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NOTHING TO LOOK AT
(How do we know what we know?)

Here we are, a group of design educators. Many of us who teach also practice. Most of us have emerged from formal design programs. Somehow we have managed to work successfully in our offices and intuitively impart design knowledge to our students in the classroom. I am suggesting that in our roles as educators, we make an attempt to clarify both how we know what we know and how knowledge is conveyed to our students. Scholarship in areas as diverse as architecture, cognition, and economics has provided us with considerable insight into knowledge theory (epistemology), though as graphic design educators we have tended to overlook these rich resources. It should be useful for design educators to better understand the generally unexamined process of what we do when we design, what we need to know as we teach design, and how we know what we know. Because this is about *how* we design and not *what* we design, there will be nothing to look at.

First, a few working definitions are in order. I make the following distinctions in place in context my use of the word “knowledge.”. Data is raw input. Information is organized data ready for use. Knowledge is the ability to use information. Wisdom is the ability to transfer and adapt knowledge. Professor of Architecture at the University of California at Berkeley, J.P. Protzen, distinguishes between research and design activities in the following way: through research we *reveal* what is already out there. Design, on the other hand, shows us how to *change* what is out there.

Most graphic designers and graphic design educators characterize the design process as one of problem solving. Unlike the hard sciences where one can know when a problem has been solved, design appears to be a much more complex, less explicit, activity. Although it is generally accepted in the hard sciences that rejecting a theory is conclusive and verification is inconclusive, in design activities we have no finite gauge even to reject a design. However, because of the cultural dominance of rationalist thought, design has remained sequestered by rationalism.

Some theorists have shown us that the rationalist assumption that design is problem solving is really a questionable one and that design activity needs to be differently understood. Horst Rittel, working at UC Berkeley and Universität Stuttgart in the early 1970’s, challenged the assumptions of first generation rationalism (problem-to-solution) in design. Rittel was interested in how designers reason. He developed what is now referred to as second-generation assumptions, a theory that addresses the uniqueness of design activities and rejects forcing design into a rationalist model that Rittel found unacceptable to design. “I contend that there are such characteristic commonalities which demarcate design from other forms of coping with difficulties.”¹

“Design as problem solving” can be traced in part to positivism’s profound effect on public consciousness, separating the mystical and religious from the factual and empirical. Originating with Auguste Comte (during the 1830s), positivism sought to eliminate speculation and concentrate on facts and that which was observable, rejecting the metaphysical.² The earlier rationalism of Descartes focused on pure reason as arbiter. Assumptions about “fact” are enormously seductive and design ultimately felt prey to science’s self-importance, embracing the first generation problem/solution paradigm. First generation assumptions implied that we could purely think our way through to a solution. Professors Greig Cryslar and Jean-Pierre Protzen at The University of California cogently describe first order assumptions to include: problems separable into discipline, divisible problems, focus on problem-solving, hierarchical knowledge base, separation between theory and practice, problems separable from solutions, explicit procedures to

solve problems, and the existence of a “best” solution. They point to the more appropriate second generation approaches, particularly based upon the work of Horst Rittel, to turn the first generation approach on its head and yielding almost polar opposites to the previous list. The latter approach presents design activity as the much more complex, non-linear process it is.³

If we use a typical Bauhaus object as an example, we might ask the question, “Will this teapot hold boiling water if it is made from porcelain?” And, with reasonable certainty, we could answer “yes.” But if we ask what it should look like, the possibilities are limitless. Designing the teapot would require a rather free-form dance among inspiration, intuition, technology and functionality, resulting in the welcome instability of praxis. It is this instability that allows for a series of different views of the task.

Before addressing Rittel’s position in greater detail, I would like to review several dictionary definitions of the word “problem.” They include: “1. Any question or matter involving doubt, uncertainty, or difficulty. 2. A question proposed for solution or discussion. 3. *Math.* A statement requiring a solution, usually by means of a mathematical operation or geometric construction. 4. Difficult to train or guide...5. *Literature.* Dealing with choices of action difficult either for an individual or for society at large.”⁴

Further dissection of the above definitions allow the following observations to be made. (1) This first definition is far too amorphous and looks like it can be applied to almost any vagary. (2) This second definition looks like it might work for design applications, but we should ask what precisely is the question and who is proposing it. (Can you help me? How can I do this? Have you done this before?) (3) This mathematical definition is the one that has adhered to design processes through the potentially erroneous act of casting design as scientific, linear process capable of producing a replicable outcome. If design has cloaked itself in the validity of simple mathematical linearity (acknowledging that much of mathematics is highly complex), this might be evidence of a clever public relations stunt, because as far back as the Enlightenment (marked by emphasis on human reason and rationality) and particularly since the Industrial Revolution, western countries have deified scientific views of the world. Rejecting the moniker of artist, western designers certainly sense science’s aura of credibility (theory/fact). These views have a black and white, early twentieth century German design certainty about them, confusing the precision of the artifact with the messiness of the process to design it. (4) This definition works when applied to people, not design activity. (5) The definition applied to literature actually makes the most sense for what I am proposing. Design is a method to get at good decisions that lead to actions.

Interestingly, another of my dictionaries lists only a single synonym for the word “problem.” That word is “mystery”⁵ and seems serendipitously related to what we have been doing both as practitioners and as educators. Perhaps it would be more appropriate to re-consider design as mysterious, if not defined literally as “mystery.” As a student, my own brushes with linearity, with design as science, are revealed in the following comments made to me by former professors. One, trained at the Bauhaus, informed my class that “There is but one solution to each problem.” Another asked me why I left architecture. I had assumed that at age eighteen I was too young, hadn’t experienced enough about the ways in which people live in order to begin to design spaces for them. His response was, “You’re wrong. If I could have had you begin your studies in architecture at age twelve, I could have made a good architect out of you.” Upon reflection, I realized that this comment was, for me, a defining epiphany about modernism, or at the very least, modernism misinterpreted, robbed of its inquisitiveness. It also implied a singularity of solution, splitting my collective experiences of the world from some external problem “out there” waiting to be solved.

Horst Rittel was responsible for separating design methods from what he presents as the incorrectly categorized activity of problem solving. His argument is based upon the idea that in order to solve a problem, a problem must be formulated. Design does not offer a problem, but rather defines what the problem is. So, the problem is less solved by design than it is identified by design. “Learning what the problem is IS the problem.”⁶ Design, he writes, is actually “plan-making” that takes place first “in the world of imagination, where one invents and manipulates ideas and concepts instead of the real thing – in order to prepare the real intervention.”⁷

Rittel redefines reasoning for designers, calling it “disorderly” not because it is sloppy thinking, but because it is constantly shifting. “There is no clear separation of the activities of problem definition, synthesis and evaluation. All of these occur all the time.”⁸ Seeing design activity as a form of argument, Rittel suggests that the designer needs to figure out his or her own position by asking a host of questions during the process such as whether a choice is productive, whether losses should be cut (i.e., go back to square one), and whether what is chosen can actually be accomplished. These constitute for Rittel what he refers to as deliberations, necessarily leading to judgements in which the designer has “made up his mind,”

at least at some point along the way. But forming a judgement is not a prescription for what is to be done next. Rittel suggests that designers have this enormous “epistemic freedom,” unlike politicians who feel compelled to seize on a fact and derive (correctly or not) a what *ought* to be done, however questionable this link between fact and action might be.⁹

Categorizing constraints as “what the designer does not want (chooses not) to change”¹⁰ is a distinctive definition. He does acknowledge that there are various factors such as personality, response to tradition, and conscience that play a role in how a designer “reasons.” He points to the influence of cognitive style that reveals someone’s preference for a visionary approach versus a more detailed, nuts and bolts approach. But all of these cognitive differences exist inside a social setting, ultimately making design a political activity.¹¹ If, as educators, we were to hold on to Rittel’s definition of constraint *as choice*, we would have a golden nugget to remind us about how we box ourselves in, and that other options do exist *if we choose them*.

A typical student may become interested in pursuing design some time during their mid-to-late teens as they begin to choose a focus for their higher education. The content of a student’s cumulative experience at that initial point of contact with design education is quite individual, having encountered formative events, including exposure to discrete sets of family, friends, education, media and geographical influence that constitute a significant part of who they are. The student then confronts formal design pedagogy which, more often than not, is institutionally specific, after having chosen a place to study design that resonated with them, most probably as the result of some visceral response. What follows once a student is embedded in an educational setting may be the most influential of innumerable external influences on his or her development as a designer.

Educational and personal influences derive much of their complexity as a result of flux and the unpredictability of individual receptiveness to new stimuli. The way in which a given design student views and represents the world is not static. Rather it is influenced by what they see, read, hear, learn and make. Influences do not yield uniform effects, and the process of living and learning is predictably only in its *dynamism*. Who we are today, in the sense of how we would respond to a project, is neither precisely who we were yesterday nor who we will be tomorrow. It is possible to re-visit the rationalist position that there is only one right solution to each “problem.” However, the statement needs further delineation: that there is possibly one solution, to one problem, defined at one moment in time, by one person. This does not, of course mean that if you are an architect and the city hires you to design a school that you design a firehouse. Most design projects have inherent, functional attributes and conditions that need to be embedded in what the artifact *in part* becomes. The bigger view of design, as Rittel sees it, might include how we respond to a supposed fact. If, he asks, that we are demanding more electricity than we can currently produce, is the design response to build more power plants (economic, or is it possible to figure out how to use less electricity (political)?¹²

The role of language in pedagogy has occupied many theoreticians. Design, in particular, relies on both visual and verbal language in practice and in the classroom. Donald Schön describes design as a “conversation with the situation (that) is reflective.”¹³ He uses the example of an architecture student in a studio environment who has been given a program to design an elementary school on a particular site. The site is steep and appears to be presenting constraints to the student which are not perceived in the same limiting way by the professor. No doubt in part the discrepant perceptions are a result of their respective experiences of the world thus far. The slope of the site is essentially antagonistic to the student’s experiences *to date* of what shape a classroom must be. I would add here that the student’s current level confidence (which will increase over time and with experience) also constrains the student’s understanding and ability to imagine what (else) can be. Here we might reiterate Protzen’s description that research reveals what is already out there and design reveals possibilities. The real pedagogical problem becomes unhinging the student’s connection to conformity that exists because conformity typically represents the path of least resistance (aesthetically, politically, economically). Students arrive in the classroom with exposure to what already exists and a passion to unleash what might be. In the above example, it is critical for the student not only to understand the particular possibilities, but to understand how to look at what is and envision what isn’t yet. Design is inside the head, waiting to be drawn out through the conversation. It is the crucial moment in design between taking in and giving out (and not necessarily in an anti- or a-historical way).

What transpires in Schön’s description of the reframing of the problem is the use of design language, which is conceived as both verbal language along with drawing. “Three dimensions of this process are particularly noteworthy: the domains of language in which the designer describes and

appreciates the consequences of his moves, the implications he discovers and follows, and his changing stance toward the situation with which he converses.”¹⁴

Because language is a central part of design classroom exchanges, it should not be marginalized as non-visual and, therefore, unimportant. Whether we are speaking or listening, we are hoping (sometimes against hope due to increasing linguistic flux) that what is being conveyed is precise on both ends of the communication. If words cannot do a thorough job communicating, then perhaps in tandem with images, the space between what is sent and what is received is bridged. The act of defining is an integral and important part of design pedagogy. In this instance it actually might be useful to borrow from scientific methodology. Ackoff distinguishes between “conceptual definitions” and “operational definitions.” The first tells us what to think about, the latter tells us what to do.¹⁵ Definitions are not absolute, but nevertheless distinguishing between them relates to praxis (theory plus action). In the early part of the twentieth century E.A. Singer offered instructions for the “content of definitions,” paraphrased from Ackoff as follows: 1. Evaluate as many definitions of the concept (over time) as possible. 2. “Try to identify the core of meaning.” 3. Establish a “tentative definition based on this core.” 4. Determine if the usage makes sense in the project at hand. 5. Welcome critical comments and revise as needed.¹⁶

Ackoff provides the reader with an example of just how misleading assumptions can be. For example, F.C.S. Schiller, in the early 20th century, in trying to determine how many rooms were in a dwelling, discovered that no one had been explicit in the survey about what constituted “a room.” Those who designed the survey were annoyed at the thought that a room needed defining, responding that “everyone knows ...”. All sorts of questions entered the discussion regarding shape (“Can a room be triangular?”), purpose, etc.¹⁷ The point is that when we are using language, even if the words are not obscure, when meanings of central words are left implied, meaning and understanding may be sacrificed. Because much of what we do is part of some continuum, what often happens is that further actions taken are based upon implicit meanings that could have been made more explicit. We then build upon imprecise communications. Just think for a minute about the distortions when playing the old whispering game of telephone.

Because design pedagogy relies largely upon our ability to use verbal language to talk about design, of particular interest is a study by Jackendoff and Landau, “Spatial Language and Spatial Cognition,” which examines in part how we actually “manage to talk about what we perceive.”¹⁸ The authors dissect the relationship between language usage and the object world. They contend that “any aspect of spatial understanding that can be expressed in language must also be present in spatial representations.”¹⁹ For design educators, their study reveals just how dependent we are on the linguistic category of prepositions as we talk about the object world of design artifacts. The way we construct sentences when we talk about physical relationships of objects actually reveal information about scale, mobility, and position, reflecting cognitive specialization. The authors contrast the statement, “The table is under the book” with our normal verbalization, “The book is on the table.” In fact they both may be accurate, but contained in the way we typically choose to express this physical condition, is information about scale, relationship, motion, primacy of object and location.²⁰

Although there are only 80-100 prepositions in English, with only a few related to temporal description, they do significant visual work in the language. The authors point to the fact that if we say a bug is crawling “*along a flagpole*” we know that the flagpole is lying down. Otherwise we would say the bug is crawling up or down the flagpole. This example reveals our assumptions about direction of a major axis.²¹ When we say “above” we assume no contact, but when we say “on top of” we assume direct contact.²² These examples use common words which yield readily understood assumptions about space and are perhaps the most essential parts of speech when we are discussing design artifacts from city planning to videos. The products of design are almost always concerned with relationships in the object world, and this analysis makes explicit and conscious what we take for granted in daily discourse.

In conclusion, it is worth reconsidering design’s victimization by scientific method. Unlike the laboratory, design doesn’t know, in advance, precisely what question it is trying to answer. It is a less procedural process than that. Every action taken shifts the question. Epistemological views could classify design knowledge acquisition in a variety of ways. Design can be social, solitary, visual, verbal, and any combination of these. Hopefully, whatever it is that we ultimately make to look at, embeds itself inside the shifting set of “everything to think about.” What a designer makes is at a complex intersection of personal experience, initial formal education, observations and influences from the world, external and internal critiques, different but natural abilities, and the education which is ongoing, formal and informal, but

mostly reflective. Before we ultimately produce the artifact, there is everything to think about and really nothing to look at.

END NOTES

- ¹ Horst Rittel. *The Reasoning of the Designer* (Stuttgart: IGP Arbeitspapiere A-88-4, Universität Stuttgart, 1988), 291.
- ² Jacques Barzun. *From Dawn to Decadence, 1500 to the Present, 500 Years of Western Cultural Life*, (New York: HarperCollins, 2000), 509.
- ³ Greig Crysler and J.P. Protzen. *Differences between 1st and 2nd generation design theories and methods approaches*, (University of California at Berkeley, Department of Architecture, course materials for Arch. 130, Spring 2004).
- ⁴ *Webster's Encyclopedic Unabridged Dictionary of the English Language*, (New York: Gramercy Books, 1989), 1146.
- ⁵ *Webster's New Collegiate Dictionary*, (Springfield, MA: G. & C. Merriam Co., Publishers, 1961), 672.
- ⁶ Rittel, 292.
- ⁷ *Ib id.*, 291
- ⁸ *Ibid.*, 292
- ⁹ *Ibid.*, 295.
- ¹⁰ *Ibid.*, 296.
- ¹¹ *Ibid.*, 297.
- ¹² *Ibid.*, 295.
- ¹³ Donald Schön. *The Reflective Practitioner: How Professionals Think in Action*. (New York: Basic Books, Inc., 1983), 79.
- ¹⁴ *Ibid.*, 95.
- ¹⁵ Russel Ackoff with Shiv K. Gupta and J. Sayer. *Scientific Method: Optimizing Applied Research Decisions*. (New York: John Wiley & Sons, Inc., 1962), 142.
- ¹⁶ *Ibid.*, 150.
- ¹⁷ *Ibid.*, 147-148.
- ¹⁸ Ray Jackendoff. *Languages of the Mind. Essays on Mental Representation*. (Cambridge, MA: MIT Press, 1992), 99.
- ¹⁹ *Ibid.*
- ²⁰ *Ibid.*, 109.
- ²¹ *Ibid.*, 110.
- ²² *Ibid.*, 114.

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Leslie Becker is Professor of Graphic Design at California College of the Arts and head of Becker Design. She holds a B.F.A. from The Cooper Union and M.A. in design from The University of California at Berkeley. She was founding designer/writer/editor of the SF.AIGA newsletter. Her writing has appeared in a variety of publications, among them *Print*, *Graphis New Talent*, *Design Book Review*, *Citizen Designer*, and *The Education of a Typographer*. She has served on the SF Board of the AIGA, been a (fairly regular) presenter both at AIGA National conferences and AICAD conferences. She has made presentations in Beijing at Tsing'hua University and at the University at Wuppertal, Germany. Her design work ranges from custom furniture and lighting design to print graphics. She is currently a Ph.D. student at Berkeley with a focus on design and ethics. Remembering what it feels like *not* to know is essential to good teaching.