

A Beginner's Mind

PROCEEDINGS

**21st National Conference
on the Beginning Design Student**

Stephen Temple, editor

**Conference held at the
College of Architecture
The University of Texas at San Antonio
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Situating Beginnings
Questioning Representation
Alternative Educations
Abstractions and Conceptions
Developing Beginnings
Pedagogical Constructions
Primary Contexts
Informing Beginnings
Educational Pedagogies
Analog / Digital Beginnings
Curriculum and Continuity
Interdisciplinary Curricula
Beginnings
Design / Build
Cultural Pluralities
Contentions
Revisions
Projections

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“Deep Smarts”: a Confirmation of Studio-Based Pedagogy and, more particularly, Design/Build

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Part One

“To know and to act are one and the same”.¹

“Think with the whole body”.²

Your deepest and most needed body-of-knowledge as a studio instructor can't be transferred onto a series of PowerPoint slides or downloaded into a data repository or be transferred to others via distance learning. It has to be passed on to the student in person -- *one-on-one*, and *slowly, patiently, and systematically*. This is the message and implication of “Deep Smarts”, an experience-based mentoring concept, developed by Dorothy Leonard and Walter Swap of the Harvard Business School, which claims to help explain the most effective way that senior members of an organization or profession can pass on their deepest knowledge or, even more importantly, their “wisdom”, to the next generation.³

When one of our students sizes up a complex situation within a design studio project context, and then comes to a rapid conceptual or formal/spatial decision that proves to be not just good but brilliant, we react by thinking, “that was smart!” After we've watched him or her do this a few times, we realize that we're in the presence of someone special, someone with a type of design wisdom. It's not simply raw brainpower or information-at-their-fingertips, though that helps. It's not only emotional intelligence either, though that, too, is often involved. It can be described as “deep smarts”, the stuff that produces that mysterious and highly desirable characteristic, good design judgment.

Those that have deep smarts can see the whole picture and yet zoom in on a specific problem others have not been able to solve, or even recognize or diagnosis. Almost intuitively, they can make the right decision, at the right level-of-inquiry, and with the right people. Their insight seems to be based more on know-*how* than on facts per se; it is comprised of a system-view as well as expertise in particular areas. Deep smarts is experienced-based, but it may not be particularly philosophical – it's not “wisdom” in that sense – but those with deep smarts come as close to wisdom as the real world of action and decisions and production gets. Because it is experienced-based, it can't be produced overnight or imported readily or simply *explained* to others, but with the right techniques, this sort of knowledge *can* be taught and thus passed on through time.

Some design educators possess deep smarts, and the following discussion will now focus on them as a group. Their judgment and knowledge – both explicit and tacit – are stored in both their heads and hands.⁴ Their judgment and knowledge is essential to the institution; it cannot progress without them and this wisdom they inherently possess. It is important to understand the concept of deep smarts, how it can be cultivated, and how it can be transferred from one person to another.

Very few institutions and administrators manage this human asset well, perhaps because it is difficult to pin down and measure. Much of their insight is neither documented nor even articulated. But to, therefore, conclude that one can mostly neglect it is risky, probably even

foolish. Also, at most institutions, deep smarts develops more by chance than by intent – and often in spite of leadership or mentoring practices rather than because of them. It is neither efficient nor effective to cultivate experienced-based know-how in an ad hoc fashion or to simply rely on an institution’s existing procedures for transferring knowledge. One should consider how people, both faculty and students, actually learn.

Think about something *you* are really, really good at doing – chess or cooking or design or whatever. Chances are, if you are not just competent (and so easily satisfied!), but truly *expert*, it took you many years, probably decades, or more to develop that expertise – in which time you’ve come across countless different situations, each inherently unique. With many experiences under your belt, you have likely found some common ground and discovered a few rules-of-thumbs that predictably work. However, as an expert, you have the perspective to go beyond generalizations and respond to unusual situations. You know facile ideas don’t apply, because you have seen so many exceptions. When confronted with a setback or a surprise, you can modify your course of action by combining elements from your menu of familiar options. In short, you can exploit an extensive *experience repertoire*. Experts who encounter a wide variety of situations over many years accumulate a storehouse of knowledge and, with it, the ability to reason and operate swiftly and often without a lot of conscious effort. Those with deep smarts can rapidly determine whether current cases fit any patterns that have emerged in the past; they are also adept at coherently (though not always consciously) assembling disparate elements into a whole that make sense. They can identify trends and anomalies that would escape the notice of less experienced individuals. The act of synthesis that is architectural design certainly fits within this type of activity. When asked to explain a decision, experts often cannot re-create all the pathways their brains checked out and so cannot give a carefully reasoned answer. They chalk up to gut *feel* what is really a form of gut *knowledge*.

As educators, one of our two fundamental responsibilities is to transfer our knowledge to someone else – our students. We also sometimes need to access bits of wisdom accumulated in someone else’s head (or hands). But before we can even begin to initiate such a transfer, we must consider how our brains process incoming information.

What we already have in our heads is a prime determinant in how we assimilate new experiences and attempt to extract knowledge from those experiences. Without *receptors* – hooks on which to hang new information – we may not even perceive or process that information.⁵ For someone to capture complex, experienced-based knowledge, his or her brain has to contain some *frameworks, domain knowledge, or prior experiences* to which current inputs can connect.⁶ Otherwise, the messages and information sent remain relatively meaningless data, even “chatter”. Without these receptors or frameworks, some individuals, because they are adaptive or because they’re “quick studies”, can *sometimes* be successful. However, usually this type of sink-or-swim strategy is inefficient or, even worse, ineffective. It is far better strategy to deliberately create receptors by providing frameworks or tools or other types of mental structures to which new experiences can be tied.

Receptors, however, are not enough. The most valuable component of deep smarts is the *tacit* know-how that a person has built up over many years of experience. This knowledge cannot be easily documented and handed over in a set of files or on a CD. But the preponderance of PowerPoint slides, web sites of best practices, repositories of project reports, online training, or even in-person lectures for the goal of transferring this knowledge is largely a losing set of strategies. Even the smartest and well-intentioned people have inherent difficulty gaining insight and knowledge, much less wisdom, from such materials and techniques, because so much of the knowledge they really need to absorb is tied to specific contexts and has tact dimensions.

Part Two

*“I’ve never built a ship’, Paxmore said quietly. ‘I’ve never learned’. ‘A man learns how by building it’.*⁷

What is *tacit knowledge*? This concept is familiar to those who have read Donald Schoen’s book *The Reflective Practitioner*.⁸ However, the person who coined the phrase “tacit knowing” and who has introduced the most complete description of this concept is philosopher Michael Polanyi through his book *The Tacit Dimension*.⁹ Knowing tacitly means, “we know more than we can say”.¹⁰ Often condensed into the saying “learning by doing”, tacit knowing is a way of knowing the world; it is the primary way, as implied by Leonard and Swap, that architectural knowledge is transferred. The theme of Polanyi’s book echoes, at least to my ears, the underlying basis of studio teaching in general, and in design/build experiences in particular. There *is* a difference between “knowing what” (theory) and “knowing how” (practice). However, an important distinction of Polanyi’s thesis is that these two categories are not so tidily divisible; the “what” and the “how” inevitably talk to and directly relate to one another. As he explains it, “an explicit integration cannot replace its tacit counterpart. For example, the skill of a driver cannot be replaced by a thorough schooling in the theory of the motorcar; the knowledge I have of my own body differs altogether from the knowledge of its physiology; and the rules of rhyming and prosody do not tell me what a poem told me.”¹¹ Tacit knowledge is the arena of design in general and design/build in particular, with its “. . . problems and hunches, physiognomies and skills, the use of tools, probes, and denotative language.”¹² In design/build, a key instrument of knowing is the hand and its extensions, tools. The hand and its extensions operate at every level of architectural study. Instead of our brains telling our hands what to do, our hands return information to our brains, and often include surprising, even revealing, messages. Polanyi tellingly quotes an engineer whose dissertation topic was juggling: “Simply *telling* someone the idea *won’t do*. No matter how sincere the inquiry, a great deal of practice, and a special kind of practice, is necessary for real understanding.”¹³

A central paradox in transferring deep smarts is that constantly reinventing the wheel is at least somewhat inefficient on its face, but fundamentally people learn deep smarts by *doing*, by the act of making.

Leonard and Swap have identified a number of techniques used by what they call knowledge coaches – experts who are motivated to share their deep smarts with protégés (in our case, primarily with our students).¹⁴ However, instead of the traditional mentoring role, to help one’s naïve protégés navigate the institution or provide personal advice, the knowledge coach primarily serves as a teacher transmitting his/her experience-based expertise and tacit knowledge.

Approaches vary considerably in how effectively they address this central deep smarts paradox and set-of-requirements. Most of these modes are well understood and are not revelations. However, learning-by-doing methods are not as familiar to many. They *require active engagement* from both the teacher and the student, they *take (more) time*, and they usually *happen one-on-one*. Of course, these final characteristics are distinguishing elements of almost any design studio-based learning experience, and more particularly with design/build.

If a list of teaching techniques were developed, moving in order from passive reception of knowledge to active learning through experience, it might look like the following:

*“directives/presentations/lectures/etc. > rules-of-thumb > stories-with-a-moral > Socratic questioning > [questions-that-stimulate-reflection] > guided practice > guided observation > guided problem-solving > guided experimentation”*¹⁵

Recall now that the concept of deep smarts is based on an extensive experience repertoire. It's true that merely describing experiences to people, or telling them what to do or giving them rules, may create some mental receptors or scaffolding upon which to hang experiences; rules help people make sense of their experience but they do not serve as a substitute for it. The tacit dimensions of an expert's deep smarts have to be *re-created* and then *experienced* to take hold. That is, the novice needs to discover the expert's know-how through practice, observation, problem solving, and experimentation – under the observation, direction, and critique of a knowledge coach.

As the list above states, various forms of guided experiences work well to develop deep smarts. This simply means learning-by-doing, with feedback from a knowledge coach, which helps create deep understanding. As discussed earlier, this works especially well when the subject matter has many *tacit dimensions*, so even an expert may not be able to make them all explicit. Guided experience works especially well when the knowledge is *context-specific*, so it's appropriate to be alert and adaptive, rather than to apply general formulas. And this works well when the *situation is new*, and so there is great uncertainty and/or ambiguity.

Part Three

“ . . . very few people are aware that in each of our fingers, located somewhere between the first phalange, the mesaphalange, and the metaphalange, there is a tiny brain. The fact is that the other organ which we call the brain, the one with which we came into the world, the one we transport around in our head . . . has only ever had very general, vague, diffuse, and, above all, unimaginative ideas about what the hands and fingers should do. For example, if the brain-in-our-head suddenly gets an idea for a painting, a sculpture, a piece of music or literature, or a clay figurine, it simply sends a signal to that effect and then waits to see what will happen. Having sent an order to the hands and fingers, it believes, or pretends to believe, that the task will then be completed, once the extremities of the arms have done their work. The brain has never been curious enough to ask itself why the end result of this manipulative process, which is complex even in its simplest forms, bears so little resemblance to what the brain had imagined before it issued its instructions to the hands. It should be noted that the fingers are not born with brains, these develop gradually with the passage of time and with the help of what the eyes see. The help of the eyes is important, as important as what is seen through them. That is why the fingers have always excelled at uncovering what is concealed. Anything in the brain-in-our-heads that appears to have an instinctive, magical, or supernatural quality – whatever that may mean – is taught to it by the small brains in our fingers. In order for the brain-in-our-head to know what a stone is, the fingers have to first touch it, to feel its rough surface, its weight and density, to cut themselves on it. Only long afterward does the brain realize that from a fragment of that rock one could make something which the brain will call a knife or something it will call an idol. The brain-in-the-head has always lagged behind the hands . . . [and so] the fingers still have to summarize for it the results of their tactile investigations, the shiver that runs across the epidermis when it touches clay, the lacerating sharpness of the graver, the acid biting into the plate, the faint vibration of a piece of paper laid flat, the orography of textures, the crosshatching of fibers, the alphabet of the world in relief.”¹⁶

In our world characterized by acceleration and tectonic shifts in cultural norms and expectations, one might think that guided experience, in whatever form, is perhaps passé at best, or at least too costly. How many of us have heard the grumbling from those in central

administration about the inefficiency of studio-based teaching, often followed by questions such as, “why can’t you do studios through distance learning?” “The days of the one-on-one apprenticeship is over”, is perhaps also commonly heard. Yet many who share this view will nonetheless willingly spend lots of money and years of planning and effort and precious resources on formal training workshops and computer systems and multi-media projection systems and the like. All such investments are not wasteful. But the claim here, based on the work of Leonard and Swap, is that *guided experience* is the *only* way to cultivate deep smarts – and those-in-charge need to be realistic and rational about how much tacit, context-specific knowledge can be created or transferred, or not, through what might be described as other more “pragmatic” or technology-driven pedagogical means.

We need to educate those-in-charge about this *best practice* of teaching an experienced-based profession. No one questions why medical students, after becoming thoroughly book-smart, need to spend years working closely, elbow to elbow, and laboriously with experienced and giving doctors in order to become effective practitioners of medicine. We must make that analogy clear, and provide the clearest justification for such a claim. The concept of deep smarts can help in the making of an effective argument.

Guided experiences increases value exponentially – it promotes dual-purpose learning and builds on all that we know about how people accumulate and retain knowledge and wisdom. How can we afford not to (continue to) invest in it?

Part Four

The brain asked a question and made a request, the hand answered and acted.”¹⁷

Guided experiences, in terms of architectural education, occur most frequently and directly in the context of design studio courses and, more particularly, in design/build courses.

This business/psychology-based concept of deep smarts generally parallels the studio-model of architectural education; thus, helping to affirm studio-based pedagogy as an effective means for our students to cultivate “design wisdom”. It also questions whether lecture-type courses, now usually passively-received bullet-pointed information via PowerPoint, are effective in helping our students develop the *gut* knowledge and feel and instincts needed to operate effectively in the architectural arena. Professional design knowledge is of limited value if one has no gut feel about how to bring it to an effective realization out in the body of the physical world.

The conventional wisdom in beginning studio pedagogy is that one begins with the general and gradually works toward the specific; this is usually accomplished by introducing students to abstraction and new notions of form/space as a means of detaching them from their familiar world and to open their minds to another. The concept of deep smarts, however, calls into question this common means of beginning one’s design studio experience. The actual lived-experiences of each of our students, importantly always within the enveloping ether of the designed/built environment (unless the student was a feral child) can be one of the most effective “hooks” on which they can hang new knowledge. It is important to remember that for someone to capture complex experienced-based knowledge, his or her brain has to contain a sufficient framework, domain knowledge, and/or prior experiences to which new inputs can effectively connect.

In conclusion, in our academic environments, increasingly intolerant of “slow and patient” methods of teaching, an understanding of the *science* of the most effective methods of passing on deep smarts, absolutely necessary for professions such as medicine and architecture (both of which operate by actors intervening within a physical body in order to increase its wellness), can effectively serve as a sound argument for and defense of the hands-on studio-based model of pedagogy.

Perhaps one of the best illustrations of the power and relevance of experience-based pedagogy to develop deep smarts comes from this passage from the Introduction to the book *Rural Studio: Samuel Mockbee and an Architecture of Decency*: “Architects have long criticized their profession’s defining educational experience, the studio, where students, working under an established architect, are given a design problem, come up with a solution, flesh it out with floor plans and elevations, and defend it in a public session called a crit”. Sound familiar? Josh Cooper, a 1997 Auburn graduate, recalls that what he learned in class did not make sense until he began working on the Bryant House in Mason’s Bend as a second-year student at the Rural Studio. ‘Rather than drawing a window and not having a clue what I was drawing’, he says, ‘there was now a client standing there, and that window had to work for him. On a different level, I gained a lot of confidence knowing I could make that window work’¹⁸ As an educational experience, *that* approach seems to be both *deep* and *smart*, and worth explaining and defending.

Endnotes

¹ samurai maxim, from *Zen to Go*, Jon Winokur, ed., p. 35.

² Taisen Deshimaru, from *Zen to Go*, Jon Winokur, ed., p. 35.

³ *Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom*, Dorothy Leonard & Walter Swap, Harvard Business School Publishing, 2005.

⁴ For a helpful perspective on the “intelligence of the hands”, see Jose Saramago’s *The Cave*, the story of an old potter living within an unsettling changing culture and a transforming physical setting.

⁵ *Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom*, Leonard & Swap.

⁶ Ibid.

⁷ *Chesapeake*, James Michener.

⁸ *The Reflective Practitioner: How Professionals Think in Action*, Donald Schoen, 1983.

⁹ *The Tacit Dimension*, Michael Polanyi, 1983.

¹⁰ Ibid, p. 4.

¹¹ Ibid, p. 20.

¹² Ibid, p. 29.

¹³ Ibid, p. 104.

¹⁴ *Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom*, Leonard & Swap.

¹⁵ Ibid.

¹⁶ *The Cave*, Jose Saramago, translated from the Portuguese by Margaret Jull Costa, pp. 66-67.

¹⁷ Ibid, p. 68.

¹⁸ *Rural Studio: Samuel Mockbee and an Architecture of Decency*, Andrea Oppenheimer Dean and Timothy Hursley. Princeton Architectural Press, 2002.