The Age of Design

by Jeff Conklin

A chronic pain pervades modern organizations, both private and public. We describe it as frustration—the frustration of trying to do a difficult job without the proper tools, like tuning up your car with carpentry tools—and it is hidden behind a quiet resignation. This really isn't something unusual, something to be concerned about or worth fixing, because this is just the way it is in organizational life. If you're hiking in Maine in the summer, you expect mosquitoes. If you go mountain climbing in the Alps in the winter, you expect it to be cold. You don't complain about it much because you know *that's just the way it is.*

Organizational pain, as pervasive as it is, very rarely is discussed and rarely is a focus of management troubleshooting, much less any kind of intervention. This is because the experience of frustration and resignation is ubiquitous. It extends from the janitor's closet to the executive suite. Being everywhere, it goes unnoticed.

Over and over again in my research and consulting practice I hear a common theme running through comments made by corporate clients. On the surface it is a complaint about being under intense pressure to coordinate and innovate while still feeling disoriented by the most recent reorganization, mixed with frustration about how much time seems to be taken up in meetings, most of which are too long, poorly run, and ineffectual. These clients complain that they are being asked to

collaborate with some other person, or team, or company, and there is often good reason not to trust these others. There is a sense that things are in chaos, and their organization is just barely managing to keep up.

These people are often a bit embarrassed and apologetic—the way they would be if unexpected company dropped in on Sunday morning when everything was a mess. They say things like, "We're in such upheaval lately, and, you know, our company just doesn't seem to have its act together like the others in our industry." Along with this pervasive condition of pain is a glimmer of hope: although the turmoil and uncertainty is exhausting, they just need to try a little harder and everything will soon return to normal.

Often part of the picture is an impending Big Decision. "As soon as the Big Decision gets made, things will settle down and we can get on with business as usual." The Big Decision can be a merger, a reorganization, a new manager or executive, the selection of a certain database or standard or technology platform, approval of a budget, announcement of a new regulation or court decision, etc. The mythical Big Decision is always being made by someone else, some other person or organization. There is always a Big Decision in the offing that makes everything chaotic, all work tentative, and all progress provisional.

This condition—of chaos, uncertainty, and overload—amounts to pervasive organizational pain. Strangely, as pervasive as the pain is, it is also hidden. It is not discussed, it is not the subject of major studies, and there are no programs or initiatives to ease this organizational pain.

The purpose of this paper is to answer three questions:

1. Why does this pain remain hidden?

2. What is it and where does it come from?

3. What can we do to manage it?

The short answers to these questions are that the pain is caused by the mismatch between our beliefs about life and work and the reality we

experience. The pain remains hidden from our sensibilities inside an outmoded and crumbling belief system that has been the central institution of truth and validity for the last 250 years. The way out is to begin to recognize and acknowledge the nature of our current reality, and then to begin to learn, like children taking their first steps, how to operate and cooperate in this emerging reality.

Why does this pain remain hidden?

It is important to understand how something can be both pervasive and yet hidden. Normally, if a phenomenon is pervasive it is also quite obvious: for example, the pressures to innovate, to cut costs, to establish strong links up and down the supply chain all dominate the corporate landscape, and they are clear for all to see. Hardly a management book or article is written that does not touch on these themes. How can it be that there is a pervasive pain in organizations that is somehow undetected and unexplored by most observers[1] of the organizational scene?

The reason is that this organizational pain is hidden because the current paradigm says that the sources of the pain do not exist or are insignificant or imaginary.

The term "paradigm" has gotten a lot of play in recent years. Unfortunately, it has been used in a very watered-down way to describe things that are superficial and transitory, such as attitudes, beliefs, and concepts. The term paradigm, originated by Thomas Kuhn in his groundbreaking book *The Structure of Scientific Revolutions* (1962), refers to the cognitive foundation on which attitudes, beliefs, and concepts come and go. Like water to the fish, it is extremely difficult and rather extraordinary to get a glimpse of the paradigm in which you (and your organization, community, country, or species) live, much less to change it. The absence of awareness is similar to the blind spot in your eyes: if you are aware that it exists, you can detect your blind spot[2], but

---

[1] Writers like Margaret Wheatley point to it, but treat it as a "negative" theme. Consequently, it is avoided by most writers.

[2] Close your right eye and look straight ahead with your left eye. Bring your left finger up about a foot from your face and move it around, slightly below your line of sight and 2 or 3 inches to

the moment you stop the effort to be aware of it, you return to the "paradigm" in which your eyes are giving you complete and accurate information about the visual world.

Sensory systems are designed to measure changes: a change in temperature, a movement of light, a new sound, an unusual smell. If a sensation (or belief) is constant, it literally becomes invisible over time. If you could ask a fish, "How's the water?" the fish would say, "What water?"

What is it?

Once the term paradigm was popularized, people could see that their paradigm could make them weak in the face of a changing business environment. The solution: change your paradigm! However, individual people do not and cannot change a paradigm. Paradigms do change from time to time, but times of paradigm "revolution," as Kuhn called it, are times of enormous upheaval, uncertainty, and fear. They can also be very exciting. We may become more aware of our paradigm, we may conceivably participate in a paradigm change, but a change of paradigms, like the tide, a glacier, or a forest fire, happens at its own speed.

The first role of a paradigm is to explain this mysterious universe, and the second role is to filter out all the phenomena that do not fit that explanation. The paradigm of an age determines what are the important phenomena to predict, control, account for, and so on. If an event or a phenomenon does not fit the paradigm, it does not exist, or is imaginary.

For example, until a decade or so ago the Western scientific community was not much troubled by the phenomena of clairvoyance, telekinesis, telepathy, and so on—it simply ignored them, or, when pressed, asserted that they did not exist. People who reported these things were regarded as lying or delusional. Because these phenomena did not fit within the explanatory structure of modern science, they were invisible to the scientific eye.

---

the left of it. At some point you will observe that, in your peripheral vision, the tip of your finger disappears and reappears as you move it. This blind spot is due to the small part of the retina where there are no rods and cones because the optic nerve exits the retina there.

Of course, the difference between "can't be explained" and "doesn't exist" is that there is plenty of room in a paradigm for things that cannot be explained. When the psychological community finally agreed something was happening, but that, "these phenomena cannot be explained," they created the field of "parapsychology," with research programs, conferences, and grants for going about the business of creating explanations. Until the scientific establishment allowed them to, these phenomena "didn't exist," so only people on the periphery of the psychological community could take them seriously.

Thus, if a scientist observes a ghost, or has a premonition that turns out to be true, he or she ignores it or chalks it up to coincidence or indigestion. Imagine the plight of a scientist who lives in a haunted house, in which strange sounds wake them up and objects disappear or are moved overnight. His belief system says that nothing is happening, but that doesn't necessarily help him to sleep better.

Ø How it is in organizations

As water is for a fish, meetings are for knowledge workers. If you ask a knowledge worker about his or her meetings, they will reply that their meetings are, well, fine. They're just the way meetings always have been and always will be. When the meetings don't work, the only solution—so far—is to have more meetings, with more people present.

If you ask them about their organizational pain, they will say "What organizational pain?" Since the pain has always been there, and it's at all levels, it must be just the way things are—like the blind spot, just part of life.

To illustrate, imagine the plight of a manager in an organization who finds herself in more and more meetings, struggling to find time to participate in and manage various teams, with the vague dread that she doesn't really understand what's going on around her. Perhaps the people above her, who could tell her what's going on, are keeping it a secret for some reason. Her belief system says that she just doesn't have the skills or knowledge that she should have, she doesn't have enough information, and she's just not working hard enough. Her experience says that something is terribly wrong, but it never occurs to her that the problem is systemic—that everyone is feeling the same thing, but for some reason,

this pain is only mentioned in grousing and impotent complaints, the way we complain about bad weather.

This seems to violate reason. Rational people, confronted by a problem, study it and fix it, don't they? What is it that makes organizational pain different? The answer is that, according to the prevailing paradigm, the pain doesn't exist. More precisely, its sources don't exist, so the pain can't exist.

The source of organizational pain is the intense need to communicate and collaborate like never before using systems and tools that were not designed for communication and collaboration.

The paradigm established over the past couple of centuries, in the "Age of Science," quietly assures us that collaboration isn't all that important, certainly not as important as being on the "inside," being in control, and preserving one's turf. This paradigm assures us that we're doing just fine at communicating, and that the last thing we need are more communication and collaboration tools—there's already too much to do.

Where does it come from?

We live in a time when extraordinary comfort, safety, and convenience are commonplace in the industrialized Western world. We owe our quality of life to science and its younger sibling, technology. At the dawn of the 18th century, when the Enlightenment was in full swing, science was the new kid on the block. The church had been the central institution of truth and validity in Europe for over a thousand years, and it still was the most powerful single institution in society. But as science demonstrated its ability to produce material results and the power of the church waned, society slowly but surely shifted from faith in the church as the source of meaning and truth to faith in the institution of science. Nowadays, if a government or a corporation needs to make something big happen, influence people, and/or change the tide of events, it brings in the Big Guns, the experts from science and technology, to report on or study the "facts" in the matter. Three hundred years ago, representatives of the church held this power.

Although science itself is undergoing profound paradigmatic changes, these are really part of a larger revolution that is taking place on the planet. This larger paradigm change is occasioned by many things, but principally by the very successes and failures of science and technology.

The success of information technology has not only revolutionized the workplace but also the marketplace. Global markets now operate at a speed that is manageable only with powerful computers, with amounts of money that dwarf the economies of most countries, that it escapes any kind of monetary control or understanding.

In the sphere of the environment, our success at creating comfort and convenience for more and more people is placing Mother Earth's ability to sustain life in jeopardy. The success of medicine in keeping people alive, and even creating new life forms, has taken us beyond any existing ethical or moral framework.

The current paradigm, incorporating the values and beliefs of the institution of science, has created the conditions which are beginning to cause that paradigm to fade. Too many of the significant phenomena of our times do not fit within that paradigm. Too much of our direct experience must remain hidden, ignored, and denied for the Age of Science to continue to reign much longer. This is not to say that science itself is in any danger; science will continue to evolve and grow. It is our myths about science—popularized and encrusted into the paradigm of that epoch—that are now crumbling of their own weight.

The Legacy of the Age of Science

Ø Description, prediction, and control

In the Age of Science, the use of language was *descriptive*. The job of science was to describe the universe. A scientific theory is a description of the way the universe is constructed and the way the parts function, based on careful experimentation and observation. Once we had created a good description of the natural world, we could begin to exercise control, and the way was opened for technology, the art of harnessing, controlling, and transforming the world. In the last century, organizations and "organizational science" have borrowed heavily from the ethos of

science and technology: the goals of "management science" were to *describe* the *future* (also known as *prediction*) and to control it.

Ø Individuals are the unit of achievement

In the Age of Science, the basic social unit was the *individual*. When we think of the great accomplishments of science, we think of a number of individual geniuses who shaped our understanding of the world: Copernicus, Galileo, Newton, Pasteur, Watt, Salk, Edison, and Einstein. We think of their activity as being a solitary one, spending hours and hours in a laboratory, combining brilliant insight with untiring diligence and rigor. Similarly, our organizations hire, train, promote, reward, and dismiss workers as individuals. Organizational charts show boxes filled with individuals. The difficulty and failure rate of the current move toward teams is a testament to the depth of the foundational value our Age of Science culture places on the individual.

Ø Facts legitimize decisions

In the Age of Science, facts were the only acceptable basis for decisions and actions. A fact is "a piece of information presented as having objective reality" (*Webster's Ninth New Collegiate Dictionary*). Some of the most important breakthroughs in science came from someone digging underneath accepted superstition or myth and discovering the hard, objective facts in the matter. Although in some cases it took a long time for prevailing beliefs to change (for example, the notions that the earth is not the center of the universe, that the earth is round, and that disease is caused by germs), the history of science is the history of facts eventually winning out over beliefs handed down from the past. Similarly, before making a decision, the prudent manager or team leader gathers all of the facts in the situation, thus avoiding making a decision based on "mere" feelings or intuition.

Ø There is a right answer

In the Age of Science, the goal of problem solving was to find the *right answer*. In the paradigm of science there is a reliable formula for deciding among alternative theories: you design experiments which reveal which theory is true, that is, which theory gives an accurate description of the world. The everyday equivalent of a true theory is the right answer, or in business, the right decision. Our educational system prepares us well

for this world by reinforcing the message that the way to succeed in school is to know the right answer, and (if you don't happen to already know the right answer) the goal of thinking and learning is to find it. Of course, you can't get to the right answer without the facts, so (the paradigm tells us) the critical ingredient for finding the right answer is lots of information.

Ø Our problems are tame

In the Age of Science, the problems to which organizations devoted themselves were generally tame ones: they may have been complex, they may have involved hundreds of people or years of effort, but the problems themselves were not wicked. The problem was well understood (e.g., "Build a bridge across the widest river in the world."), the stakeholders were few and in control, the constraints were stable, and, in the end, there was a concrete result that solved the problem, and in the best cases was even clearly the right answer.

Ø Problem solving is routine

In the Age of Science, there was a universal method for solving problems, a linear progression from collecting facts to coming up with the right answer. Similarly, the basis of "management science" is a systematic linear approach to solving a problem: (1) gather the data, (2) analyze the data, (3) formulate a solution, and (4) implement the solution. Gather, Analyze, Formulate, Implement: *GAFI* for short. GAFI is so powerful (the paradigm says) that it works on any problem, no matter how complex. If you were working on a problem in the Age of Science, and you ran into trouble, you always knew that the way around it was to do more GAFI: gather more data, do a deeper analysis of the data, check for possible errors in your formulation of the solution or indications that you had simply mismanaged its implementation.

There are many other ways that the Age of Science has shaped and is shaping organizational life, but these aspects point to the key elements that are behind organizational pain—and the reasons it stays hidden.

What can we do to manage it?

Because our paradigm is invisible —like the blind spot in the eye—it is very difficult to be aware of it except during a time of paradigm shift. In the exciting and terrifying times of paradigm shift, we can look back and begin to distinguish the old, fading paradigm, and looking forward we can make out a few features of the emerging one. While we can just begin to see enough to give it a suggestive name, like the "Age of Science," naming the emerging paradigm is purely a matter of creation. I like the "Age of Design" because it captures something which I believe to be fundamental to the current upheaval: the job of humanity is now shifting from understanding our world to being conscious about creating it—that is, *designing it.*

The challenge for knowledge organizations is learning and innovation. Mere prediction and control, while still important, won't cut it any more.

We are poised in a transition from one epoch to another. In the fading epoch, organizations rewarded individuals for predicting and controlling their environment. Individuals worked separately, using a linear process, to gather all of the facts so that they might, in a moment of lucidity, formulate the right answer and deliver it, neatly packaged, to the organization for approval and implementation. In the emerging epoch something new appears to be happening, and those who excelled in the former paradigm are no longer winning and succeeding as they did before.

In place of using language for describing, we are using it to *create.* In place of prediction and control, we seem to have nothing but chaos, sometimes in the somewhat orderly form of markets. In place of individual efforts, the problem solving process is *social.* In place of basing decisions and action on facts, we base them on *stories* that give us a more coherent sense of *meaning.* In place of finding the one "right answer," we seek to gain *ownership* and shared understanding of whatever solutions or schemes we have developed. And in place of a reliable linear method for solving any problem, we are left with nothing but an intensifying need to communicate and collaborate with *lots* of people, and thus with *meetings* and *teamwork.* (When the meetings don't work, the only solution—so far—is to have more meetings, with more people present.)

This description of the emerging Age of Design is not prescriptive. It is not a recipe for how to change your paradigm. It is simply a description—a story!—of what has been happening in organizations and in society for the last decade or so, and of what seems to be happening in the organizations which are succeeding and in which people are thriving. It is a story that gives new meaning to the organizational pain, and new meaning to the emerging technologies of communication.

Let's examine this shift in more detail. First, however, it is essential to note that the Age of Science is not "wrong," nor is the Age of Design replacing the Age of Science—it is *subsuming* it (Figure 1).
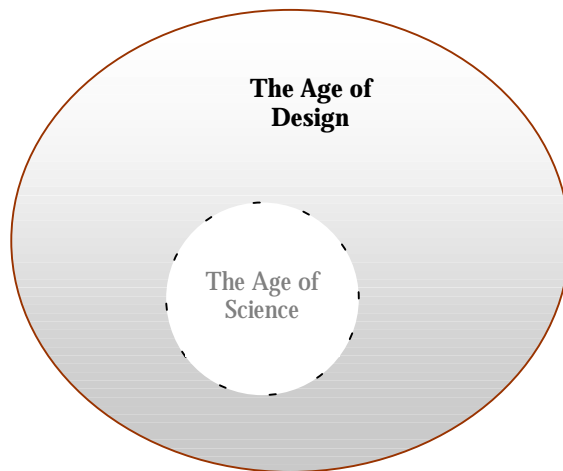
The Age of Design

The Age of Science

Figure 1. The Age of Design *encloses* the Age of Science. Just as we still have the church, the skills and knowledge so important in the Age of Science are still very important—they just are not sufficient any more.

The Challenges of the Age of Design

As we enter the Age of Design, the focus of our activities and our language is shifting to *creation*. Description is about *what is*. Creation is about *what might be*. As the pace of global competition increases, it is an organization's ability to learn and to innovate that gives it the largest competitive advantage. Consequently each employee is asked to throw off the shackles of past ways of thinking and old ways of doing things, to become an "intrapreneur," to think for him- or herself and invent new ways of increasing customer satisfaction or decreasing costs. Courses are

given in creative problem solving and consultants promote thinking "outside the box." This is remarkably different from the social contract employees made in the Age of Science: to be a replaceable unit of mass production or a precise clerk, a cog in the machine of manufacturing.

As knowledge workers gather in the meeting rooms of the Age of Design, the questions facing them are often not tame, but wicked (Rittel, 1972). That is, they involve significant social complexity in addition to being technically complex. The difference between tame and wicked is the difference between building a bridge between the right and left banks of a river and building ownership in a solution between the competing interests of diverse stakeholders. What should we do about X? How should we do it? Who are the key stakeholders? What will it cost? How much time do we have? Who should be on the team? Each of these is a facet of the wicked problem that the group is assembled to solve, and each question calls for the group to harness all of the creativity and knowledge at its disposal.

<p style="text-align:center; color:maroon; font-weight:bold;">These are exciting times. Not only is the group empowered to come up with a radically new solution, but it is, in fact, expected to, since all of the existing options are unacceptable.</p>

The demand to innovate can, depending on your temperament, be fun, but it also requires exercising emotional muscles that the Age of Science did not use: taking risks, exposing "half baked" ideas, admitting you don't know about something, learning in public, making decisions using incomplete and inconsistent information, etc. We may be masters of the skills required in the Age of Science, but mere novices at the skills required in the Age of Design.

Ø Social skills

In the Age of Design, the problem solving process is fundamentally *social.* The trend towards teams, flattened organizations, and "matrixed" and "networked" organizational structures reflects the recognition that organizations are not really so much machines as communities. Getting something done depends on your social skills and your social network, both formal and informal. We've all heard that success is based on *who*

you know, not what you know, but the dynamics are shifting from one-on-one barter in a back room to sub-communities that form for mutual benefit.

In the Age of Science, you chose a project manager on the basis of their level of expertise; in the Age of Design, you choose a project leader on the basis of their ability to listen, to relate, to lead, and to inspire. Since the success of the effort depends on the group's knowledge and creativity, the ideal team members not only are experts but also have great social skills. Because the solution must be embraced by a wide variety of stakeholders, the process of coming up with that solution needs to involve, at some level of participation, all of those stakeholders. It is essentially a social process.

Ø Storytelling skills

In the Age of Design decisions and actions are based on *stories*. By "story" we mean a narrative that ties together many different people, events, and objects and gives a pleasing and compelling coherence to these elements. Facts are welcome to be part of the story, but a catalog of facts makes for a dreary story, and can serve to disintegrate the Big Picture. Facts also can create a compelling story: when someone asserts that they have based their decision on the facts, he or she is simply telling a story designed to be pleasing and compelling to a certain (dwindling) audience. If you listen closely, you may hear them throw in enough "background" material to give their story meaning for other audiences as well.

Ø Skills that create shared understanding

In the Age of Science, compliance with decisions was derived from everyone knowing their place in the hierarchy, seasoned with fear of stepping out of line. The new organizational landscape requires coordinated action and decision compliance that is not just downward in the tree of command and control, but also *sideways* and *outward*. Less and less can an executive or manager say, "I've examined all the facts, I've weighed all the options, and I've made my decision. Trust me and comply." Wicked problems require a much higher level of shared commitment and shared understanding than command and control can generally give.

Ø Skills that create shared ownership

In the Age of Design, in place of finding the one "right answer," we seek to gain *ownership* and shared understanding of whatever solutions or schemes we have developed. There are two reasons for this. In part, wicked problems just don't allow for a very strong sense of "rightness" to develop about any one solution—they all have obvious flaws. But more deeply, the thing that makes a decision effective, that makes it stick, is that the people who are affected by it *buy it.*   This is not new, but what is new is the range and distribution of players whose ownership of the new solution is critical to its success in becoming an *implemented* solution.

Ø Selling skills

Remember Sony's Betamax video format? Generally regarded as a superior system, with a sharper image, better audio, and smoother high speed review, Beta systems enjoyed a time when video stores had nearly as many Beta movie titles as VHS. Even as VHS tapes took over all of the video store shelf space, there was never any contest between the technical quality of a Beta movie and a VHS movie. So what happened? Somehow, VHS simply had more "mind share," and so sales of VHS tapes and VCRs slowly pulled ahead, until the Beta VCR was put in the basement with the old eight track car stereo.

Remember the Apple Macintosh? For several years the Mac was a far superior computer system to the DOS-based IBM personal computer. But for all kinds of reasons, some subtle and intangible, the Mac's technical superiority never quite overcame the larger mind share of the flawed and awkward PC. The installed base of "Wintel" machines is over 80% and steadily climbing.

In each of these cases, and many more like them, it was not enough for a company to have the "right answer." Ultimate success or failure depended on its ability to influence the rich and organic forces of mind share, approval, public opinion, and confidence. In these cases, the "ownership" was ultimately reflected in an actual physical purchase, but the lesson for the Age of Design is clear: if you have created a solution to a wicked problem, do not expect its technical elegance—or any other feature, such as cost, reliability, upside, installed base, etc.—to carry the day. The ultimate "rightness" of your solution will be determined by the depth of understanding of it and ownership of it that you can achieve across all of the stakeholders. In a word, if you've got a team working on a wicked problem, make sure you've got at least one person who can *sell!*

Ø Creative problem solving skills

Finally, what is it that we have in the Age of Design to replace the reliable linear GAFI method? What tool can we fall back on when the score is Organization 3—Wicked Problem 42? In workshops, people have problems with this question. The answer is not high-tech. Quite the contrary, because we are babes in the woods in the Age of Design, the nature of our toolset is pretty primitive.

Look at it this way. What tool do we have and use every day in organizations to help us be more *creative*? What tool is appropriate for a *social* problem solving process? What tool do we invariably use to create shared understanding and ownership? Just look at your calendar—what are you doing most of the time at work? Yes, you are in *meetings*, having conversations.

Meetings are the most powerful tool currently available for resolving wicked problems.

The social nature of problem solving implies more conversations and meetings. The process of sharing and creating meaning through story telling implies more conversations and meetings. The process of creating ownership and shared understanding implies having more conversations and meetings. The failure of the linear GAFI process to create workable solutions implies having more conversations and meetings.

We are all aware of the abundance of meetings in organizational life, but few of us think of meetings as a tool, certainly not a handy and reliable tool like GAFI. The reason is that, due to our immaturity in this Age of Design, we're just not very good at meetings and conversations. We do meetings and conversations the way people 300 years ago did transportation: we get around, but its slow and uncomfortable and unreliable. Nonetheless, we rely on it very heavily, evidently, because when the meetings and conversations that we're having are not solving the problem at hand, we schedule *more* meetings, with more and different stakeholders invited.

Tools for the Age of Design

The marketplace, driven by Age of Science thinking, has responded to the tremendous increase in communication occasioned by the Age of Design by providing infrastructure and devices. This is natural and appropriate. The explosion of telecommunication technologies, including computer networks, cellular phones, fax machines, pagers, email, wireless devices, the Internet, and the Web, is an expression of the sudden need for individuals and organizations to be much more richly interlinked globally than ever before. But far from increasing our ability to collaborate, share understanding, and find meaning, most of this technology is overloading

and desensitizing us to a point where finding meaning in life is further removed. By turning up the pace of the march of progress, "communication technology" conspires to fragment us even more severely from each other and ourselves.

Our society, indeed the world, is ready now to take the Age of Design seriously enough to begin creating tools that match the problem. Many such efforts, in many different directions, are emerging.

Ø Dialog Mapping

Dialog Mapping, whether done using computers, whiteboards, or the back of an envelope, is simply a way to organize for communication, specifically for the rich communication and interaction required by a diverse group of stakeholders tackling a wicked problem. It is an extremely simple and very powerful tool, but it is a tool for the Age of Design, not the Age of Science: don't expect your colleagues to grasp its value right away.

Ø Public learning

Again, it is important to emphasize that the tension between Age of Science thinking and Age of Design thinking is not either-or. It is not that GAFI doesn't work anymore, or that it isn't an important skill for knowledge workers. To the contrary, the ability to manage a project according to the principles of planning, accountability, and follow-through are as important as they ever were. However, these skills alone are just not sufficient any more. The enigma of the emerging epoch is the dominance of wicked problems. The old skills must now be supplemented with new skills, of participation, dialogue, creativity, story telling, creating shared display, case making, building alliances, making decisions, making lots of mistakes, building prototypes, using simulations to test ideas, learning publicly, caring, trust, love, community, being vulnerable, exposing assumptions and biases, etc.

The Age of (Mis)Information

Observers who are content to call the emerging epoch the "Information Age" (or even the "Knowledge Age") do not appreciate the totality of the

change that is afoot. This is how the Age of Science perceives the Age of Design. The following story illustrates why this name is mistaken.

Imagine that the year is 8,000 BC. You and your tribe and your ancestors have had a nomadic lifestyle, hunting and gathering in a given area until the food starts becoming scarce or the weather turns. As you're pulling up your tent stakes one more time you learn of a nearby tribe that is not moving on. It turns out that for several years they have stayed in the same place, not drifting from campsite to campsite. How is this possible? Why would they even want to? Don't they realize that tribes that don't move when conditions change die out? After investigating, your tribe learns that this other tribe has found out how to *control plants and make new plants grow!* They do it using *seeds!*

As the idea spreads, there is much excitement about this marvelous new "technology" in which seeds are harvested, stored, pushed into a groove in the ground in spring, watered, and tended. It seems like everyone is experimenting with and learning about seeds. "Seed know-how" is coveted. Seed experts emerge. A new brand of tribal competition springs up around who controls the seeds, which tribe has grown the most and the best plants, which has the best seed technology.

Gradually, families replace their tents with more stable structures that cannot be moved. Because the tribe stays in one place, that place takes on a new significance. The notion of "home" emerges, along with land that is "home," and because it is the most precious resource of the community, groups of men band together in each tribe to police and defend their "homeland" and its seeds. Some people even talk and act as if they owned the land where their house is, and they plant "private" gardens. The elders struggle with all of these changes and declare that, for better or for worse, there has been a revolution in the way human beings live. We have entered, they declare, the "Age of Seeds."

From our historical distance we can see that while seeds played an enabling role, the Agricultural Revolution reached into and changed every aspect of human culture. It may have seemed like it was all about seeds at the time, but deeper evolutionary forces were at play, and seeds were just the most obvious part of this change. Similarly, with time we will see that information is just a part of the revolution that is taking place around us. Computers and information science played an important part at the beginning, but the notion that work is about creating, storing, and

transferring information (or knowledge) is increasingly misleading and myopic.

What Happens Next?

Interestingly, the emphasis on information is an Age of Science way of thinking. The popularized paradigm of Science focused on *things,* on objects and parts and components. This thinking runs so deep that it is common in our culture to regard human beings as objects. Management has been the art of controlling these "people objects" to get the most out of them. Ultimately, each of us regards ourselves as an object, identifying with the body and its properties and possessions. In software engineering, "object-oriented technology" is a crowning achievement of this kind of fragmentary thinking.

When a person immersed in this "object-oriented" way of thinking looks at the world, they of course see objects. When they look at an organization, they see a set of "people objects" and an organizational structure (the org chart). And when they look at two or more people talking and working together, they see the exchange of "information." Facts, as the basic unit of exchange in the Age of Science, have evolved into "information," and—by "adding value" to it—even into "knowledge." But in all of these cases the stuff in question is viewed as a discrete package of text or numbers or both, representing some measure or idea or concept. The key word here is "discrete." Facts, knowledge, information can all be stored in computers, recalled, emailed, analyzed, and put into color charts for presentation.

To see how this belief skews our thinking, and the way we relate to each other and to work, consider the following parable. There once was an isolated seaside village in which, like us, the villagers thought in object-oriented terms. Living by the sea, weather and sailing were important parts of their lives, and so they studied the wind very carefully. They discovered that wind consisted of elementary parts, which they called "blowtrons." The more blowtrons, the stronger the wind. What seemed like a faster wind to the uninitiated was actually blowtrons at a higher energy level.

Because of its economic significance, much experimentation, study, and argument went into discovering the exact nature of blowtrons. How big were they? Some said they were pea sized, others said golf ball sized. In one theory they changed size depending on circumstances. How did they clump together? When they hit a building or a boat sail, what were

the forces that drove one blowtron one way while the one next to it went another way?

To you and me the problem is clear. These villagers' difficulties in understanding the wind stemmed from their deep-seated tendency to fragment nature into component parts. They did not have the language or conceptual framework to consider the wind as indivisible, whole, a flow, a pattern, a form of energy. Because of this, instead of discovering how to make wind mills and sail upwind, they spent their efforts on trying to make tools for capturing, storing, measuring, and using blowtrons.

What if our society has fallen into a similar trap? What if there was no such thing as information? What if facts, information, and knowledge were no more real than blowtrons?

Suppose that all that is ever happening at work is communication: conversations and other more subtle ways of relating between people. Suppose that communication, to be correctly understood, cannot be fragmented into parts.

How would that impact our tools? For example, our primitive ideas about communication were implemented in a system called "electronic mail," or email. The designers conceived of communication as the exchange of discrete messages, and, more than thirty years later, we are still using technology that reflects that conception. (As it happens, it was far and away the easiest implementation of interpersonal communication, from an engineering standpoint, and it still is. But then, the command line interface is the easiest engineering implementation of how a user can operate a computer, but few people will put up with that interface any more.)

Of course, email is a dreadful structure for the kind of group communication that is required for working on a complex project or a wicked problem. Everyone can sense that. But we settle for a system based on exchanging messages because we understand communication as the exchange of information, and on the face of it there doesn't appear to be any information that you can't exchange with email. Thus our beliefs about the nature of communication and work blind us to the ever-

present failure of our tools to support and enhance the kinds of interactions we are trying to have.

Summary

We will overcome the handicaps of Age of Science thinking as we awaken to the deeper realities of our current organizational environment, and commit ourselves to creating and discovering deeper, more effective means of communicating and relating with others.

Acknowledgements

References

Kuhn, Thomas (1962). *The structure of scientific revolutions.* Chicago: University of Chicago Press.

Rittel, Horst (1972) "On the Planning Crisis: Systems Analysis of the 'First and Second Generations'," Bedriftsøkonomen, Nr. 8. Also Reprint No. 107, The Institute of Urban and Regional Development, University of California, Berkeley, California, Tel: (510) 642-4874, email: iurd@uclink.berkeley.edu.

Rittel, Horst (1972) "Structure and Usefulness of Planning Information Systems," Bedriftsøkonomen, Nr. 8. Also Reprint No. 108, The Institute of Urban and Regional Development, University of California, Berkeley, California, Tel: (510) 642-4874, email: iurd@uclink.berkeley.edu.