PATTERNS

From the Editor.

For three years now this bi-monthly newsletter has been saying, in one way or another, that it is important for educators to be systems thinkers. In this issue of PATTERNS we look into whole systems design as the activity of systems thinkers that should be included in public school teaching curriculum.

While the systems thinking found in such popular books as *The Fifth Discipline* by Peter Senge (Currency Doubleday. N.Y. 1990) essentially provide specific answers for how organizations should be structured, **Harold Nelson, Director of the Antioch University Whole systems Design Graduate Program in Seattle**, points out that; *"Whole systems design is more concerned with giving people the creative critical thinking skills that will allow them to change their organization as things change around them."*

For example, in our November 1998 issue, Principal **Vera Blake** demonstrated systems thinking in the way she designed her middle school in response to the changing demographics. Systems thinking gives us the tools, methods and skills for holding the complexity in all its richness so that it doesn't have to be reduced to some artificial, simplified homogenization.

The design of social systems should not be the prerogative of the so-called "design expert." When it comes to social systems, it is the people in the system who are the experts. Yet we have no instruction in "systems design" in our general education curriculum. Design training is considered only for such professional schools as engineering, and the arts or the very few graduate programs emerging in unique schools such as Antioch University.

Prior to the emergence of social sys-

A Designerly Way of Knowing

An Interview with Silvia Austerlic

I first met Silvia Austerlic on the internet when she responded to the September 1997 issue of PATTERNS on the subject of integrating culture, ecology and design. When she came to the United States I was struck by her youthful energy and dedication to creating a more loving, sustainable world for all people. She is now enrolled in the Graduate Program in Whole Systems Design at Antioch University in Seattle and we talked during the winter break.

Silvia was born and grew up in Buenos Aires, Argentina. She studied graphic design at the University of Buenos Aires where she began teaching Art History in 1990. In 1997 she helped to set up the Universidad Virtual de Latino America (http://www.ldc.lu.se/latinam/uvla/ uvla.html), webpages hosted by the University of Lund, Sweden. Her research interests are Design Philosophy and Theory in relation to the "collaborative potential" of the Internet. She has been working since 1995 on INFO-DESIGN, a set of principles, metaphors and tools which aims to take advantage of the new technology to give voice to new actors (children, women, indigenous people, local communities, nature) in a way that both protects and transforms their cultural identity.

Barbara: I was intrigued by the question you raised in a message you posted to your extensive email "community," You asked; "How do we educate people to be capable of innovation, that is, detecting change and acting from a new paradigm yet to be invented?" That sounds like a chicken and the egg kind of problem.

Silvia: Yes, that question asks us to look at what is missing in our present ideas of education and particularly in what we call teaching. I think we forget that we are a learning species. In the context of our evolution I think we have to let go of our present understanding and try to grab a new sense of ourselves. And that's an inner process. It has to do with being silent and with pictures too. I think we have to start with making questions. I sent this question all over the internet.

B: So you started a dialogue?

S: Yes, I got response from all over...From a University in Brazil I got this, "How do we learn to know?" From somewhere else this came; ""What is the familiar in a real life learning situation?"..."What is our relationship between learning and changing?" "Learning is the change that matters." I love this as a personal matter. For example, I got this,which shows it has to do with healing, not just talking. Someone wrote; "answering your question had a curious spin-off. For many years I've been a schizophrenic smoker and decided this was my last day. Yesterday, some hours after answering your question I realized the following; my smoking has a learning component that I was not seeing at all. To cease smoking I must first learn how it is to live without smoking. It is not a decision problem, it is a learning problem."

B: Ah Ha! That's a twist.

S: We have to learn, it's not that we have to know. You go to school and they tell you that you must know this and this and

tems design, the improvement or planning approach to systems change was practiced in social planning. This approach - widely used as strategic planning - reduces the problem to "manageable" pieces and seeks separate solutions to each.....It is a "how-oriented" activity that designs "named systems with defined objectives and specifications."

For example, one of the "pieces" is addressed by *Joe Oakey, formerly President and Founder of the Autodesk Foundation,* a nationally recognized organization promoting and implementing Project Based Learning.He now is Development Director for *Project Lead the Way (PLTW)* which has developed and is implementing a new curriculum that will increase the number of U.S. students who select engineering and technology careers. This would introduce design learning into the public schools in a limited way but in the wide systems view it might serve as a beginning. He points out that if this country is to stay competitive in the world economy which is more and more dependent on technology, we have to stay ahead in the preparation of technical workers. Actually, at the current time the U.S. has 1,800,000 engineering and technical job vacancies that can't be filled. Parallel to that we have a sharp decline in the number of graduates from engineering schools and technical curricula in our community colleges. The seats in our engineering schools are being filled by recruiting foreign students. This project, funded fully by the **Charitable Venture Foundation**, is a boon to schools. Oakey states; *"We develop, review and keep current, five high school courses that comprise a pre-engineering curriculum. We supply the curriculum free to participating schools, train teachers at no cost, and negotiate with vendors to provide, at greatly reduced costs, the equipment needed to implement the program. We also have middle school curricula that will develop an interest in students at that level. My task is to get schools across the United States to adopt the program. I also participate in the planning and de-*

this. I always wonder, how do these people know what I want to do?

B: To know is static, to learn is the process. I think it comes out of the idea that information is a commodity that you buy.

S: Yes, and the vision of knowledge as power. I don't want to tell people that they are wrong but I want to open my own page.

B: How can people who are working in the traditional system which puts emphasis on knowing...there's a given amount of material to know...they're tested on it...taught to prepare for the tests...How do you break out of that cycle and still maintain yourself within that system?

S: It's hard. If they see differently they are living with that dissatisfaction. They're feeling bad where they are. I had to leave that culture behind and this is why I came here to develop my ideas. Sometimes you have to work in the darkness. But then it has to do with asking questions and sharing what you find with other people...having truthful conversations with kids. We have to trust that the information that we need is already inside of us.

It is not the system out there. ## We put the boundaries on the system

B: I'm getting a picture of how the internet can be a very useful tool for people working in the system who have to maintain their jobs and yet need an outlet so they begin to ask the real questions and get into conversations with others. They are sort of leading a double life but at least are becoming more and more aware of how stuck they are. Then the imagination can bridge ..so they can still stay in the system with that cybernet support system and yet get courage to be able to find imaginative ways within the old system to make changes.

S: Yes that is something we learn in systems design....that it is not the system out there but that we put the boundaries on the system.. We have a monolithic image of systems but right now everything is changing. If you look beyond your nose.....people are changing curriculum, having classes that are participatory and experiential and so on. So if you bring solutions rather than arguing problems anyone can make changes. It's a personal challenge and there are no perfect systems right now.

B: It's like alternative medicine. That's a good model because now, rather than seeing it as 'alternative' it's becoming 'complementary' medicine. What works in both systems survives to create a new system. It's dynamic rather than static.

S: I would emphasize it is not only intellectual talent, but emotional and even spiritual talent that makes this happen. Why would people change? A willingness to be part is essential to see and to share a bigger whole world. That's what's behind all of this change...I want to feel that I belong to this universe and that we are connected in this world and that I am connected to the bird and the tree and the car and the computer and the money and to my family. That's the big picture. And you find this in Africa and in India....when I told you yesterday I was with this Buddhist monk. He was 34 and had been trained as a monk since he was 8 years old and I'm 33 and suddenly he made a comment and it was the same thing I was thinking and I realized that there are no boundaries at all. It is like...How can we, who have such different boundaries and paths, be thinking the same? It has to do with evolution. That's how I see it...To recognize that we are not like individuals but we are part of something bigger which is human beings.

B. So would you say that's the real evolutionary leap.... to recognize our connectedness?

S. Yes, I see that everywhere. My sense of feeling bad is that I felt isolated and that's like the spiritual disease of western society. We feel we are strangers. We are brought here and we do not know if we will have food for tomorrow or a home or a place to participate like a community. The indigenous people talk alot about that. There's no sense of community in the modern world.

B. And, of course, we're so well trained in a competitive society that we yearn for community but have not learned how to create it.

S. Yes. The evolutionary shift has to be from a competitive mode toward a collaborative mode and, for me, one of the advantages of the Internet and cyberspace is to use the collaborative potential. It's a different rationality. For example, in the real world information is more valuable if there are few pieces of that information and you have that. If you share that, other people know about it and you lose it. In cyberspace, on the contrary, information is more valuable becauseif what you have is good more people will go there to see that information and you will expand your vision by participating in conversation. My work is not selling information, it's sharing visions.

B. That's an evolutionary leap out of the priesthood idea of knowing.

S. Yes, It's the *designerly way of knowing*. It's not knowing as a power, it's knowing as a process. You embody that knowledge. And I really think that knowledge saved my life in a way. I was feeling isolated in my place and I began reading and I found meaning there. It opened for me horizons and hope and healing and I think its so important to speak and to dialogue. It's not just bla bla bla ideas. Something else happens there....perhaps wisdom? ....some connecting power?

B. So are you saying that the designerly way of knowing is what saved your life?

S. (laugh) Yeah. We all have that way of knowing. What I think is that we have to be who we are. And it has to do with evolution....it's not a mistake what we are doing. We have to open our minds and our hearts to see ...like the dark side of the moon... the dark side of human beings, our emotions, our fears. That's why I feel that it is spiritual. The needs of the soul, the needs of the heart....a different approach to communication and to learning.

B: In school we are taught that we have to learn only about what's "out there." It sounds like you're saying that the new territory to explore is within us. How does this relate to design as a way of knowing?

S: In the traditional way, we think about the world and not about what is our place there. We are taught objective science.

B: The objectification of the world and our problems.... as if we are not part of the world and the problems too.

My work is not selling information, it is sharing visions.

S: The design way has to do with framing. Designers work with clients who bring you problems and you have to change the way you see the problems in terms of the desired outcome. And you and your client are a part of that. It's not that you have the answers...the client, the users, the community are all a part of the solution. We are not alone. You find your place and let others participate. It's not power over it's power with.

B: That sounds like a justification for design as an introduction to the development of cognitive skills and abilities, in real-world problem solving and in schooling. That is particularly important for the teaching profession which claims to "empower" students.

S: Yes, but we must be careful not to interpret this justification in instrumental terms, as a training in problem-solving skills, but in terms that satisfy the more rigorous criteria for education. As far as problem-solving is concerned, design in general education must be justified in terms of helping to develop an 'educated' person, able to understand the nature of ill-defined problems, how to tackle them, and how they differ from other kinds of problems

B: We have a new generation of students who have grown up in a world created by the global electronic information revolution with all its economic and social disruptions who, in general, are finding their traditional course studies unable to hold their interest. The every-day learning in the streets and on TV takes precedence. How might the introduction of design in general education help this situation?

S: Well first, what do we mean by "design?" **Nigel Cross of the Open University in the UK** introduced the notion of a "designerly way of knowing" (Design Studies, Vol. 3 No 4 October 1982). Traditional views of intelligence and ability see schooling as the

*velopment of the curriculum and processes. I feel that true educational reform can only be measured at the level of action in the classroom. **The reform of the interaction between the teacher and student has to be the ultimate goal and this kind of change requires curriculum reform and teacher training.** People who write books and make speeches are necessary, but if a concurrent effort is not made to get into the trenches and change the way teachers teach and what they teach, all the consortia, books and speeches are worthless. "*

Joe Oakey can be reached at, jhoakey@home.com

This emphasis on what and how teachers teach includes the relationships and dynamics between teacher and student as well as the relationship and dynamics among teachers.

In the last issue of PATTERNS, **Vera Blake** spoke of the importance of collegiality among teachers in her school of culturally diverse students. **Larry Mann, ASCD Staff Writer**, writes;

*"Last month at the ASCD Fall Conference on Teaching and Learning, one of our presenters, **Fran Prolman**, lead a discussion on the importance of collegiality among teachers. Collegiality, which must not be confused with mere cordiality (friendliness, greeting cards, fun activities, casseroles), is one of the indicators of an effective school. Collegiality is in evidence when teachers share resources and materials, but most importantly when they engage in serious conversations with each other about good teaching practices, pedagogy, and research—when they raise their levels of awareness about effective teaching through small, informal forums. One of the things that gives ASCD strength is its quality of forum-ness."*

Robert Pitts, Tucson, AZ, referring to the importance of the physical design of the system in encouraging collegiality, responds.

"As a beginning teacher in Colombian schools I found great support and opportunities to exchange ideas because the structure of the schools was

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such that teachers change rooms instead of students. The result was to force individuals into common work areas during planning time. These were opportunities to discuss difficult aspects of teaching with veterans and find new materials. And at the same time relieve stress through conversation about local and global issues. After teaching for eight years in U.S.. schools I am yet to find the kind of informal working environment needed to promote real collegiality."

These examples indicate a growing awareness of the importance of curricula, relationships, dynamics and design in solving the problem of "supply and demand" in the first instance and the problem of "isolation and burn out" in the second instance. Systems designers know very well, however, *that getting rid of what is not wanted will not give us what is desired. They look, not at solving problems, but at designing new systems.*

The systems design approach requires both coordination and integration. We need to design and operate all parts of a system interactively, and therefore simultaneously. As you can imagine, this is no small task. This requires a *"designerly way of knowing."* which is the emphasis of this issue of PATTERNS.

We believe that *"design intelligence"* is as innate as any of the intelligences listed by **Howard Gardner** in his study of multiple intelligences. Therefore, it should be developed as an integral part of our educational experience beginning with kindergarten. At present, education in systems design and the professional practice of systems design are limited to a few technical professions. The *Whole Systems Design Graduate Program at Antioch University, Seattle, Washington* is one of the few sites where a program has been developed. In an interview with **Silvia Austerlic**, a student in the program, we explore the importance of developing design intelligence for teacher education programs. Educators speak of "empowering people" so that they can take charge of their lives. This is impossible unless we educate people to take charge of their

acquisition of verbal and numerical language systems learned to perform abstract, logical operations. Design ability is essentially non-verbal. He suggests that 'designerly' ways of knowing rest upon the manipulation of non-verbal codes in the material culture which translate messages either way, between *both* concrete objects *and* abstract requirements.

B: That reminds me of a Junior High student I once worked with who could not read although he was essentially intelligent. As the class clown, he would do things like using the paper stapler as if it were a keying device for transmitting Morse code. I wonder how an understanding of design education might have helped him. **Howard Gardner** might well have included 'design intelligence' in his theory of multiple intelligences.

S: Yes, a review of a wide variety of studies of design activity and designer behavior makes a case for design ability as a fundamental form of human intelligence. These studies tend to support the view that there is a distinct 'designerly' form of activity that separates it from typical scientific and scholarly activities. Studies show that scientists tend to adopt a generally problem-focused strategy while architects adopt a solution-focused strategy. Architects learn about the nature of the problem largely as a result of trying out solutions, whereas the scientists set out specifically to study the problem. (Ergonomics, Vol. 22 No 1 (1979) pp 59-68

B: That seems to fit with **Bela H. Banathy**'s method of ideal systems design as different from strategic planning methods of creating organizational change. The more lineal thinking strategic planning focuses on problems in the schools, for example, while systems design focuses on the design of the desired school.

S: Yes. **S.A. Gregory**, in his book, *The Design Method*, (Butterworths, London (1966) says that the scientific method is a pattern of problem-solving behavior employed in finding out the nature of what exists, whereas the design method is a pattern of behavior employed in inventing things of value which do not exist yet. "Science is analytic; design is constructive."

B: There is much in the conversation concerning changes in schooling that center on constructivist theory and the need for creativity and innovation. But the idea of teaching a designerly way of knowing would have to begin in the schools of education.....not just in the schools of professional design like Antioch. We have such an emphasis on the scientific way of knowing which seems limiting in these times when we need to be creative in how we can use the new technology for the good of humanity.

S: Another difference is that science is a process of pattern recognition while design is a process of pattern synthesis. We need *both*.

What should teachers LEARN?
What should teachers UNLEARN???

B: How do you interpret this and what are your feelings about "a designerly way of knowing" to be incorporated into the teacher education program?

S: I think that Cross is making a case for design ability as a form of graphic intelligence, a multifaceted cognitive skill possessed in some degree by everyone, which takes place in the intentional act of drawing/sketching/modeling.' This process might be understood as a "reflective conversation with the situation" and involves the use of verbal AND non-verbal languages. In this context, thinking (theory) and making (practice) are but two dimensions of the design process, which must be learned by doing. The gap between a description of designing and the knowing-in-action that corresponds to it must be filled by reflection-in-action in dialogue with someone in the role of coach. In this dialogue, coach and student convey messages to each other not only in words but also in the praxis, hands-on the medium of performance. The student tries to do what he or she seeks to learn and thereby reveals what he or she understands or misunderstands. The coach responds with advice, criticism, explanations, description -but also with further performance of his own. Feelings as well as understanding are involved, each critically bound up with the other. When the dialogue works well, it takes the form of reciprocal reflection-in-action. .

S: *For a "designerly way of knowing" to be incorporated into the teacher education program, the whole learning framework should be reframed. The designlike task is important, as well as building a relationship between teacher/coach and student conducive to learning. A reflective practicum is an experience of high interpersonal intensity. The learning predicament, the students' vulnerability and the behavioural words created by coaches and students critically influence the learning outcomes. Moreover, the process of coaching and the learning experiences of the practicum must become central to the intellectual discourse of the school*

B: C.P. Snow wrote of the two cultures of Science and the Arts. Is there a case for Design as a third culture as Bela H. Banathy suggests in his latest book, *Designing Social Systems in a Changing World?*(Plenum Press. N.Y. 1996)

S: A principal outcome of the Royal College of Art's research project on ''Design in general education'stated a belief that Technology, centered on design ability, can be viewed as a third culture, with its own things to know, ways of knowing them, and ways of finding out about them.(Royal college of Art, London. 1979) They call it "Design with a capital D"and note that it involves a synthesis of knowledge and skills from both the sciences and the humanities in the pursuit of practical tasks. The central concern of Design is the 'conception and realization of new things.' At its core is the 'language of modeling'; it is possible to develop students' aptitudes in this 'language' equivalent to aptitudes in the 'language' of the sciences (numeracy) and the ''language' of the humanities (literacy).

In my own INFO-VIEW, design can provide us (concerned thinkers, doers, makers of the 'Gaian' culture) with 'open-minded' conceptual frameworks (principles, tools, methodologies) from where to think ANEW the possibilities offered by new technologies of information and communication.

B: Chaos theorist, Ralph Abraham sees the Internet as a new space for cultural production and a novel medium for understanding and organizing collectively-constructed knowledge. (PATTERNS January '96 & July '98).

S: Yes, from this perspective, "technological know-how" plus "designerly know-what" are creating a new rationality and a concrete opportunity for change. The new information practices pose a radical challenge: how to navigate global spaces in order to design local actions. *Situations, not objects, are the material of design.* But before this can happen organizations and individuals must define the identity, vision and goals that underlie it. and be capable of continuous self-improvement.

B: That sounds vaguely like the chicken and the egg problem which began our conversation. Where can you be reached so we can continue the dialogue?

S: Yes. Dialogue is the name of the game!!!! Contact me at :   silvia@telebyte.net

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Three Cultures

Field of Knowledge:
• **Arts: human experience**
• **Science: the natural world**
• **Technology: the artificial, human-made world**

Range of Values:
• **Arts: subjectivity, imagination, commitment, concern for 'justice'**
• **Science: objectivity, rationality, neutrality, concern for 'truth'**
• **Technology: practicality, ingenuity, empathy, concern for 'appropriateness'**

Type of Skills:
• **Arts: criticism, analogy, evaluation**
• **Science: experiment, classification, analysis.**
• **Technology: modeling, pattern forming, synthesis**

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systems. For this we have to develop a *"design culture"* in education, in our business and social organizations, and in our society as a whole. As Bela H. Banathy insists;

"We have to create opportunities for design learning and the development of design competence. People empowered by such learning will be able to apply this competence individually and collectively in the contexts of their lives....In an age when the speed, intensity, and complexity of change increases constantly and exponentially, our ability to shape change - rather than becoming its victims or spectators - depends upon our ability, competence, and willingness to give direction to change and to guide the purposeful evolution of our systems, our communities, and our society. I believe that systems design is the means by which we can guide change. Organizational capacity and human capability to engage in design enables us to take part in activities by which we can enrich our quality of life and create authentic and sustainable systems. Even more importantly, collective design capability empowers people to exercise truly participative democracy."

In this issue we also explore design action and systems thinking with **Harold Nelson, Director of the Antioch Graduate Program.** From him we learn that the Whole Systems Design Program is a synthesis of progressive educational practices and an emerging new field of academic inquiry focused on complex social systems. *"Whole Systems Designers trigger healthy change in complex multidimensional social systems, grounding effective action in an interactive human atmosphere of ethical and aesthetic responsibility."*

Would we want anything less for all of us?

Bela Banathy points out that commitment to a **whole systems design culture** means participation of all those who serve the system and are served and affected by it. It means creating the most idealized design; one that will act as a

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Reflections: Future Memory Mind Book

by *Silvia Austerlic* and Barbara Vogl

If it is true that
new technologies are transforming
modern structures,
the question thus becomes;

Can Third World countries
reposition themselves creatively
in the space of this transformation as
relevant actors in the conversations that
are shaping the world, and perhaps as creators
of alternative discourses about society, nature and economy?

*I believe this to be possible.
Our human dignity demands
from us a critical and creative
attitude in facing the challenges
of the future, and*

the future is the space of design.

Why, then, is there so little evidence of this new view in the world????

*There are at least two answers to this critical question.
One of them we cannot change immediately.
It is the dominance of industrial-era
world view among those who
have access to, and control,
the* **mass media**

*The other reality can be altered very rapidly.
It is the feeling of those who want a different future*
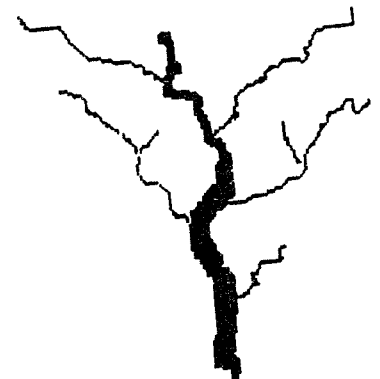
that **they are alone**

*If this very large percentage of the population should grasp
that they are part of the birth of a fundamentally*

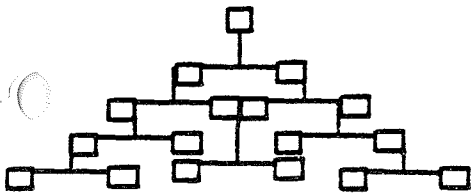## different culture

then change would come more rapidly.
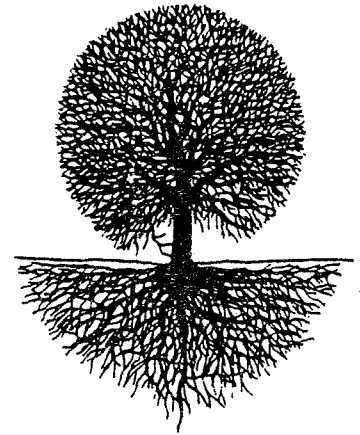
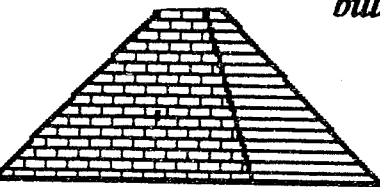**Analogous network systems in Nature,
Humans and an Urban Community**
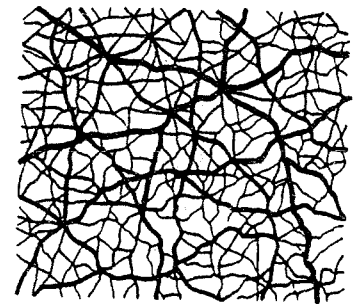
River system

From Hierarchies

Bureaucracies

Economics

billionaires

workers at bottom

The explosion of new technologies, the formation of geopolitical blocs, and novel forms of digitalized planetary connectivity such as the Internet are fostering novel scenarios and world orders, calling for **alternative approaches.**
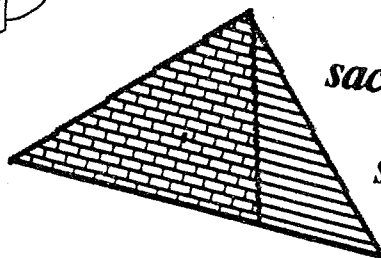
To Holarchies

In Society

Ecology

In Nature

We need to help people understand that the many movements that currently exist are motivated by **convergent dreams.**

NOW REMEMBER, FOLLOW THE RULES OF MIND MAPPING AND PRACTICE, PRACTICE PRACTICE!
- BEGIN WITH A CENTRAL IMAGE
- PUT ONE WORD ON EACH BRANCH.
- USE KEY WORDS, SYMBOLS, PICTURES AND CARTOONS
- CONTINUE TO BRANCH OUT AS YOU ADD NEW IDEAS TO THE MAP.

PRACTICE MAKES PROGRESS.

It is my belief that it is not so much the intellectual ideas... everyone has those more or less.... but it is the willingness to be a *part* which is **essential** to see and share a larger whole world.

sacred rule

structural stability

AND ONCE YOU'VE BECOME COMFORTABLE WITH MAPPING YOUR MIND,
·LET·GO·
AND CREATE MINDSCAPES
THE RULES:
HAVE FUN.
SEE WHAT HAPPENS.
(THERE'S NO WRONG WAY TO MINDSCAPE.)

We need a new choir that can produce a harmony from many different tunes.

Conversational arena
CYBERSPACE
- new space for cultural production
- novel medium for understanding & organizing collectively constructed knowledge

magnet, pulling people toward its realization. It means the recognition that designing is life-long learning as individuals and as an organization. As individuals we learn what contribution we can make to the whole. As an organization we learn to reexamine continuously our collective values, perspectives, purposes, and modes of operation.

Design learning is both relational and dynamic. We place the ideal model out there on the horizon, and as we move toward it, the horizon changes. As new realities emerge, as the contexts in which our system is embedded change, our perspectives change, and so does the ideal. But what remains constant is the insistence that our systems exist to serve living beings and that it is within our power to guide our own evolution and the evolution of our system toward a better future for all.

• *Designing and redesigning systems in which we live and of which we are a part enables us to take charge of our future. It guides us in transcending our existing systems and in transforming them so they become viable in a new age. The task of accomplishing such transformation is no small order.*

Bela H. Banathy

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*The division of
the perceived universe
into parts and wholes
is convenient
and may be necessary,
but no necessity
determines how
it shall be done.*

Gregory Bateson

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*The mere world will
become a planet only
when worldly development
is
stopped and replaced
by loving participation.*

Eugen Rosenstock-Huessy

Design Action and Systems Thinking:
The Necessity of Being "Un-Disciplined" and "Out of Control"

Our old habits of thinking, both scientific and artistic, which have served us well in describing and explaining the natural world, seem to have limited direct utility in the creation or recreation of elements of the un-natural world. We need to appreciate the distinction between creating what does not exist versus describing or explaining what is already found to be in existence. **Herbert Simon** (1982) proposed the creation of a *science of the artificial* as distinguished from the *science of the natural*. His idea was framed within the rational tradition of science, so it formed an important early bridge between that tradition and the much more inclusive tradition of 'Design'.

Design is a strategy for facilitating change. It includes, but goes beyond, the theory of a science of the artificial in that it deals with social organizations, patterns of human interactions, and functional social-technical structures that serve human purposes. These structures, often called "human activity systems" are formed by ethical and aesthetic principles in addition to principles of formal logic. Design is both process and artifact. In the process of design there emerges an understanding of possibilities that cannot be predetermined. The innovation of these possibilities requires the utilization of a form of creative leadership that pulls people into change rather than pushes them into it. As an artifact, design serves human purposes through the creation of functional assemblies or systems that become part of people's lives.

The terms 'design' and 'redesign' are often applied to activities that can be better described as planning, management, or problem solving. This has discouraged attributes unique and outside of these familiar domains from being examined. For example, design thinking is often characterized as a cognitive midpoint between scientific and artistic understanding as in professions like architecture and industrial design. Design needs to be dealt with on its own terms, however, and its uncommon nature needs to be explored. Design also needs to be appreciated as applicable to a wider spectrum of human endeavors.

Design as a Strategy for Change

Intentional change can be defined in two ways. One is in proactive terms, while the other definition is in reactive terms. The proactive strategy is one of working toward a desired state using design; the reactive way involves working away from an undesirable state, as in finding a way to the end of a problem. The ability to identify and work toward what is desired needs careful cultivation. We have a great deal of experience with the reactive and very little good experience with the proactive.

Design as a Perspective on the Nature of Problems

The reason that design is more appropriate than problem solving for intervention in organizational change is that there is a problem with problems. **Horst Rittel** (1972) explains the issue as a contrast between *tame* problems and *wicked* problems. [Ed. note; Roughly, *tame* problems can be understood and analyzed; Solutions can be generated, assessed, implemented, tested and modified. *Wicked* problems, on the other hand, cannot be exhaustively formulated and every formulation is a statement of a solution; There is no rule for knowing when to stop, no true or false, and no exhaustive list of operations. Wicked problems have many explanations for the same problem and every problem is a symptom of another problem.]

Decision-makers, managers and administrators will often concede that the complex situations they face are not typically tame problems but in fact are wicked problems with many of the characteristics that Rittel presents. Understanding issues

as wicked problems helps us gain a better insight into why tame-problem strategies have not worked in wicked-problem situations.

Design as an Application of Judgement

It is difficult to see how to respond to all the challenges posed by wicked problems. However, by stepping out of the reactive, problem-solving mode into the proactive, design mode it is possible to become intention and to facilitate desired change. Design decisions are made as a mater of formal design judgment. Judgment in this case is not the same as that implied by the negative connotation in the everyday usage of the term. Rather, it is a form of deliberation that leads to understandings that cannot be reached using critical thinking skills that more successfully obtain answers of truth in internally consistent problematic contexts.

There is a problem with problems

Design judgment is used in both negative and positive contexts. Dilemmas are the negative context and intentional compositions are the positive context. For dilemmas there are no true or false answers, only consequences for decisions made. For intentional compositions, decisions are based on judgments of collective purpose and value.

Also distinguishing design judgment from solution-seeking logic is the issue of control. To engage in design dialogue, individuals must give individual control of the outcome over to a process of emergent quality rather than to a linearly managed process. To be *out-of-control*, with no agendas, no outcome expectations and no similar scripts of logic aimed toward predetermined ends is essential for the emergence of break-through insights.

The creative aspect of design also requires that individuals must learn to trust their informed intuition. Intuitive thinking, which is out of the direct control of the rational mind (although influenced by it), is essential to the success of creative design. The rational side of the mind has to trust the un-controlled intuitive side in

a creative partnership. This partnership can be nurtured and enhanced, but not controlled.

Con-versation, i.e. a turning together

Design judgment is enhanced considerably when done collaboratively in dialogue. An individual can follow the same rational logic as a group of people or as a computer to come up with the same best solution to the same logically defined problem. However, there is a synergistic difference in the outcome of a design process based on design judgment and on design dialogue. This synergistic quality can be characterized as wisdom. It is the result of a formalized, dynamic, human interaction (a con-versation, i.e. a turning together) around shared needs and desires within the framework of design and design teams.

Design as an Expression on Behalf of the Other

Perhaps the most salient differentiation between scientific or artistic thinking and design thinking is that the purpose of design is not to describe or explain what exists in the modality of *self expression*, but to create what does not exist on behalf of another through *other expression*. This point is critical in the understanding of design.

The designer/client relationship is a systemic relationship of integrated, collaborative, and mutually influencing tensions. Clients and designers act as a unified intentional whole, (a *con-spiracy*, i.e. a breathing together), with the purpose of transcending in imagination and action what either could do separately.

This compound role (self and other) loses all authority and potency if broken into separate roles, just as the quality of wetness disappears when water molecules are separated into their constituent parts of hydrogen and oxygen.

Above I have offered brief descriptions of some key differences between design and other ways of thinking and acting in situations. Design represents a powerful approach to contemporary problems, but

it, too, is limited when applied from a single perspective or from the frame of reference of a single professional discipline. A way of looking across such perspectives is necessary.

Systems Thinking

The problems, dilemmas and opportunities of life do not present themselves within the traditional disciplinary boundaries of a university curriculum. In order to get a better frame from which to work, it is necessary to *un-discipline* some expertise, to promote an integration of specialized knowledge and to create knowledge of integrated wholes. This is the domain of systems theory.

The systems approach is an example of an integrated, "un-disciplined" approach to understanding human endeavors. It involves seeing and acting in the world with an appreciation for complex inter-relationships and interdependencies inherent in wholes. **C. West Churchman** (1968) set the stage for the application of systems ideas to social systems in contrast to scientific and engineering systems applications. He also laid the groundwork for the integration of systems thinking into planning and design practices. Systems thinking has begun to influence traditional disciplines and professions as well as to define new fields of integrative study such as ecology. Systems concepts such as wholism and interconnection are beginning to be used in everyday settings. The world is becoming better at being more undisciplined.

The world is becoming better at being more undisciplined

Contemporary systems thinking with regard to social systems is quite different from the systems engineering of the 1960s and 1970s. Merely employing a systematic process, for example, does little to ensure that actions are taken with respect for the complexity of organization and the situations that exist within them and between them and their environments. This evolution in systems thinking continues along with changing views in other domains such as science.

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Margaret Wheatley(1992), for example, makes a case for the creation of new metaphors to be drawn from the emerging paradigms of a new science. Complexity, chaos, and nonlinear dynamic behavior are just a few of the attributes of the new sciences. The new metaphors that reflect these attributes will be used in the development of new strategies of intervention and management of complex contemporary organizations.

Design action and systems thinking are two strategies that well matched to the opportunities brought by these paradigm shifts and merging new metaphors. The ability to ask the best questions and to synthesize complex information into congruent patterns are attributed of design and the systems approach. This includes the identification of the what, where, and when of traditional expertise but only within the context of an integrated whole.

Conclusion

Design action and systems thinking are complementary to the degree that it becomes difficult to distinguish between the two when they are brought into intellectual proximity of one another. Design action profits greatly from the un-disci-

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One can never consent to creep when one feels an impulse to soar.

Hellen Keller

Peripheral Visions: Learning Along the Way

by Mary Catherine Bateson
Harper Collins. N.Y. 1994

The author, daughter of Anthropologists Margaret Mead and Gregory Bateson, writes of the lost delight in learning; that learning which is felt as "a coming home." This is the kind of learning that induces a sense of recognition which comes in finding a match with something that is within.

Piaget spoke of this kind of learning. EDUCARE, the drawing out. I like to call the action of teachers who inspire this kind of learning as "priming the pump." This is the revelatory aspect of learning....the "ah ha!"

Bateson says that this model of learning-as-coming -home can inform schooling. Children become educated through "living patterns." Informal learning, unverbalized and unquestioned, takes precedence over explicit teaching. This is particularly evident in our macromedia environment. Discovering the connections and regularities, the "patterns," within the knowledge that children already have before coming to school is a form of recognition.

Bateson writes; *"If teachers were to approach their classes with an appreciation of how much their pupils already knew, helping to bring the structure of that informal knowledge into consciousness, students would have the feeling of being on familiar ground, already knowing much about how to know, how knowledge is organized and integrated. This might be one way for schooling to assume the flavor of learning as homecoming: learning to learn, knowing what you know, cognition recognized, knowledge acknowledged. When schooling conflicts with previous learning on specifics, more general patterns may be disrupted and the sense of how knowledge is put together may be unraveled."*

As I read this very wise book I think of my own children beginning their school experience so eager to learn. "Natural knowledge" they bring with them has not been learned in an orderly progression and much of this invisible learning is negated when school begins. Nat\ural learning is systems learning. This is inner knowledge of interconnectedness. School is designed to teach the contextualization of learning and the importance of keeping different areas of life separate; home from workplace, Sundays from weekdays, and work from play.

The author has extensive experience with schooling in other cultures, particularly Iran and the Philippines, and her observations bring textural richness to this book. It provides sound advice for teachers in multicultural classrooms. *"Affirming patterns already learned would mean a profound modification of the teacher-student relationship: skills achieved could be built upon or varied rather than replaced and students could be treated as expert sources on their own experience. Conflicts between home learning and school learning could be replaced by comparisons of alternative patterns instead of a dissonant jangle. Schooling could offer the chance to choose behavior that will be adaptive, rather than forcing it."*

Commenting on the wealth of new thinking about schooling today and the groundswell of anger against educators of all kinds, Bateson maintains it is not because they are not doing their job but because we have no adequate understanding of what that job is in the kind of society we are becoming.

" *We think the issue is the transmission of specifics, the meeting of specified goals, but these are illusory and children are wise enough to know it. It is a mistake to try to reform the educational system without revising our sense of ourselves as learning beings, following a path from birth to death that is longer and more unpredictable than ever before. Only when that is done will we be in a position to reconstruct educational*

systems where teachers model learning rather than authority, so that schooling will fit in and perform its limited task within the larger framework of learning before and after and alongside." Bateson, with her extraordinary upbringing, demonstrates the wisdom of the systems perspective, expressing the essence of a designerly way of knowing in these final quotes;

"The avalanche of changes taking place around the world, the changes we should be facing at home, all come as reminders that of all the skills learned in school the most important is the skill to learn over a lifetime those things that no one, including teachers, yet understands."

"The world we live in is the one we are able to perceive; it becomes gradually more intelligible and more accessible with the building up of coherent mental models. Learning to know a community or a landscape is a homecoming. Creating a vision of that community or landscape is homemaking."

This book should be in every library in every school of education in the country. It is an excellent introduction to the sensibilities of whole systems design learning and action.

by Barbara Vogl

The Third International Conference on Teacher Education
June 27-July, 1999

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From the Facilitator:

We are entering our **fourth year** as an **ASCD sponsored network** and during this time we have steadily grown in membership. According to the feedback we receive, we feel we are filling a niche and would like to continue responding to the needs of our membership. However that rhetorical "we" is just that. The "I" in the "we" is beginning to think "sabbatical."

This is the year when everyone is thinking "changes" as we prepare for the millennium. It is a particularly good time for reflection. Changes will be discussed at our **annual meeting in San Francisco** so please come prepared to contribute to the continuance of this network. *The STCT annual Network meeting will be held on Monday, March 8, from 1 to 2:30 PM. at Moscone Center, West Mezzanine, Room 256.* We will be looking for a new facilitator so come with your pledge for what you want to do to make this a truly participatory network.

One of our purposes is to bring educators and systems scientists together in dialogue. We might expand our on-line networking by developing on-line seminars. With enough sponsorship, I am sure this is do-able. Another idea is to develop an *on-line newsletter directed toward high school students.* I believe interactive dialogue could develop from this. Again, we will need more sponsorship and members willing to get involved.

The program for our meeting will be a discussion by **Brent Cameron, Founder of the Wondertree Foundation for Natural Learning in Vancouver, B.C.**

The STCT will be looking at natural learning through story-telling from a whole systems perspective. This, too, is in conjunction with The Wondertree Foundation for Natural Learning. A CD-Rom and Webcourse for parents, mentors and educators wanting to support learners in a new learning paradigm of self-design and global ecology will be shared. *The Session is listed as 2458 in the catalogue and will be Sunday, March 7 from 5:30 to 7 PM. It will be*

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held at the Moscone Center, West Mezzanine, Room 274.

If anyone wants to discuss ideas for the STCT annual meeting we could meet for dinner afterwards.

Barbara Vogl   bvogl@aol.com

Announcements

It is not too soon to think about joining the **Asilomar Conversation Community** sponsored by the **International Systems Institute.** The ACC will be held at the Asilomar Conference Grounds, a State-owned (read, "inexpensive") facility on the sand dunes of beautiful **Monterey Bay in California.** The date is from **Friday, November 5 through Wednesday November 10, 1999.**

This is an experience which "grounds" you in the "feel" of systems thinking as morning, afternoon and evening you are in relationship with systems thinkers from around the world, interrupted only by excellent meals and strolls on the beach. It is here that projects germinate and get hatched. The idea for this STCT network was born there; a conversation community to include children is germinating now.

So we are suggesting that this is an inexpensive place for a family vacation where children are not just welcomed, but are valued and listened to.

The total cost for accommodations for the week including all meals is;
Single.....$540
Double...$380   Deluxe....$425
Triple.....$320

First day accommodations, plus $35 registration fee is due **May 5, 1999**
Remainder of payment for accommodations is due **August 4, 1999**
That's it! The only problem is that it might change your life.
Contact:
Sue McCormick, Coordinator,
Email: sue@digisys.net

Knowing is not enough;
We must apply.
Willing is not enough;
We must do.
                        Goethe

You are invited to join us as a member of the ASCD sponsored

Systems Thinking and Chaos Theory Network

Please send this form and a check (US dollars) made out to:

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