Ongoing Discussion "Thought Piece"

Revision 2.0

Prepared by

Bill Bellows
william.bellows@pwr.utc.com

and

Ariane David
arioff@aol.com

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Ongoing Discussion Host

Tim Higgins
timothy.higgins@pwr.utc.com

Sustainable Thinking Transformation
Bill Bellows and Ariane David

The aim of this Thought Piece is to provide a brief background and highlight the continued efforts related to a thinking transformation that began in the early 1990s and continues today.   Beginning with the simple connection between working together and thinking together, and continuing with a vision of organizations that embody the ability to examine thinking and transition this examination into purposeful actions, what remains to be considered is what is needed to sustain such an effort. This Thought Piece follows the authors' design and delivery of a similarly named and focused seminar at the In2:InThinking Network's 2011 Forum (http://in2in.org/forums/2011/PreandPostConference/SustainableThinkingTransformation.html) in which the concept of a sustainable thinking transformation was raised in reference to the organizational issue of team work; specifically,

> *Individual and group proficiency in the principles and examples of "thinking together" is fundamental to organizations that "work together, learn together, and think together."   In the new economy, the proficient utilization of thinking will be a necessary condition; fundamental to business competitiveness. The aim of this session is present a proposal for how to elevate and then* advance *the consciousness of individual and collective thinking about sub-systems, variation, knowledge, numbers, interactions and thinking patterns.*

Talking About Team Work

The focus on creating jobs has once again elevated the concept of *working together* in the vocabulary of politicians in the United States, including an August 6th press release from the Office of the Press Secretary for The White House, referencing President Barack Obama's Weekly Address, titled, "*Creating Jobs and Getting All Americans Back to Work.*" The opening lines from President Obama follow below;

> *This week, Congress reached an agreement that's going to allow us to make some progress in reducing our nation's budget deficit. And through this compromise, both parties are going to have to work together on a larger plan to get our nation's finances in order. That's important. We've got to make sure that Washington lives within its means, just like families do. In the long term, the health of our economy depends on it.*

Seven thousand miles away from Washington, DC, a similar sentiment was raised by Ambassador Gary Locke in a news report by Associated Press, dated August 14, 2011.

> The new U.S. ambassador to China, [Locke] the first Chinese-American to take up the post, said Sunday that the two countries could solve many of the world's problems if their governments work together more.

From U.S. politics to world politics to organizations around the planet, public and private, for-profit and non-profit, a reliance on working together is fundamental to both solving problems and preventing problems, not to mention exploring mutually beneficial opportunities for investment in the absence of apparent problems.

While references to the phrase "work together" are easily found in internet searches, what does it mean to "work together"?   The concept of "cooperation" is explained on the wikipedia website as;

> *the process of working or acting together, which can be accomplished by both intentional and non-intentional agents. In its simplest form it involves things working in harmony, side by side, while in its more complicated forms, it can involve something as complex as the inner workings of a human being or even the social patterns of a nation. It is the alternative to working separately in competition. Cooperation can also be accomplished by computers, which can handle shared resources simultaneously, while sharing processor time.*

> *Cooperation is the process by which the components of a system work together to achieve the global properties. In other words, individual components that appear to be "selfish" and independent work together to create a highly complex, greater-than-the-sum-of-its-parts system. Examples can be found all around us. The components in a cell work together to keep it living. Cells work together and communicate to produce multi-cellular organisms. Organisms form food chains and ecosystems. People form families, tribes, cities and nations. Neurons create thought and consciousness. Atoms cooperate in a simple way, by combining to make up molecules. Understanding the mechanisms that create cooperating agents in a system is one of the most important and least well understood phenomena in nature, though there has not been a lack of effort.*

As stated, the difference between working *separately* and working *together* lies in the realization of a connection between the individual components, be they

political parties or nations or co-workers. Lacking appreciation of a connection is a cause of blame in our political systems as well as organizations as when one component assigns responsibility for a negative result to the other components. Should the result be positive, however, the apparent disconnection dissolves, finding the respective components now competing for association with the successful outcome.   Such was the sentiment of *selective* association in a 1961 press conference quotation from President Kennedy after the defeat of U.S.-led forces in the Bay of Pigs invasion of Cuba;

> *There's an old saying that victory has 100 fathers and defeat is an orphan.*

Thinking About Team Work

Our explanation of the connection between thinking and team work begins with a favorite quotation from Tom Johnson in his book, Profit Beyond Measure, aptly sub-titled, "Extraordinary Results Through Attention to Work and People;"

> *How the world we perceive works depends on how we think.   The world we perceive is a world we bring forth through our thinking.*

Regarding how we perceive the world, the impact of the difference between working together and working separately can be seen mathematically with the simple question, "What does 1 plus 1 equal?" For example, 1 cup of water plus 1 cup of water equals 2 cups of water. Ditto for 1 apple plus another equaling 2 apples.   But, does the same apply to 2 co-workers each saving an hour in their tasks? Would the organization then save 2 hours?   Or, would 2 workers each saving $10 save the organization $20 overall.   Sadly, such an additive saving is nearly impossible.   To understand why, consider the real-life example of the machinist who "saved time" by not deburring the holes he machined (which removes the sharp edge after the hole is machined) and the subsequent greater effort on the part of downstream co-worker(s) to use holes that are not deburred.   By comparison to the scenarios of combining cups of water or apples, do the savings of hours also add?   At question is the classic issue of whether or not the items being added are dependent or independent, that is, separate. In the case of water and apples, they are not connected or dependent on each other; that is, they do not work together to create a third apple nor a third cup of water, nor operate in such a way that water would be lost (other than by evaporation) or part of an apple would be lost. But, in an organization, our actions are always connected to others.   By comparison, can you imagine a worker who received nothing (data, reports, parts, etc.) from others (other than salary) and delivered nothing to others? That is, was truly an island in the company? To sum up, "What does 1 plus 1 equal?," it depends on the nature of the relationship between the objects.   If they are truly independent, which is often the case, other than examining people interacting, then addition does

work. If the two objects are people working together, the results can be more than the sum of the parts; more than 2 and getting better through better thinking, also termed super-additivity or even positive synergy.   On the flip side, we could also see super-additivity with negative synergy, leading to 1 + 1 being less than 2, and getting worse.

Herein lies the connection working together and *thinking* and the possibility that our awareness of components and actions may be such that we are unable, if not unwilling, to acknowledge connections between them.   That is, if we are unable to think in terms of connections or dependencies, can we work *together* or are we resigned to working *separately* and simply *talking* about team work?

As an example, consider the expression "the straw that broke the camel's back" or the belief that the "game was won in the closing seconds." Both statements imply singular causality, leading to the assignment of sole blame or credit to one component, as if the other straws and players were merely spectators.   Contrast this model of a singular cause to a model in which all outcomes are appreciated to result of a system of causes, acting together, in which the final score is reflection of the interactions of all straws throughout the game, with appreciation that the causes extend to events before the game in a system which is understood to be *open*, not *closed*.

The efforts of Pratt & Whitney Rocketdyne's (PWR) InThinking Network to foster "better thinking about thinking" continues today, some 16 years after it's initiation in 1995.   The aim of the effort is to realize better team work through better thinking, which can also be phrased as improving how we think together as a means to improve how we work together.   Through a simple extension, thinking together is seen as a means to improve how we learn together, design together, build together, and dream together.   This list goes on and on, should the components of any system move from seeing themselves as individual components in a closed system to connected components in an open system. To expand on this proposition is to see any system as part of a larger system, or to see any system as a sub-system, ever part of something bigger.   Such an appreciation moves thinking about systems from closed ("this system is the big picture") to open ("this is system is part of a bigger system") and simultaneously expands one's awareness of uncertainty, as is the case when the sub-system we're working in is a sub-set of an unbounded system.

How does one gain awareness of the interconnections that surround us, with an admiration of the ability of a poet such as William Blake, "To see a world in a grain of sand and heaven in a wild flower; Hold infinity in the palms of your hand and eternity in an hour" and thereby move our thinking from "look what I have done" to "look what we have done."   This appreciation is perhaps easier to explore in nature, with the mindset of naturalist John Muir, who pondered, "Tug on anything at all and you'll find it connected to everything else in the universe." Away from the outdoors, yet close to the favorite trails of John Muir, efforts to

initiate and maintain such awareness within an organization began within Pratt & Whitney Rocketdyne (PWR) in Canoga Park in 1995 (when Rocketdyne was a division of Rockwell International), through the creation of "A Thinking Roadmap," now referred to as "An InThinking Roadmap."

A Thinking Roadmap

The phrase "A Thinking Roadmap followed from Rockwell International's concept of a "Technology Roadmap," wherein each division of Rockwell was responsible for defining both their short-term and long-term technology development plans. In seeing the vast opportunities for simultaneously advancing the thinking awareness skills of the entire enterprise, including employees, suppliers, and customers, an informal "Thinking Network" was formed to lead both a short-term and long-term thinking transformation. Thinking skills were presented through an interconnected set of seminars and workshops, our "A Thinking Roadmap," (see next page) as a means to create awareness of the thinking of Russell Ackoff, Edward de Bono, W. Edwards Deming, Tom Johnson, and Genichi Taguchi, to name a few of the thinking pioneers whose writings and teachings have been incorporated into these thinking transformation efforts. With a process in place to create this awareness within individuals, specifically within individuals once they leave the confines of a seminar or workshop experience and return to their workplace positions, the role of a Sustainable Thinking Transformation is to not only maintain, but advance the fundamental aspects of *thinking together* and to build upon a foundation of realizing both the implicit and explicit assumptions (thinking) behind our actions.

In addition to the singular causality thinking behind "the last straw broke the camel's back," early clues to the advantages of focusing attention on *thinking about thinking* included the assumptions behind the answers to the question, "How much time is spent (in organizations) discussing parts (or activities) that are good (going well) and arrive on time?" Years of experience in raising this question to countless audiences across the U.S. and U.K. has revealed that little time, if any, is spent in meetings to discuss parts that are good and arrive on time, nor task elements in a program plan that are deemed good and color-coded "green." More recently, the practically of discussing parts that are good and arrive on time has been questioned. It follows that meetings, attention, and resources not allocated proactively, well before trouble occurs, will be far more readily allocated for problems, such as when the camel's back is broken or, closer to home, when a bathroom toilet overflows, possibly necessitating an emergency call to the plumber and hopefully not on Sunday evening. Sadly, the stillness before such an unplanned event did little to reveal the emergence of a problem, much as driving a car without the capability of a gas gage to sense small changes in gas volume will provide no warning of a pending need for emergency help. Such an event, when coupled to the "last straw" causality phenomenon, as a quick 1-2 punch, leaves organizations open to a potential

recurring pattern of highly reactive problem identification followed by fixation of blame and the subsequent cycles of separation that can easily create silos within organizations.   Such a pairing of problems, such as high unemployment, to the fixation of blame, such as by political opponents, is an all too common news story.
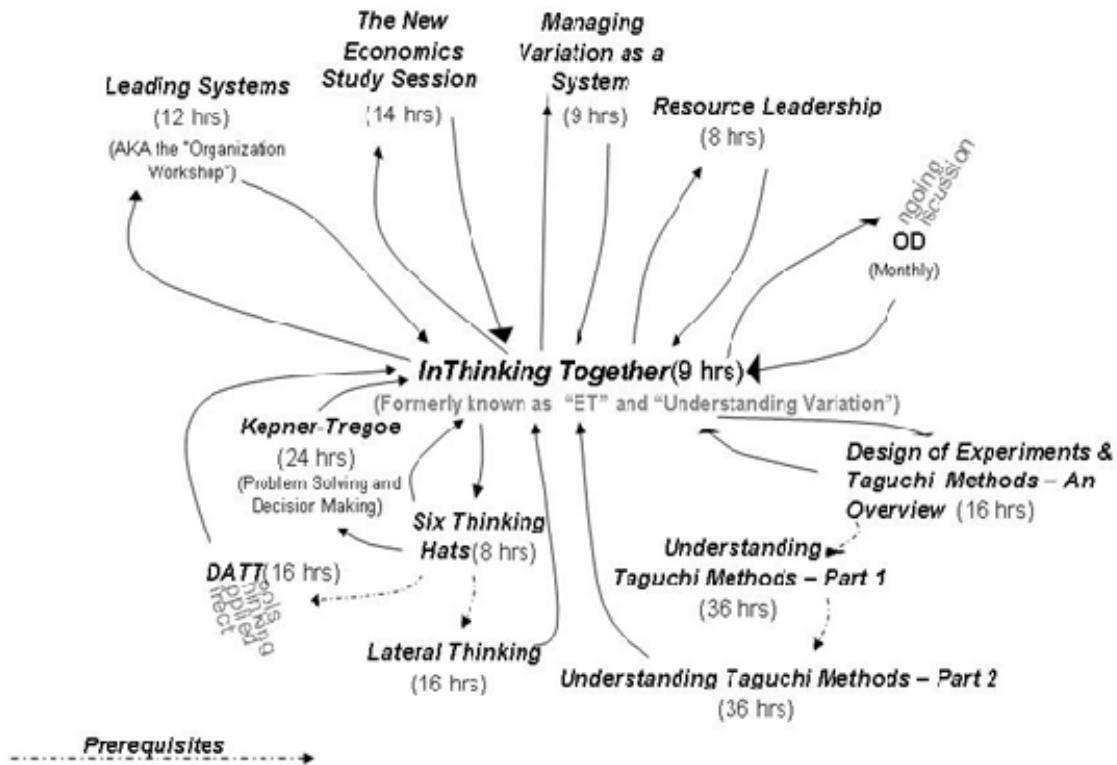
PWR's An InThinking Roadmap – Seminars, Events, and Workshops

Category Thinking and Continuum Thinking

A simple proposal to explain problem-blame cycles is to become aware of our thinking patterns and realize that we routinely utilize two different thinking styles. The first invokes the use of *category thinking* to process information, such as when we look around an organization and look for *problem areas* and *non-problem areas*, or, when studying for a final exam, we look at weekly quizzes and the mid-term examination and look at the questions we answered *correctly* and the ones we got *wrong*. At a minimum, we need two categories (correct/wrong, problem/non-problem) to employ category thinking and can easily add more, such as when we ask what category a singer's music falls into, with choices that range from country to blues to hip-hop to rock, and more.   In biology, scientists have long since created a broad array of genus-species category criteria to classify life forms ranging from plants to insects to animals.   Likewise, economists have given us the categories of upper class, middle class, and lower

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class, not to mention labels for the systems of capitalism, socialism, and communism. As with arranging our kitchens and closets at home, categories help us to efficiently organize things (classes, plants, insects, animals, exam questions, music, movies, people, etc.) and events in a way that is easy for us to manage.

At risk when using categories to relate new experiences to old ones is to assume that all items placed in a given category are identical, as when we assume that all folk singers are the same or that all mechanical engineers are the same. While there is often the need to count and the activity of counting is based on the creation of a defining category, such a glossing over of differences can prevent seeing potentially valuable differences, including opportunities to learn something new when the experience is placed in a category with haste. As with the adage "no two snow flakes are the same," we require a different style of thinking, termed *continuum thinking*, to acknowledge that differences will always exist between snow flakes and all elements placed in the same category.   Continuum thinking is essential for acknowledging differences, such as the difference between a gas tank that is one-quarter full and one that is three-quarters full.   In both cases the car has gas (vs. doesn't), yet gas gages provide the ability to detect such a difference and provide the driver of a car with the ability to act before trouble occurs.   Similar "shades of gray" detection systems could be used to measure bacteria levels in a water supply long before the realization of dangerously high bacteria levels, or to detect a slow degradation in the operation of an overhead crane, long before a bearing failure leads to a crisis situation. Away from industrial settings, medical science has long used a "shades of gray" continuum of LDL ("bad") cholesterol levels as an early detector to heart disease, all the while seeking early indicators of cancer in an effort to move always limited patient resources from the science of cancer treatment to the science of cancer prevention.

InThinking and Reflexive Organizations

Using the simplicity of category thinking, two types of organizations have been explored within PWR since 1998 in a simple two-category visioning exercise. Within one, better thinking about thinking, (termed InThinking) including the dramatic impact of the difference between category thinking and continuum thinking, as well as the limitations of single causality, are deeply and broadly understood. Such is the construct of an "InThinking Organization."   By contrast, the alternative organization in this two-category model is termed a "Reflexive Organization," wherein assumptions behind actions are not explored and the differences between category thinking and continuum thinking are both out-of-sight and out-of-mind.   Hence, the organization will fall victim to crisis upon crisis, with ever taller silos emerging after every cycle and the associated fear of failure as well as fear of bringing forth bad news.   From a continuum perspective, organizations are acknowledged to extend along a never-ending

axis from highly Reflexive (and beyond) to highly InThinking (and beyond), with associated levels of team work and cooperation, not to mention associated profitability (and, beyond measure).

The visioning exercise related to these organizations is based upon an imagined visit to both for the purpose of documenting two aspects of each; one directed at the physical environment, the other at the people attributes.   The physical aspects of each follow from an initial one week tour, during which no one else is present and all observations are limited to people-less characteristics.   For the second week in both, people are present and the visioning observations thereby shift to the associated "People" attributes of each. The reader is invited to use the "Trip Report" table on the next page to document their own observations of both the "Physical" and "People" attributes for a minimum of five minutes. Consideration should be also given to the hallway conversations in each organization.

Understanding Thinking: A Very Brief Overview

The first thing we have to do if we're going to understand thinking is to understand the system out of which the thinking happens. Think of it as your mind's operating system that determines what you perceive, how and what you think, the way in which you reason, draw conclusions and act. Everyone's got one, yet most people are completely unaware of its existence, and as a result, we believe that our thoughts and perceptions are the pure and logical reflections of the objective world around us, rather than the mental construct that it is. This system goes by a number of names: mental model, cognitive framework, mental map "the box" (outside of which we are urged to think,). Twenty two hundred years ago, Plato likened it to *a cave in which people's minds were held captive.*

Mental models are our rules of thinking or logic. They consist of all of our beliefs and assumptions along with all the conclusions we've reached about life throughout our lives. What we perceive, i.e., what we think we see, hear or otherwise take in through our senses, is dictated entirely by what fits our mental model. In other words, no matter how much we would like to believe to the contrary, we simply cannot not think inside the box!

Consider these Thought Questions in preparing for the OD sessions;

1.   What are the implications for thinking?

2.   Given these implications, what can we do to improve the way we think?

3.   If you could improve the way you think, what would that mean to you?

Regarding "thinking about wholes," we've been told that systems thinking involves thinking about wholes or whole systems. If so,

1. What is a "whole system"?

2. What does it mean to think in wholes?

3. What are the implications of this for how we think?

In order to speak about seeing the "whole" of anything we first have to decide on what the whole is by drawing a boundary around the thing. We make this decision based on what is useful at this particular moment. We then create the definition: what is on one side of the boundary IS the thing, and what is on the other side IS NOT the thing. This is relatively easy to do when we're talking about a thing, for example a plant or a tomato or a boat. And yet even here there could be some fuzziness about what really is part of the thing: is the pollen of the plant once it flies away still "plant", is the stem of the tomato the tomato, is the oar a part of the row boat?

The issue of seeing the "whole" becomes even messier when we start talking about aggregations of things, for example a "crowd". What determines what makes up a crowd? How do we determine who's in the crowd and who's not. Is a person standing on the outer edge of the crowd a part of it? How about someone standing five feet away? How about a hot dog vendor caught inside the exiting crowd at a baseball game? Is she part of the crowd?

When we start talking about open non-linear dynamic systems, then determining what the whole system is becomes impossible. At this point all we can do is draw an artificial line around some part of the system and say that what's inside the line is the system and what's outside isn't. We do this with organizations: we declare a legal and financial definition of the boundary between "the organization" and "not the organization" and say that everything in this columns is the organization, everything not in this column is not the organization. But what about the people? What part of the people are the organization? What about their knowledge? Relationships? Skills? And if we define the system as being "the organization" according to our legal and financial definition, then what about the larger system within which the organization operates?

And herein lies the problem with the systems thinking mandate to see the whole system: we cannot ever define the whole system, the best we can do is define an artificial, (albeit functional) boundary for the system. This is fine until (and it's almost always "until") we come to believe that this artificial boundary is the real system boundary, i.e., that everything inside the boundary is relevant and everything outside is irrelevant. The fact is that believing that we can ever know the *real* boundary of any system is antithetical to *real* systems thinking.

Format for Ongoing Discussion

The first hour of the Ongoing Discussion on each day (Thursday, August 26th and Friday, August 27th) will be dedicated to a review of the foundation of InThinking and Reflexive Organizations and findings on the Trip Reports collected by the participants, ending with reflections on the two questions below;

What does sustainability mean in both organizations?

What are the obstacles to sustainability in both organizations?

The second hour on both days will be dedicated to a conversation that begins with the participants' answers to these questions.   We'd also like to on the Thought Questions listed above and the lessons to be learned when considering the impact of Chris Argyris' concepts of single and double-loop learning (details online at http://www.infed.org/thinkers/argyris.htm).

Trip Report

InThinking Organization	Reflexive Organization
(Physical)	(Physical)
(People)	(People)

Biographies

Bill Bellows is an Associate Fellow in the InThinking Network at United Technologies' Pratt & Whitney Rocketdyne business unit in Canoga Park. He is known within Pratt & Whitney Rocketdyne and his previous employer, The Boeing Company, and for his efforts to provide insights to the advantages of thinking together, learning together, and working together. Audiences for his classes have also reached after-school program in elementary schools, graduate students at Northwestern University, public workshops at the University of Richmond in Virginia and California Polytechnic State University in California, as well as, corporate, university, and public classes across the United Kingdom. Away from work, Bill serves as a Visiting Research Fellow at the University of Leeds in England, and as a board member of the W. Edwards Deming Institute, the Volunteers of America – Los Angeles chapter, and the American Youth Soccer Organization – Valencia, California section. He is also a founding board member and current President of the In2:InThinking Network, a non-profit company dedicated to the pursuit of "better thinking about thinking," for individuals and organizations. Bill earned his B.S., M.S., and Ph.D. in mechanical engineering from Rensselaer Polytechnic Institute in Troy, New York, USA.

Ariane David is a founding and managing partner of, and human systems development specialist with The Veritas Group, a consulting firm specializing in organizational development. She is a Senior Lecturer and member of the Executive College at California Lutheran University, and the Executive Director of the National University Center for Organizational Excellence. She has served as an advisor to numerous boards of directors and project based groups including the Senate Committee on Corporate Ethics.

Ariane's specialties include systems thinking, organizational learning, organizational change, culture development, conflict transformation, strategic thinking, and executive/management development. She holds a Ph.D. in Human and Organizational Systems and a B.S. in Physics. Her research and practical experience in the area of whistle-blowing has made her a recognized expert in this field. She is an acclaimed speaker and author.