienced meanings *converge into relevancy*. We invented it all. There is nothing to be romantic about.

Of all the relationships children have with their environments, their relationship with information represents an environment that could, with the help of modern technology, very effectively model the new learner-oriented learning paradigm. If we could recraft our relationship with information so that it better corresponded to the way our nervous systems have evolved to learn - have evolved to process meaning - that new relationship would be based on responding to the immediate (micro time) meaning dynamics of the individual who is learning. This is the destiny of technology in education.

"Learning is a process of extending the capability to be present to what is being experienced"

As I have tried to point to with each "jump", the real issue is relationship. The relationship a learner has with the environment supporting or actively facilitating learning is the single most important aspect of learning. 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.

For a learning environment to steward the learner's sensitivity to his or her own meaning-needs (internal) while at the same time facilitating their integration with rule-based critical thinking skills (external), it will need to employ, in addition to explicit pedagogies, a new general relationship model designed to do so. This requires a different conceptualization of the relationship between learners and information intended to facilitate or resource their learning. One in which access to knowledge, everywhere possible, is organized and made available according to the relationship-with-meaning-needs (in time and context) of learners rather than the structural conveniences of the subject material or the mediating technology.

This is the significance of Daaron's invention and the Nintendo observations. Essentially what he conceived of is a companion that responds to his immediate curiosities and uncertainties. Nintendo confirms that the "disengagement" issue isn't just an artifact of the classroom or textbook. Special media effects aside, if children can't resolve the tensions produced by the uncertainty surrounding an obstacle - in time - they become too frustrated and dis/engage. If however the environment does provide them with ways to **resolve** their tensions, through resources available to them - in time - they can apply their significant conceptual dexterities for as long as the subject/activity remains relevant and challenging (and their teachers or parents will let them).

We all need INVISORS.

Emphasizing that the individual is the most important subject will certainly help students with their self-esteem and learning processes.

Paul Britton, District Career Prep. Coordinator CUSD

This was totally new to me — after 23 years as a teacher. This "idea" could radically change how and what we do in the classroom.

Grant Wilson, Computer Coordinator

Implicity

The technical capabilities to provide learning environments capable of dealing with any subject-content in ways consistent with what I have described exist today. Not the "radar helper" or "invisor" as stated, but the relationship principles they both imply. The problem isn't even one of cost. Systems capable of totally transforming our relationship with information, of providing a new (**learner**) interface to recorded knowledge, will ultimately prove to be very cost-effective. But, so long as the role of educational technology is viewed in terms of isolated subject mastery rather than as *a mediator of a new general relationship*, albeit one a ways off, its evolution as a force in educational evolution will remain mis-directed and what I have described will not be considered relevant.

I mean by this new "general relationship", a relationship whose central intention is that learners learn to experience the significance of **how they are learning** - learn to develop their own subtle participatory *"sense"* of learning - learn that the compass with which they can orient themselves, regardless of the subject, emerges from *their own* meaning needs - their own *fluctuations of meaningfulness*. Thus, *a learning oriented relationship*, a way of mediating the learner and world which is relevantly responsive enough to encourage and enable learners to "follow through" with their own meaning need impulses. To become clearer about, and more discriminatingly trusting of those impulses; and to begin to learn the inner instrumentation of their own personal learning process.

Such a relationship implies an inversion in our thinking about educational objectives: As the paradigm shifts from "knowers" to "learners" the education process must be turned inside out. Facilitating persons who are able to continually learn (learning oriented human beings) is a significantly different objective, calling for a significantly different goal orientation than depositing knowledge into people. **Thus, rather than viewing our capacities to learn as the means through which we acquire knowledge and skills (become knowers), we must see, knowledge and skills as the means through which we exercise and extend the range of our capacities for learning (become learners).** As this inversion dawns, as we begin to view "subjects" as *semnasiums* - as the exercise environment and apparatus in which people learn to participate in, and extend, their capacities for learning - then "subject mastery" will become an implicit consequence of the process through which individuals learn to become learning oriented and our educational systems learn to facilitate learners.

I am suggesting that if we focus on the relationship - on developing a *mutually learning oriented relationship* between education as a system, educators, and learners - and then work from there towards the role of methodology and technology in mediating it, an entirely different paradigm can emerge. One that will not only evolve more quickly into consistency with what we know about learning but that will also give rise to entirely new classes of machines, machines designed from the ground up for learners.

Learning Insights, a company I founded to learn about these issues is exploring and developing just such an approach today.

The "learner-interface" and information processing systems we are developing will provide the same navigational, representational and referential dexterities as those of the invisor. Our goal is to develop a generalizable and economically deliverable learning environment. One, that can be run on existing personal computers and that will ultimately define a new class of machines - machines, designed entirely to facilitate and exemplify the kind of relationship we have discussed - one centered on responding to, empowering and enlivening the learner.

Toward these beginnings, I spend part of my time with Learning Insights and part of my time at Apple University learning about, experimenting with and creating learning environments. And, pervading and extending beyond both of these, I spend all of my time trying to learn about the depths of the significances of learning and how to change our relationships with them.

And, of course, I take plenty of walks with Daaron.

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Appeared as *Beyond Knowers* in the Brain Mind Bulletin, April 1991
Appeared as *From Here to Implicity* in the California School Boards Journal, Fall 1991.
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Learning to Learn

DAVID BOULTON

LEARNING MORE ABOUT LEARNING IS ESSENTIAL FOR ANY INDIVIDUAL AND ANY ORGANIZATION - ESPECIALLY SCHOOLS.

Within this decade companies interested in determining which among numerous candidates is best for a position, will send their candidates to LCAS - Learning Capacity Assessment Services. At LCAS, candidates will be placed in simulated informational, interpersonal and collaborative situations that have been designed to exercise the edge of their current 'know-how'. The main point of these simulations will not be to assess knowledge, but rather, to observe the candidate in situations that require learning. Once roughly qualified on know-how, the determining consideration for candidate recommendation will be LCAS' assessment of how well each candidate can ongoingly learn - how well each candidate learns to learn.

Sound frightening? Its just evolution in fast-forward. Only continually improving, total quality, learning organizations can sustain and extend their existence in a highly competitive global economy. Continually improving, total quality, learning organizations need learners, indeed are a community of learners. Organizational evolution will 'select' learners and whereas the distinguishing attribute of a "knower" was "know-how", the distinguishing attribute of a learner is "learning-now". Its already becoming the business of business to be able to recognize the difference.

What's frightening to me is that business will be developing this selectivity almost a generation ahead of people being educated well enough to thrive in it.

How can we learn about learning to learn? What does `learning to learn' mean?

Obviously, the deeper meaning here is associated with learners learning to extend and master their own capacities for learning. But how can we help them do it? What are our least subject specific, most generally applicable, capacities for learning? How do we help learners apply and extend them?

Before we can extend our capacities for learning we must first make our experience of learning more vividly conscious . It's hard to develop something we aren't aware of. In learning to walk, we learn to integrate a host of bodily impulses into a sense of balance. After repeated falls we develop a `sense' of beginning to `fall' that informs the movements that sustain our balance. Similarly, if we can develop a `sense' of `falling' out of learning - if we can learn to sense ourselves `dropping out' or `disengaging' - it can illuminate and extend our capacity to participate in learning. What could be more generally useful to a learner?

How might we become aware of falling out of learning? I believe that "falling out" results from having encounters with events (physical sensations, words, terms, phrases, concepts, ideas, sounds, languages, pictures, presentation styles, frames of reference, etc) that `miss' or simply do not make meaningful connections. Such `misses' cause spikes of uncertainty, curiosity and creativity (my son calls them `need mores' and `want to adds'), I call them `meaning needs'.

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?

MEANING NEEDS By "meaning needs" I refer to the impulses that underlie, give direction to and emerge within conscious awareness and activity. I believe they are the core of a student's capacities to employ "critical thinking skills", to formulate a "good question", to "construct knowledge", to "abstract coherently", to avoid "premature closure", to avoid "tendencies toward self-deception", to live with "ambiguity" and to dis/cover his or her own "creativity". After all, what is an authentic question but the articulation of living uncertainty? On what basis does one learn to distinguish between authentic creativity and distracting tangents?

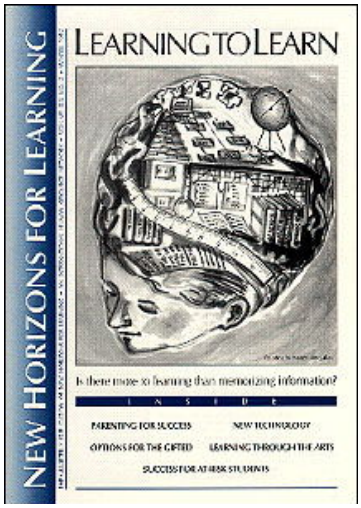
As these impulses fluctuate in various contexts, how the learner has been habituated to, or has learned to participatively respond to them, (consciously and/or subconsciously follow through with or suppress them) is, I believe, close to the phenomenological core of his or her capacities for learning.

Differentiating these impulses into integrated physical behaviors is the way we learn to walk, ride a bike or dance. In more subtle ways we tune into these impulses when learning to hear the the difference between alphabet sounds. But whereas this internal process of learning to learn serves us so well in the real world of physical-sensory activity, this awesome process is largely ignored when we enter the world of knowledge and formal education.

Because many of the materials and strategies used in traditional classrooms, such as lectures, text books and computers, are unable to respond to the `meaning needs' they *provoke* in us, they *insidiously teach us to ignore them*. When we ignore our own needs for more meaning, we become prone to following poor inferences and tangents, 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 fountainhead of our capacities for learning. Developing a new sense of learning begins with vivifying our awareness of our meaning needs.

I suspect, based on my own early experience as well as watching children today, that most of us learn to ignore all but our most powerful meaning need impulses. We learn to suppress following through with them not because we have discerned that they are meaningfully inappropriate, but because we have learned that they are for the most part circumstantially irrelevant or inapplicable - like waving our arms in front of a blind person. I submit that our educational systems, in the name of helping us learn about things, is creating an environment in which we learn to separate from, suppress and tacitly invalidate the deeper intrinsic movements that are our most important capacities for learning. I think our educational systems are unintentionally yet pervasively facilitating our learning not to learn.



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.

SO WHAT CAN WE DO?

• 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 become 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 they are `and how to respond to them?

• How do we reconcile the need to respond to learners at this level of meaning with the need to achieve curriculum objectives.

KNOWERS VS. LEARNERS

I think that the way we approach these questions is crucial. Historically, having been concerned with producing `knowers', we have valued their 'know-how' as the `end' and, secondarily, their capacities for learning as the `means'. But today, our challenge is to facilitate learners. As learners must, almost by definition, be capable of learning in ways and about things that can't be reliably predicted at the time of their education, we must invert our orientation: knowledge, skills, and other tools must become the `means' - the environment - we provide learners to exercise and extend their capacities for learning in. From this orientation, everything we `learn about' is is but part of the contextual gymnasium, the apparatus, in which we exercise our capacities for learning.

TO THE CORE

All of this leads me to the core of my work. Having seen the necessity and inevitability of a radically new educational paradigm, I am one of a team of learners dedicated to making it happen. After nearly a decade of research, we are developing a comprehensive social and technological system through which each learner's personal "meaning needs" and the impersonal learning objectives of the educational system can be "mediated" in a way that allows each to continually learn from the other.

We call our system "DIACOM" as it is based on the social and technical processes of dialogue, collaboration, performance support, communications and computers. 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. These interfaces, again both technical and social, will connect with one another

in a way that enables collaboration between learners and that will inform teachers (through "teacher interfaces") of the needs of each individual and of the needs of the class as a whole. Finally, utilizing the emerging sciences of the "learning organization", the information flowing out of these interfaces will provide educators and curriculum designers with the feedback they need to evolve learning oriented curricula.

- Our most basic learning capacities depend on extending our awareness through real time feedback and feed-forward relationships with our environments.
- Without gravity and the solidness of the ground we couldn't learn to walk - we couldn't learn to walk in space.
- Without the water's support and resistance we couldn't learn to swim - we wouldn't learn to swim in a desert or on a mountain top.
- Learning to walk and swim in the "meaning space" of knowledge is no different - just subtler.
- Without an entirely different and more responsive relationship between what we learn and how we learn, we, individually and as a species, can't sustain (let alone extend) the learning oriented natures we are born with.

Through David Boulton's presentation my concepts of learning and teaching have been positively shattered, exploded into 10,000 brilliant lights of new ideas. My teaching career will never be the same, nor will it ever be as complacently comfortable.

John Hindle, Administrative Head
Confederation High School

What you said about children — if children can't resolve the tension produced by the uncertainty surrounding and obstacle in TIME they become too frustrated and disengage — accurately reflects the dynamics of my youth. You've hit on something that at once seems perfectly plain, when explained, and at the same time I've never heard anyone else bring to public awareness — that being "present" is a prerequisite to being able to learn.

Connie Mantis, Learning Systems Designer,
Advanced Technology Group, Apple Computer

"This is a key direction toward the liberation of learners, regardless of their past; to the liberation of teachers so they can better fulfill their role of encouraging, facilitating and enhancing the dialogue with each student."

Bob Kennedy, Director of Education
Nipissing Board of Education
CANADA

"On a purely subjective level, I was personally stunned by the sophistication yet clarity of the concept, and my educational background, as well as my long experience in educational computing, told me that it was an absolute winner."

Martin Lowry, Education Marketing Manager, Apple Computer
UNITED KINGDOM

"The Learner Interface is extraordinary. You've captured the essence of how we learn. Including, how our brains create and process meaning."

Pascal Gayet, President
Fitness Consultants
FRANCE

"Without reserve, I can confidently say that this is the most exciting academic project that I have seen in quite some time."

Manuel Gandara, Director of Centecemes, University of Baja California
MEXICO

UNITED STATES
Congressional Office of Technology Assessment, **Chris Spelius**, Research Analyst

"I found our discussion of learning theory quite useful on both abstract and concrete levels. Your insights about how technology can be leveraged to support learners are well reflected in your interface design work. Your vision is encouraging and I look forward to following your work."

AUSTRALIA
Department of Education, Queensland
Paul Holland, Senior Education Officer

"David Boulton is an extremely powerful and orginal thinker whose ideas are not restricted by the commonly accepted models of teaching and learning. His argument that we need to produce "learners" rather than "knowers" is lucid and would strike a chord with any educator interested in more than just the mechanical transference of information from static resource to passive student."

EMERGING IDEAS

A Vision Learning to Happen

A Dialogue with David Boulton

"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

"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 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 fountainhead 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?"

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

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're 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-

• "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 Implicity, 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.

The Most Important Subject

Editor's Note: O.K., so we went off an a tangent with this article. This is a "think" piece, one that you may have to read more than once to appreciate. It is an essay of sorts written by a very bright fellow. David Boulton is president of DiaCom Technologies in California, a cutting-edge developer of a learning interface he calls part computer software, part video game, and part exercise bike. A learning interface drives how information is presented for learning on a computer. And believe me, most learning in the future will happen with computers. Here's what David Boulton has learned about learning:

BY DAVID BOULTON

In the early 60's, long before the hippies had the idea, my father customized a Volkswagen mini-bus. I remember him spending months working every night in the garage building its interior. He built a seating and table system that converted into a bed for him and mom. He rebuilt the front seat so the top part flipped up and made bunk beds for my brother and me. Over the engine compartment, he made a crib for my littlest sister and, to either side of it, small bunks for my other two sisters.

Being an aerospace engineer, he wired the whole thing up for sound and built a converter that transformed the car's battery power into household AC. He did this twenty years before the RV craze, and he did it all himself. But when I think back on those times, it wasn't how he built up the mini-bus, it wasn't even the summer vacation we spent in it that I remember most. What I remember most was the word he wrote in thick, bright red, reflector tape on the back of the bus: THINK.

My father was good with snappy little statements, some painfully so. He always advocated thoughtfulness, and he always pushed me to try and understand the world around me. When it came to talking about the practical world of jobs and earning money, he always reminded me of this little slogan:

The people who know HOW will always have jobs.

The people who know WHY will always be their bosses.

A BIRD IN HAND...

There used to be a television game show called "Let's Make a Deal." It was a typically moronic game show, most notably so because people from the audience would wear outlandish costumes to try and lure the host into choosing them as contestants. If selected, the host would give them some kind of gift or money which they could then trade for an unknown prize.

The dilemma for contestants was that they knew what was in their hand, but couldn't be sure of

what was behind the door (even though it was teasingly described for them). On the one hand, they knew that much bigger prizes lay in store for them if they decided to trade. On the other hand, "a bird in the hand is worth two in the bush." Many times, someone lost out on a brand new car because they elected to hang on to two or three hundred dollars.

I have been telling you all this because I want to use this game as a way to explore something with you. I want you to imagine that you are a Let's Make a Deal contestant and I will give you some choices to trade between. The left-hand column will be what you start out with, the right-hand column, what you can trade for. Each deal is separate. Circle your choices.

LET'S MAKE A DEAL

WHAT YOU HAVE	WHAT YOU CAN TRADE FOR
$1,000	$5,000
Your legs	Your ability to walk
$5,000	The skills to earn $5,000 a day
All that you have read	Your ability to read
Your past	Your future
Every breath you've taken	Your ability to breathe
A golden egg	A goose that lays golden eggs
All that you know	Your ability to learn

If you circled choices in the left-hand column - thank you for playing the game. You kept "the bird in the hand" and you're out of here. If you circled only right-hand choices then stay with me. Each right-hand choice included, but was not limited to its left hand counterpart. Read your last choice over again. Are you sure of it? Because, if you are, then...

JUMP...

Remember the title of this article? The Most Important Subject? What do you think it is? Take a minute - THINK - I'll wait. OK, what's your answer? If it's more than 3 letters long, think some more. Time's up. From my perspective, "the most important subject" is... **YOU!** From your perspective the three letters I-A-M work even better. Try saying it to yourself:

"***I am the most important subject.***"

WHY

Remember your last choice? You chose ***your*** *ability to learn* over all that you know. Somehow, it was obvious to you that "all that you know" is limited, and that "your ability to learn" is, comparatively, *unlimited*.

SMALL JUMP...

If you think back over your experience in school, would you say your teachers were more concerned with helping you understand and improve your ability to learn or more concerned with "the subject" you were learning about? Wonder why? Our educational system, with the exception of exceptional teachers, hasn't caught up yet.

For generations, it's purpose was to produce "knowers" -- people who knew things and knew how to do things. But, the world has changed and is continuing to change so fast that the only sustainable advantage any individual can have is his or her on-going ability to learn. Education will catch up with this but probably not until after you graduate. It's up to **you**!

Frankly, in my opinion, really understanding the implications of this choice to your education, your career and your life -- and beginning to live and learn as if you mean it -- is the most empowering thing you can ever do for yourself. If you do choose it, then learning to continually improve your ability to learn is something you must do.

But, you can't do it by learning about someone else's ability to learn or about some model about how the "average person" learns. You have to learn about your ability to learn and you have to do it for yourself (***from the inside out***). When you become your most important subject -- when improving your ability to learn becomes the most important subject within you, then everything else you learn will be enhanced.

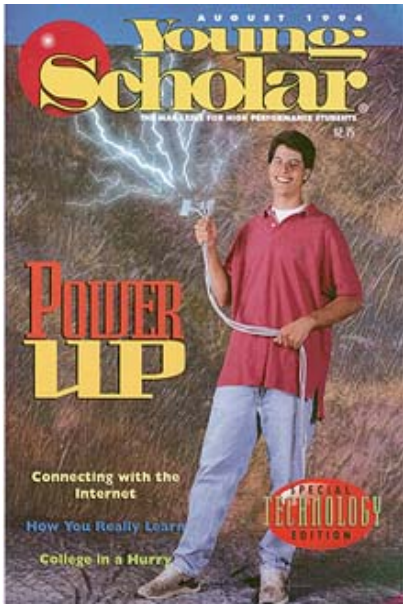
You probably don't remember learning to walk, but, maybe you do recall learning to swim or ride a bike. When you learned these things, you didn't learn them by reading, nor did thinking about them make you able to do them. You learned in a deeper way. When you learned to walk, you really learned to "sense yourself" falling. Once you could sense when you were going to fall, learning to walk got easier and you walked. The first thing you learned about swimming was to "sense yourself" starting to sink. Once you could sense when you were about to sink, learning to swim got easier and you swam. Riding a bike was virtually the same thing as walking, except you had to also keep up forward speed to keep yourself from falling. Learning to improve your ability to learn is much more like these experiences 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*™ (I will tell you about that word later) in which you can learn to improve your ability to learn.

The world is now changing so fast that the only advatage any individual can have is his or her on-going ability to learn.

You have to learn to "sense yourself" learning. You have to learn to "sense yourself" when you begin to "sink" or "fall" out of learning. So, how do you learn to do this? I call the process SEMNASTICS.™ If you're like most people, when you read the word "semnastics"™ your flow stuttered. It probably just happened again. What I am getting at is this: Every time you are in the flow of learning and encounter something -- a word, a term, a phrase, a picture, a video clip, someone's body language or tone of voice -- that you really don't understand, your flow is interrupted. I call these interrupts or stutters *meaning needs*.

What I am proposing to you is that nothing you can learn about can be as helpful to your ability to learn as learning to sense your own meaning needs. Your meaning needs govern your learning. While the essence of science is a good question, the essence of a good question is authentic uncertainty. Uncertainty is one kind of many kinds of meaning needs. Once you can tell which of your meaning needs are important, and which ones are less so, you will learn which ones to follow through on and which ones to let go. When you begin to learn this YOU start PARTICIPATING in *your own learning process* in a new way. When you begin to do this, you develop a kind of inner COMPASS that will help you learn better no matter what you are learning about.

SMALL JUMP..."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.

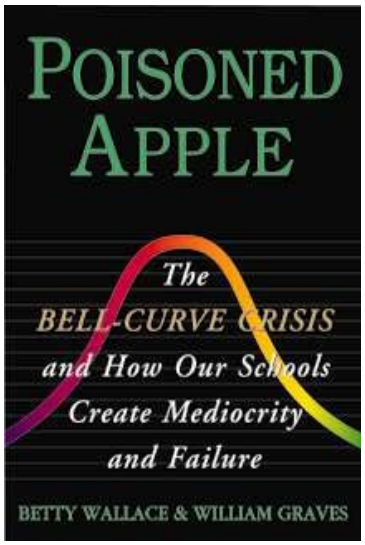


I hope I have given you something to think about - maybe even helped you learn a little. As for me, I have enjoyed the opportunity to share with you some aspects of my life's work. I am the president of a company in California called DiaCom that is developing a new kind of technology (part computer software, part video game, part Nautilus machine) for helping people to learn. We think of it as an electronic *semnasium*.™ It is our intention to help build a different education system, one which behaves as if the ability to learn is indeed more important than knowledge. One in which all the subjects are learned *semnastically*.

My work keeps me pretty busy, very energized and hopefully will for quite some time. I do have a vision, however, for my someday semi-retirement. I want to travel around the country enjoying its beauty and everywhere I can I want to stop and visit with students and teachers. When I think of myself doing this I think about a high-tech RV with one word written in thick, bright red, reflector tape on the back of it:

LEARN

... The IBM prototype requires expensive equipment, but similar systems are being developed that will cost far less. David Boulton, head of DiaCom Technologies, Inc., in Scotts Valley, California, has created the software for what he calls a general purpose electronic learner-oriented environment projected to cost about $200.



Boulton has created a framework that allows learners to explore any body of knowledge in a variety of ways according to their "meaning needs." The computer system responds to a learner's curiosity, learning style and achievement level. A student might begin, for example, probing the Renaissance, run into Galileo, become interested in history of science and end up watching Albert Einstein discuss his general theory of relativity. Like the IBM prototype, Boulton's system integrates sound, text and pictures.

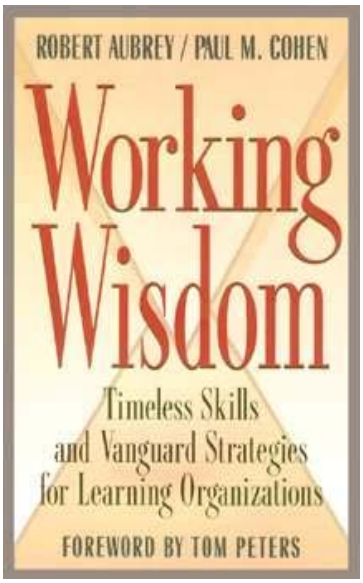
Boulton created his system after watching and recording three - five year olds play Nintendo. He concluded that the electronic game engaged them with cycles of challenges, usually some menace such as bats in a castle, and a variety of solutions to overcome those challenges, such as trapdoors and weapons. The game steadily increased the speed and rigor of the challenges as the player developed the skills and advanced from one level to the next. Boulton designed his learning system to engage students with challenges that they can solve by taking a variety of learning paths. Like Nintendo, it allows children to act creatively on their frustrations.

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."***

Boulton is testing his system in two classrooms in the Cupertino School District near San Jose, California. His product is being developed to run initially on Macintosh, Apple II and IBM-clone personal computers, but eventually he hopes it will become part of home multimedia systems and compatible with game machines such as Nintendo and Sega. As more and more people have access to this technology, a learning-oriented culture
will emerge, Boulton predicts. Schools will specialize in team learning and dialogue, he says, and allow machines to provide the "one-on-one relationship between an individual and what he is learning about."

> ***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. Children soon will be able to tap whatever knowledge they need just about anywhere.***



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

Mentoring with Technology

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.

What makes DiaCom's software such fun is that it accesses different types of information as fast as a video game It also allows learners to leave messages and gives them feedback when they have a question, suggestion, or problem. This feedback mechanism allows those responsible for the development of learning materials to constantly monitor how learners are doing and understand where they are encountering difficulties. In their work for business organizations, DiaCom addresses three significant requirements of technology:

1. Gathering as much feedback as possible from everyone in the organization via telephone- and computer-based information collection

2. Putting mentors in ongoing contact with learners.

3. Helping mentors make sense of the high volume of feedback an organization generates

Putting coaches, mentors, and information providers on-line is useful not only for learning but also for teams making a product -- DiaCom is working with project teams from a large aerospace firm -- as well as for quality improvement systems, management information reporting, and employee communication. Says Boulton, "I'm concerned with developing a world that's dialogue-friendly."

Boulton started DiaCom with a vision of how learning should be supported as the essential human resource for society. Tens years earlier, he was president of Dynapro, a robotics company that was very successful, but made him miserable. He didn't like having people seek his favor or consent, and he didn't like the rigorous time management needed to keep two shifts of workers building robots; above all, he didn't like finding himself in the position of manipulating people. So he left the company and went off on what he called a "learning binge" for a year: he read, traveled, and avidly devoted himself to learning anything he wanted - psychology, religion, archeology, whatever. That experience allowed him to trust his own learning process. He would start a book on physics, stop when he felt like it, and come back to finish it months later, having explored other realms of wisdom that were seemingly unconnected but fit together as he continued his journey.

What struck Boulton was that this trust in his own learning process was new to him, something that had been drummed out of him since his first days in school. Yet this trust was the real key to learning. He explains:

> "I had grown up with the notion that somebody out there knows what I don't know. In my learning binge, that

> belief crashed. I discovered that in any field of knowledge that I pursued, I would get to an edge where the experts were carrying on a raging war about what was true. It hit me that the universe is wide open and that there is always a fluctuating edge to knowledge. That was a truly liberating experience".
>
> "At the same time, I became irritated with what I call the insidious curriculum of education. We learn from the first days in school that it is not our own impulse to inquire that counts, what's really important is following the lesson. I discovered that the reality of learning is just the opposite. What's really important is the activity of learning and our own impulses and questions. When a child learns to walk, it does not "acquire a skill," it extends its being in space. When that child grows older and learns geometry in school he or she does not acquire a "subject" but extends his or her mental being into an abstract realm of space. And out on the edge of that realm, there is a fluctuating limit to the learner's being that constitutes what is to be explored".

The importance of Boulton's approach is that it is responsive; it does not assume "this is what you need at this time," an assumption implicit in education systems, corporate training programs, and most learning technology. DiaCom's technology accommodates the fluctuating needs of the learner.

Boulton finds it dangerous to assume "educators" can accurately predict how an individual should learn best. Not only is that assumption untrue, but it also cuts off the individual from taking control of learning.

Boulton calls authentic learning activity "semnastics" from the Greek for exercise of meaning. Learning, he says, is like a sport that one plays or practices. Technology should support semnastics. Like a game, technology should allow learners to go as fast as they can and stay out on the edge where they are excited. They should be able to slow down, make mistakes, and get help from coaches, as they would during sports practice.

One of DiaCom's early experiments with its technology was with second- and third-grade classes in Cupertino, California. DiaCom technologists and classroom teachers decided to offer the kids the opportunity to explore economics, a subject that would support Boulton's fundamental belief that anybody can learn anything. They decided to study corn as a vehicle for learning economics. For two weeks, the teachers gathered information and entered it into a computer -- how corn is produced, cultivated, processed and so on.

When the program was offered to the students, Boulton turned on the computer and explained the on-screen icons they could use to navigate through the program. Down the side of the screen were buttons that allowed them to go forward or back through the lesson; there was also an important button that allowed the kids to dialogue with the teacher. Other buttons let the kids get dictionary definitions, hear stories, or get more information. Then Boulton turned the kids loose, three to a computer. Underlying the learning process was learning construct called economics.

The result astounded the teachers and the programmers. It took five minutes, no more, for the second- and third-graders to familiarize themselves with the system and figure out how to study corn in a way that was natural to them. The teachers said that to get the same familiarity in a normal teaching setting with books and homework would take more than two weeks!

Clever technology aside, DiaCom's real breakthrough is recognizing the human dimension of accompaniment through dialogue. Although it has an important place in learning, technology itself doesn't of itself drive learning or abet wisdom. As Boulton reminds us: "The problem isn't even one of cost. Systems capable of totally transforming our relationship with information, of providing a new (learner) interface to recorded knowledge, will ultimately prove to be very cost-effective. But so long as the role of educational technology is viewed in terms of isolated subject mastery rather than as a mediator of a new general relationship...its force in educational evolution will remain misdirected."

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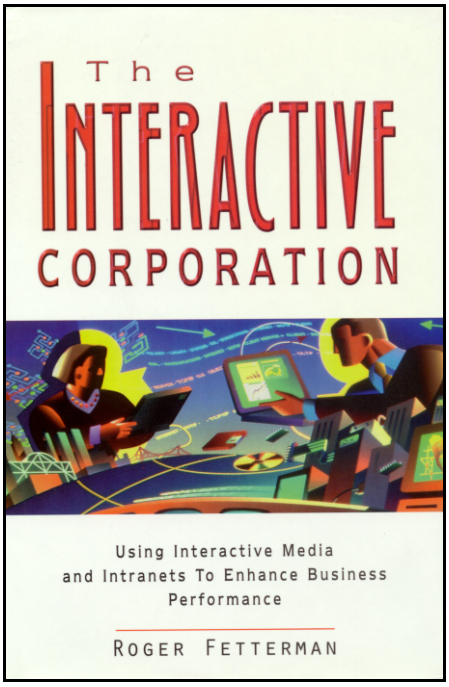
The Interactive Corporation by Roger Fetterman



CHAPTER 2 - TRADITIONAL AND EMERGING USES OF INTERACTIVE MEDIA IN BUSINESS

However, 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 as shown in Table 2-2. 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.

The learning experience with CBT, simulation and Electronic Performance Support Systems (EPSS) is controlled by the author/designer and it is task- or function-centric. The author designer determines what will be learned and how it is presented to the student. With CBT and simulation, the learning experiences do not occur at the 'moment of need since students must stop whatever they doing to take the course they need. EPSS learning modules are available in real-time since they are embedded in the performance system that is used on 'on the job.'

Learning System	Control	Focus	Moment of Need
CBT	Author/Designer	Task or Function	Not real-time
Simulation	Author/Designer	Task or Function	Not real-time
EPSS	Author/Designer	Task or Function	Not real-time
DiaCom	Learner	Learning	Real-time

Table 2-2 Comparison between DiaCom's learning approach and traditional computer-mediated systems.

DiaCom Technologies is developing a system that facilitates the process of gathering information about the needs and wants of its stakeholders: customers, employees and vendors. The system can be embedded in performance solutions, networks, authoring tools, e-mail systems, CBT courses and and other interactive computer application. The information gathered and processed by DiaCom's Distributed Dialogue Processing™ system can be used by corporations to improve the effectiveness of their systems.

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 learningsystems, such as CBT or EPSS, have focused in augmenting specific tasks and/or functions, and not on 'mediating the intelligence of the humans involved.'

Corporations that espouse the new definition of performance solutions will establish the hardware, software and human infrastructures needed to support such solutions. The payback occurs in the form of organizational learning which can improve the companies ability to compete in its chosen markets. Organizational learning capability is a key ingredient to success according to leading business experts such as Tom Peters and others.

CHAPTER 5 - INTERACTIVE MEDIA IN DISTRIBUTION

A key ingredient that has been missing in market research is the ability to gather real-time feedback from customers. The feedback and analysis tools developed by DiaCom are designed to improve customer relations and provide feedback using a variety of technologies and most particularly the Web.

For example, suppose that a customer who recently purchased an Eagle Talon decides to provide some feedback about some aspect of the design of the seats. The customer would access the Chrysler Technology Center web page and navigate through the Showroom to find the model in question.

If Chrysler were to use DiaCom's products, its customers would be able to select the car's interior on the specifications page, select the seat back in the photograph of the Eagle Talon, and then request the feedback mode. After selecting the seat recliner mechanism from the available options, the customer would be able to indicate that a design change would be highly desirable, for example, allowing the seat to recline all the way.

DiaCom's patented "Distributed Dialogue Processing™" technology makes excellent use of context sensitive dialogue boxes and an intuitive graphical interface to reduce the amount of text that needs to be entered. The whole operation is 'point and click' except for typing in the brief text message. This type of feedback mechanism could significantly improve customer service. And it would make it easier for Chrysler to respond. The company could, as a minimum, send an e-mail message and then act on the feedback, if the suggestion truly represented a defect or improvement suggestion that warranted redesign.

Feedback at this level could be a bonanza for Chrysler or any other manufacturer or service provider. The Web would enable vendors to capture and analyze feedback and respond to their customers. A whole new level of customer service could be provided that would surpass anything that is available now.

In the current consumer environment, most of us would not be willing to take the trouble to phone someone or write a letter. Our expectation is that it is too difficult to find the right person in a large organization, and that our feedback would be ignored.

DiaCom also provides a feedback analysis tool that allows marketing or customer service to 'fly through,' to analyze and understand the feedback. For the example cited above, it would group and analyze all of the feedback about seats in the Eagle Talon.

Timely feedback is the key to success. It is the missing ingredient in current marketing and customer service processes. The DiaCom solution allows the seller to capture customer feedback in real time at the moment of need. I portant feedback from the buyer should be used to refine the product and/or service offering. This ensures that it truly matches the buyer's needs and wants.

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CUTTING EDGE: GOING BEYOND NINTENDO

by James E. Conner

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 incalcuable.

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."

Although the toy, Nintendo, serves as one metaphor for his learning model, comparing Boulton's finished product to this ubiquitous game machine is like comparing a Lincoln Town Car to its precursor, the horse-drawn carriage. By exploring how a toy relates to a new order of learning, Boulton was led to construct and utilize a "learner-oriented" model that seeks to mirror how our nervous systems do, in fact learn. Learning, to be truly engaging he seems to be saying, really must be child's play. What he has attempted to do in effect, is to develop a technologic analogue of our neurological learning system. And unlike "Hal" in Arthur Clarke's 2001, the individual operator (learner or teacher) is in control.

To those who believe in magic and enchantment, even when they carry the label of science, this might sound like the stuff that dreams are made of. Boulton has, however, moved well beyond the dream and theoretical stage. He has progressed well beyond the prototype and is poised for piloting. His most mind-boggling magic is to be seen in his computer architecture. It has allowed him to compress massive amounts of information into a small "space" (ultimately within a hand-held box, projected to cost around $200). Normally, to attain such power requires very powerful, expensive computers. The underlying electronic learning environment is "designed entirely from

the vantage point of a learner needing more while trying to understand and move through learning materials--a process that encourages learners to be sensitive to their own meaning needs and to critically employ them in controlling the environment"

Boulton (1990) explains metaphorically how his learning environment works:

Imagine an electronic microscope specifically designed for learning from information. A simple and economic device, designed to receive very special kinds of "slides" - slides that carry their own lenses.

Now, imagine that slide has two such sets of lenses --"multi-sensor" lenses. One set allows you the learner to look at the meaning of a "paragraph" from various points of view. The other set enables the learner to look at any word or term with various types of clarification or elaboration. A series of such slides would represent a course of study or data base.

When using such a slide, should the learner feel the meaning is unclear, he or she can select the combination of lenses that bring it into focus.

In addition to an innovative hardware component, system components provide a number of highly useful features:

1. The Learner Interface: Optimized entirely for the process of learning and applicable to virtually all subjects, the Learner Interface allows learners to adjust a continuum of multi-media materials to suit their own unique learning and comprehension needs.

2. The Authoring System: The learning materials are developed on the Macintosh by an authoring system which can support single or collaborative authors and teachers.

3. The Learner Diagnostic System: As a learner navigates through information, a path is recorded. Each time the learner encounters an unknown word, requires clarification of a point, or chooses to have information presented in an alternative learning style, his or her choices are captured. These selections are next interpreted by a diagnostic program,.which produces a "learning map" for the instructor, highlighting areas which may require more personal assi s-tance.

In effect, the Boulton learning system seeks to establish reciprocity with individual learner's nervous systems, as they move linearly and nonlinearly through the system's electronic, icon-driven, multi-learning-mode learning environment. And, since both student and teacher are free to use the system's palate to create new materials and new options, the possibilities, for all practical purposes, are infinite. Boulton says we are beginning to experience a significant paradigm shift: from "knower" to "learner." We can, he declares, help students "exercise and extend" much more fully their capacities for learning whether the student be in engineering at Cal-Tech, medicine at Harvard Medical School, a second-grade science program, a GED program, a training program at General Motors, a university learning lab or an adult literacy program at a community college.

Paradoxically, Christopher Whittle—"admiral" of the flagship Edison Project, the grand scheme to build a vast enterprise of for-profit schools across America—articulates a vision not unlike that of Boulton:

Every kid in the late 1990s, Whittle says, will carry a lightweight portable "unit" —some futuristic interactive laptop allowing him to access information networks and teaching programs and multimedia "texts," allowing teachers to administer and grade tests, allowing parents to look in on homework and such. (Trueheart 1992, p. 1B)

To which Boulton would surely add, "Mr. Whittle, the future is now."

Jim Conner's diverse background includes work with adult education programs in the N.C. Community College System, service as a college president, and the former position as Governor Martin's master speech writer. He continues to do consulting and writing in retirement.

1987 - ESSAY - LEARNING: THE CENTRAL DYNAMIC OF A HUMAN - BEING

by David Boulton

Why do we have such a limited conception of learning? Why is it not strikingly obvious to each of us that as human beings we are first and foremost learners? That we learned to walk, talk, think, know, relate to ourselves and to others? That consciously and unconsciously, everything about ourselves is either learned or regulated by learning?

Why don't we learn about the significance of learning in our lives? That when knowing isn't whole, nothing is as appropriate, intelligent or as minimally presumptuous as learning? That while we may not learn qualities like love, compassion, curiosity and intelligence, learning can inhibit them? That our innate capacities for learning are both *extended and constrained* by what and how we learn. That what we call "conditioning" is also learning - learning which acts to limit ongoing learning. And perhaps most importantly, **that not only do "I" learn, but that most of "I" is learned?**

Why isn't learning about ourselves - how we learn and have learned to be - as important as learning to do things in the world? That the way we learned emotions as children affects the way we breathe as adults? That the way we learned to walk and balance ourselves in gravity can affect how our feet tire, our backs hurt and our heads ache? That our conceptual dexterities can be constrained by how words were introduced to us? That the ways we learn to cope with fear and violence as children significantly affects the quality of our relationships throughout life? And just to be practical, that the future of our occupations are going to be more dependent on how well we can continue to learn than on anything we learned in the past? And..., and...???

Obviously, for each of us as human beings, the significance of learning is nothing short of awesome.

Yet, why is it not obvious to us as parents, teachers, business or social leaders that as stewards of individual development and social growth *we must* understand learning's deeper and broader significances? Why is it not CLEAR that understanding learning is not the same thing as understanding "what works" in instructing? **That learning is a living, dynamic, now-time process occurring within and significantly shaping our conscious and unconscious movements of attention?** That instructing is a method of structuring experiences, based on a statistical-average model that may or may not meaningfully engage any actual, individual, human being? That the difference between learning and instructing can unintentionally cause a child to learn not to learn - can cause deep insecurities and can undermine self esteem? **That facilitating learning is, I would argue, the sacred trust?**

What will the world be like in 15 years? What will our children need to know? What particular knowledge will be more important to them than an awakened capacity for learning? A capacity to learn whatever they need as they need it? What qualities of person will the businesses of the future need? It used to be, in slow changing environments, that the ideal situation for a business was to hire people who already *knew how to do the job*. As change becomes less predictable and less manageable - as required job competencies become less definable - isn't it obvious that businesses will need people who *can learn with the job*?

In our ever more complex world, what form of organizations can prosper amidst the rate of change? Innovative advantages are only as good as they are relevant today. Survival and prosperity grow from making right decisions today - yesterday's lethargic corporations are rapidly going extinct. Already many major companies are on their way to becoming "learning communities". They are developing learning-oriented relationships with customers, stockholders, management and employees. They have come to realize that if there is nothing to hide and fair value is being exchanged, then there is no better basis for relationships than mutual learning? Companies are learning that marketing is either facilitating learning or it's manipulating a buying behavior. And, that the latter is ultimately unhealthy to the real value exchange from which legitimate business can operate and sustain itself. **From the perspective of healthy business, the best employee is a learner and the best customer is a learner.**

And what of foundations, institutions, governments and social movements? Are they really any different? Unless their intent is to manipulate people with dogma, what is more important to their missions than learning

about facilitating social learning? What is an elected official, but an elected social learner? Isn't it their jobs to find out what is really going on and what can be done to enhance individual and social quality of life? What school can insure that their curriculum will prepare tomorrow's leaders for the swiftness of the ever-new complexities they will face daily? How can someone who was once an attorney or business person and is now newly elected to office come to understand the root causes of child abuse, welfare dependency, the ecological implications of factory X at location Y or the sweeping changes occurring in international relations? ***The most important characteristic of effective leaders is their ability to be active learners.***

And what of our myriad social problems - our collective insensitivities? Spend time with any child and you can't help but see how bright and sensitive he or she is. **Insensitivity is learned**. No one really believes there is a "gene" for discrimination (racial, gender, economic or national), such behaviors are clearly learned. How do we deal with the social implications of such behavior? In the past, our approach has been to develop a curriculum to deal with them. Develop anti-discrimination curriculums. Develop ecological curriculums and so on. But what if, rather than trying to use "strategic content instruction", we come to see that the root of such biases is a closed mind? Someone not open to learning. What if we turn it all inside-out and steward the development of people who are learners? What if we explicitly develop, as our first educational objective, the individual learning of being open to and sensitive to learning?

As learning's centrality to individual human life and social well being becomes more obvious, the questions asked here begin to do their work - they begin to shed light on the *obstacles to learning that we have learned*. The reason I propose these questions is that I feel understanding the obstacles to learning, in individuals and in organizations, is critical to the development of a learning-oriented society - the only kind of society that can be healthy amidst change. The only kind of society that can really be fair and democratic.

In its simplest form what I am driving at is this the past has been oriented towards placing value on what people know - the future will place value on people who can learn. I find the implications of this stunning, for the paradigm shift from **knower to learner** is both "practically" appropriate and deeply "profound". Moreover, it is simple: We are learners - Learning makes us who we are.

Let me now turn the tone of this article from one of inquiring into learning's significance to one of contrasting a sample of the Copernican-like differences between a "knower" based vs. “learner” based:

KNOWER	**LEARNER**
* Learning is something kids do in school.	* Learning is something we all do every instant of our lives.
* Teachers know and teach and students learn.	* Facilitators of learning learn with and, at the same time, about learners.
* The goal of education is a knower with a particular corpus of knowledge, a particular range of skills and a particular way of behaving.	* The goal of education is a learner who understands how to relate to and learn from knowledge, other human beings and his or her self.
* Learning is a process used to acquire knowledge, facts, skills and experience.	* Knowledge, facts, skills and experience are used to enrich, extend and exercise our capacities for learning.
* Remembering information and patterns in knowledge leads to passing examinations.	* Realizing the relationships among meanings (their co-implications) in/forms the basis for "transference" in learning (the essence of mastery).
* Relevancy is an external association in information and knowledge .	* Relevancy is the process of meanings "re-implicating" into the flow of an ***individual's*** attention.
* Uncertainty is a sign of insufficiency and causes dis-comfort.	* Self-honesty about uncertainty is a key to developing "critical thinking". Uncertainty is illuminative and leads to deeper understandings and insights.

The list could go on and on. **A learning orientation values provisionality and openness because learning can include knowledge but is not limited to the current version of it**. It not only values "what we know," it values learning "how we know." It has profound implications for our mental health for rather than rigidly identifying ourselves: "I am .....", we can have the attitude, "I learned....." and, "if it doesn't work for me now, I can learn to be otherwise." And again, it is so utterly practical - so appropriate an orientation to whatever is happening in our lives.

The term "educational crisis" is now firmly rooted in our national vocabulary. From presidential speeches to the daily news, the problems of education are being discussed and debated. But the issue underlying the issues is not education, it is learning. How we view the role of learning in human experience, in personal growth and development, in the family, on the job, in society and in the world is the real issue. For me, the real debate, playing itself out underneath the "crisis," is whether we as a people can learn and internalize a learning-orientation. If this crisis can cause us to re-orient ourselves to the realities of learning's significance, it will have fulfilled its real promise.

Learning is the meta-trend of our future.

THE OBSTACLES TO LEARNING: INFORMATION - 1987
By David Boulton

Long before children acquire language, they seem to make discernments. Sometimes these non-verbal "judgments" are observable in the preferring of a particular toy or activity, at other times much more subtly so, they appear in the more dynamic experiences of learning to crawl or walk or drink through a straw. Somehow the child's proto-emotions and actions are responding to some "awareness", though not necessarily self- or consciously so.

The process involved in such discernments seems to imply a non-verbal awareness, though again, not necessarily a self-or non-self, or conscious or sub-conscious, one. Notwithstanding a particular identifiable orientation it does however seem that the process includes being aware of "differences" and being capable of more than automated pre-disposition with respect to them. In other words capable of learning.

This is important in that if verbal discerning uses verbal concepts and elements for a comparative basis, what is the basis of non-verbal discerning?

Relatively speaking, non-verbal discerning seems to occur in relation to dynamic differences and qualities of the "feeling" or "energy" the environment evokes within the child.

The reason for examining this is to provide a background from which to explore some potentially different views about learning. It is therefore important to move from here seeing that a significant difference between verbal and non-verbal awareness is the basis involved in discernment. Having established that there is a difference, we can begin to entertain the notion that the dynamic co-implications of these different perceptual processes are near the root of learning.

As children we learn most rapidly and profoundly through a primarily non-verbal process.

As adults our capacity for learning is limited by how well the non-verbal and verbal learning processes generally co-operate and specifically co-implicate.

The child's transition from non-verbal orientation to verbal orientation is crucial to the subsequent capacity for learning.

Verbal awareness is not just the awareness of words, but the organization of awareness by images, symbols and words. Non-verbal awareness is not just the non-awareness of words but the non-word-symbol-image nature of awareness. One is, relatively, (cognitive) content oriented, the other (affect) process oriented - but both are meaning oriented. Meaning being the result of discernment of differentiation.

To further ground the importance of such thinking consider the relationship each different basis of discernment yields with respect to meaning.

What is non-verbal meaning? It can be described in words but can it be experienced in words? As children we non-verbally experience meaning in relation to learning to walk but while we can describe that meaning, we as consummate walkers no longer experience it. In contrast, what do we mean by verbal meaning? The meaning associated with words? As the semanticists are fond of pointing out, words do not have meanings. They are vague and ambiguous and are given meaning by the context of the perceiver.

The common denominator of this circular problem about meaning, is that meaning is an interplay between the object, subject or event and the verbal and non-verbal context of its perception.

This is difficult to grasp because the process of non-verbal awareness is no longer entirely within the direct experience of the adult-self. We do have non-verbal experiences, but we no longer have a non-verbal orientation with the world. In the adult the experience of awareness is dominated by the verbal and by the self, both of which being relative abstractions of the more direct relationship with "energy" or "attention" which is

non-verbal. The point here is that the verbal minded orientation is a different reference basis or contextual ground then is the non-verbal. Consequently the nature of non-verbal awareness, is an entirely different "self-world view". The discernment processes differ in verbal content and the relationship of that content to the meaning attributed them by disparate contextual views.

Having now seen that the verbal and non-verbal bring different "contexts" to the perception of "contents", how can we reconcile the fact that the verbal grows out of, or at least is in someway rooted in, the non-verbal? In other words if the verbal is initially the result of non-verbal learning how can they imply such different perspectives?

To begin to see how this relates to the relationship a child has with information, consider the relationship between the non-verbal and verbal in the child who is acquiring language.

The first field of activity is the association of an object or, an event relating objects, to a sound. Both the sound and the non-sound perception are associated together both in what is the beginning of verbal memory and also in relation to the non-verbal dynamics of discernment. There are a multitude of co-implications. Essentially, non-verbal inner responses, recognitions, feelings and discernments are given verbal labels.

Because of the process of co-implicating experience in both non-verbal and verbal terms, learning is rapid and profoundly deep.

The first step then, in acquiring a language, is one of attention focusing on the association between the sound and its referent. Dog is dog. Tv is Tv. Mom is Mom. Ball is Ball etc.. This first step is arbitrary with respect to non-verbal awareness. The child accepts that a shoe is a shoe without demanding to know why.

But, the child does encounter difficulty when the words being accumulated do not represent labels for non-verbal discernments. When, before his non-verbal perception can distinguish a difference, he is forced to acquire one verbally: Water, Milk, Apple Juice, Orange Juice, Grape juice, etc...instead of "juice". If he hasn't made a non-verbal distinction between them, where do the labels go? The acquisition of such words prior to the ability to differentiate their meanings non-verbally can keep them from co-implicating themselves in a common concept.

The next typical step is learning to associate sounds heard with visual symbols - the alphabet. Here again other than the inability to differentiate auditorily the "B" from "D" or "P", which comes along quickly with heightened sensitivity to difference, the child co-implicates the symbols with their sounds in both verbal and non-verbal ways.

The next step is the visual recognition of words. Here begins the more subtle problem. The pronunciation rules of language can not be conceptually understood, there are insufficient verbal support elements and concepts. As such, when the sound of a word pronounced is in non-resolvable conflict with respect to the prior co-implications regarding the sounds of the letters that comprise it, what happens? The process which has guided and energized the child is "wrong", without having a way of understanding (non-verbally) "why". The emphasis is placed on relying on arbitrary associations rather than co-implications.

Such accumulations, while learned, operate like a barrier to real learning in two important ways:

1 - They help to develop and fortify a schism which takes place between the non-verbal and verbal. The child learns to rely upon the authority of the verbal without necessarily understanding "why" because he is made to feel his previous non-verbal process of understanding is wrong. How do you explain to a three year old why "eye" is not spelled "i"? Everything he has learned says otherwise and if his previous notion and the new association can't be reconciled and yet the new is correct by the reconning of a superior authority he separates within himself. The child learns to distrust the very process which has guided him through the marvelous learning feats which have made him what he is.

2 - Memory that is related to external association without being co-implicated with the non-verbal, when re-

called in its original context, prohibits the conjunction of non-verbal and verbal “meaning” processes. Except for the possibility of a later insight which could co-implicate the memory, it will remain as an insulator to understanding. Because verbal associations are sustained by the dissipation of energy of non-verbal processes their ability to later co-implicate with related understandings requires more mental energy than otherwise required. Such accumulations are not available for faster, lower energy “free-associations”, therefore they are more limited from participating in learning and creating.

Jumping now beyond the small child, we all have these characteristics. When the meaning in learning, elementally and conceptually, is not co-implicating verbal and non-verbal awareness, the energy of attention dissipates. To have learning so co-implicate, the orientation of the learner must be towards meaning. As meaning is not in the words, events and objects but in the learner, the learning environment must communicate at the learner’s level of meaning, stretching it but not disengaging it. The learning environment must be meaning oriented.

To summarize; the child’s early learning is guided by the inner response to qualities and differences in energy - not verbal content. Miraculous learning occurs under these conditions. As the verbal accumulates to the threshold of participating in perception, its accumulating inconsistencies (not reconciled non-verbally) aggregate and de-sensitize the learner to what has up to this point guided the learning process. As this condition proliferates it imposes increasing limitations to the child’s capacity to learn. The growing tacit acceptance or resignation of this situation results in rigid ness of self and a mechanical mentality reflective of the associations maintained at higher levels of arbitrary abstraction.

All of this said, the relationship a child has with information is not alone in it’s subtlety or encrusting side-effects. Once children acquire a verbal orientation their relationship with the entire world is riddled with arbitrary associations which override their otherwise natural tendency for co-implicating the verbal and non-verbal. But our relationship with information can be, relative to the other factors, easily changed.

If we can become sensitive to the potentially profound damage to our capacity for learning our relationship with information implies; we can use that awareness in interpersonal relationships and through technology to make available to the learner, of all ages, many different opportunities to perceive the meanings which will co-implicate what is being learned. This is the significance of the information age.

1988 - ESSAY - THE INSIDIOUS CURRICULUM

by David Boulton

It's not what we are intentionally teaching children that most concerns me. Beneath the various subject, technology, classroom and teacher issues, I am concerned with what the learner is learning in relation to the entire system. In other words, if we were to look at the first 8-10 years of a child's educational experience as if he or she were moving through a corridor with windows and doors that represents the intentional curriculum, I am concerned with what the child is learning from the corridor itself.

Over the educational span which begins in Kindergarten and ends in the 8th grade, our educational system is, almost as a rule, converting highly energized, curious, eager and alive children, into comparatively tired, disinterested, uneasy and curiosity dampened students. This appears to be true regardless of the teacher, the particular school, or the socio-economic family context, though they all play a role. What I am proposing is that while many complex issues do play a part in this transformation, the major player is the "corridor" itself, the insidious curriculum. But before we can see how this can happen, we have to understand a little about the learning process - the human being - it all happens to.

Before children enter the formal educational environment, their primary learning environment is their own bio-energetic, intrinsic fluctuations. In learning to walk, for example, a child is learning to balance his or her own instinctual impulses with the **real-time-intrinsic feedback** (proprioception) of their movements in the terrain they are in. Should they lean a little too forward or backward, the environment (gravity) immediately effects them and they compensate or fall. **But, interestingly, gravity and the terrain do not change or send feedback messages. The human body generates the inclination to walk and, *through a subtle sensitivity to inner self-sensing*, develops the balance necessary to do so entirely within itself. The outside environment is a comparative constant to the myriad of high frequency, multi-sensory, inner variations which are the real in-vironments the child learns to walk in.** (I think this description of learning to walk is a metaphor through which we may better understand the central dynamics of learning throughout life.)

For the young child, learning is a process of tactile sensations, sounds, sights, smells, tastes, muscle tensions - the activities going on throughout their whole being. At some really basic level, these inner variations co-emerge and cohere into inclinations, such as desire, curiosity and intention; they can oscillate through tentativeness and uncertainty, and /or they can become dis/inclinations such as fear.

Affecting the amplitude and directional acoustics of what is happening in the child's attention, these spontaneously emerging, implicate-order feelings are the child's inner learning guides (no personalization intended). Happening in the **now**, emerging between the child's attention and what is being attended, these guides dynamically and responsively orient the child through the miracles of early learning. By becoming more and more sensitive and *internally responsive* to the subtle "voices" of these guides, children go on to learn everything else.

Now let's revisit formal education.

How many thousands of hours do children sit in classrooms experiencing a presentation or

formal activity which, by its nature, circumstantially prohibits their spontaneously emerging impulses from getting attention? Their own or the teacher's? One teacher, fifteen to thirty children? If during a class lecture, a movie or exercise, the child experiences curiosity or uncertainty about details in the flow, what happens? What can they do?

For really young children, the capacity to be uncertain or curious is in marked contrast to the capacity to articulate what it's about. Meanings can be moving by at a pace so foreign that the child can't even consciously know, let alone articulate, what it is that caused them to "need more." Some older children do stand up or raise their hands and say "Excuse me - stop - I am curious about your use of the word (x)" or "What do you mean by (y)"? **But it isn't the rule**. Even for those not intimidated or those able to stay in sync with the class, thousands of minor uncertainties and curiosities (voices) are ignored for every one acted upon.

How many hundreds, if not thousands, of hours do children spend with a book in their hands? Again, what can a child do when they encounter a word, term, phrase, concept, method of presentation, etc., that either evokes curiosity or uncertainty - that causes them to need more? Put the book down, break engagement with the flow, and seek help from the teacher or reference library? Skip along hoping the meaning of the word will emerge in context? I suspect - and know from my own early experience as well as watching children today - that most children just learn to ignore all but their most powerful urges. Slowly but surely their experiences mount up to deadening their inner sensitivity.

Unlike the way children learn informally on their own, or one-on-one in relationships, the entire educational system discourages them (untold thousands to millions of times) from "listening" to their own inner learning processes.

Add it all up.

Before formal education, children learn miraculously by developing an inner sensitivity to the discernment processes we have called the "guides". This is their second to second, day to day experience for years. When they get to formal education, while in the course of being taught about various subjects, their second-to-second, day-to-day, year after year experience ***tacitly teaches them***: YOUR INNER GUIDES ARE MEANINGLESS! PAY ATTENTION! (OUT HERE)!

It hasn't anything to do with our intentions - it's a fact. The issue isn't what we are explicitly teaching, or even explicitly teaching, about how to learn. It's how the environment we teach in and through tacitly and continually discourages children from remaining sensitive to their own capacities for learning. The reasons may vary, but the fact remains that children learn to ignore their own inner "meaning needs" by the very processes intended to help them be learners.

The insidious curriculum is the corridor, the pervasive tone of the whole experience. It is the consequences of a system which has so far evolved with an orientation towards subject-matter and "what works" in presenting it.

GUTENBERG^3

TRAINING WHEELS FOR LITERACY

A CHALLENGE TO EDUCATORS, LINGUISTS, PUBLISHERS OF LEARNING TO READ READING MATERIALS, DEVELOPERS OF AUTHORING AND PUBLISHING SOFTWARE AND DEVELOPERS OF FONTS

ABSTRACT

We are proposing that you come together and develop a new method of publishing (on paper and computer screens) in which the way letters are visually presented cues the developing reader to a significantly more intuitive and immediate mode of apprehending the word's sound and therefore meaning. Particularly for young children, but also for adults struggling to read, this approach to interfacing their natural language capacities to the written word could represent a breakthrough in their education and capacity to learn.

BACKGROUND:

The publishing revolution which led to the educational revolution of the Renaissance wasn't the result of the printing press. Though serving only the elite, the printing press had been around long before the Renaissance. It was “moveable type” that made it possible to easily set-up or “program” the press and that brought the cost of publishing down to a level that eventually enabled the masses to experience the diversity, richness and learning opportunities previously reserved only for the few.

However, since the revolution, nearly everything about the publishing process has improved, except the publication. In fact, one of the most important aspects of some publications -- their role as the learning environments through which children learn to read -- hasn't changed since Gutenberg, despite "desk top publishing."

For many millions of children and adults, learning to read is the same old, difficult process it has been for hundreds of years. It is a process of acquiring an "inner interface," an inner translational system that can allow their minds to "hear" the sounds of words by looking at the string of letters that comprise them. That acquiring this translation capacity is difficult is evidenced by listening to any five year old conversing with friends and then listening to him or her read. The difference in range and fluency is striking -- it is obvious that children's oral language dexterities far outpace their reading dexterities. Humans are born capable of acquiring oral language capabilities simply by being around other talking humans, but when it comes to learning to read, our natural and instinctual language capacities have to be "conditioned" into service through a long and tedious process of visual associations and (at the time they have to learn them) totally arbitrary rote rules.

While children have difficulty learning to read words, most three-year-olds know their "A-B-C's" cold. They can recognize letters and, treating them like any other "thing" in their world, associate them with a particular sound. Given this capacity and the natural language dexterities just spoken of, what is it, then, that is so difficult about learning to read?

The core problem is obvious: In pronouncing the alphabet, there is a sharply defined, one-to-one correspondence between the visual appearance of a letter and its sound. But when letters combine in words, the way the letter needs to participate in the sound of its host word no longer has such a correspondence. Twenty-six letters can give rise to 40 sounds in ways non obvious or intuitive. Because the mental overhead required with reading is so un-intuitive and inefficient, an inner "stutter" occurs during the translation which breaks the natural flow and rhythm the reader would otherwise rely on in oral language processing.

Given the difficulty (and the comparative ease of relating to other media, such as television), it is no wonder so many children have difficulty sustaining motivation when reading. Whereas the child's oral language world is rich with range and power, the clumsiness and inefficiency of the reading process forces authors and publishers of children's materials to "dumb down" to a level children find boring as well as frustrating. Again, not

because they can't understand the meanings -- the TV programs they watch and the conversations they have are radically more complex -- but because the (tacitly acquired) "interface" is so poor. Reading is not exciting until you really learn to read -- why work to learn to read when what is being read is so boring?

In today's age of desk top publishing, why can't we make reading words nearly as effortless as hearing them? And, what if we could?

OUR GENERAL CHALLENGE:

We are challenging you to provide developing readers a way to more fully utilize their natural language capacities by making the appearance of words visually cue the word's sound in significantly more obvious and intuitive ways. More specifically, rather than having only uppercase and lowercase variations in visual appearance, we are proposing that letters be capable of being visually represented in ways intuitively suggestive of how they participate in the sound of their host word. Essentially, we are proposing you add a new level of modular flexibility to the idea of a character.

By developing "character families," each letter can be presented in a variety of ways reflective of its various sounds when participating in words. There can be both alphabet-general and letter-specific visual variations, such as sharp, flats, drags, louds, softs, silents, and blendings, both forwards and backwards. By modulating the boldness, size, slant and shape of letters (analogous to a visually-intuitive, musical notation system), we think it possible to significantly help developing readers learn to read. Unlike phonics or ideographic props, this approach would work without the secondary confusion of multiple spellings.

Whereas, in the days of Gutenberg, adding another dimension of presentation options to each character in a typeface would have proved impossibly cumbersome, today, adding such capabilities so that word processors can modify the appearance of letters in a font family shouldn't represent any technical problems at all.

EDUCATION TASKS:

For educators, the challenge involved is in learning to tune the visual presentation modalities of each character to maximize its general intuitability across the full range of its possible modes of participation. We recommend that a team of linguists and reading teachers collaborate to develop a starter set of character presentations which would be subsequently modifiable by them based on their actual experiences in using the system with struggling readers. Members of this team would be joined by alpha, and subsequently beta, testers of the first team's work. Concurrent to the development activities, a clearing house would be formed that would receive the character families and presentation dictionaries, perform evaluations on overlaps, and distribute the growing system to all interested parties.

TECHNOLOGY TASKS:

Conceptually, the technology involved is relatively straightforward. The first component is the "carrier" or shell that extends the font family to have the added capacity to store the alternate presentations of each font. The second component is the additional user interface extensions that enable the manipulating of alternate fonts. The third component is an on-line, font generator with tools to augment the user's ability to manually adjust a character's appearance and create the alternate fonts. The fourth component is the "presentation dictionary" which, like a spell checker in a standard word processor, scans the words in documents and looks them up on its data base. Having found a word match, the dictionary reads the character presentation modalities for the letters in that word and adjusts the letters of the word in the publication to match. .

Taking up this challenge could create a breakthrough in literacy and, even beyond that, change the ecology and efficiency of the "inner interface" that regulates learning. Take it up!

THE 3 LAWS OF *FEEDBACK*

Feedback - ***The currency of learning*****.**

Feedback - ***The Quantum Semantic™ element of systemic evolution and improvement.***

Feedback - ***The difference between what works and what doesn't.***

IF THE COMPETITIVENESS OF A COMPANY DEPENDS ON ITS CAPACITY TO SATISFY THE NEEDS OF ITS CUSTOMERS -- THEN ITS COMPETITIVENESS DEPENDS ON HOW WELL IT IS AWARE OF THE NEEDS OF ITS CUSTOMERS.

IF A COMPANY'S PERFORMANCE DEPENDS ON HOW WELL IT PROVIDES FOR THE NEEDS OF ITS EMPLOYEES -- THEN ITS PERFORMANCE DEPENDS ON HOW WELL IT IS AWARE OF THE NEEDS OF ITS EMPLOYEES.

IF THE EFFECTIVENESS OF AN EDUCATION OR TRAINING EFFORT DEPENDS ON HOW WELL IT SUPPORTS THE INDIVIDUAL LEARNING NEEDS OF ITS STUDENTS -- THEN ITS EFFECTIVENESS DEPENDS ON HOW WELL IT IS AWARE OF THE INDIVIDUAL LEARNING NEEDS OF ITS STUDENTS.

1 **The success of any effort to design, develop or improve any 'system' ...**

company, product, process, service, project, issue, curriculum, classroom, school district, pedagogy, etc.

in terms of its systemic performance:

organizational efficiency, cost-effectiveness, optimal achievement of intent

depends on the volume, dimensional extent (scope) and granularity of the feedback it can gather and learn from.

2 **The volume, scope and detail of feedback flow in a system is inversely related to how difficult it is for its constituents...**

customers, employees, partners; learners, teachers, parents, administrators, curriculum providers, assessors, superintendents, board members, stakeholders, etc.,

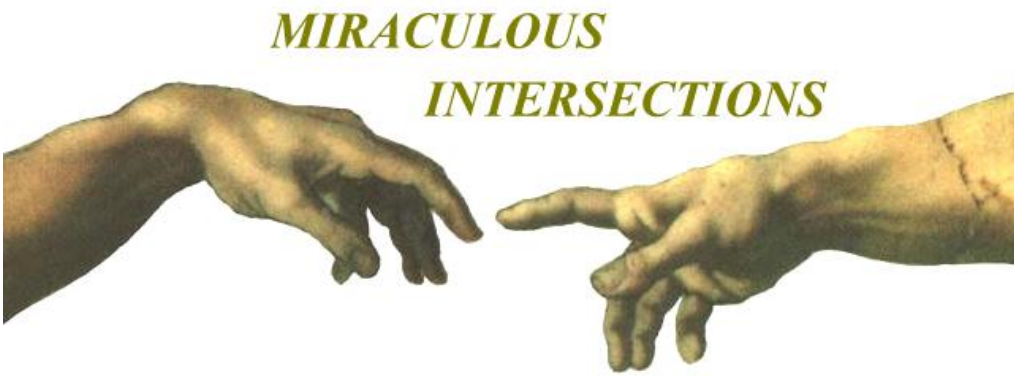
to articulate their feedback in the moment and in the context of their interactions with the system.

3 **A system's ability to learn from the feedback it gathers is directly related to how well its "owners"...**

persons responsible for any one or all of the resources available in the system

persons responsible for any one or all aspects of the implementation, mission or intent behind a system (above)

process and understand (in relation to their areas of responsibility and priorities) the feedback they receive.



Stutter: *A perturbation in the flow - an involuntary 'drop-out' or 'disconnect' in the flow of engaging or interacting*

Every "***stutter***" in the flow of an individual's interactions with any "resource" intended to support or facilitate their learning, performing, participating, using or enjoying...

> any or all aspects of: a product, process, service, i.e., a course, book, computer simulation, game, etc...

is ***a great opportunity*** for both the individual and for all those involved in providing what he or she is interacting with. Each "stutter" represents the ***best possible source*** of information from which to become more intelligent and more effective (independently and in relationship.)

For the individual interacting with a resource, each stutter is an internal feedback signal indicating that something is missing, needed or incomplete. It also provides, if reflected on and distilled (disambiguated), the ***best possible source*** of internal information from which to understand what is missing or needed and, given the available options, how to best proceed.

For the people and organizations that benefit, profit or are responsible for providing the "resources", the ***best possible source*** of information from which to intelligently evolve and ***cost-optimally improve*** them ***stems from understanding...***

> in precise relation the specific interaction locations they are responsible for

where and why people stutter.

Foundations of our Vision

We believe that human beings are born learning-oriented (with nervous systems "wired" or *oriented* towards continuously learning) and that the living core of this deep learning is a dis-ambiguation (ambiguity reducing) process oriented towards extending an individual's presence more fully into their own living and experiencing.

Learning to extend our presence (exercising our extension) whether in the 3 dimensional space of walking or the n-dimensional space of physics, music or semantics, is, at root, the same *core process*, even though the environments we are exercising in are different. This difference in environment, however, is critical, and **the difference that makes the difference is feedback**.

Feedback whether from the environment outside our bodies or internally generated from within us - is what our learning process is "wired" to be guided by. In the more somatic activities of manipulating physical objects, walking and, initially, talking, this wiring works well. These activities provide us with immediate feedback about what is actually happening during our interactions. For instance, the inner sense of falling is the immediate feedback necessary to walking. However, when we encounter the information-mediated world of consensual agreement based knowledge, rules and systems (from classrooms and textbooks to methods, procedures and policies), our wiring gets confused. Precisely because the information is unable to provide us with coherent feedback at the moment we are interacting with it, our deepest learning capacities can't directly engage. Here, in thousands (if not millions) of instances of being educated, trained or just interacting with the world, we are tacitly (unconsciously) conditioned to ignore our most authentic meaning need signals, our stutters. (Stutters -- spike-like involuntary drop-outs in the flow of our attention that underlie our meaning needs and guide our natural extension and learning.) Consequently, we are educated, trained and paid to ignore all but our most powerful impulses (and stutters). As a result, we accumulate a substitute, and a much less efficient "inner interface" through which to learn and engage the world.

We wouldn't learn to swim in a desert or walk in outer space. Learning (our capacities to learn -- the skills to work) occurs best in environments that support us and give us the feedback we need to sense ourselves on the very edge of whatever it is that we are doing.

We believe that any person could learn anything if the people and/or materials resourcing their learning could feedback and unfold themselves in relation to that person’s dynamically arising learning/meaning needs. In other words, if the resources unfolded in response to the real-time dis-ambiguation process of who is learning, while they are actually learning.

Heart of the Vision

Therefore the heart of this vision is of a new ethic of interface and a new general relationship between people and the systems that mediate their relationships.

The vision represents a covenant between such systems and their human constituents that, in effect, says:

> **"Learn to trust and follow your meaning needs - clarify and distill (dis-ambiguate) them - articulate your most deeply authentic needs as they occur to you- if we cant help you now, tell us. The fact that we couldnt help will in form our evolution so we better serve you and others like you in the future."**

The vision represents a mutually learning-oriented and mutually intelligence-friendly approach toward facilitating each individual's potential and toward mediating distributed human relationships and interactions.

Attributes of the Vision

- Illuminates a fulcrum - a point of maximally efficient leverage - that lies at the in tersection between the needs of each individual child and adult and the needs of the organizations who benefit by educating, training, or providing goods and services that help them learn, perform and participate

- Provides a benchmark for assessing a system's capacity to mediate human intelli gence

- Provides a new paradigm for re-visioning education and training

- Defines a new competitive distinction in hundreds of markets

- Defines "next step" value-added extensions to hundreds of existing products and services

- Defines a whole new class of products

Long-Term Mission (project: IMPLICITY)™

Our long-range mission is to create, or cause to be created, a parallel and, in some cases, alternative, commercial (but not-for-profit), on-line, education system.

The system would serve as a virtual multi-generational, multi-cultural, multi-lingual school system and university that begins in the US and grows over time to serve the entire (virtually) world. Available over the Internet, ultimately, it would be accessible via cable set-top boxes to millions of people. Built on the concepts and technologies of **Distributed Dialogue Processing™** and the **Learner Interface**, *Implicity*™ would "grow itself" over a 3-year period of public education partnerships and, thereafter, profit through monthly subscriptions, as well as government contracts and corporate partner fees. Its primary customers will be parents (on behalf of their children), adults, and public education institutions.

Kind of Learning: *Semnastics*™- a different kind of education grounded in the deep processes of learning to learn and extending from there to learning about. Parents already choose among "kinds" of education systems, Montessori, Waldorf, Kindercare, Futurekids, Sylvan, Gymboree, etc., that represent ways of educating they prefer for their children. We believe that it is possible to create a "signature" identity for a WAY and KIND of learning that is ecological, ergonomic and aerobic for the mind's core capacity to learn: SEMNASTICS™.

Implicity has a series of organizing principles that revolve around two primary intentions: 1) to model a new kind of mutually learning oriented education. 2) to model a new kind of dialogically distributed constituency, itself an alternative to representational politics as we now understand it. Here are some highlights:

Turn the whole idea of educating inside out. Instead of being fundamentally organized around teaching and deg/cree-ing - it is fundamentally organized around facilitating learning. By this we don't mean "band wagon" lip service to being superficially "learner-centric" - but rather a sophisticated organizational and technological heuristic serving a dialogue rich culture that is focused on continuously improving its faculty's and technology's capacity to resource the real-time learning needs of its subscribing/attending learners.

"Reinvent" the process of an educational system as if its "customers" are learners who are "buying" the means to:

a) Master their own capacity to learn. Operationalize in their being their recognition that the most important (generally leveragable) "subject" is how consciously self-extending they are of their personal capacity to "interface" and "learn" (generally).

b) Develop their knowledge, facility, competency and mastery of subject matter, but not necessarily in order to obtain orthodox degrees or certificates.

c) Order the unfolding of their education in relation to what is authentically (to them - in the moment and overall in their lives) emerging as "needs" and imperatives in their learning. Learning which is dialogically interfaced, "coached" and "resourced", and generally self-directed.

Develop an "ethic of interface" and a covenant of mutual learning that:

a) helps learners learn to dis-ambiguate and articulate what is most authentically necessary for sustaining the thrust of their own optimal learning, as it is happening, and to use this process as their primary "compass" and "orientation" to learning and interfacing.

b) provides everyone involved (faculty and learners) the technological means to efficiently express their needs, further dis-ambiguate them in the field of the resources unfolding before them, and to either have their needs met or contribute to the "feedback" dialogue that informs how resource allocations are prioritized towards meeting the actual needs of the school's constituency.

Develop and model a virtual political process that radically redefines a representative as one who is responsible for refining the fidelity of their representation by having an ongoing, ever more extended and inclusive person-to-person, and technologically distributed, dialogue with their constituents.

Distinctions and Benefits for Parents:

• A parallel system for the **remedial, supplemental, or special** (disadvantaged or talented) educational needs of their children.

• A **21st Century curriculum** for global learning -- critical skills for the next generation Distinctions and Benefits for Adults

• Semnastics™ (all the above), and

• Vocational, continuing education and company reimbursed skills development.

Project *Implicity*™is the future goal of a Vision Learning To Happen.

NOTABLE JOURNAL ENTRIES

Journal Entry 8/89: Tides of Meaning

A VIEW OF THE SIGNIFICANCE(S) OF LEARNING (provisional play)

Nothing alive is still. Stillness is a quality of death and inanimation. Digitality is a still observation.

From the moment we are alive, we are moving. We are moving physically and we are moving mentally. (brain cells swin to their locations) At a sufficiently subtle level, both (physical and mental) are emergent qualities of the same "whole" moving. This moving, like a confluing infinity of differing tides, propagates the relations between our inner most material processes and every aspect of the universe which affects them. In my own experience the word closest to covering these infinite ranges of movement is "attention". Attention is the bio-psycho-energetic-movement.

From the heart thumping startle of a near miss on the freeway, to the more finely focused and dissipated calculations of balancing a bank account, attention is co-implicate.

Like a boat traveling across water leaves a wake, attention leaves memory. The bodies we are and our remembrances of events past are both co-resonating wakes of attention. And just as the boat both leaves a wake and is affected by wakes, attention passing through memory is modulated by and modulates the form of memory.

Meaning is the active resonating together of attention and memory. Meaning may be mediated by cognitive operations at higher levels of abstraction but its nature is an energetic quality of attention not an abstract construction.

Learning is the non-inherently predetermined interactivity between meaning and memory.

All living grows out of learning.

Evolution is nature (life) learning.

Being human is learning - learning to realize and fully extend and embody living.

The significant obstacles to our capacities for learning are brought in by our learning. **We learn to fear learning about ourselves.**

Journal Entry 9/89: Meaning Being

As Thomas Kuhn pointed out, change seems to occur by the incremental additions of new facts into the framework of an existing "paradigm" or because some higher level of generalization subsumes older paradigms and relates them in a new one. Any attempt to see established facts from a new perspective is a formidable undertaking. The difference between the Ptolemaic and Copernican solar system was but a different organizing generalization that seems simple today, but for Copernicus to make his argument was at the time quite complex. The paper you are about to read is concerned with how we see what we know and as such can't avoid some complexity on route to a high level of generalization.

.....

The past twenty years have seen an enormous increase in the sophistication of our understandings of: quantum mechanics, molecular biology, information processing, brain functioning, artificial intelligence, cognitive science, systems theory, chaos theory and human potential. Yet, more striking than the strides made in each discipline is the emerging paradigm they all share about the universe, nature, life and more specifically human beings. They all agree, reductionists and wholists alike, *we are meaning being*. We are the cutting edge of "being" *learning*.

At the level of physics it is said that a “signal”, an “event” or a fundamental “particle” has meaning only in relation to some observational context (itself a meaningful frame of reference). Similarly, from the chemical messages of DNA to the complex telecommunications of modern society or the relationship between parent and child, anything that is meaningful is so only in a context. The basic attribute of context is meaning, therefore, meaning is *irreducible*. According to all we know, probably according to all we can know, meaning is the basic “stuff” of existence. Change of any kind is first and foremost a change in meaning.

Biological entities, such as ourselves, are meaning *being*. Our bodies process food according to laws and habits which create a context for the complex chemical interactions occurring. At a higher level of generalization, the music of Mozart has beauty because there is meaning in the way it resonates with our nervous system. Similarly, when learning mathematics, a given formula is a method from which meaning can be assimilated and transformed.

We are a near infinite confluing of co-implicating contexts, which are incorporating meaning in relation to an infinite environment, and doing so throughout every measurable interval of our existence. The way we process meaning, how we do it, why we do it, and how different meaning is to *being* than to *awareness*, we are studying. But that we are meaning being, that life is meaning being, that meaning beings are life, is as close to certainty as we can get.

Journal Entry 5/89

Any real experience has in its nature the need to go deeper than a human being can control. Yet, we learn early that devastating things happen when we don't control our experience.

DAARON

One evening Daaron, my four year old son, came into my room while I was working on my computer. He said “daddy, can we go for a walk?”. I said that we could, but we would have to wait a minute until I finished saving my work and shutting off the computer. As I proceeded to do this, he wandered over to a side table covered with magazines and glancing upon them noticed the cover of a recent “Science News”. On the cover was a picture of an aborigine with a bow and arrow.

Daaron immediately asked “daddy can I have a bow and arrow?” He had asked about one once before and had been gently deflected from pursuing it. I was just finishing up and shutting down and as I got up to walk over to him I replied that maybe when he was a little older we could get him one. As this was happening and just before I could say “lets go for a walk” (which would have deflected him again) I recalled my own early fascination for the bow (action at a distance). As I did, I proceeded to tell him that when I was a little boy, though a little older than he, I had had a bow and... As I paused in speech, his face stopped me awake.

On Daaron's face was intensity, sincerity, innocence and sorrow, he looked at me full on and somehow full deep and said “oh.., you lost it?” I can't really describe what happened his voice - its tone - was so incredibly innocent and so fully present. I just melted into the moment. While describing it will take some time and paper, it all happened within an instant.

Thinking did not cloud my mind, it was one of those moments of communion when we were in full resonance. One moment he experienced the bow in his hands, the next it was suddenly gone, he was pained and so too must I be - his reaction was immediate. A sorrowful “oh.....” followed by a sorrowful but consoling “you lost it?” For him the bow was incredibly meaningful. For me to have once had one and today not, I must have suffered the loss of it as he would. His experience brought him to feel sorrow for me and my (he supposed equally present) pain at its loss.

Timelessly, I experienced the essence of love, compassion and intelligence.

His love and compassion and sorrow were not products of ideas, images or some desire to get anything from me - it was naked and alive - incredibly present, innocent and sincere. And yet while there was this incredible warmth there was also this awesome intelligence.

The aspect of that intelligence which was most striking was its timelessness - his feelings were totally in the now - it was inconceivable that he could outgrow the desire for the bow, hence I hadn't - I must feel as he did. From that perspective, his response was beautifully intelligent and compassionate. It was at this point that I saw that: **"the only reason I do n't see the incredible human intelligence in the behavior and actions of every human being is the rigidity of our own frame of reference"** - that, each human being's behavior is perfectly intelligent given that individual's nature, and more importantly here, their frame of reference. Further, and this had been something I have been exploring for years, the difference in our perspective was for me best described as a difference in *timescape*.

I had thought about this point from many angles previously, but here was an experience that was deeper and showed their reality. I had often observed that children especially, but adults also, behaved incredibly intelligently given the way they see their world. That the issue was not how to learn about behavior, rather to learn about how people learn to experience the world - how they learn to see it - how I learn to see it. Now it was clear that this was so, that adults may have more convolutions and may live in a psychological space-time extending into vast fields of memories, but that their behavior was fundamentally an intelligent reaction to their perception of the world. With a pressing vitality it was clear that the only reason this is not always obvious to me is that my own way of perceiving the world will not let me experience the world from theirs.

After a whirlwind tour of reliving important moments in my relationships with people, a review illuminated by this view of human behavior, I hugged Daaron and we went out for our walk which though too long a story to tell here turned out to be magical from one end to the other. Super shoes, what a concept.

Ever since that day when I encounter some aspect of a person's behavior which seems unintelligent, I ask myself why is my point of view so rigid?

FRIENDS - JOHN

My life, owing in large part to my somewhat unique vocation, enables me to be in dialogue with people about the essence of learning (for me the process of the content of consciousness) 20 to 30 hours a week. It has been so for nearly 3 years and I can't express enough the gratitude I feel for having had such a wonderful environment of challenging and encouraging friends and family.

Shortly after the event with Daaron, I spent a day with my friend John. John is a very unique human being. Not only does he enjoy and become animate in dialogue about our shared human condition, he has had some remarkable and insightful personal experiences which illuminate and inform his gentle and encouraging but challenging nature. John has a somewhat different view of the significance of learning than I and exploring that view has indeed been enriching. **John has had personally validating experiences about the relationship between psychological rigidity and patterns of bodily, physical, organizations. His process of being more open and alive, of overcoming what he learned before he was aware of learning - of becoming more open, is what he calls body-work.**

The underlying philosophy about John's body-work arises from the fact that human beings are more than what is behind the brow. That human experience is a full being phenomena, extending throughout our whole physicality. This of course is not a new idea, the fact that our whole nervous system is one with the brain and with the body is most certainly true, we only separate them in classifying - they are all integral in a larger whole. But what John is saying is that those of us who are aware that we are "blocked", obstructed from being open enough to truly be ourselves and experience the world, shouldn't confine our inquiry to the space between the ears. That, emotions and thoughts are process of the whole body, and thus so are the blocks. **That these learned blocks can best be seen as patterns of physical organization which we have acquired to brace ourselves from unpleasant experiences. Trying to stop from crying, stiffening our shoulders in fear, tightening our whole body to avoid trauma, these things we did as children left patterns of organized**

knots in our physicality which persist into adult hood and tether our capacity for whole experience. From such a perspective these blocks combine to act like a psycho-physical straightjacket, which by its nature excludes our conscious awareness of its existence.

Having somehow experienced this wholly, not just the idea, John has been doing his body work for some 14 years. A great deal of that time he worked with a somatic therapist (Stanley Keleman http://www.centerpress.com) who taught him that the first step in untying the knots or blocks was becoming sensitive to their existence. The therapist uses a descriptive example roughly like this:

> **Imagine that you have clinched your fist very tightly and for so long that you are no longer aware of doing it. To unclench it, you must first become aware that it is clinched and then proceed to clinch it even tighter. In the act of clinching it tighter you reestablish awareness and proprioception and can then relax it.**

John has come to feel this must happen to a vast network of subtle knots distributed throughout the body.

I had, before that day we spent together, understood the logic of all this, what John did was make me experience its reality. By talking me into a deep breathing state of relaxation he asked me to focus my awareness on every little muscle in my neck and shoulders. Then, as my awareness was tuning in, to slowly move my shoulders searching for little pockets of resistance. As I encountered them he said, breathe deeply with the pocket focused in awareness - deepen your perception of it. Finally, as the awareness of the block was deepest, he said to move my body in ways that I felt would relax it. I did this and had the definite experience of a vivifying bubble burst - an expansion to the dimension and richness of awareness.

That experience, others from that day and since, have co-implicated the relationship between learning and being, and the fact the human being's first learning is bodily organizations. In addition to having a process revealed, this experience served to deepen my sense of conviction that human learning is initially time-blind, indeed constructs time, for here again was evidence that as small children we learn in ways which constrain our capacities for learning.

MOTHERS DAY

If you pay great attention to anything alive if you really establish an inner sync with something living, in that quiet attentiveness you can subtly feel the other's living impulses.

When I really attend a bird standing on the ground watching attentively for its lunch, when the bird jerks its head, very subtly, Ifeel an impulse to jerk mine. When I really commune with a baby, if I rhythmically pulse a muscle group, the baby will also. I have seen this.

Little children, infants, are constantly ßei ng-learning."They do not experience the world in words or images or in relation to a self - but in cascading waves of energy and feeling. They resonate with reality at a level which is not abstract. While we adults can attempt to theorize and describe their orienting process of experience, that orientation is, in us, so deeply learned over that we no longer experience it.

The human infant's experience of the world, its learning, is grounded in that kind of experience. Their sensitivities are not just sensual they are also pre-sensual. They are empathic, their being learning is grounded in an empathic resonance with their living environment. Long before their senses are reporting reliably on their physical relation to the world this resonance is shaping their relationship with their senses. They can and are easily traumatized by resonances unnoticed by the caregivers.

On Mother's day, the day after my day with John, I spent almost the entire day with a dozen little children. (mostly infants). I was amazed at how present this empathy was. I could feel anger in the being of some, hurt in others and a buoyancy and freedom in still others. It was plainly obvious in seeing the parents which ones were hurt and angered and how they have unaware, provided an ambient context for their child to "being-learn" to relate to life in similar ways.

We don't seem to see this and as such our unawareness of this subtle and delicate level of being causes us, through ignorance, to bruise and mar these most beautiful expressions of life and love and humanity's potential.

Why don't we treat each child with the reverence and facilitative carefulness we would afford a Christ, Einstein, Curie or Michaelangelo? Why don't we cherish them, each one, as if he or she were the key to the whole future of mankind? Which of course they are, these beautiful beings are all this and more! Where is LOVE, COMPASSION and INTELLIGENCE on this planet if not here?