Edith Ackermann, Urs Hirschberg
Talent, intuition, creativity
On the limits of digital technologies

In an issue of the Austrian architecture magazine GAM entitled "Intuition & the machine", guest editor Urs Hirschberg interviews developmental psychologist Edith Ackermann. Ackermann explains how imagining and realizing novel ideas engages aspects of the mind, body and self that we barely control. Learning, she says, is like the art of living itself, as it is about navigating uncertainties rather than controlling what we cannot predict. Which makes the question as to where digital technologies fit into these complex processes all the more exciting.

Urs Hirschberg: Before we talk about intuition, let us talk about talent. When architects are asked about how they design, many say that they cannot really explain it. Some will even go so far as to say that designing can't be taught. If this were true, wouldn't it undermine the very idea of architectural education?

Edith Ackermann: Like intuition, "talent" is a conceptual convenience to be taken with a grain of salt. We usually think of a talented person as someone with a natural gift, an above-average ability, or an innate aptitude for achievement or success. The problem, as I see it, lies less in how we position ourselves along the nature–nurture continuum than in the implied fixity or malleability of mind associated with either innate or acquired dispositions, competences, or character traits.
Teaching students to sharpen their "talents" as architects and designers constitutes an extra challenge, because when it comes to learning the craft or developing a designerly sensibility, "talking the walk" won't help "walking the talk." Alas, students who talk most in class or mimic their masters aren't always the ones whose productions stand out, surprise, or delight. This is not to say that mindful engagement, self−reflection, and perseverance, aren't essential to becoming a good thinker and an accomplished practitioner.

Learning is all about moving in and out of focus, shifting perspective, and coming to "see anew." Imagining and bringing forth novel ideas engages aspects of the mind, the body, and the self that we barely control. Learning, like the art of living itself, is about navigating uncertainties rather than ruling over what we cannot predict. An exceptional educator, I think, is one who understands that teaching is always indirect, that learners may have reasons to stick to their beliefs, and that becoming an accomplished designer takes more than mimicking the master, incorporating experts' views, or following instructions. It is one who also knows when not to intervene.

UH: Sounds like it also takes talent to bring out talent. What about the notion of intuition, then? It is often conceived as a mystical quality or as divine inspiration. Seen from a psychological point of view, is intuition an innate ability or is it something we acquire over time?

EA: Intuition is an unfortunate term for an otherwise deep idea: our human ability to understand something without thinking it through, and to unknowingly mobilize unexpected inner (and outer) resources, when needed in−situ. Intuition requires that we develop a "feeling for what matters," (my own twist on Damasio's "a feeling for what happens") before we even can tell or prove that we are right. It is about "seeing through" situations that we cannot otherwise apprehend, or explain. In its unfortunate connotation, the term evokes the instinctual (the animal within) or, as you suggest, it gets elevated to the mystical (divinity inspired). In either case, it is seen as a sudden outburst of unexamined "truths" or cryptic prophecies (revelations, inner calls).

Swiss psychologist Carl Gustav Jung (1921) defined intuition as "perception [...] via the unconscious," and opposed it to sensation (perceiving via sensory inputs). Intuitive subjects, in Jung's typology, rely on their senses mostly as a trigger to bring forth other seemingly unrelated thoughts, images, possibilities, and ways out of situations. By a mostly unconscious associative process, they come up with surprising insights yet are unable to tell why they thought or felt the way they did, or what prompted them to think their thoughts in the first place. They may do so in retrospect. We now know that intuition is less a matter of psychological type than it is a powerful heuristic tool used by most people to stay afloat in situations that are too unpredictable or bewildering to be apprehended otherwise.

UH: Conceiving of intuition as a strategic tool, in what way can it help us to solve complex or difficult tasks both in everyday life and architectural design?

EA: Intuition also alludes to the notion that when it comes to human affairs, the tensions we experience (the dilemma we face) often cannot be solved (eliminated or explained away) but need to be navigated (carefully monitored). Maintaining a balance, in this sense, can't simply be achieved by opting out troubling causes, or comparing options. What's needed instead is an ability to hold the tensions, contain the trouble within range, stay alert and re−calibrate along the way.
UH: Some people "trust" their intuition...

EA: Alternatives to the term "intuition" can be found in Polanyi's notion of tacit knowledge,\(^3\) which he defined as knowledge that an actor knows he has (ex: how to win a contest, be a good coach, catch a ball) but cannot describe in terms other than its own (skillful) performance. Such partially unexamined yet masterful enactments (insights or know−how) come close to Schoen's notion of "reflection−in−action,"\(^4\) Lakoff and Johnson's "metaphors we live by" (situated and embodied cognition),\(^5\) and Bruner's enactive representations (performative acts).\(^6\) What drives our quests as humans is not to oppose but to reconcile gut feeling and brainpower, the beast and the genie within. We do so by giving our mind a hand and our senses something to hold on to.

UH: "Thinking aloud" techniques or introspection have often been used to get designers to verbalize −− or otherwise externalize −− their insights as they work their ways through problems. Do you think introspection provides a useful technique for designers to gain insights into their own design process?

EA: Intuition, as we have seen, provides us with hints without the burden of reason. Introspection, on the other hand, allows us to "look inward" and examine our own inner thoughts and feeling, as if outside−in. Used as both a technique for self−examination and a method in psychology, introspection is a mixed blessing. For one, most any attempt at overtly digging into one's own --- or other people's --- mind tends to alter the very mind we are trying to capture.\(^7\) What's more, as the theory of the adaptive unconscious suggests, our mental processes, including "high−level" processes (like goal−setting and decision−making) remain mostly inaccessible to introspection.\(^8\) In sum, introspection works fine as a window into what we are currently thinking yet it fails on how we arrived at those thoughts. And thinking aloud techniques (first person accounts) are valuable as long as they are complemented by other methods such as observation or clinical interviews.

UH: You said that we need to "give our mind a hand." Don Norman talks about external aids, about "things that make us smart." Architects repeatedly make use of external aids in the form of sketches, models, diagrams, etc. Are these architectural tools also examples of what you referred to as "embodied cognition"?

EA: Both "situated" learning and "embodied" cognition emphasize the importance of being−in−the world, being in touch with things --- literally touching things --- as a lever to thinking. And no one puts it more eloquently than Francis Bacon in his famous quote: "Neither the bare hand nor the unaided intellect has much power; the work is done by tools and assistance, and the intellect needs them as much as the hand."\(^9\) Giving the mind a hand suggests that much of the knowledge we have gained is knowledge−in−action: we think and act at the same time! Giving the hand a tool further suggests that the materials we explore, and the tools we use, are instrumental in helping expand and mediate our action in the world.

I like to reserve "embodied" cognition (verkörpert in German) to the notion that our body has its own intelligence (it "thinks" as much as our mind), and that our insights and know−hows are so deeply engrained in our sensori−motor experience that we literally live by them. "Embedded" cognition (eingebettet in German), on the other hand, speaks to the ways intelligent beings (body/minds in−situ) shape and furnish the world in which they live.
To phenomenologists "embodied" cognition refers to the intuitive experience of being—in—the—world. Tool—use, on the other—hand, is about humans' abilities to extend their reach beyond the unaided hand’s (body/mind’s) immediate grasp and feel empowered in return. As Michael Polanyi puts it, "while we rely on a tool or a probe, these are not usually handled as external objects [...] Instead] we pour ourselves out into them and assimilate them as parts of our own existence. We accept them existentially by dwelling into them." In Maurice Merleau–Ponty words; "To get used to a hat, a car, or a stick is to be transplanted into them, or conversely, to incorporate them into the bulk of our own body." The point here is that even though there may be a physical demarcation between body and tool, through tool—use the demarcation fades away: the tool—at—hand becomes an extension and hence part of us. Alas, our very abilities to set or blur boundaries, to switch modes, and to shift perspectives is what keeps us going and gets us smarter. We are not just cyborgs—in—principle, we come to our senses by learning to leap and see anew.

**UH:** Does this mean that the tools architects use intuitively can be regarded as an extension of the body?

**EA:** Heidegger distinguished different modes of tool—use. In a first mode ("ready—to—hand", zuhanden in German), a person uses a tool as if it were an extension of the body; the focus is on the task and users are unaware of the tool (the tool is "phenomenally transparent"). In a second mode ("present—at—hand", vorhanden in German), a tool is treated as a separate entity and users are aware of "its" properties (the tool is "phenomenally present"). This mostly happens when users experience a "breakdown" (for example, the tool fails to function as expected and thus becomes the focus of attention).

The idea of present—at—mind further captures the ways in which creative people move between modes as they interact with an object, tool, or media. The stress is on the dance itself: I may be at one (fused) with my tool (as long as everything runs smoothly). Yet, as soon as anything goes unexpectedly, I switch mode, I consider the tool as an entity in itself, and recalibrate my handling of it. In other words, learning occurs as a result of our conscious or unconscious moving back and forth (1) between dwelling in/stepping back (immersion, separation); (2) between centering/decentering (treat as me/ treat as other); and (3) between taking it in/projecting it out (internalize/externalize).

**UH:** Digital phenomena aren't bound by the same laws as analogue ones: They can be non—linear, unpredictable, buggy, they can crash and we don't understand why. They can also perform tasks that are outside anything we could achieve without them. They can be mind—boggling. Can we still develop an intuition for them?

**EA:** Indeed, things get complicated once the tools we use begin to act on our behalf, take on entire chunks of a task, or take over altogether (solving our problems their own ways). That's when from objects to think with they become operations embedded into a physical device or a computer program (machine, automaton). From mental aid (description, notation, model) or tool (instrument, abacus) they become "augmented" or blended realities, virtual world, artificial partners, avatars (simulations).

Thirty years ago, we asked what we would use computers for. Now the question is: what don't [shouldn't] we use them for.\textsuperscript{13} Whether we feel depleted or enthralled by the previously unthinkable options made possible by digital technologies is an important question. Yet more intriguing, as you suggest, is whether we will still even notice, let alone challenge, the technologies' impact on how we think, learn, and live our lives, as their own "machine-ness" (or claimed "human-like-ness") increasingly dissolves into the fabric of the time-spaces we inhabit.

**UH:** If these new technologies are dissolving into our daily lives, will we develop new types of intuition for them?

**EA:** It is hard to tell what intuition different people will develop for them but one thing is sure: not all the hybrids and quasi-objects we incorporate in our everyday lives are equally inspiring or vivid as relational "partners." Some draw us in while others keep us at a distance. Some are obedient while others seem to have a mind of their own. Some are tiny and stay with us wherever we go. Others yet, big and bulky, keep us grounded, posted, or even boxed in: they request that we position ourselves with respect to them. Donald Norman introduced the term "affordance" to refer to an object's ability to signal its potential uses.\textsuperscript{14} Examples of objects with poor affordances include a lamp that doesn't tell the location of its "on" switch and a doorknob that doesn't communicate whether the door should be pushed or pulled. Ultimately, even a mundane doorknob could be delightful if, beyond getting us through a doorway, it could retain our attention, suspend our breath and why not? Slow down our steps! It too could evoke feelings about passages and thresholds, and enrich our experience of transiting. It could speak a language that reaches our inner most aspirations. It's clear that digital artifacts have to provide affordance as well, but that won't be enough. While affordance speaks to an artifact's clarity to signal uses, something more is needed to capture our imaginations and sense of delight. This "something more," may well be its own unusual blend of autonomy and responsiveness: an invitation to play and dance!

Embodied interaction, as used in HCI (Human Computer Interaction), seeks to understand the role the body plays in the conception, experience, and interactions with technology. And interactions are seen as intuitive, if a user, without much priming, explanation, or help, can instantly, successfully and unconsciously utilize it. Drawing from Heidegger, Paul Dourish in particular defines embodied interaction as "the creation, manipulation, and sharing of meaning through engaged interaction with artifacts."\textsuperscript{15} Dourish stresses the dual nature of our lived vs. perceived body. In substance, through our lived, or experiential, bodies (corps propre, in French) we inhabit the world, which is different from seeing my body in the mirror as an object among other objects in the world. Through empathy we relate to other people not only as objects in the world but also as lived bodies.

**UH:** You have worked and written a lot about new forms of creativity that digital media have engendered. Intuition in design is seen as being closely related to creativity. How would you describe this relationship and how have digital tools influenced it?

**EA:** Talent, intuition, creativity ---- you really want me to address one huge topic after another! To answer this one we first have to establish what we mean by "creativity". I recently wrote an article in which I quote Lubart who discusses different traditions of creativity we can discern in different cultures. According to Lubart, Westerners mostly consider creativity as
product-oriented, originality-driven, and aimed at solving problems by "breaking grounds." The Western view also stresses individual gains (self-promotion, personal benefits) over greater social good (societal and environmental considerations such as air quality or collective welfare), and favors a work ethic based on competition and a belief in progress. The prevailing view in Eastern philosophies, by contrast, is rooted in tradition, seeks harmony (balance), and emphasizes the "emotional, personal and intra-psychic elements" of creativity (inner "truth"). The purpose is less to innovate, or be original, than it is about tuning in (composing with what's there), slowing down (dwelling), letting go (drifting), and seeing anew (adopting a beginner's mindset).

Today's "cultures of creativity" cut across generations, social groups, and territorial borders — be they geographic, national or ethnic. Indeed digital media and the Internet play a large role in this as they enable new forms of expression, ways of sharing and trading, and modes of appropriation. Appropriation is the process by which a person or group becomes acquainted with, and gains interest in, things by making them their own. It is an eminently creative process, often resulting in unexpected uses, clever détournements, and surprising outcomes. The connection between creativity and intuition has much to do with appropriation. For a technology to evolve and become better adapted to its users, something more than mere adoption is needed. The long-term, innovative effects occur when users appropriate the technology, make it their own and embed it within their lives.

**UH:** During your work at MIT you have collaborated with a lot of nerds, techies and geeks — including myself. It seems to me that your goal in these collaborations has always been to promote those aspects of a project or technology, which allow us to learn, to engage our minds, to enrich our experience. In your opinion, why are these qualities so hard to come by?

**EA:** Those who know how to code aren't always the best at imagining creative uses, and those who truly care about users aren't always of good advice when it comes to designing innovative concepts, scenarios, or products. One lesson I have learned in working with "geeks," designers, and educators of all kinds is that when it comes to innovating for others, it may be best not to guess what users want, or for that matter, do what they say. Instead, listen carefully, and then bring your expertise to help co-create what they — and you — will love once it is there!

Another lesson, equally important, is that beyond mere functionality and ease of use, the scenarios we imagine and the tools we build should feel right to users' kinaesthetic and proprioceptive senses, and sustain their imagination and interest over time (I grow with my tools and my tools grow with me). Humans are corporeal beings embedded in a physical world. Yet, they are also curious minds and playful spirits. And they can stick to a task forever (beyond the cool factor) if they are enjoying what they get themselves into (they favor "hard fun" over ease of use).

**UH:** Hard fun is still fun. Many digital products we are exposed to aren't fun at all. They are annoying, un-intuitive, mind-numbing. Do you see a way to change that?

**EA:** Not all the artifacts we design or interact with are equally good projective materials. Some are clearly better suited to foster meaningful and delightful encounters. This is why it seems essential for designers as well as users to take
responsibility of their products by not falling into the trivial–constructivist or the neo–empiricist trap. The first would like to assume — I am caricaturing the constructivist's stance — that no matter the materials at hand, learners will project their own experience anyway (so why bother about the setting). The second, as mentioned earlier, rests on the notion that the smarts to be earned by interacting with cool tools are themselves embedded in the materials (so why bother about the learners). Striking a balance between the two seems the obvious way to go. Though, as we know, this is much easier said than done.

3 Michael Polanyi, The Tacit Dimension, University of Chicago Press, 1967
5 George Lakoff and Mark Johnson, Metaphors We Live By University of Chicago Press, 1980
7 See also Edith Ackermann, "Hidden drivers in pedagogic transactions: Teachers as clinicians and designers", web.media.mit.edu/~edith/publications/2003–Hidden.drivers.pdf
8 See Timothy D. Wilson, "Knowing when to ask: Introspection and the adaptive unconscious", Journal of Consciousness Studies 10, no. 9 (2003): 131–40
12 So-called dual processing theories in cognitive psychology establish a distinction between automated and controlled mental processes. A controlled process is "activated under control of, and through attention by, the subject," and "may be set up, altered, and applied in novel situations for which automatic sequences have never been learned." Walter Schneider and Richard M Shiffrin, "Controlled and automatic human information processing: I. Detection, search, and attention", Psychological Review 84, no.1 (1977): 1–66, esp. 2–3.
13 Sherry Turkle, Alone Together: Why We Expect More from Technology and Less from Each Other, Basic Books, 2011
15 Paul Dourish, Where the Action is: Foundations of Embodied Interaction MIT, 2004, 126