

# Computational Creativity through a Gap

## A Position Paper for the Dagstuhl Seminar 12-17.07.09 on Computational Creativity

**Iris Asaf**

**The Bartlett Faculty of the Built Environment**

**UCL, London UK**

[i.asaf@ucl.ac.uk](mailto:i.asaf@ucl.ac.uk)

### Abstract

A significant aspect of creativity is its elusive mystery. Unlike pure novelty or pure originality and adaptability, creative ideas have an aura of something which is unanticipated, yet, in a way not completely surprising, but providing insight into familiar ideas. This position paper wishes to focus on this mysterious aspect of creativity and discusses uncertainty and *the creative gap* as aspects that are part of creative thinking processes in generative art and design.

Keywords: uncertainty, creativity, gap, generative design and art.

### Creativity and Uncertainty

In whichever form or discipline where creativity is employed, whether art, design, architecture, music, or scientific discovery – the creative act has always constituted an essential mechanism: that of an uncertain exploration, the development of

premeditation to envision something that has not yet been made, or that may surprisingly appear. As indeed expressed by Margaret Boden: "Unpredictability is often said to be the essence of creativity" (Boden, 1995, p. 1). And what is uncertainty, if not a condition of unpredictability? Uncertainty, then, that unique condition of vagueness and

unexpectedness inevitably tags along any creative process.

This connection between creativity and uncertainty, or between the accidental and the creative, is not a very new one. It is rather an old concept, one that has been developed and discussed for years by so many. I will only mention a few: the philosopher Paul Virilio and his theory of the accident of art (Virilio, 2007, 2004), the scientist Henri Poincaré and his discussion on the mechanism of chance within natural phenomena (Poincaré, 1952), the musician John Cage and his work on Indeterminacy, as well as Dada and surrealist artists, such as Marcel Duchamp.

For the latter, Duchamp, as for other surrealists and Dada artists in the early twentieth century, creativity resided in the ability to 'unlock' the unconsciousness through various kinds of devices and representations. The dialogue with a mechanic device of chance such as in Duchamp's Large Glass can serve as one well known example (Manolopoulou, 2006). These notions, influenced by Freud's psychoanalytic theory of insight, reflected upon the idea of the indirect knowledge of the unconscious that rises to the surface at a creative moment (Neubauer, 1979, Wilson, 1991). This creative leap, to the surrealists, did not necessitate obtaining novel discoveries, (though some of their ideas can

indeed be considered novel), but merely the recollection of the familiar, the rising to the surface of consciousness what was hidden through a given medium.

Interestingly, as reflected by Duchamp:

*"In the creative act, the artist goes from intention to realization through a chain of totally subjective reactions..., in the chain of reactions accompanying the creative act, a link is missing. This gap, representing the inability of the artist to express fully his intention, this difference between what he intended to realize and did realize, is the personal 'art coefficient' contained in the work. In other words, **the personal 'art coefficient' is like an arithmetical relation between the unexpressed but intended and the unintentionally expressed**" (Duchamp, 1959, p. 77).*

The creative act of art, according to Duchamp, involves an almost calculated gap between intention and realization, a gap which I would like to place as an idea within the context of the seminar.

## **The Creative Gap**

As part of my current research at the Bartlett School of Architecture, UCL, I interview designers and artists that are using computational means, such as generative systems, for their own creative processes. My interest is to learn from various

practitioners, what is it in their work with computational methods that enables creativity? In other words, what is happening in the collaborative process between the artist and the computer or the generative simulations that prompts a creative process? Interestingly, though the practitioners interviewed came from different backgrounds and held different views on art and design (for example, some were skilled programmers and created their own generative design or art whereas others collaborated with scientists and programmers) they shared some similar reflections, revealing part of the mystery of the creative act within their working process.

An important notion which was repeated in the conversations related to the power of surprise, the emergence of complex patterns and imagery that could not have been predicted with a human mind alone. This point is also reinforced by what has been published in the literature on architectural digital design. For example, the theoretician Manuel DeLanda (2002) points that:

*"As an aid to design these techniques would be rather useless if the designer could easily foresee what forms would be bred. Only if virtual evolution can be used to explore a space rich enough so that all the possibilities cannot be considered in advance by the designer, only if what*

*results shocks or at least surprises, can generic algorithms be considered useful visualisation tools."* (DeLanda, 2002, p.117).

In this respect, a significant aspect of the creative process in design in general, and in generative design in particular lies within this mysterious condition of uncertainty and unpredictability. It is a condition that inevitably stems from the gap between the designer's mental image of what an expected outcome could be and what is actually produced within the system (Asaf, 2009). Thus, during a creative moment, these two levels, as phrased by Duchamp, the level of 'the unexpressed but intended' and the level of the 'unintentionally expressed' exist in a dialogue, in an interplay of oppositional levels. By this cognitive gap the design or artistic process proceeds through subversion, through a *dialectical conversation* between the human mind of the designer and its otherness, the non human computer expressivity, that prompts the pursuing of meaning of what at first glance, on the screen, may seem unpredictable. What is re-established in this kind of a system is the mechanism of *feedback* between the designer or the artist as an individual observer and the computer or its algorithmic expressivity that serves as an autonomous agent. This process of feedback can at a certain point give rise to some new insight, some hidden meaning rising to the consciousness of the observer.

Finally, within the context of generative design or art, *as long as this gap exists*, and in a sense well founded in the generative algorithmic method, *as long as what is revealed is non obvious to the person that observes the revelation*, then an important mechanism is established. It is a mechanism that prompts a constant editorial role of interpretation, of questioning the revelation, and by that enables the design or the artistic process to go "beyond itself" towards its otherness, its difference. I argue that it is a mechanism that enables the generative design or artistic process to become creative.

## Final Comment

Over the past several decades creativity has been studied in diverse fields including psychology, artificial intelligence, arts, neurosciences and philosophy, and has managed to remain a rather elusive question. Recent published literature points at the complexity of it as phenomenon, and the need to put together today the many perspectives on one multidisciplinary platform, that would enable to address the 'gaps' in current conceptions of creativity. This is evident in current published work such as by: Beghetto and Kaufman (2007), Ivcevic (2009), Liu (2000) and Richards (2007), amongst others. One of the missing links relates to a better understanding of

*creative thinking*, which is a key matter in arts and sciences. In this respect uncertainty and the creative gap discussed here need to play their role in understanding the mechanisms of creative thinking. Modeling the creative gap is perhaps a matter of the next generation of computational theories of creativity to further explore.

## References

- Asaf, I. (2009) On Un/Certainty as A Method in Architectural Digital Design. Faculty of Architecture and Town Planning. Haifa, Israel, Technion – Israel Institute of Technology. MSc dissertation.
- Beghetto, R. A., & Kaufman, J. C. (2007). Toward a broader conception of creativity: A case for mini-c creativity. *Psychology of Aesthetics, Creativity, and the Arts*, 1 , 73-79.
- Boden, M. (1995) Creativity and Unpredictability. *Stanford Humanities Review*, 4(2), Stanford, CA, USA, 123 – 139.
- DeLanda, M. (2002) Deleuze and the Use of the Genetic Algorithm in Architecture. In Leach, N. (Ed.) *Designing for a Digital World - Architectural Design*, (pp. 117-129), London, Wiley-Academy.

Duchamp, M. (1959) The Creative Act. In Lebel, R. (Ed.) *Marcel Duchamp*. New York, Paragraphic Books, (pp. 77-78), <<http://iaaa.nl/cursusAA&AI/duchamp.html>> (Accessed: 24.10.08).

Ivcevic, Z. (2009) Creativity Map: Toward the Next Generation of Theories of Creativity. *Psychology of Aesthetics, Creativity, and the Arts*, 3(1), American Psychological Association, 17-21.

Liu, Y. T. (2000) Creativity or Novelty? *Design Studies*, 21 (3), 261–276.

Manolopoulou, Y. (2006) Drawing on Chance: Extracts from Drafting Pier 40. *The Journal of Architecture*, 11 (3), Routledge, Taylor and Francis Group, 304-314.

Neubauer, P.B. (1979). The Role Of Insight In Psychoanalysis. *Journal of the American Psychoanalytic Association*, 27S, SAGE publications, 29-40.

Poincaré, H. (1952) *Science and Method*, translated by Maitland, F., New York, Dover Publications. (Originally published in 1908).

Richards, R. (2007) *Everyday creativity and new views of human nature : psychological, social, and spiritual perspectives*, Washington, DC, American Psychological Association.

Virilio, P. (2007) *The Original Accident*, Cambridge; Malden, Mass., Polity.

Virilio, P. & Lotringer, S. (2004) *The Accident of Art*, New York; Los Angeles, Semiotext(e).

Wilson, E., Jr. (1991) Psyche. XL, 1986: Freud's Theory of Insight. Ingrid Kerz-Rühling. *Psychoanalytic Quarterly*, 60, Psychoanal Q Inc., New York, 167.