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EXPERIENCES OF ARTIFACTS:

People's Appropriations / Objects' 'Affordances'

To a constructivist, knowledge is not a mere commodity to be transmitted –emitted at one end, encoded, stored, and reapplied at the other– nor is it information, sitting ‘out there’ and waiting to be uncovered. Instead, knowledge is (derived from) experience, and actively constructed and re-constructed by subjects in interaction with their worlds. In Piaget’s words (1937): “Intelligence organizes the world by organizing itself” (p. 311). In Ernst von Glasersfeld’s terms: “The world we live in ... is always and necessarily the world as we conceptualize it (this book, p. 7).

One of the implications of adopting a constructivist stance is the idea, dear to radical constructivists, that ‘reality’ as we know it “lies forever beyond our experiential field” (ibid., p. 5) and that “knowledge does not [and cannot] represent a [true] picture of the ‘real’ world but provides structure and organization to experience” (ibid., p. 6). In other words, “What determines the value of conceptual structures is their experiential adequacy, their goodness of fit with experience, their viability as means for the solving of problems –among which is, of course, the never-ending problem of consistent organization that we call understanding” (ibid., pp. 6-7).

A second implication is a strong call to abandon the *conduit metaphor* of human communication for what Reddy refers to as the *tool-maker's paradigm* (Reddy, 1993). At the core of the *conduit metaphor* lays the deeply rooted notion that meaning resides in words, and that words are carriers of meaning (containers), to be conveyed (like on a conveyer belt) between speakers and listeners. The *tool-maker's paradigm*, by contrast, emphasizes that meaning does not reside in words, texts, or artifacts. Instead, “it is subjective in origin and resides in a subject’s head, not in the word which, because of an association, has the power to call up, in each of us, our own subjective representation” (Glasersfeld, this book, p. 8).ⁱ

In my tribute to Ernst von Glasersfeld, I wish address some of the paradoxes that arise if one adopts a non-critical radical constructivist stance to account for creative people’s interactions with –and through– (hu)man-made artifacts, in particular as they engage in the process of ‘world-making’, to use Goodman’s expression (1978), or designing in a broad sense .

ⁱ Reference: Chapter in book. *Keywords in radical constructivism. Ernst von Glasersfeld* . (M. Larochelle, Ed). Rotterdam, Taipei. Sense Publishers. pp. 249-259.

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CONSTRUCTIVISM AND THE PRACTICE OF DESIGN

Designing (*proiettare* in Italian) can be seen as the flipside of reflective abstraction: an iterative process of mindful concretization, or materialization of ideas (*concrétisation réfléchie* in French).ⁱⁱ To design is to give form, or expression, to inner feelings and ideas, thus projecting them outwards, making them tangible.

In the practice of design, the purpose is not to represent what is out there (or model how things are) but to imagine what is not (or envision how things could be) and to bring into existence what is imagined. Creators are fabricators of possibilities embodied: They both make and make-up things! Important here is the notion that a designer's projections emerge through a conversation with –and through– their own and other people's externalizations. The nature and quality of this conversation are a key to all forms of learning, and paramount to intelligence itself. In Schön's terms, learning *is* designing, and designing *is* a conversation with –and through– artifacts (Schön, 1983, p. 76).

In what follows, I explore why treating our own externalizations *as-if* they had an existence, beyond our immediate rapports with them, is a viable mental attribution –even if we know that we cannot know their whereabouts. In substance, expecting our creations to have integrity (lending them autonomy, permanence, identity) while remaining mindful of their qualities (letting them 'speak' and celebrating them for what they are, at the risk of over-interpreting) are two facets of cognitive adaptation, as defined by Piaget.ⁱⁱⁱ Their function is to elevate human transactions (between me/not me) beyond blind projections, or assimilation pure, with its unfortunate consequence: reducing anything that is other to a mirror-of-me (over assimilation).

As Ernst von Glasersfeld remarks: Vico saw long ago that "facts are made by us and our way of experiencing, rather than given by an independently existing objective world. But that does not mean that we can make them as we like. They are viable facts as long they do not clash with experience, as long as they remain tenable in the sense that they continue to do what we expect them to do" (this book, p. 7).

Along with Piaget, I think that attributing, or projecting, meaning in the objects of our experience is a pillar of cognitive adaptation.^{iv} In contrast to Piaget, I put more emphasis on the accommodative pole of human adaptation –which does not come without complications within a constructivist framework.^v

I explore some of the pragmatic, ecological, and epistemological consequences that arise if one opens this Pandora box. I wonder in particular: 1. How can designers take responsibility for the qualities of their creations if they assume –I caricature the constructivist stance– that people will use them as Rorschach stains any way? 2. Beyond setting limits to our actions and/or clash with our expectations, what qualities does it take for an artifact be able to call up, in each of us, our own subjective representation?

PEOPLE AS WORLD-MAKERS AND WORLD READERS

People are 'world-makers'

People spend a great deal of their time carving out their niches –virtual and physical– so that they fit their needs, support their purposes, and augment their potential. They build cities, homes, and furniture, they invent computers and airplanes, and they create alphabets, geometries, and musical scores. Young and old, they give form or expression to their ideas. People are also busy keeping track of their experience and leaving traces behind. They mark their grounds to find their ways, and they use the marks they leave behind as anchors to orient themselves. Newcomers to a culture are left to live with the marks traced by others.

Early on, children learn to set the stages and to build the props, which enable them to best explore, enact, and ultimately work through many intriguing or captivating events. As they reach their second birthday (with the apparition of the symbolic function), most children engage in pretend or fantasy play. As they recast their experience on a make believe-ground (do *as if*), young pretenders bring their feelings and ideas to life and, by the same token, make their dreams come true. This act of projection enables them to revisit personal experience *as if* it was not theirs, and, through this act of distancing, engage in a dialogue that brings about greater intimacy and deeper understanding.

People are 'world-readers'

People 'read' meaning into existing forms, be they their own or those produced by other, and they do so in creative ways. Readers, in other words, are in no way passive consumers. Instead, they engage designed artifacts by reconstructing them through the lens of their interests and experience.

In the same way that designers are readers (they constantly reedit their drafts), readers are constructors. As Bordwell mentions about film audiences: "The artwork sets limits on what the spectator does. But within these limits, the viewer literally *recasts the play*" (Bordwell, 1986, p. 30). Viewers impose their order upon things by rearranging or replacing clues, by filling in blanks or 'creating phantoms', by ignoring clues, and by forcing causal-temporal connections. In Piaget's words, world-readers assimilate incoming signals (in this case, a narrative unfolding) to feed their views (they interpret them through the lens of previously reconstructed experience) and they accommodate their views only in so far as some unexpected puzzlements or surprises are called upon by the materials.

ARTIFACTS AS INTERLOCUTORS

Artifacts set limits to people's reconstructions

They do so by opening up greater or lesser mental elbowroom (*Spielraum* in German) for personal interpretation. Indeed, to suggest that readers *recast the plot* does not entail that they do so from scratch. Instead, people compose with what is

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offered by the materials –one may say with what the materials evoke– to improvise their part.

For a text, like any other artifact, to capture our imagination, it has to embark us in a journey filled with wonders and surprises. At the same time, it needs to provide the right balance of freedom and structure to allow for personal reconstruction. A setting that gives out all its secrets before you even start wondering is disengaging because it excludes you as a partner. A setting that offers no resistance at all is disengaging because it is predictable (too malleable, it mirrors). Both will not have much evocative, or holding power. Objects (*Gegenstaende* in German) stand against our tendency to blindly assimilate them.

Learning as a conversation with artifacts

People learn by switching roles from being producers to being critics, from being actors to being audiences, from holding the stage to moving into the background. People also zone in and out of situations to change their stance. In other words, no matter how embedded we are in a situation there comes a time when we distance ourselves to look at things from afar. Putting on a critic's hat and shifting perspectives enable us to engage our own creations *as-if* they had been produced by 'another' or existed independently, and then, reengage them again (Ackermann, 1996).

As designers converse with their externalizations, they usually start a dialogue with a whole range of interlocutors, imaginary or 'real', to whom they address their work and from whom they borrow, or draw inspiration (Valéry, 1940). As soon as an idea takes shape, or form, it gains both a physical and a social existence (Habraken, 1985). It is not exaggerated to say that while interacting with the world, a creator's mind moves both in-and-out of its own expressions (from production to critic), and back-and-forth from itself (to include viewpoints of others).

MINDS ENGAGE FORMS AND FORMS ENGAGE MINDS: RADICAL CONSTRUCTIVISM IN QUESTION

Strengths

Radical constructivism offers a solid framework to discuss how meaning is constructed and interpreted through form.

Based on the assumption that any organism, to be viable, needs to carve a niche within a world too big to ensure anyone's survival, radical constructivists remind us that if the world appears to us as we see it, it is not because it is made that way, but because we are made the way we are (Watzlawick, 1984)! In other words, reality takes on un-recognizable facets when captured through the prisms of different creatures. Conversely, what we think of as 'shared realities' feel shared because they are produced and recognized by minds of a similar kind.

Ernst von Glasersfeld makes a compelling case for why taken-for-shared stabilities are not true to reality but akin to the organism's survival and growth.

Early on, human infants make sense of their experience by building *stabilities* in the world. These stabilities, or cognitive invariants as Piaget refers to them, are constructs of the mind. Object permanency, conservation of object-size, and the creation of a coordinate system to situate objects and movements in space, are examples of cognitive invariants built by humans in interaction with their world. Creating invariants is a needed self-orienting device invented by intelligent organism to find their ways, or survive (Ackermann, 2004).

Limitations

While offering a solid framework to discuss how meaning is constructed and interpreted through form, radical constructivism leaves partially unanswered the question of how forms engage minds. At the cost of caricaturing, let me put it this way: fellow constructivists seem to ignore that, once launched, an artifact takes on a life of its own, thus transcending both the author's intentions and any singular act of interpretation.

As fellow humans, we share (or think we share) enough common ground that we sometimes forget that “what we know depends on how we came to know it!” (Watzlawick, 1984, p. 9). We then act *as-if* our invented realities had always been there and we rely on them –and refer to them– as tangible and shareable entities (objects to think with, and relate through).

In other words, as they interact with people and things, intelligent beings tend to exaggerate both what they have in common and how stable our world is. While this amnesia is a problem to constructivists, it is also a viable strategy when it comes to designing artifacts for others to live or learn in: Lending autonomy and existence, we posit, sharpens our sensitivity to –and respect of– their qualities, independent of their author's intentions and our immediate relation with them.

EVOCATIVE POWER OF (HU)MAN-MADE ARTIFACTS

Objects' affordances

Norman (1988) introduced the term ‘affordance’ to refer to an object's ability to signal its potential uses. Borrowing from Gibson, he used the word to gauge the qualities of everyday object. To Norman, a poorly designed object is one that fails to signal its built-in affordances. As an example, a lamp that does not tell you how to switch it on, a doorknob that remains ambiguous as to whether it wants to be pushed or pulled, or a panhandle that confuses you: “hold me/do not hold me” (i.e., I burn you if you do, I let you down if you do not).

The concept of affordance, while limited to uses, provides a first step toward understanding how forms engage minds. It highlights that indeed human-made artifacts signal potential usages through their built-in features, or embedded qualities.

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Genius loci!

In *'Poetics of Space'*, the French philosopher Gaston Bachelard further explores why humans can be deeply moved by what he calls *felicitous* objects or places, and why felicitous objects and places can, in turn, be said to *reverberate* atmospheres, or ambiances, in ways that capture human imagination (Bachelard, 1964). To Bachelard, felicitous objects and spaces (things able to transport us) cannot and should not be characterized by functionality alone. Instead, they attract us because they have become topographies of our intimate being. As such, they 'speak a language' that enters in resonance with felt human aspirations.

Even a doorknob, to take a previous example, could become a felicitous object if it did not just call up our urge to 'push or pull to enter'. It too could retain our attention, suspend our breath and, why not, slow down our steps, by conveying something that speaks to, or evokes, our experience of passage between places. Everyday objects could speak a language much more un-tangible and rich, in resonance with our being and aspirations. Ideally, designers could endow objects with the ability to speak such language.

To take a less trivial example, think of the differences between different types of shutters, such as a persienne, a venitienne, and a jalousie. All are shutters yet each calls upon different feelings along the continuums of seing being/seen, privacy/public, light and darkness. My European friends usually prefer French windows to American guillotines not just because windows can be cleaned and shutters keep light and thieves out, but because the opening of both windows and shutters are along a vertical axe (left and right from the center), allowing arm movements that enter in syntony with breathing in and out, which procures a sense of delight as one opens or closes, letting light and air in.

Bachelard offers important insights into what it takes for (hu)man-made artifacts to enter in syntony with our needs as sensory-motor creatures (smooth to our senses), to tackle our expectations as rational beings (functional), and to 'speak to' our aspirations as artists and poets (poetics). He explores the phenomenological touch-points between people's experiences of intimate things, and thing's capacity to inspire and 'transport' people.

TO CONCLUDE

Constructivism, especially in its radical form, emerges from the growing awareness that any so-called reality is –in the most immediate and concrete sense– the construction of those who believe they have discovered and investigated it. What is supposedly found is an invention whose inventor is unaware of his act of invention, who considers it as something that exists independently of him; the invention then becomes the basis of his world view and actions. (Watzlawick, 1984, p. 10)

This being said, not all ‘constructed realities’ are equally engaging, as partners or habitats. Some feel delightful while others leave us cold. Some please most of us, while others attract only a few.

Like a good conversationalist, a well-designed object is one that ‘knows’ how many surprises and wonders contribute to capture people’s imagination. Like a narrative text, it offers “a dynamic system of competing and mutually blocking retardatory pattern” (Sternberg, 1978, p.177). In Shklovsky’s words, “a narrative text is less like an elevator than a spiral staircase which, littered with toys, dog leashes, and open umbrellas, impedes our progress” (quoted by Bordwell, 1985, p. 38).

From a pragmatic-ecological standpoint, it seems essential for designers of human-made artifacts (from educational software to playgrounds and books) to take responsibility for their products by not assuming –I caricature the constructivist’s stance– that learners will use them as a Rorschach stains anyway (projective test). Designers need to acknowledge that their products will survive after them, and that it is ultimately the built artifact, rather than the builder’s intentions, that becomes part of other people’s cultural heritage. It is ‘its’ qualities that will persist to evoke or signal potential uses to newcomers who encounter them for the first time. Denying the power of places and things to impact people can breed a culture of ‘not caring’.

Surely, designers cannot predict how their creations will be appropriated. What designers can, however, is be attentive to the idea that, once conceived, their creations are no longer a mere extension of themselves. Instead, they come to exist as separate entities. They gain both autonomy and an identity as ‘invented realities’, an integral part of the cultural landscape in which other newcomers will live and grow.

People read into artifacts because of who they are, and because artifacts offer clues. Like archeological sites or eroded landscapes, they are marked by their history, and they embody the knowledge or collective experience that went into their being (both reflecting and transcending builders’ and readers’ intents and aspirations). The constructivist’s nightmare may well come true! Yes, human-made artifacts can call upon certain experiences and uses, and discourage others. And they sometime impose their logic, or constraints, beyond the builder’s intents and any particular act of interpretation.

From an epistemological standpoint, it seems equally important for learning researchers and educators to rethink the role of accommodation in cognitive adaptation. To Piaget, we have seen, intelligence is adaptation, and adaptation is the ability to maintain the maximum of what is acquired while opening up to the maximum of novelty. Adaptation, in other words, calls for a balance between openness and closure, assimilation and accommodation.

In Piaget’s own words: “Assimilation is by its very nature conservative, in the sense that its primary function is to make the unfamiliar familiar, to reduce the new to the old” (Piaget, 1954, p. 352-353). Accommodation, by contrast, shakes and decrystalizes existing schemes so that they fit to the demands of the environment. Its

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primary function is to make what is familiar unfamiliar again, and to question the old by listening to the new.

Circular reaction was a term introduced by Baldwin, and used by Piaget, to refer to infants' ability to modify their activity in relation to an unexpected effect, and actively reproduce some interesting events, which were at first discovered by chance. The concept of circular reaction is a concept of major importance to psychologists. According to Flavell, the principle's value "lies in the fact that it is the device *par excellence* for making new adaptations, and of course new adaptations are the heart and soul of intellectual development at any stage" (Flavell, 1963, p. 93).

Radical constructivism, I suggest, gives more weight to the assimilatory pole of human adaptation. While this is an important contribution, especially in an intellectual climate mostly dominated by innatist or empiricist views, it is useful to remember that an organism that solely assimilates is not viable. Such an organism fails because it is insensitive to variations in the environment that may help it adjust its conceptual structures. Such an organism closes up to surface perturbations for 'blindness' to others and inconsideration for odds. Conversely, an organism that solely accommodates is at risk of disrupting its own momentary equilibrium, for an excess of openness to external solicitations. An act in which assimilation and accommodation are in balance constitutes a truly adapted act!

NOTES

- ⁱ The [tool-maker's paradigm](#), according to Reddy (1993), is a far better candidate than the "conduit" metaphor to understand how meaning is built and read into form. Words are not like little wagons, which transport meaning back and forth between a sender and a receiver (who load and unload them at each end). They are more like a misty landscape, or an obscure blueprint, the contents and textures of which are filled-in by the interlocutors. The tool-maker's paradigm further suggests that people's minds are like secret gardens surrounded by big walls. In each garden, the terrain and resources available are partially shared and partly unique. Inhabitants communicate among themselves by exchanging notes (blueprints, questions, suggestions) which they annotate and reedit to come to closer understanding.
- ⁱⁱ The term 'concrétisation réfléchie' was coined by G. Céllier (1992), who noted that Piaget had given it less thought than to 'abstraction réfléchissante'.
- ⁱⁱⁱ To Piaget, human cognition derives from biological adaptation, yet biological adaptation is not sufficient to define human cognition. Psychological adaptation allows infants to modify their own internal states, to enlarge their field of experience, and to construct an increasingly sophisticated set of strategies to deal with ever more complex situations. Psychological adaptation implies the organism's ability to expand its activity over greater and greater distance –in space and time– and over more and more complex detours.
- ^{iv} Piaget broke down the biological notion of assimilation into 3 distinct forms. 1) *Reproductive assimilation* asserts that when an organism has a structure available, there is a tendency to exercise it. Its adaptive advantage is to consolidate activity through repetition. The need that triggers the behaviour is the very consolidation of the scheme itself, rather than any external stimuli. 2) *Generalizing assimilation* asserts that when an organism has a structure available, there is a tendency to exercise it in all sorts of different situations. Its adaptive advantage is to expand the experiential field. And 3) *Recognitory*

assimilation asserts that when an organism has a structure available, there is a tendency to incorporate the objects acted upon into the structure of the scheme. In other words, an object that has been sucked and/or touched and/or seen is recognized as a 'thing' to suck and/or to touch and/or to see. The adaptive advantage of recognitory assimilation is attribution of meaning in a very primitive sense: objects can be 'tagged' by use, and 'gauged' according to how they fit or resist usages. The 'thing to ___' gains both permanency and identifying features as a result of its consistent answers to given interventions.

v Accommodation is the [adaptive](#) principle complementary to assimilation. It accounts for the adjustments of a scheme necessary to assure effectively the success of an action. A baby who sees the bottle and wants to reach it has to learn how to do so if the bottle is presented in a slightly different position. The adjustments necessary to succeed, despite variations in the context, are referred to as accommodation. The overall function of accommodation is to provide the baby with the possibility to adjust her/his pre-existing schemes so that they fit to the demands of the environment.

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