Rethinking Wicked Problems
Unpacking Paradigms, Bridging Universes

Dr. Jeff Conklin
President and Founder
CogNexus Institute
Author, Dialogue Mapping: Building Shared Understanding of Wicked Problems

Dr. Min Basadur
President and Founder
Basadur Applied Creativity
Basadur Center for Applied Creativity Research
Author, The Power of Innovation

GK VanPatter
Co-Founder, NextDesign Leadership Institute
Co-Founder, Humantific / InnovationLab
GK VanPatter: Welcome, Jeff and Min. I guess a good place to wade into the subject of so-called “wicked problems” is to begin with a little historical context.

In 1960s and 70s, Horst Rittel and Melvin Webber wrote several articles including their 1973 *Dilemmas in a General Theory of Planning* in which they coined the terminology of “wicked problems” to describe a certain type of complex problem that they perceived to exist.

In Wikipedia, the following explanation regarding the origin of the terminology “wicked problems” can be found:

*The concept of “wicked problems” was originally proposed by H. J. Rittel (a pioneering theorist of design and planning, and late professor at the University of California, Berkeley) and M. Webber in a [1973] seminal treatise for social planning [Dilemmas in a General Theory of Planning]. Rittel expounded on the nature of ill-defined design and planning problems which he termed “wicked” (i.e., messy, circular, aggressive) to contrast against the relatively “tame” problems of mathematics, chess, or puzzle solving.*

Wicked problems have incomplete, contradictory, and changing requirements; and solutions to them are often difficult to recognize as such because of complex interdependencies. Rittel and Webber stated that while attempting to solve a wicked problem, the solution of one of its aspects may reveal or create another, even more complex problem.

Classic examples of wicked problems include economic, environmental, and political issues. (For an extreme case, consider what it would take to “solve” terrorism, where even the term “terrorism” is highly controversial and difficult to define). Problems whose solution requires large groups of individuals to change their mindsets and behaviors are likely to be a wicked problem. For examples of analyses of world-scale wicked problems, you can read about the work done by the Millennium Project of the American Council of the United Nations University.


Today there is so much hype around wicked problems that it would be easy to overlook the preceding history and the fact that the rising complexity of problems had been identified as an issue by the problem solving / operationalizing thinking community for some time — twenty years before *Dilemmas in a General Theory of Planning* appeared.
For example, in 1950, J. P. Guilford gave a widely recognized inaugural address entitled “Creativity” to the American Psychological Association. As a senior scholar studying creativity, Guilford spoke of the rising complexity of problems facing the world and the related educational challenges with regards to creativity.

To live is to have problems, and to solve problems is to grow intellectually. It is probably safe to say that at no time has a larger number of informed and otherwise intellectually able individuals lived on this planet. Yet the problems to be solved seem almost overwhelming: how to keep peace, how to feed and clothe an expanding population, how to keep the population from expanding too rapidly, and how to educate it.

To place Rittel’s and Webber’s *Dilemmas* in context, here is an extremely abbreviated publication timeline spanning 60+ years.

1973: *Dilemmas in a General Theory of Planning*, Horst Rittel and Melvin Webber
1973: *The Structure of Ill-Structured Problems*, Herbert A. Simon
1970: *Design Methods*, John Chris Jones
1969: *The Sciences of the Artificial*, Herbert A. Simon
1967: *The Use of Lateral Thinking*, Edward DeBono
1967: *The Nature of Human Intelligence*, J. P. Guilford
1967: *Creative Behavior Guidebook*, Sidney J. Parnes
1966: *Creative Problem Solving Model*, Alex Osborne and Sidney J. Parnes
1964: *Notes on the Synthesis of Form*, Christopher Alexander
1963: *Applied Imagination*, Alex F. Osborne
1961: *Synectics*, William J. J. Gordon
1957: *Charles Franklin Kettering*, T. A. Boyd
1953: *Operational Approach to Creativity*, William J. J. Gordon
1948: *Your Creative Power*, Alex Osborn
1946: *Problems of Men*, John Dewey
1922: *Teaching to Think*, Julius Borass
1910: *How We Think*, John Dewey

So here is the question: From your perspective, what did Horst Rittel and Melvin Webber bring to the party in 1973 that was different then what was already being wrestled with in the realm of creative problem solving?

**Jeff Conklin:** I think Rittel’s contribution is that he distinguished a new domain of problem type, as opposed to, say, a new way of solving complex problems. Problem wickedness is not about a higher degree of complexity, it is about a fundamentally different kind of challenge to the design process, one that makes solution secondary and problem understanding central. In this sense, the notion of wicked problem isn’t describing something new; it is distinguishing something out of nothing.

Like the story of the many words Inuits supposedly have for snow, the power of distinction is that it separates out what is important (or urgent or dangerous) from an undifferentiated unity.
The distinction “wickedness” helped to explain why no level of linear thinking – no matter how much data was considered or how brilliantly it was analyzed – would ever present a workable solution to some problems. (The parallel with Simon’s “ill-structured problems” bears deeper study, but I think Rittel and Weber’s formulation is more radical and far-sighted.)

From a historical perspective, in Rittel’s time he was trying to speak to and persuade an audience that was firmly rooted in the rationalistic tradition, so he drew his distinction of wicked problems purely in terms of the properties of the problem. You can read Rittel and Weber’s “Dilemmas” paper and imagine that there is such a thing as a problem with no people involved. Today we can view this as a shortcoming of the wicked problem distinction as sketched in *Dilemmas* – it seems to happen in a vacuum. Almost forty years later we can easily introduce the dimension of human interaction and the subjectivity of design into the equation.

Most of us would agree that there’s no such thing as a problem without someone who says “Something is wrong with X” or “I need something.” Literally, there’s no such thing as a problem. To speak of a problem and to engage with solving it is to engage in a conversation among stakeholders (people who care about the outcome). In my thinking about wicked problems, I like to introduce the notion of “social complexity” as inseparable from problem wickedness. There are no single stakeholder wicked problems.

The practical challenge of dealing with a wicked problem is the tendency for the effort to become fragmented and fail. But in the early 70’s, speaking the language of their peers, Rittel and Webber brilliantly laid out a case for a new kind of problem that entailed a new kind of approach. (A quick look at the large design problems of our day – “The Dig” in Boston, the new Bay Bridge in San Francisco, the FAA’s decades-old effort to modernize the air traffic control system – it is clear that there is still much to be learned about what makes such large projects fail so regularly and spectacularly.)

For Rittel, the understanding that a problem was wicked lead naturally to the conclusion that the problem solving process needed a new approach, a “second generation” approach, one that involved dialogue among the stakeholders. He invented the Issue-Based Information System (IBIS) specifically as a way to help the stakeholders manage the issues and communicate rigorously and coherently about them. But he didn’t have the technology at the time to make IBIS practical for project teams.

There’s another peculiarity about the notion of a wicked problem. In introducing the concept of wicked problems to groups, I often have to wrestle with the concern that, on the face of it, there is no “solution” for a wicked problem, at least not in the same way that a tame problem has a solution. Some people regard this as a shortcoming of the distinction “wickedness” . . . if there’s a problem, there must be a solution. Of course, it is precisely this tension that is what distinguishes wicked problems.
You don’t so much “solve” a wicked problem as you help stakeholders negotiate shared understanding and shared meaning about the problem and its possible solutions. The objective of the work is coherent action, not final solution. Thus, Rittel and Webber’s contribution was well ahead of its time, and is now finally helping us understand why communication and collaboration, more even than creativity, keep emerging as critical to success on large projects.

Min Basadur: Other than to coin a phrase and raise awareness, I am unclear what Rittel and Webber brought that was new. Osborn’s earlier writings alerted Americans that they would fall behind other countries if they did not educate themselves and their children to use their imaginations to think better. Einstein lamented something like “as one gets older, one begins to realize that the chaos of the world is too great for anyone to put order into it to any degree that makes any real difference.”

The Creative Problem Solving Institute’s annual events in Buffalo continually raised hopes that really difficult problems such as poverty and peace could be managed if people increased their problem solving skills deliberately. De Bono wrote book after book entreatng people to learn how to think more complexly. Einstein also discussed the importance of problem definition versus problem solving which he said was often only a mere exercise in mathematical skill. To view problems from new angles and define them from new perspectives was a much more difficult thinking skill. To watch the current U.S. government continue to hack away at complex problems in a single minded “only one solution approach” and successfully sell it to the American people indicates we have made almost no dents in human skill and understanding of complex problem solving.

GK VanPatter: I see different perspectives emerging here. Let’s try some Rittel declumping as we seem to have several threads of thought intertwined.

Jeff, I saw four key sentences in your comments about Rittel. You said:

1. Rittel’s contribution is that he distinguished a new domain of problem type, as opposed to, say, a new way of solving complex problems.

2. Problem wickedness is not about a higher degree of complexity, it is about a fundamentally different kind of challenge to the design process, one that makes solution secondary and problem understanding central.

For Rittel, the understanding that a problem was wicked lead naturally to the conclusion that the problem solving process needed a new approach, a "second generation" approach, one that involved dialogue among the stakeholders.

From a historical perspective, in Rittel’s time he was trying to speak to and persuade an audience that was firmly rooted in the rationalistic tradition, so he drew his distinction of wicked problems purely in terms of the properties of the problem.

Let’s try this simple sense-making process logic:

If a “second generation” approach to problem solving was Rittel’s suggested solution, let’s back up and ask ourselves: What was the problem condition to which this was a solution from Rittel’s perspective? Where specifically (in what domain of practice) did Rittel perceive the problem to exist? Who was the “rationalistic” audience to whom Rittel was referring? And specifically, What was Rittel’s suggested “second generation” process solution?

From both of your comments above, I am guessing that Jeff can best address these questions.

Jeff Conklin: These are some good foundational questions you’ve asked. In my thoughts here I am quoting from Rittel’s “On the Planning Crisis” paper (C1).

What was the problem condition that this was a solution to from Rittel’s perspective?

After citing some great successes of the then-prevalent “first generation” systems analysis approach (e.g., NASA’s missions), Rittel points to a “hangover” (particularly in the United States) concerning its possibilities and usefulness. This first generation approach, briefly, had eight steps: understand the problem, gather information, analyze the information, generate solutions, assess the solutions and pick one, implement it, test it, and modify it. Rittel said, “In general, it can be said without exaggeration that the classical systems approach has not yielded what was expected of it, and in a number of large projects can only be considered” as a failure. He cites “cutbacks and cancellations in the budgets of many of the large projects for applications of the systems approach” and that “many of the think-tanks . . . which have been selling this approach . . . are in very bad shape and are reducing their size.”

Thus the problem condition Rittel was addressing was this hangover from the euphoria that no problem was so complex that it would not submit to the linear systems analysis approach of the day. (By the way, I still encounter a dogged clinging to this “first generation” approach, or the tatters of it, in many of the clients I work with. Some things don’t change.)

Where specifically (in what domain of practice) did Rittel perceive the problem to exist?

Rittel starts this paper defining systems analysis to be “attacking problems of planning in a rational, straightforward, systematic way.”
He mentions as examples NASA missions, big defense systems, scheduling of toll bridges, production mix for a [manufacturing] company, “urban renewal, improving the environment, in tackling the nutrition problem of mankind, the health systems, and even the penal and law enforcement systems.” In other words, he was a true generalist in his approach to design and planning.

**Who was the “rationalistic” audience to whom Rittel was referring?**

Rittel didn’t use the term “rationalistic.” I borrowed it from Winograd and Flores (C2). Not having been a close associate of Rittel’s, I can only speculate about what audience he had in mind. Maybe someone else with better historical credentials can comment on this. One small clue: Rittel’s “On the Planning Crisis” paper appeared in the Norwegian journal *Bedriftsokonomien* (about which I can’t find any information) and his “Dilemmas in a General Theory of Planning” paper was in *Policy Sciences*. Who reads those journals?

**What specifically was Rittel’s suggested “second generation” process solution?**

In “On the Planning Crisis,” Rittel lists ten “principles of the systems approach of the second generation,” which I summarize very briefly here. (The original is clearer, more readable, and more compelling.)

1. Symmetry of ignorance: There are no specialists. The expertise which you need is distributed over many people.

2. Maximized involvement: Nobody wants to be “planned at.” Make the people who will be affected participants in the planning process.

3. Deontic premise: The basis of judgments is not scientific expertise, but rather “political and general moral and ethical attitudes” . . . “a personal premise of the ‘ought-to-be’ nature” of the problem solver. (This leads to the need for “methods which show some transparency of the planning process.”)

4. Objectification: We must successfully exchange information about the foundations of our judgment. ”If you can tell me why you say that Plan A is great, and I understand your judgment, you have succeeded in objectifying your space of judgment to me. And although I may not share your judgment and might not be convinced, I understand you now.”

5. No scientific planning: Planning is “always political because of these deontic premises.”

6. Planner as midwife: The planner “helps to bring about problems rather than . . . offers solutions to problems. He is a midwife of problems rather than an offerer of therapies.”

7. Skepticism: The planner “makes careful, seasoned respectlessness, i.e. casting doubt on something, a virtue.”
8. Moderate optimism. The planner “knows that responsible planning is important, because one cannot be rational. On the other hand, one is obliged to be rational, although it is impossible.”

9. Conspiracy model of planning: “Because we cannot anticipate all the consequences of our plans, every plan, every treatment of a wicked problem is a venture, if not an adventure. Therefore, “let us share the risk” and find “accomplices who are willing to embark on the problem with us.”

10. Argumentation: ”The planning process of wicked problem solving must be understood as an argumentative process: one of raising questions and issues towards which you can assume different positions, with the evidence gathered and arguments built for and against these different positions.”

This last principle sets the stage for Rittel’s invention of Issue-Based Information System (IBIS), which in addition to wicked problems is Rittel’s other amazing contribution to the world, and is the basis of my practice and teaching.

3

GK VanPatter: Thanks for that, Jeff. In sense-making terms I believe we still have numerous apples, oranges and rabbits intertwined here. It might be that Rittel had a few intertwined in his work. 😊 Before we can get to discussing what works and what does not in the real world today, let’s try to understand together what this is.

In our innovation sense-making work, we distinguish between these three basic things:

Operating Context
Tools (Process, Profiles, Frameworks, Others)
Related Skills and Behaviors

In Rittel’s description of what he is referring to as the First Generation model, he is describing a tool, an eight-step process. Yet, what he seems to be suggesting as a Second Generation (Wicked Problem Solving) model is general Operating Context descriptions and general Behavior descriptions. These are not equitable entities.

Let’s call this description of Rittel’s Generation One a rabbit.

This is a tool, a specific process logic:

- understand the problem
- gather information
- analyze the information
- generate solutions
- assess the solutions and pick one
- implement it
- test it
- modify it
The five descriptions below from Rittel’s Generation Two (Wicked Problem Solving) model seem to be apples. They appear to be general Operating Context descriptions or suggestions.

1. Symmetry of ignorance
2. Maximized involvement
3. Deontic premise
4. No scientific planning
5. Conspiracy model of planning

The five descriptions below from Rittel’s Generation Two (Wicked Problem Solving) model seem to be oranges. They appear to be general Behavior descriptions or suggestions.

6. Objectification
7. Planner as midwife
8. Skepticism
9. Moderate optimism
10. Argumentation

There seems to be no reference to specific Tools in Rittel’s Generation Two (Wicked Problem Solving) model. I guess the closest thing to a very general overview description of process would be his 10. Argumentation.

In addition, it is not 100% clear if Rittel equated the above-outlined eight-step process to be equivalent to what he described as the “Linear Systems Analysis Approach.”

Am I missing something here? Let me ask you two. From your perspectives, what is it that Rittel is criticizing in Generation One? What is it that he is describing as Generation Two?

**Jeff Conklin:** The challenge that Rittel faced in challenging the Generation One paradigm is that deeply buried within the Generation One paradigm is an orientation to process as a linear sequence. In its simplest form, this sequence is some derivation of a primitive “scientific” process: 1.) Gather the data, 2.) Analyze the data, 3.) Formulate a solution, 4.) Implement the solution. I use the acronym GAFI to describe it. Prior to the emergence in the high-tech world of such system development approaches as cyclic development and “agile programming,” virtually all problem solving and project management approaches were based on GAFI. What makes GAFI paradigmatic is that in the face of any difficulties on a project, the solution is always some variation of “do more GAFI” – gather more or different data, analyze the data differently, reformulate the solution, or adjust the implementation process.

Certainly the rabbit of the Generation One tool that Rittel invoked fits the GAFI model (“understand the problem,” “gather information,” etc.).

If a problem is wicked, however, GAFI doesn’t work. That is essentially Rittel’s critique of Generation One – its failure rate is too high.
No prescribed linear process will work with a wicked problem, in part because the design effort must start producing robust solutions just to illuminate the hidden issues and flush out the hidden stakeholders. Moreover, piling more resources into GAFI only makes the situation worse, as key stakeholders are driven off to go look for an approach that speaks to *their* understanding of the problem.

Rittel’s problem – and now my problem as well – is that from a Generation One perspective Generation Two sounds like fluff. In my experience, the elements of Rittel’s Generation Two approach sound naïve, undisciplined, and uninformed to Generation One practitioners. It certainly doesn’t address Generation One concerns like to how to predict events and control the process.

Rittel understood that solving a wicked problem is more emergent and interactive than any prescribed linear sequence of steps can deal with. It would be like a football coach laying out the whole sequence of plays before the game started. That is why Rittel’s Generation Two process description does not prescribe a tool in the sense of a series of steps. Instead he described an orientation to the design process, an operating context. The tool Rittel offers is indeed argumentation, which by its nature is more like a chess game than a game of dominos.

So my take on what Rittel was describing as a Generation Two approach to wicked problems could be summed up as “Power Tools for Collaboration” because in addition to the Generation One tools and skills, wicked problems demand tools and skills for making multi-stakeholder conversations as efficient and effective as possible, particularly in creating shared understanding and shared commitment among diverse and often hostile stakeholders. In my experience, it is easy to underestimate the possibility of sabotage from alienated stakeholders on a wicked problem.

Min Basadur: What Rittel describes as a First Generation model is virtually identical to the Kepner and Tregoe (1964) approach documented in the book, *The Rational Manager (B1)*. Quite rightly, Rittel recognized that this approach is insufficient in that it assumes the problem “as given” and that a linear analysis is sufficient. However, a fundamental flaw in Rittel’s First Generation/Second Generation taxonomy seems to be that he assumes that one can somehow a priori decide whether a specific problem is a wicked one requiring highly skilled problem definition or a linear one which is already well defined. This assumption is the basic cause of a huge amount of poor problem solving in my experience.

The linear model that Rittel and Webber build their argument against is flawed in that it misses the point that the problem that one is attempting to “understand” may already be the wrong problem. Russ Ackoff (1979) fought with his rationally-minded colleagues in Operations Research over this point for decades.

The first three steps of the model should be: [1] find a problem and regard it as a fuzzy situation; [2] gather information divergently, study it, and then converge upon the vital few key facts; [3] define the problem(s).
Herbert Simon (1961) operationalized this concept of fuzzy situation by his identification of two very different kinds of problems people encounter. The first kind is of a more “programmed” nature. Solutions to this first kind are based on rigorous training on the job or in school, experience, analytical skills and knowledge of rules and procedures pre-designed to handle similar situations. The second kind is of a more “non-programmed” nature. Non-programmed problems usually have never been encountered before and have no pre-set rules and procedures to guide their handling. They are sometimes caused by changing circumstances. Such problems are typically less structured, unpredictable, and ambiguous as to “what is wanted.”

The main challenge is to discover and define “what is wanted” because nobody really knows. Often sensing, anticipating and defining the problem are more difficult than solving it. Non-programmed problems require additional skills such as problem and opportunity sensing, fact gathering, problem defining, creating and evaluating diverse options, and implementing new things that have never been tried before. They require the use of imagination, non-linear thinking and some risk-taking.

In the problem defining step, one must try to conceptualize the complete picture, with the more strategic aspects linked to the more tactical aspects of the picture, followed by convergence to the most critical sub-problems. In this step, whether or not the problem is linear or wicked is discovered. The remainder of the steps then follows.

This suggested reordering of the steps above recognizes the typical human failing of prematurely assuming that a problem is correctly defined as given or as first perceived. Problem definition must take into account these human behavioral deficiencies. The behavioral aspects of problem solving include attitudes, cognitive skills and preferences, and communication, dialogue, and collaboration skills.

The ten points in Rittel’s Second Generation model address the fact that it is humans who must define and solve problems and implement solutions, not machines, and they often must do so in teams. It is often difficult for groups of people to think together innovatively, especially in situations which are ill-defined and involve complex issues. All of the human frailties in thinking and communicating thus must be dealt with to achieve good problem solving work.

While the ten points in Rittel’s Second Generation model do begin to recognize the human behavioral aspects of problem solving, they seem to lack recognizing the importance of imagination, especially in problem definition. He also fails to identify the concept of achieving constructive dialogue without argument (Basadur et al, 2000).

Basadur and Finkbeiner (1985) (B5) identified deferral of judgment, active divergence and active convergence as three separate behavioral skills required to harness the imagination in problem solving and to permit constructive dialogue without argument.
Elbing (1978) (B6) identified perceptual biases that interfere with problem analysis and that often cause managers and other organizational members to act hastily and to handle problems ineffectively. They tend to: evaluate before investigating, thus precluding inquiry and a fuller understanding of the situation; equate new and old experiences by searching for the familiar rather than the unique in a new problem; approach problems at face value rather than ask questions to unearth reasons underlying the problem’s more obvious aspects; direct decisions toward a single goal, not recognizing that most problems really involve multiple goals that need simultaneous handling; confuse symptoms and problems; overlook “unsolvable” problems and concentrate instead on simpler concerns; and respond automatically or act before thinking (sometimes called the “knee jerk” effect).

Basadur (1994) identified the following attitudinal, behavioral, perceptual, and cognitive shortcomings. People wait for others to find problems for them to solve rather than take the initiative to seek them out. Important problems that cross organizational, functional and departmental lines are often avoided: “That’s not our problem.” People often make the premature assumption that “it can’t be done.” Too much knowledge of the particular field causes them to experience “tunnel vision” and to lose childlike inquiry and challenging of custom. Unsubstantiated assumptions are accepted as facts.

People are unwilling to take the time to discover the real facts, which might lead them to refreshing new ways to define the problem. They emphasize problem solutions rather than problem definitions, believing that “I already know what the problem is.” Failure to observe and consider trivia and to investigate the obvious prevents individuals from finding a balance between narrowing the problem too much (missing the “big picture”) and broadening the problem too much (not breaking it down into small enough sub-problems). This shortcoming can be further fuelled by people’s inability to sufficiently use imagination to connect seemingly unrelated matters and synchronize logic, sequencing and imagination.

Finally, and perhaps most important, Rittel’s approach to wicked problems is too restrictive in another sense. Wicked or not, the word “problem” has been defined in many ways. One way is as a gap between the present and some desired state of affairs (Evans, 1991) (B7). However, the word “gap” can carry a positive, negative or unknown connotation, providing three different views. A positive gap exists when a fine opportunity is sensed for an innovative product or procedure which will move the state of affairs upward, higher than the present baseline even when the present baseline is satisfactory or the best seemingly possible. For example, Land (1972) (B8) attributed his Polaroid camera invention to his ability to discover and define a problem where seemingly no problem existed. A negative gap exists when there has been a drop in performance below a baseline that needs to be corrected. An unknown gap exists when our base state of affairs has been or soon will be wiped out by environmental changes beyond our control. I suppose that any of these three types of gaps could contain wicked problems or non-wicked problems. In the end, however, the only safe way is not to prematurely decide if it is one or the other, but instead defer judgment and define the problem after fact finding.
4

GK VanPatter: Min seems to be suggesting an alternate model. In several ways it is a suggestion that strikes to the heart of the entanglements here. By that I mean it suggests that other models existed and exist outside of what is depicted by Rittel as Generation One and Generation Two. I believe this is an important piece of the puzzle. More on this momentarily.

I can see we are rapidly entering some mind-bending terrain here. Of all the innovation-related subjects (historical and current) explored during the many NextD Journal conversations completed to date, the conceptual complexities that surround Horst Rittel and wicked problems have to be among the most discombobulated and complicated. I am so glad that the two of you are here to help make sense of this complexity. 😊

Be patient with me for a moment while I try to do some declumping. I believe we still have numerous oranges mixed with rabbits here.

Anyone doing a Google search of the term “wicked problems” today will find 1,420,000 references. At least on a superficial level, the terminology of wicked problems seems to be everywhere right now. In the marketplace and in academia, we see professionals from various disciplines picking up on the terminology of wicked problems by referencing the term. Some consulting firms are even incorporating it into corporate branding messages.

Part of the reason for the current popularity of the term itself is likely because there is finally growing recognition that the pressing challenges facing our planet are increasingly complex and fuzzy. Media coverage of global warming, films such as Al Gore’s “An Inconvenient Truth” and popular new books such as Alex Steffen’s World Changing / A Users Guide to the 21st Century are helping to raise awareness among the public of the global-scale challenges facing humanity. For better or worse, the term “wicked problems” has become a catchy headline phrase, synonymous with a general awareness among the public that these kinds of looming large-scale problems exist.

In parallel to rising problem awareness, various communities, including the business community and the design community, are seeking to become more actively involved in helping to address large-scale social and other complex challenges like never before.

One of the reasons why we are having this conversation is because we recognize that there is a huge difference between acknowledging that highly complex fuzzy challenges exist and having the tools, methods and skills to grapple with such challenges in tangible ways.

With this in mind and in the interest of sense-making, what I would like to do here is start to separate the term “wicked problems” from the notion of tools, methods and skills. Obviously describing problem types and having tools and skills to address them are three different things.

So far in this conversation I can see at least five interconnected layers that combine to create a rather mind-bending effect for any of our readers trying to figure out what exactly is going on: 1. There are geographic school of thought differences.
2. There are background/discipline perspective differences. 3. There are numerous time-related disconnects. 4. I believe there are also several instances of logic creep. 5. I can see at least one strawman argument construction as well. Without too much trouble we could burn up the remainder of our conversation time by focusing on any one of those five streams. Some might be more valuable to our knowledgeable readers then others.

All things considered, I would like to do something difficult here and try to reach into the foundation of the complexity; otherwise our readers will not be well served by the three of us getting together. It occurs to me that “1. geographic school of thought differences” not only connects to our conversation here, but also underlies much of what occurs in the literature after Rittel’s *Dilemmas* appeared in 1973. Since this represents relatively unchartered territory, taking this route might be a bit of a bumpy road, but let’s try it.

It is no secret that anyone researching the history of creative problem solving, innovation and/or design methods will eventually end up encountering two central historical thought leadership universes that seldom seem to acknowledge each other. In Rittel’s writings, such omission can be found in the sense that he often reflects a surprisingly narrow (some might say convenient) understanding of creative problem solving and never seems to acknowledge that there was, at the time of his writing, a whole alternate universe of creative problem solving thought leadership outside of the narrow definition against which he chose to build his argument. We call this not so little hiccup the “Buffalo-Berkeley divide” It is essentially a gulf between two thought leadership universes.

Of course, the parallel universe unacknowledged in Rittel’s 1973 writing was referenced earlier in this conversation by Min. This universe was/is located on the East Coast of the United States and centered on the Creative Education Foundation that was founded by Alex Osborn within the University of Buffalo in 1954. It is in that universe where numerous thought leaders had for many years prior to the appearance of *Dilemmas* been working in the realm of human–centered applied creativity and creative problem solving, specifically on forms of process that were much different than traditional engineering or those of traditional science. No reflection of this parallel universe can be found in Rittel and Webber’s *Dilemmas*. Instead what we see in *Dilemmas* is an argument constructed against a specific depiction that is then artfully framed sequentially as Generation One and Generation Two.

In the literature and in real life, the Buffalo-Berkeley universe divide seems to work in both directions and remains with us today. The two universes have their own thought leaders and often have blind eyes to each other. For example, I have in front of me a 400+-page volume entitled *The Creative Problem Solving Source Book / A Fifty Year Digest of Proven Innovation Processes*, edited by Sidney J. Parnes and published in 1992. For those aligned with the East Coast thought leadership universe, this is an important historical book spanning fifty years of innovation process-related history. It contains no reference to Horst Rittel, Melvin Webber, wicked problems, wicked problem solving or Berkeley.

For reasons unknown, these two centers of thought leadership seldom appear in each other’s histories. With the exception of Herbert Simon and a few others who are recognized in both universes, each has its own distinct set of officially recognized historical characters, as well as those who subsequently build on their foundations.
While numerous commonalities exist between the two universes, including an interest in being human-centered, they each had/have very different roots, beliefs and precisions. At the core of the Buffalo universe is the belief that all humans have the capacity to be creative. At the core of the Berkeley universe is the belief that humans have conflicting interests and objectives.

No meaningful conversation can occur related to the history and state of applied creativity and creative problem solving process mastery in the U.S. without acknowledgement of these two universes. Unfortunately, much of the wicked problems literature, historic and contemporary, is fatally flawed in this regard. There is a certain irony in that much of the subsequent literature oversimplifies context by omitting half the historical picture while simultaneously stressing the need to recognize complexity!

With sense-making as our goal, here at NextD we are focused on the future, but we recognize that futures are often built on the past. Since the Buffalo-Berkeley universe divide cascades forward into much of the contemporary literature, it continues to play a significant but largely unrecognized role in writings and discussions regarding applied creativity, creative problem finding/solving, organizational transformation, innovation, strategic design and wicked problems even today. Perhaps here in this conversation we might open a small window between these two universes.

In order to better understand the level of Rittel wicked problems complexity that cascades forward into the realm of today, I am going to ask you to take a look now at three pictures. Picture A is a brief look at Rittel and Webber in context and in action doing problem finding. Picture B and C are examples from contemporary literature of others building on Rittel’s logic constructions and/or the unacknowledged Buffalo-Berkeley universe divide.

**Picture A**

Horst Rittel and Melvin Webber were at the time of their most well-known writing based in Berkeley at the University of California. They were active in the realms of city planning and what was at that time the emerging science of design. Horst Rittel had previously taught at Ulm, a leading highly experimental design school in Germany that was primarily physical object bound. The types of challenges focused on at Ulm were relatively framed and the scale was primarily products and product interfaces.

When Rittel and Webber wrote *Dilemmas* in 1973, Rittel was a professor of Science of Design and Webber a professor of City Planning at the University of California where they were working on city/urban planning-related issues. They became interested in the interconnected fuzzy social challenges that are embedded in any kind of large-scale urban planning exercise. This was the door through which they entered the arena of highly complex fuzzy problem solving. It is likely that the alternate patterns they were aware of at that time are revealed in their analysis of existing urban planning conditions. It is no secret that *Dilemmas* is chock full of criticism of the urban planning approaches that existed at that time.

At its core, their often-sited *Dilemmas in a General Theory of Planning* is essentially a differencing manifesto rather then a sense-making one.
Underneath the theoretical terminologies can be found at its most basic level a rather
straightforward suggestion that engineering and science have failed and that a new kind
of approach to urban planning-related challenges is required. It is primarily against the
depiction of their competitors (i.e., traditional engineering and science) that Rittel and
Webber do their differencing. To explain that differencing, they created the linear
taxonomy of Generation One and Generation Two.

Where the picture starts to get more complicated is when Rittel and Webber begin
moving from the specific to the general. By that I mean they begin Dilemmas focused on
urban planning and then seem to extrapolate into the larger realm of creative problem
solving in general. I think it is interesting to note that in subsequent years much of the
building on the wicked problems model by others jumps off from, not the specifics of
urban planning, but rather the more generalized extrapolations. In the years since it first
appeared, considerable additional extrapolations have been built on the extrapolations
found in Dilemmas. Many of those who seek to articulate differences between
engineering, science and design still site the Dilemmas piece. Those differencing efforts
often overlook the Buffalo-Berkeley universe divide. Those narratives, most often being
driven by academics, typically overlook the harsh reality that the innovation-enabling
marketplace today contains not two or three, but rather a multitude of disciplines and
players.

If we apply our sense-making logic to Dilemmas, what emerges is the realization that
there are really two parts to it. In the first part, Rittel and Webber are engaged in problem
formulation and in the second, part solution formulation. Looking at Dilemmas
proportionally, it becomes clear that most of the text (by that I mean most of their
expressed thoughts) are focused on the former: forming problems with much less
detail around the latter – formulating solution options. Following are a few examples of
Rittel and Webber engaged in problem formulation.

The kinds of problems that planners deal with – societal problems – are inherently
different from the problems that scientists and perhaps some classes of engineers deal
with. Planning problems are inherently wicked.

The search for scientific bases for confronting problems of social policy is bound to fail
because of the nature of these problems. They are “wicked problems” whereas science
has developed to deal with “tame problems.”

The problems that scientists and engineers have usually focused upon are mostly “tame”
or “benign” ones. As an example, consider a problem of mathematics, such as solving
an equation; or the task of an organic chemist in analyzing the structure of some
unknown compound; or that of the chess player attempting to accomplish checkmate in
five moves. For each, the mission is clear. It is clear in turn whether or not the problems
have been solved. Wicked problems, in contrast, have neither of these clarifying traits,
and they include nearly all public policy issues – whether the question concerns the
location of a freeway, the adjustment of a tax rate, the modification of school curricula or
the confrontation of crime.

The difficulties attached to rationality are tenacious, and we have so far been unable to
get untangled from its web.
This is partly because the classical paradigm of science and engineering – the paradigm that has underlain modern professionalism – is not applicable to the problems of open societal systems. One reason why the public has been attacking the social professions, we believe, is that cognitive and occupational styles of the professions – mimicking the cognitive style of science and the occupational style of engineering – have just not worked on a wide array of social problems. The lay customers are complaining because planners and other professionals have not succeeded in solving the problems they claimed they could solve. We shall want to suggest that the social professions were misled somewhere along the line into assuming they could be applied scientists – that they could solve problems in ways scientists can solve their sorts of problems. The error has been a serious one.

During the industrial age, the idea of planning, in common with the idea of professionalism, was dominated by the pervasive idea of efficiency. Drawn from 18th century physics, classical economics and the principle of least-means, efficiency was seen as a condition in which a specified task could be performed with low inputs of resources. That has been a powerful idea. It has long been the guiding concept of civil engineering, the scientific management movement, much of contemporary operations research, and it still pervades modern government and industry. When attached to the idea of planning, it became dominating there, too. . . . Because it was fairly easy to get consensus on the nature of problems during the early industrial period, the task could be assigned to the technically skilled, who in turn could be trusted to accomplish the simplified end-in-view. Or, in the more workaday setting, we could rely upon the efficiency expert to diagnose a problem and then to solve it, while simultaneously reducing the resource inputs into whatever it was we were doing.”

By now we are beginning to realize that one of the most intractable problems is that of defining problems (of knowing what distinguishes an observed condition from a desired condition) and of locating problems (finding where in the complex casual networks the trouble really lies).


Before we move on and look at Pictures B and C, I want to ask you for your impressions of this logic. Does the problem formulation in Picture A make sense from your perspective? Does Picture A represent a strong foundation to build generalized principles and approaches to creative problem/opportunity finding/solving?

Jeff Conklin: I would like to start my response by making a confession. I have not studied the field of design theory. I have read a few books, but I am far from an expert in the evolution of design theory and practice. I stumbled into the field in the mid 1980’s when I was doing research in new tools and approaches for software engineering. The head of the research program, Les Belady, had known Horst Rittel at some previous time in their professional lives. Belady invited Rittel to come to Austin and tell us about his IBIS (Issue Based Information System) structure for design conversations.

I still remember Rittel’s talk that day as a turning point in my career, because in addition to providing us with a simple structure for capturing design rationale,
Rittel gave us a way to understand why the software engineering profession was so fixated on the linear "waterfall model," and why that model so consistently failed. Large software systems were wicked problems, but the software engineering kept treating them as tame!

Our excitement with Rittel's ideas was bolstered by independent cognitive science research suggesting that the design process was "opportunistic," not linear. Since then, I have given hundreds of talks on the concept of wicked problems and opportunity-driven problem solving to a wide range of audiences. In most cases, the feedback I get is a sense of excitement and liberation, particularly among seasoned professionals. The problems and failures of projects they have worked on all their lives are not simply due to incompetence and mismanagement, they are due in part to slavish organizational devotion to a linear, "scientific" process. Ironically, the waterfall model is still alive and well in the practice of software development, and the message about wicked problems as relevant as ever.

I apologize for the personal story, but I want to be clear that my credentials to speak about design theory come only from my personal experience, mostly in a high-tech context for the past 20 years. I was not aware of the Buffalo school of thought. I'm just learning about it in this conversation.

That said, let me try to respond to the question, "Does the problem formulation in Picture A make sense from your perspective?" I am assuming that Picture A is a summary of the "Dilemmas/Berkeley" view of the challenge for the design field.

As a practitioner in the field, I find that Picture A still makes sense. For me the distinction between Generation One and Generation Two anticipated and points to the paradigmatic shift from "modern" to "post-modern" thought. As I said earlier, "Rittel understood that solving a wicked problem is more emergent and interactive that any prescribed linear sequence of steps can deal with." A Generation Two approach to wicked problems would include tools and skills for making conversations among diverse stakeholders more effective and successful. I imagine that the readers of this journal are quite sophisticated, and that the Dilemmas characterization of Generation One may seem exaggerated or even disingenuous. In my experience, however, Generation One is not a strawman. It is a real world view held by many senior managers and executives and it shapes how they plan, organize, resource, and run projects.

Indeed, in this regard I am struck with one part of Basadur's response to the previous question.

He seems to accept that the linear model is flawed, but his adjustment of the model is to add some sophistication to the problem definition phase, so that you define the problem "correctly" before proceeding with a linear solution formulation process. This appears to be a classic Generation One approach. If the difficulty with a linear design process is problem definition, then you simply work harder and better at defining the problem precisely before proceeding to the solution.
In contrast, the direction in software development practice is more representative of a Generation Two approach. You accept that you won’t understand the problem until you’ve created a solution, so you start writing code and building and testing prototypes very quickly in short iterative cycles with users deeply involved in the process from the beginning. The problem formulation evolves and emerges in parallel with the solution formulation. That’s what makes the process non-linear.

"Does Picture A represent a strong foundation to build generalized principles and approaches to creative problem/opportunity finding/solving?"

Again, I am out of my league in addressing this question. I certainly can’t comment on how the Berkeley school compares to the Buffalo school in providing a foundation. My sense is that Dilemmas is best understood as a manifesto, and Generation One as a characterization of a kind of bias towards rationality and blindness to social complexity and the politics of design. As you say, GK, it is a differing paper, and so has probably had a polarizing effect in the field of design. And, as you say, it was long on problem formulation and short on solution formulation. The Berkeley school’s solution formulation appears to be "argumentation," and that’s about it.

But from a post-modern perspective, the idea of focusing on the conversations and relationships among the stakeholders is everything. Rittel’s IBIS was a significant contribution to the art of dealing effectively with social complexity, perhaps even building toward a science of creating shared understanding among stakeholders.

The term "argumentation" is unfortunate. It suggests people angrily shouting at each other. I don’t use the term much. But in an academic context it is a branch of rhetoric and can be defined as “the interactive process of forming reasons and drawing conclusions to resolve some matter” (D. O’Keefe, “Two Concepts of Argument,” Journal of the American Forensic Association, Vol. 13, pp. 121-128, 1977) Rittel’s IBIS is a simple rhetorical grammar for inquiry and deliberation that fits nicely with the moves being made in design and problem solving conversations.

The intention is to help the participants communicate more clearly and effectively about complex sets of issues. The IBIS approach does not focus on creativity or innovation. Rather, it assumes that if you remove the barriers to communication and shared understanding then creativity shows up quite naturally, along with all of the other aspects of intelligence, both individual and collective intelligence.

Min Basadur: You are absolutely right, GK, that there are others who have long studied wicked problems or whatever subject of which wicked problems is a subset or vice versa. For example, if you enter “creative problem solving” into a Google search, you find 4,150,000 references. If you enter “creativity,” you find 67,600,00; for “creative thinking,” you find 74,200,200; for “problem solving,” you find 78,800,000; for “complexity” you find 93,900,000, and you will find 1,060,000,000 for “design.” Bottom line, there are numerous people and groups independently studying this subject or subjects.
Because the subject is so ill-defined and jargon-laden, it is virtually impossible for anyone or any of the various groups to corral all of this thinking. The various thinkers in this field also have all they can handle to push their concepts past other academics who are engrossed in their own pet projects, most of which concern much better defined fields of endeavor by the way.

I think what we are talking about is really the subject of “thinking about thinking.” Most of education at every level up until recently has focused on “content” – learning facts or what is known about a particular subject, say biology. More recently, there has been an emergence of interest in focusing on “process,” that is HOW we think instead of WHAT we think.

Most people never “think about thinking.” Those who do usually discover the subject just as Rittel and Webber apparently did: by experiencing the real world and discovering that the people working in a particular field with them are using thinking methods that fall way short of what is required. They happened to be wrapped up in the particular content of urban planning. I had the same experience when I joined Procter and Gamble’s product development department after completing my degree in Engineering Physics. When you join a large successful organization as a young green person, you naturally assume that everyone really knows what is to be done and your job is to learn those things as quickly as possible. What you discover is that the organization is really only a collection of individuals doing the best that they can with what they have at the present time.

I ran into many excellent thinkers in my work, but was sometimes frustrated in getting accomplished what I considered very simple problem solving when I ran into what I later began to understand as “linear thinking.” These thinkers were by and large excellent engineers, but many had little interest in the “larger picture.” Their interest lay more in analyzing and optimizing a small piece of the picture and only that part that concerned their own “silo” (department or sub-group). I began to sense only later that I was more of a “horizontal thinker” in an organization where success had depended on “vertical thinking,” i.e., executing a successful formula consistent from the top down.

GK, this is what you termed moving from the specific to the general. The only way I became interested in the subject of “thinking about thinking” was by becoming AWARE of its existence and importance by my discovery experiences. I later began to slowly realize and comprehend that many outstanding colleagues at P&G had become successful by executing the well-defined process they had learned and been trained in for selling or marketing or manufacturing or R & D, etc. When they ran into a totally different situation, such as managing entering into an entirely new business, they sometimes failed because they had never been in (or learned from) any important situations requiring what I later began to understand as “strategic thinking.” That is, figuring out WHAT needed to be done differently, not HOW to execute the old formula that had worked well in past routine situations as they climbed the ladder.

An expression that comes to mind is the “definition of basic research.” “Basic research is what I am doing when I don’t know what I am doing.”
To be an excellent, more complete thinker, that is to be able to grapple with wicked problems, requires the ability to recognize and be aware that that you may not know what you are doing before running off and doing something (more often than not, a “wrong thing”). Once I discovered that there were real gaps in the ability to think among very smart people, I became excited about being able to make a meaningful contribution to something important, and have made a career out of attempting to simplify this fuzzy field. I have tried to build a few simple frameworks to integrate the key unifying principles most of the approaches and models all converge upon.

So here goes. In a nut shell, there are two kinds of problems: simple and complex (wicked, if you like). The two co-exist in every field of endeavor. Complex problems require substantial definition and often across numerous dimensions. Simple problems need little or no definition or redefinition. Some people try to explain this difference by referring to and stereotyping specific fields of endeavor. For example, engineering is often seen as preoccupied by responding to well-defined problems with optimized solutions. This may be true in many cases, but great engineers are often faced with much fuzzier tasks and also have the ability to redefine even supposedly clear-cut given situations for breakthrough advances.

Engineering work often requires the ability to manage complex projects in uncharted or even unknown territory involving multiple stakeholders; hidden challenges; fuzzy, incomplete, incorrect information; and self serving interests to name a few. Scoping out a new engineering project is one of the most complex and wicked problems one will encounter. This challenge is very similar in nature to challenges of trying to get issues of public policy, political prioritization, urban planning, climate change, poverty, etc. even mobilized, never mind resolved.

Real science is focused on understanding complex, unknown situations. My colleagues and I call this the conceptualization portion of the creative process (or the creative problem solving process, or the innovation process, or the wicked problem solving process, etc.). Einstein said that the real essence of science is the creative formulation of problems and looking at them from new angles. Solving problems already formulated was relatively easy, an exercise of mere mathematical skill.

I think it is a gross oversimplification to say one field or another is more absorbed with complex or simple problems than another. In addition to what I mentioned above, to say so would violate the fundamental truth that complex problems tend to be multi-disciplinary and multi-dimensional. However, there are additional gaps in our grasp of “thinking about thinking.” There is more to the creative process than the conceptualizing and optimizing stages discussed above.

GK VanPatter: Following are two examples of contemporary literature that seek to connect into and build on the wicked problems model. Picture B and Picture C were created seventeen years and thirty-three years after Dilemmas in a General Theory of Planning was first published.
PICTURE B: Created by Dr. Richard Buchanan in 1990.

The “wicked problems” approach was formulated by Horst Rittel in the 1960’s when design methodology was a subject of intense interest. A mathematician, designer and former teacher at the Hochschule fur Gestaltung Ulm [School], Rittel sought an alternative to linear, step-by-step model of the design process being explored by many designers and design theorists. Although there are many variations of the linear model, its proponents hold that the design process is divided into two distinct phases – problem definition and problem solution. Problem definition is an analytic sequence in which the designer determines all of the elements of the problem and specifies all of the requirements that a successful solution must have. Problem solution is a synthetic sequence in which various requirements are combined and balanced against each other, yielding a final plan to be carried into production.

In the abstract, such a model may appear attractive because it suggests a methodological precision that is, in its key features, independent from the perspective of the individual designer. In fact, many scientists and business professionals, as well as some designers, continue to find the idea of a linear model attractive, believing that it represents the only hope for a “logical” understanding of the design process. However, some critics were quick to point out two obvious weaknesses. One, the actual sequence of design thinking and decision making is not a simple linear process, and two, the problems addressed by designers do not, in actual practice, yield to any linear analysis and synthesis yet proposed.

Rittel argues that most of the problems addressed by designers are “wicked” problems.

As described in the first published report of Rittel’s idea, wicked problems are a class of social system problem which are ill-formulated, where information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are confusing.

This is an amusing description of what confronts designers in every new situation. But most important, it points toward a fundamental issue that lies behind practice – the relationship between determinacy and interderminancy in design thinking. The linear model of design thinking is based on determinate problems which have definitive conditions. The designer’s task is to identify those conditions precisely and then calculate a solution. In contrast, the wicked problems approach suggest that there is a fundamental interderminancy in all but the most trivial problems – problems where Rittel suggests, the “wickedness” has already been taken out to yield determinate or analytic problems.

To understand what this means it is important to recognize that indeterminacy is quite different from undetermined.
Indeterminacy implies that there are no definitive conditions or limits to design problems. This is evident, for example, in the ten properties that Rittel initially identified in 1972.


PICTURE C: Created by Dr. Klaus Krippendorf in 2006.

“The difference between science and design needs to be addressed. [Herbert] Simon states it in simple terms. “The natural sciences are concerned with how things are . . . design, on the other hand, is concerned with how things ought to be, with devising artifacts to attain goals” (Simon 1969/2001:114). The fundamental problem that designers are to solve, he suggests, is how to change an existing situation into a preferred one. Defining design as problem solving is common, but commits designers to a technical rationality that is at home largely in engineering. It conveniently bypasses the qualifications suggested above. Simon’s background in computer engineering and early cognitive science leads him to distinguish science and design in terms of the logic they respectfully employ. In the natural sciences, he observes, the standard propositional and predicate calculi, which are able to state or deny factual truths, serve their researchers well. Designers, however, are concerned not with factual truths, but with what should be. Replacing “is” with “should be” makes all the difference. “Should” statements are imperatives, and the logic underlying the design discourse. Simon conceives synthesis as enumerating alternative solutions and evaluation as using optimizing techniques to identify the best or a satisfactory solution. This process manifests his technical rationality in action. It works where problems are clearly defined and the solution space is finite, which often is the case in engineering.

Simon’s technical rationality extended simple engineering conceptions to larger design problems in defense systems, R & D efforts, National Aeronautics and Space Administration (NASA) projects and operations research. But it started to falter when applied to city planning, the design of corporate strategies, and even consumer goods. Not only does Simon’s rationality assume consensus on what is to be accomplished, it also takes for granted that the outcome of the design process can be implemented by decree, similar to how the components of a mechanical system are installed. Technical rationality emerged as the mode of operation in the industrial era, is typical of how engineering problems are solved, and is still practiced in tight organizations – in the military, for example, or in bureaucracies where users can be trained, correct use can be enforced, and dissenting voices are unheard of. Technical rationality is at home in coherent social hierarchies. But it fails when applied to problems that involve people as informed agents, in heterarchical forms of organizations like markets. In cities, for example, design typically improves the lives of some at the expense of others.
Interest groups may be looking for particular outcomes and try to define the problem to their advantage. In the marketplace, consumers make informed choices that cannot be understood in mechanical terms.

Under these conditions, technical-rational problem solving breaks down and design must proceed differently.

Horst Rittel (Rittel and Webber, 1984) made the shift from top-down technical problem solving to a conception of design that accommodates the participation of stakeholders. Working with planners of large social systems, he soon recognized that Simon-like problem solving could not provide guidance where intelligent humans – individuals, organizations, and communities – with interests in a design are involved. He called problems of a technical nature “tame” problems in contrast with what he identified as “wicked” problems, and he anticipated several of the issues that The Semantic Turn is now addressing. For example, he observed that in the social realm, problems are never solved (and thereafter forgotten). They more likely involve conflicts that may be resolved by consensus – only to resurface later on as other kinds of conflicts, calling for further resolutions, and so on. In the social domain, stakeholders typically invest in the outcomes of design processes – in their own future. Coming to a consensus on what the wicked problem is is the problem. His [Rittel's] design conception moves argumentation into its center, making language and discourse the ultimate arbiter of what is desirable, achievable and will be done.


I appreciate your patience with this lengthy text and these difficult questions. In these three brief excerpts one can get a glimpse of the entanglements cascade that exists today around wicked problems. Does any of this make sense to you?

I am sure our readers would be curious to hear each of your expert perspectives on the logic of Picture B and Picture C.

**Jeff Conklin:** Picture B tries to get at the issue of indeterminacy of problem conditions, and suggests that Rittel's problem wickedness has more to do with the conditions being indeterminate, not just simply undetermined (as in not yet determined). This view again reveals how far ahead of his time Rittel was. He was really quite post-modern in his thinking. I think if he were still alive he would say that conditions (or parameters) of problem formulation are at least under-determined, if not undetermined. And again, he is trying to identify an industrial age approach (a Generation One approach) to problem formulation that implicitly says:

1. There is a problem
2. The dimensions/conditions of the problem can be determined/defined
3. Thus the problem can be objectively defined

From a post-modern perspective, there is no such "thing" as a problem. Problems are not things which can be objectively known and defined. A problem statement is an interpretation of a situation by a human observer. Problems and problem definitions only come into existence because someone declares a condition to be a problem. The conditions of the problem are thus a subjective matter.

In short, problem conditions are "undetermined" exactly because they are a matter of language and interpretation. What the problem is depends on who you ask. Picture B suggests that we can treat social problems like physics problems, by carefully carving out what is known (i.e., determinate) about the problem. I prefer to work from the assumption that a group of stakeholders can negotiate a problem formulation that they all agree to work from, but, as a statement in language, it doesn’t make any sense to describe that description as indeterminate versus undetermined.

Picture C makes more sense to me. I think that’s how Rittel would talk about problem wickedness today. Picture C refocuses the design process on human interaction as informed agents embedded in a context of interests, concerns, and meaning making. Problems are neither formulated nor solved in any final sense. The "rightness" of a problem formulation is determined by the range of stakeholders who are willing to come together in that context for dialogue.

Argumentation – as a kind of rigorous discourse process – becomes a powerful tool in mitigating some of the most dysfunctional patterns of stakeholder interactions when the stakes are high and the number of stakeholders large. Argumentation supports the intellectual integrity required for the creation of common ground. Creativity, insight, and innovation emerge spontaneously as the fluorescent by-product of shared understanding and shared commitment.

Min Basadur: We know from our collaboration work with your NextDesign Leadership Institute that times have radically changed in the design industries. In earlier eras, business clients would often tell designers exactly what they wanted and designers would figure out how to execute the assignment. I know that you describe this as the “brief business” where clients write up and frame challenges in the form of “design briefs” that are then addressed by designers. Considering the rising complexities of the modern world, it is not surprising to see a significant shift underway in many industries, including design. We understand that increasingly today design clients DON’T know what they want. They know they need something, but that’s it. More importantly, clients arrive thinking that they know what they want, but it turns out to be not the right thing at all. As you have been pointing out for some time in this journal, this represents a significant shift and great opportunity for designers.

This shift in client needs requires new design skills, e.g., helping clients figure out what they should want. In other words, formulate the right challenge, (or reformulate the initial assumed challenge) for the client, and let the solution fall into place. This can only be done well by involving the client in the process, since the real [content] knowledge resides within the client.
VanPatter (2002) suggested here in this publication that the traditional skills and tools of design have historically been engaged after challenges had been framed, often by others. As in my story about managers at Procter & Gamble, if a designer’s old role was to figure out HOW, but now the demands of their new role includes helping others figure out the WHAT, it is likely that new skills will be required.

From my perspective, Albert Einstein was not only the consummate scientist of our time, but also that he understood design perfectly. He held that problem definition is much more important than problem solving for true advances in design as well as in science.

This leads me to your questions regarding Pictures B and C. Anyone who says problem definition is an analytical sequence truly is out of touch with the real world. Questions of ownership and motivation and open mindedness and honesty muddle the waters tremendously. If you cannot elicit the real and sometimes buried facts around these issues, there is no chance you will come up with what "should be." Problem definition is anything but an analytical sequence in design or any other activity involving problems requiring creativity. Often missed by academics engaged in argument construction is the recognition that analytical problem solving is different from creative problem solving.

Only for purely analytical problems is problem definition rational and sequential. This usually means finding the root cause of a well defined beginning situation for which concrete facts exist or can be uncovered to pinpoint what went wrong. Once discovered, the root cause can be eliminated by an optimal (or sub-optimal) solution to restore things to their original state. No imagination is required for this kind of problem definition. This is called analytical problem solving.

Questions of ownership, motivation, open mindedness, conflicting objectives and interests, ambiguity, and honesty do not normally muddle the waters nearly as much in analytical problem solving as they do in creative problem solving, especially complex or wicked problems. So I agree, of course, with Rittel that problems faced by designers are in this sense often wicked problems. Smart designers (and consultants, leaders, and other change facilitators) involve their clients directly in problem definition work, digging out the key facts, feelings, emotions and buried desires and challenges of the clients (stakeholders) and getting them to reach crystal clear consensus on the problem(s) – that is, the challenges and opportunities they are really trying to solve or to which they aspire. The imagination is critical here.

In Picture C, the author states: Designers, however, are concerned not with factual truths, but with what should be. Replacing “is” with “should be” makes all the difference. “Should” statements are imperatives, and the logic underlying the design discourse.

From our perspective, the term “should be” is prescriptive. In the challenge defining work that we do, we use “might be” not “should be.”
This permits divergence to be maintained until sufficient understanding is reached to create a collaborative array of significant, mutually acceptable challenges.

In our work, we involve clients in co-creating aspirational statements of challenge (“How might we...?”) to create the “preferred” situation that Simon (B9) seems to be talking about.

While the Picture A Rittel model centers around activity described as “argumentation,” we have a very different point of view. We recommend what is likely the opposite of “argumentation,” that “nurturance of different points of view” is the secret. In our experience, creativity in thinking up exciting challenges includes accepting all important ones (to the stakeholders) for big picture mapping which then relates all the critical challenges together (B10). This big picture thus honors all points of view as legitimate and permits distinct individual challenges to be selected (and sometimes redefined). It permits “expansion of the pie” (B11) and facilitates creative solutions that satisfy what formerly seemed to be conflicting objectives. This co-creation approach is very different than coming in and announcing to people what “should be.”

There is something else here, too. In the final paragraph of Picture A above you quoted Rittel and Webber’s Dilemmas in a General Theory of Planning (1973). They said:

*By now we are beginning to realize that one of the most intractable problems is that of defining problems (of knowing what distinguishes an observed condition from a desired condition) and of locating problems (finding where in the complex casual networks the trouble really lies).*

Here’s the question: What happens when there is no “desired condition”? What happens when no one “observes” a condition?

Life would be much easier if formulating wicked problems was confined to people handing us an “observed condition,” and also handing us a “desired condition” and asking us to get consensus on a definition of how to get to the second from the first. This is an incomplete conception of problem formulation. My research suggests a more complete conception of problem formulation and wicked problem defining and solving in the form of a four-stage cognitive process model.

Our research indicates that the successful leaders of the 21st century, be they designers or politicians or managers or concerned persons of any type, are going to have to be able to do more than just get important problems properly defined. They are going to have to generate such problems first and excite others about taking them on. This we call problem FINDING (as distinct from problem defining), and represents the first stage of our four-stage model. This is the stage that Al Gore is in right now with his “An Inconvenient Truth” about global warming efforts. From our perspective, that is a great example of a fuzzy situation.

Generation, that is problem finding, means continuously and deliberately discovering new and useful problems to be formulated, solved and implemented.
Kabanoff and Rossiter (1994) cited problem finding as one of the most vital and difficult frontiers for creativity researchers – a “messy” concept that is hard to define and use. Problem finding is a crucial element of creativity, especially real-world creativity in applied settings. It means discovering new problems for subsequent definition. This is similar to what Simon (1977) called “opportunistic surveillance.” Guilford (1950) stressed the importance of “sensitivity to problems” and related it to our everyday notion of curiosity. Others have emphasized that discovering new important problems to solve and implementing new solutions is as important as or even more important than creating the new solutions. (Mackworth, 1965; Livingston, 1971; Getzels, 1975; Leavitt, 1975; Simon, 1960; Levitt, 1963; Ackoff, 1979). Basadur (1979) and Basadur, Graen and Green (1982) provided empirical evidence that attitudes, behaviors and skills associated with problem finding were distinctly different from those associated with problem solving.

People tend to wait for others to find problems for them to solve rather than take the initiative to seek out or anticipate problems, changes, trends and opportunities for improvement or innovation. Rarely does anyone in business, industry and government precisely define your assignment. This provokes some frustration and anxiety in many people trying to adjust to continual, accelerating change. How to live with the anxiety of not knowing what you are supposed to do in uncharted territory? In organizations, people often will not raise, and indeed do their best to avoid, important problems that cut across organizational functions and department lines: “That's not our problem.”

They tend to overlook “unsolvable” problems and concentrate instead on simpler concerns. Often people assume prematurely that “it can’t be done” when they know too much about their work and fail to inquire further or challenge convention. Numerous historical examples exist in many industries.

Successful leaders in the 21st century are also going to have to get people involved in executing the fourth and final stage of our model, which is called Implementation. This may be the most difficult part of wicked problem solving. Even when difficult complex problems have been raised, defined, and solved, often nothing happens. The solutions do not get implemented. One reason is that often those most interested in their formulation are the least interested in making the actual changes happen. They assume someone else can handle this and that the implementation is self evident and relatively simple.

Another reason is that people are often afraid to implement their own creative solutions. They fear failure and the unknown (which is where their new solution will take them). They fear their solution is imperfect and will open them to criticism. Distrusting their superiors, associates and subordinates, and looking for the best route to compete, succeed and move ahead, they conform to accepted patterns. The need to belong and to learn the rules for achieving career success win out over the opportunity to make bold, risky decisions and the prospect of making mistakes. Who wishes to make a fool of themselves or of others?

People consider it impolite to be too inquisitive.
They hesitate to confess ignorance or to ask “why” about things that everyone else seems to know or accept. This leads to the “group think” phenomenon in team problem solving (Janis, 1971). In our present high-speed communications age, thought and change leaders must contend with a group of people loosely defined as “media” who are only too eager to jump upon any new idea or mistake to rip it apart and find blame, or at least oversimplify it and sensationalize a negative spin on a portion of the solution.

Kabanoff and Rossiter (1994) defined applied creativity as a process “occurring in a real-world, industrial, organizational or social context; pertaining to the finding or solving of complex problems; and having an actual behavioral creative product (or plan) implemented as the final result.” Working beyond “argumentation,” we believe that successful leaders will have to learn to synchronize individuals’ very different preferences for various stages of this four-stage creative process (called their process style) into everyday organizational work and life for tangible results and for motivation, job satisfaction and group interaction (Basadur, 1992; 1994; 1995; 2004).

See the mini presentation See Deeper! Think Smarter! on the NextD site: http://nextd.org/InnovationProfile/index.html

…Stay tuned for Part 2 of Rethinking Wicked Problems!

Copyright © 2007 NextDesign Leadership Institute. All Rights Reserved. NextD Journal text may be quoted and printed freely for non-commercial purposes with proper acknowledgment. If you wish to reproduce or transmit any of this text for commercial use, please send a copyright permission request to journal@nextd.org


(B3) Ackoff RL (1979). The future of operational research is past. J. Opl Res. Soc. 30, 93-104.


(B7) Evans JR (1991) *Creative Thinking in the Decision and Management Sciences*. South-Western Publishing Co., Cincinnati, OH.

(B8) Land E (1972). From Sean Callahan’s article Dr Land’s magic camera. *Life Mag.* 27, October, 42.

