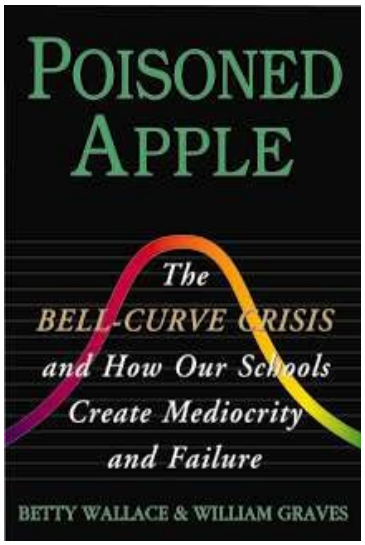
... The IBM prototype requires expensive equipment, but similar systems are being developed that will cost far less. David Boulton, head of DiaCom Technologies, Inc., in Scotts Valley, California, has created the software for what he calls a general purpose electronic learner-oriented environment projected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

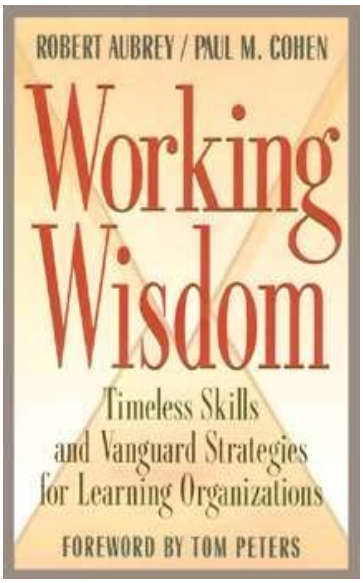
Boulton created his system after watching and recording three - five year olds play Nintendo. He concluded that the electronic game engaged them with cycles of challenges, usually some menace such as bats in a castle, and a variety of solutions to overcome those challenges, such as trapdoors and weapons. 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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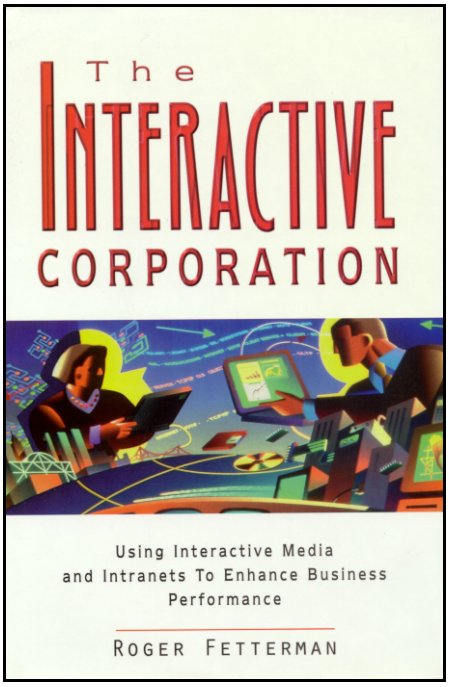
The Interactive Corporation by Roger Fetterman



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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