

~ **SECTION THREE** ~

Schooling and Learning
in the Digital Age

Content and Process in the Digital Age

By Sara Armstrong

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MY FIRST TELECOMMUNICATIONS EXPERIENCE took place in the very early 1980s, when my students took part in an interactive book talk with another school 200 miles away. Using Atari 800 machines connected to phone lines by 300-baud modems, students from both schools engaged in a discussion while the other teacher and I feverishly typed in the name of the student speaking and everything he or she said. We based our book talks on stories from the Junior Great Books series. The questions each group of students devised were based on the Great Books (www.greatbooks.com) discussion model—that is, questions that grew from the text, for which there were no obvious answers and about which we were curious.

Those Friday morning sessions lasted for several years. Out of the first year came the realization that something very unusual was taking place: my students were conversing via modem and computer with students they wouldn't ordinarily meet. One of the students at the other school changed from a solitary, separate reader into a well-read, thoughtful leader in the discussion groups. For some reason, talking as part of a group to strangers through the computer let her share all the interesting ideas she had been formulating through her years of self-imposed isolation. She was truly changed by the experience; she became one of the students who mentored younger students in the telecommunications process, helping them pick out

stories, create questions, and participate in our online sessions during subsequent years.

The Atari BASIC program we used for our discussions provided us with a split screen, so both groups could type and read what the other was typing simultaneously. It was an elegant program. The only problem was that we could not print or save what took place, so the exact words are gone—though the learning remains. And the learning reinforced the power of person-to-person communication and encouraged looking for other opportunities to talk with people anywhere in the world for the price of a local phone call.

The content of our talks was an exploration of literature and how it related to our lives—perhaps differently in our suburban situation from that of our rural colleagues. Most important was the sharing and the “knowing” my students insisted they felt for their distant, faceless peers. Indeed, when the students met each other in person, they easily merged and immediately began playing together. In contrast, adults from both schools hesitantly made small talk, not having had the experience of meeting their counterparts online.

What will the content of the online world be in 20 years? Whatever it is, my guess lies in the increased importance of communication among people all around the world. B. Keith Fulton, executive director of corporate relations at America Online, talks about the “relationship revolution” we are experiencing now. As more and more teachers perceive the power of online projects in which students work out and share answers to specific problems, the discoveries that are posted online through this process not only are documented in the sharing, but also are spread more widely than was possible just a few short years ago. Project-based learning is a method more and more schools are considering. Learning, within a meaningful context, becomes deeper and transfers better to other situations when students are engaged in explorations of their own design. By creating questions to be answered and developing the process by which the answers will be reached, students take responsibility for their learning and participate in all aspects of creative problem solving. Access to online resources often takes the learning even farther. For example, students from different parts of the world can share their local information with one another and look for patterns, make comparisons, or develop hypotheses based on shared data and taking into account geographical differences. Cultural studies become much richer

when students talk with members of other cultures directly, share ideas, and conduct research. A number of formalized online projects already in place help teachers and students focus their thinking on important questions. CyberFair, ThinkQuest, and I*EARN are three examples.

The **CyberFair Contest** (go to <http://lightspan.com>, click on Global Schoolhouse, and follow the path to the CyberFair Contest), created by Al Rogers and Yvonne Andres in 1996, uses the theme of “share and unite” to encourage students to connect with their communities. In this ingenious contest, K–12 classes and schools develop Web pages around immediate, local information to share with the world. Students talk with others in their communities to learn about where they live in more depth. They provide information that would be difficult for people anywhere else in the world to locate. The information is presented in Web pages, which are in turn evaluated—using a comprehensive online rubric—by other students. Students not only publish their own work but also receive feedback from their peers about the effectiveness of their thinking and presentation.

ThinkQuest (<http://www.thinkquest.org>), another Web contest, encompasses three events. The **ThinkQuest Challenge** engages 12 to 19 year olds, who work in teams of two to three from around the world to create Web pages in content areas for their peers. **ThinkQuest Junior** is a Web design contest for fourth through sixth graders. In **ThinkQuest for Tomorrow’s Teachers**, team members include pre-service and in-service teachers, along with college of education and content-area college faculty, who develop Web pages in school subject areas or related to professional development. A huge library of these Web pages is available for the world to see and use online. Each Web page is judged on a number of criteria, including interactivity—meaning that the Web site becomes more valuable as people use it, usually by contributions they can make to the site, which in turn makes the site a richer place.

I*EARN (International Education and Resource Network at <http://www.earn.org>) now includes over 2,500 schools and organizations in more than 50 countries. Teachers from around the world engage their classes in projects that include elements of social activism, and that are often set up, implemented, and reported on in a variety of ways via email and Web pages. Work done in the Holocaust/Genocide Project, the First Peoples/Indigenous Arts Project, the Global Marches Against Child Labor Project, and the World Religions Project (to name just a few) raises awareness of

current issues on a worldwide scale. These projects provide opportunities for students and teachers to make important differences in their own lives and in the lives of others, and to lay foundations for students to become informed, caring global citizens.

It takes an ongoing effort for educators to include technology—particularly Internet resources—into curricula. The effort is clearly worth making when students become engaged in learning, develop critical thinking skills, and step forward into solving real-world problems.

In this multimedia age, where more than enough information is available through a variety of media, it's important to develop tools to evaluate what each medium does best. An important part of our students' becoming educated includes encouragement to assess what is conveyed, and what they then present, through video, text, graphics, Web pages, audio, and combinations of these possibilities.

What does the Web do better than any other medium? One answer has to do with communication among folks who wouldn't ordinarily get to know each other. Another must relate to making learning relevant—which students understand through publishing their work and being held accountable by a worldwide audience for what they share. Perhaps technologies such as virtual reality or holography will provide yet another dimension to what can be learned and shared. Though these technologies are not yet a part of most educators' toolboxes, they—as well as yet-to-be-developed technology tools—may well make a huge difference in what is taught and learned, and in how teaching and learning take place. At the same time, I believe that educators will continue to become better facilitators and guides as they provide experiences and resources for their students to learn to succeed in life. There will always be basic skills and literacies that students must acquire, including numeracy, reading and writing, questioning media messages, art and music, and physical and social skills. And I hope that within the near future the importance of speaking several languages will become recognized. After mastering the basics, I expect students will engage in a series of thoughtful projects that integrate technology, cross curricular areas, include critical thinking at every step, require collaboration, and add new information or resources to the world. Educators will guide students as they explore their world and create problems to solve that take them deeper into content areas within meaningful contexts. The process of education will obviously be more important than products, and learning

will be measured by student and teacher reflection on the process, student and teacher evaluation of the effects of the results, and teacher-facilitated student plans for the next project.

Twenty years ago, a telephone line, modem, computer, and a desire for offering opportunities for students to think, share, and work together across distances provided a beginning. Twenty years from now, thoughtful information developed and shared by students with other students—who then become real people to each other—will continue to deepen and enrich the lives of all involved. That is my hope. 

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An Appropriate Future Emerges from a Well-Designed Present: The Technology of Self-Design

By Brent Cameron

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I THINK THAT ALTHOUGH the following idea is a simple axiom, its inverse nature creates significant confusion. *The more we focus on learning about the complexities of the external world, the more ignorant we become of who we are and of how we work as human beings.* This need not be the case, yet because of “how” we are designing the learning process, we catch ourselves in our own trap. I propose that as long as we pay attention to the “quantity” of accumulated information in our evaluation of human learning we will only be dealing with the outer shells of our learners, leaving them empty and closed. While growth, development, and progress are worthwhile, unless we are able to include “the quality of being in this present moment” in our evaluations, then we are negligent to the very purpose of education. Negligent because we are seduced into ignoring—into overlooking—the most profound piece of technology in the universe, one’s self.

If I eagerly encourage a group of new students to learn more about technology, or even learn more about the world with technology, I inadvertently diminish their potential as human beings. Understanding how this

happens is to transform the best intentions of educators and parents into actions that are ecological for the learners. Consequently, when I begin working with a group of youth, I emphasize that whatever we are going to do, that whatever we are going to learn, is but a mirror for self-understanding. For example, Michael Maser, a colleague of mine, recently created a brochure to advertise a new learning program for home learners whose curriculum focuses on gardening and earth stewardship. He quotes Fukuoka, a Japanese farmer, in describing this program: *“The goal of farming is not to improve crop production but to perfect human beings.”*

What is essential here is not to put perfection (or success) in the future after the accomplishment of anything. If an impressionable learner sees everyone standing looking at the horizon and into the future, then he or she will also look outward. As a mentor, I choose to sit quietly off to the side of those standing leaning towards the horizon, and in my conversations with impressionable learners, I encourage them to look inward, by looking inward myself. And in our conversation, from the awareness of one’s center in the present moment, it is certainly possible and important to glance at the horizon and make plans for the journey. It is, however, a journey from here now, where the future is always an illusion and where here and now are closer than breathing.

I am concerned about balance and wholeness in terms of a human being as a dynamic system. How can we have a discussion about the future without an appreciation of the present? How can we have a discussion about technology and education if we do not begin with the experience of technology and education? How can we advance on the journey of learning if we don’t have a sense of home that we can leave and come back to?

I must include the learners in the learning; I must hear from them, *how they are*, before I can introduce them to the marvelous technologies for discovering the world. Recently I debated our Minister of Education on a Provincial radio program, arguing that we could not make our schools better until we enfranchise the learners. The idea that a change in quantity—more computers, smaller classes, or better teaching—can influence what is actually necessary for significant improvement is absurd. We can improve the factory and the working conditions. Yet until we address the issue of quality, as experienced by the learner, we are merely rearranging the deck chairs on the Titanic. The quality issue begins and ends with a self-assessment of one’s own sense of wholeness and wellness.

Happiness is a biological condition, and unhappiness is a political condition. Children are happy. The responsibility is on us to design the kinds of quality relationships with them that sustain their happiness. I am afraid that our use of technology falls more into a category of seduction whereby management uses technology to diminish the effects of coercion. If we use technology to keep better track of our effectiveness as educators, then shame on us. If we are seducing children into postponing their happiness until the future, then we are sentencing them to a life primed for consumerism, where one's sense of loss and emptiness is imagined to be fulfilled at some point in the future through ownership.

Never before in the history of the earth have we known so much about how the world works; never before have we had such a rich wealth of knowledge or so many awesome ways of delivering information to the learner. However, the better trained our teachers and the more technology and the better information we have on hand, the more apathetic and the more disenfranchised is the learner. To quote physicist Murray Gell-Mann, "*Schooling today is like taking a child to the world's greatest restaurant, and feeding them the menu.*" In order to understand this wonderfully absurd metaphor, I think that we can look at the defining paradigm in which we live.

More than 500 years ago, as part of an intellectual renaissance in the western world, Columbus shifted our paradigm from imagining that the world is flat to imagining that it is spherical. This shift afforded us a whole new set of possibilities for living. Although we have had a renaissance in our understanding of the outer world, we have just begun a new renaissance of discovery of the inner world. We have a reasonably accurate three-dimensional model of the outer world, yet we still have a flat, old-world view of our inner world that was influenced by Newton and Descartes.

Not only is our inner world model flat and superficial, it is material and described using quantitative metaphors from the exterior world. We are still living in the Industrial Age of products and materialism because our language retains its historic metaphors. For example, I challenge you with this metaphor shifter: "*the universe is not made of atoms, it is made of stories.*" It is only when we understand this, do we begin to move experientially into the Information Age. We are not things assembled from things in a world of things; we are not made of atoms. It is through our experiencing that the world exists; it is because we share stories in this experience that we become aware that we experience the world. What is essential now is to discern what

kinds of stories we are telling each other about how we experience. It is when we investigate the epistemological aspects of the story in its telling that we begin to appreciate the technology of being human.

How does one shift paradigms? If one is a fish, how does one become aware of the water one swims in? And how and why do we crawl up onto the land and into the air of a new paradigm? As humans, we swim in the water of our language without realizing it. The membranes and boundaries of one's paradigm all reflect back onto the logic contained within one's existing paradigm, as if we are living inside a bubble. Breaking through requires critical tensions, whereby one cannot find any reason to stay and becomes fascinated with glimpses of possibilities beyond. My personal journey might serve as a story in paradigm shifting that could encourage you to seek out my mentors and their work, and to network with me, in order to paradigm-shift your own work, your own manner of living.

First of all, in my youth, after earning two degrees, I did not join my friends and set off building my life on what I had gained. I began looking for what I had lost, as I had an unnerving sense that something significant was missing, even though I could not remember what it was. My search took me in many directions and on many journeys of discovery. It wasn't until 10 years later, with the birth of my daughter and my first year in silent conversation with her, did I actually discover what I had lost. My rediscovery of the joy and enthusiasm of the infant was the treasure of my search. It has taken me 22 years since this birth to put my insights into words and models for others to understand. It has been through my associations with a number of children and adult mentors that I have been able to transform this discovery into a new paradigm of living and learning.

Many years ago I read Einstein, and his phrase "time and space are relative to the point of view of the observer" stuck in my mind, although I did not understand it nor appreciate how it affected my manner of living. Many years later I read Benjamin Whorf, a linguist, who wrote about language and reality. He said that every Hopi mother and father is teaching their two-year-old child the fundamental principles of the Theory of Relativity by the very nature of the Hopi language. In my own youthful search for meaning, I had experienced sweat-lodge ceremonies and jumped naked off cliffs into icy winter waterfalls. I intuitively sensed this integration of indigenous insight with Relativity Theory, yet I still could not put it into words and share it with others.

Years later, I met Buckminster Fuller, who said—while jumping up and down—“thinking like a genius is thinking like a child.” This was another clue in the puzzle, and for years I built many of his models and dome homes. Yet it wasn’t until I met Dr. Derald Langham did I think of standing inside the structures, not as homes but as mind maps and begin to shift the paradigm. It was with this experience that I realized that I had previously represented all systems, including myself, from the outside.

When my daughter was born, I read one book about child development, by Joseph Chilton Pearce. Eight years later, in 1985, I invited Joseph to do a workshop in Vancouver, and for three days I heard about his understanding of Paul McLean’s triunal model of the brain. I began working with children, incorporating Joseph’s interpretation by allowing the parts or aspects of the brain to develop and create relationships with other aspects into a comprehensive whole. I was able to do this on a profound level because I had met another mentor and was beginning to learn how language influences human beings.

Over several years I studied with Dr. John Grinder, co-founder of NLP, and he helped me become aware of my own inner processes, programs, and strategies. I began understanding the very form and structure of beliefs and thinking. I also had the opportunity to see Virginia Satir work with families and illustrate her way of unraveling the family mind by shifting the patterns of conversation. I began to see the child as a part of the family conversation and began working with families by influencing shifts in assumptions, attitudes, and beliefs that were unconsciously being modeled by children. I began working with children on the inside, helping them to design their own inner worlds from a place of fulfillment and enthusiasm to understand.

About this time, I also met Douglas Harding from England, who was able to introduce me to a number of *experiential experiments* that allowed me to discover myself in the very center of the universe, at the heart of living. I began to experience time and space relative to the point of view of the observer, me. He gave me a set of tools to essentially build a new paradigm, to give people an experience that fundamentally burst them through to a new epistemology. Using systems theory to help explain his work and integrating three-dimensional models of one’s self from Fuller and Langham, I began to develop maps and models of this new inner world.

Imagine and experience yourself as a large sphere, and with your right hand point out at other systems, biological and material, out there. Then,

with your left hand, point back at the center of your sphere, and look at the one who is looking. The right hand points at distinctions and differences away from the center, and the left hand points at relationships and integration toward the center.

Over the past 12 years Kathleen Forsythe joined the board of the Wondertree Foundation and brought her understanding of conversation and systems theory to my work with the children. After meeting her mentor, Humberto Maturana, I began to understand her way of seeing my work and began using new words and metaphors to interpret my models. I have been working with children, parents, and educators, introducing them to these new maps and models and helping them transform the way they see and experience themselves in the world. From this context, the use of computers and information technology serves both as an important tool for communication as well as providing significant metaphors to describe the new experiences. Shifting to holographic and programming metaphors provides important nuances to explain and understand one's process.

Beneath all the models and theories are the actual experiences that make this work legitimate. I am continually inspired by the children and youth who have so clearly and profoundly demonstrated their inherent genius. The work is founded on love, on a context of respect for the legitimacy of the individual: the individual as learner regardless of age, the legitimacy of everyone as lifelong learner, and the experienter of this learning. These children have unfolded their infinite interior in elegant and profound ways, naturally and informed by the maps and models as new and accurate representations of the human process.

In this light, my most significant mentor is my daughter. Ilana Cameron is both 22 years old and 0 years young. She is currently studying music at college, yet she is doing this within the context of her lifelong process of Self-Design. She is learning from her enthusiasm and is incorporating the mentors and resources of the college to enrich her experience. She was my inspiration to start Wondertree, a learning community where learners are enfranchised to design their own learning paths. She, like the many other children I am working with, are doing what Bucky hinted at, that "thinking like a genius is thinking like a child." By designing a learning model that allows each child to learn from his or her enthusiasm, they have maintained their childlike curiosity and are therefore showing up in the world as leaders in their varied fields of endeavor.

It all began 18 years ago in 1983, when against the background of her family experience, where Ilana was honored as a competent and whole being, she found school an injustice. Ilana was six. She had only been to school for two weeks. One evening as she described her day, she explained that she was sitting on a swing, and that it was a beautiful morning. She said that when the bell rang she realized that she did not “really” want to go inside. As she swung, she remembered her daycare, she remembered when she could sit in the sandbox and practice whistling, all day long if she wanted. She remembered that having choices was really important to her. She felt that by going in that building, she was giving up control of her life. She asked me if she “had” to go to school. I told her no, that she could go to school if she wanted, and that the most important thing was to listen to her heart. She looked at me and asked, “Would you be my teacher? Can we continue doing what we have been doing since I was born?” And so we did.

I am working with children, youth, and parents as a Learning Consultant in a new paradigm. I have been using technology to enhance the tools available to learners to increase the quality of their learning. Information technology needs to be a tool for informing, and it is people who inform—what they inform is data. The external world is full of distinctions, full of data, full of *news of difference*, as Bateson says. Yet it is only human beings who, through their quality of being, sense the patterns that connect. During my work as a Learning Consultant working with children beyond the paradigm of schooling, we are discovering the principles and methodology of Self-Design and Natural Learning. We are discovering that enthusiasm is the founding criterion of real learning, not instruction. The need to know, the need to make sense of the world, the need to discover who one is and how one works, are fundamental to learning that informs the whole person about the whole world.

It is certainly important to evolve our metaphors of invention as they serve us to deepen our understanding of ourselves. Descartes encouraged us to see ourselves as clock-like machines; however, throughout the Industrial Age we actually became clock-like machines. Using computer programming and holographic imagery, we are able to tell more intricate and more accurate stories about our epistemology. Yet remember, as Korzybski warned, *the map is not the territory*; the story is not the experience. Let’s make sure that we are eating the food and not the menu. The graphic user interface has provided the computer user with a more friendly, more whole-brain relation-

ship or conversation with a computer. If we are careful how we have this conversation, it can serve to inform us about our strategies for living not to distract us from an awareness of ourselves as learners.

The television and the computer screen offer up a paradigm shift from a left-hemisphere dominant literary culture to a right-hemisphere dominant culture of images, impressions, and relationships. Note that the right hand is connected to the left hemisphere and the left hand to the right hemisphere. It is the right-hand dominant culture that speaks to dominance and hierarchy of power and authority. It is the right hand that holds the sword, that makes the distinctions and differences seem real. However, as so eloquently pointed out in my friend Rianne Eisler's book, *The Chalice and the Blade*, it is the inclusive left hand that holds the chalice, that holds the contexts of patterns that nourish. The integration of left and right, the integration of distinctions and inclusions, can be elegantly represented by one image. This image illustrates what is hidden in all living forms, one that is intuitively experienced as beauty. Living life is about balance, which is about experiencing harmony.

Many people today, especially our young children, are out of balance. They are being baby-sat by televisions and computer games. To me, the most frightening issue about technology is that children are being abandoned to it—abandoned to a medium that communicates more about violence and violation than it does about respect and about the qualities of human relationship that truly nurture our spirit. My friend Raffi is quick to point out that in a child-honoring society, human relationships and nature are far more appropriate nurturing environments than technology. I continue to advocate to children and parents that every hour invested in relationship with a television or computer screen be balanced with at least one hour in human relationship and at least one hour in nature. It is through these “real” interactions with the intuitive and elegant patterns of nature that flow through us and resonate with our essential being that we become alive. It is in experiencing the world that we eat real nourishing food. With this nourishment we realize that technology is the menu that informs us about the food available.

The logarithmic spiral informs us with its fundamental qualities for a) growth change and increase (learning) and for b) maintenance of the unchanging and consistency of orientation to whole form in balance. It is through the work of my late friend Gyorgy Doczi that I have been able to

integrate the metaphor of the Logarithmic Spiral into a developmental model for Natural Learning. It is in this world of ever-increasing speed, as travel or computation, and ever-diminishing increments of time, as schedules or nanoseconds, that it is more important than ever to find one's still point. Science seduces us into believing that the center of the universe is ever further away, currently 15 billion light years away, yet it was Einstein who brought the center of the universe back to the experience of the observer. It is each child that is the center of the universe. It is an inclusive center, the one pointed to by each of our left hands, pointing back to oneself as the observer. It is my experience that children are more than willing to discover the world as a friendly place. They are eager to use the tools of technology to enhance the quality of their living. However, they want to discover the world without being coerced into losing their sense of enthusiasm. We can take them into the future as long as we acknowledge them as they are and stay with them in the present moment. The quality of the present will insure a sustainable future. Enthusiasm is a sacred place for us all. 

Brent Cameron, executive director of the Wondertree Foundation for Natural Learning, lives in Vancouver, British Columbia. He is a two-time winner of the National Northern Telecom Award (1989-91) and a winner of a Marshall McLuhan Award for the use of innovative technology in education. He has written a book and produced a CD-ROM, "Self-Design and Natural Learning," and is consulting to parents, educators, and communities around the world to move into the next paradigm of human-centered learning for global ecology. His work, including his master's thesis and the work of others in the organization, are available through the Wondertree Web site, at www.wondertree.org.