

## Designing the Flow / Between, Across, and Beyond

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**Abstract** *The present approach regards the discussion of matters related to the design of space as a complex system. The main question is how to design space as **emergence** from subject's **trans-actions in mixed realities environments**. The central goal is to produce a methodology based on **systemic measures of complexity** and self-organization to help architects designing for mixed realities environments. The present work is part of the Clarissa Ribeiro's PhD research at ECA.USP – School of Arts and Communications, University of Sao Paulo, Brazil. Clarissa Ribeiro is a researcher of the Digital Poetics group, headed by her tutor, Professor Gilberto Prado.*

**Introduction** The goal of the Master's Degree dissertation concluded in 2006 at Nomads.USP – Center for Interactive Living Studies, was to increase the understanding circa interfaces between complexity and architectural design processes. This approach draws on understanding the scope of the change brought by complexity, since 1940s Cybernetic, Information Theory and Systems Theory first developments. Concerning the master research main goals, was important to investigate the sciences of complexity and the complex thought historical, to map its fundamental principia, achieving subsidies for defining criteria to analyze and select examples of complexity emergence in Architecture, focusing on design processes. Two periods of time were selected – from 1960s to 1970s and, from 1990s to 2000s –, distinguishing two specific moments closed related in Architecture History. The intention was to contribute for an effective understanding of Architecture not merely or specifically as object, but as a complex system, simultaneously organized and organizer.

Starting from the conclusions of the master dissertation, the present work draws on studying appropriate architectural design processes methodologies to explore the design of space as the design of a complex system. In processes of that sort, the architect will possibly not be the absolute designer that considers together form and function to create objects. The architects of that sort of processes, need to realize themselves, as the British cybernetic Gordon Pask suggested once (PASK, 1969, p.493), as 'system designers'. According to Pask, "[...] architects are firms and

foremost system designers who have been forced, over the last 100 years or so, to take an increasing interest in the organizational (i.e. non tangible) system properties of development, communication and control." (PASK, 1969, p.493).

As a result of this way of thinking, it is important to the contemporary architect to recognize himself as the designer of interactions between subjects, objects, and environments that might be physical and/or virtual. Further than, it implies in connecting developments and knowledge of areas that dialogue with Architecture since the time when architects was 'computing without computers' (FRAZER, 2005, p.34-43). Starting from the 1940s Cybernetic, Systems Theory and Information Theory, the dialogue nowadays implies a wide range of knowledge from the sciences of complexity, that includes developments from biology, mathematics, physics, chemistry, to point some, and implies in understanding the meaning of such terms as emergence, self-organization, morphogenesis, and so forth.

Concerning contemporary Architecture, developments in areas like artificial intelligence and evolutionary computation have being incorporated into contemporary architectural design processes methods and techniques and are setting to enter Architecture into a new phase of transition. In the last few decades, subjects as emergency, complex systems and morphogenesis have gained growing interest in Architecture circles. International publications, amongst which the British periodic AD Architectural Design, can be a reference on how much these themes concerning



the subject of the present research proposal are themes of interest for a wide range of Architecture international community. Article and books concerning emergent design, self-organized systems, intelligent systems, interaction design, systems design, digital art, has already attracted considerable interest internationally. Examples of this growing interest include publications as the issues 'Morphogenetic Design Strategies (Architectural Design, 2004, Academy Press), 'Techniques and Technologies in Morphogenetic Design (edited by: Michael Hensel, Achim Menges, Michael Weinstock, Wiley-Academy, April 2006), 'Morpho-Ecologies Towards Heterogeneous Space in Architectural Design' (Hensel, M. & Menges, Achim, 2006, Architectural Association, November 2006).

International publications that have tradition in publishing vanguard themes in architecture are nowadays avid for research results or academic discussions concerning the interfaces between architecture, computer sciences and complexity sciences. Considering the present research approach, it has diverse intersection points with international published literature that have tradition in publishing contemporary themes.

Considering effectively the importance of that dialogue between Architecture and complexity, the present approach implies understanding how to incorporate the knowledge of the sciences of complexity for developing a methodology to design space as a complex system.

### **Between, Across, and Beyond**

At present, the architects are expected to be read to work, assisted by computer systems, with a wide range of dynamic factors concerning subjects, objects and its environment, to experiment original ideas concerning contemporary architectural design processes. According to Peter Testa, "The widespread use and availability of information technology and computing has radically changed the field in which architecture operates and is over time having an influence on architecture itself. [...] There is of course enormous potential in the capacity of computation to deal with very large databases and to enlarge the space of design in the contemporary world." (TESTA, 2006)

In addition, we are all increasingly immerse, acting and living, 'between, through and beyond' mixed realities. Concerning Architecture, it is essential that contemporary architects conceive it together, in dialogue, the physical and virtual dimensions.

It is important here to comprehend the meaning of the trans prefix from its Latin meaning. According to Basarab Nicolescu, "from etymological point of view 'trans' means 'between, across, beyond'. (NICOLESCU, 2000). As important as, is to understand the concept of mixed realities. The concept of 'mixed realities', according to Oliver Grau, "[...] currently center on connecting real spaces, including their forms of cultural and social actions, with image processes of virtual environments." (GRAU, 2003, p.245).

Immerse simultaneously into the virtual and the physical dimensions of mixed realities, the subject will be in a continuous transactional process that could be better understood analyzing selected digital art installations as case studies. By means of art explorations inherent freedom, these case studies would be essential, considering the experimental part of the research.

The case studies may include explorations of the North American artist Camille Utterback as Text Rain (1999), Untitled 5 (2004), External Measures (2003) and Liquid Time Series (2001-2002). The current Liquid Time Series, as an example, consists of two distinct works, Liquid Time Series—Tokyo, and Liquid Time Series—New York. In both works, the subjects interact with images from urban sites in these cities (Figure 1; Figure 2) where people, data, or other physical matter are transferred or in flow.

As Utterback explains, "In the Liquid Time Series installation, a participant's physical motion in the installation space fragments time in a pre-recorded video clip. As the participant moves closer to the projection screen they push deeper into time—but only in the area of the screen directly in front of them." (UTTERBACK, 2007)

The experimentations mentioned are examples of digital art mixed realities explorations that stimulate





Figure 1 *Liquid Time* (2001-2002)

and invite the user (the subject) to re-imagining and to redefine its own contexts, to redefine himself indefinitely. The subject in that context could be considered as a 'trans-actor'. The subject will not be a passive viewer but effectively an actor integrated to the digital art work process, modifying it, constructing it at the same time that he experiments it. According to Lynn Hershman, "Interactive systems require viewers to react. Choices must be made. As technology expands, there will be more permutations available, not only between the viewer and the system, but between elements within the system itself." (HERSHMAN, 1990, p.329)

In this context, the central research hypothesis is that, in mixed realities environments, subjects, considered as parts of a self-organized and complex system, could trans-act 'between, across and beyond' physical and virtual dimensions of these realities, and have the potential to generate diverse spatial configurations as emergences, in diverse instants in time.

Considering that our complex systems are mixed realities environments, it is central to define what could be considered as the system's 'elements'. Regarding this objective, it is important, as an example, to define our system in theoretical or abstract fields specifying: the possible elements and their states; the



Figure 2 *Liquid Time* (2001-2002)

elements and their possible attributes; the initial state of the system; the Inter-relations between the elements; the degree or character of interdependence between the elements.

It is still necessary to certify if the elements are distinguishable as systems parts, as well as if it is possible to identify the inter-relations between the elements. That is what allows classifying it effectively as a 'system'.

After defining the system elements, it is possible to measure the complexity of the system, considering, for instance, the interrelations between the system itself and its environment. In addition, it is possible to delimit some system organizational measures verifying, as an example, the relations of conditionality between the elements or the way in which the elements of a system organize themselves in subsystems.

This sort of systemic measures will constitute the bases to the development of a methodology in order to study and design space as emergence.

The research objectives integrates, in a primary stage, the theoretical objective of structuring a methodology to study subject/object/environment transaction processes in mixed realities as a complex and self-organized system, focusing the space as emergency of this



system organizational processes in time. In a secondary stage, the main objectives fits in the empirical objective of selecting and analyzing, supported by the developed methodology parameters, examples of digital art installations as case studies, focusing to time periods: 1990s and 2000s.

Using the methodology parameters, based on systemic measures, the purpose is to conceptualize, design, and construct an experimental digital art installation that would function as prototype design to test the methodology principles in real world applications. Some data processing and evaluation strategies that could be used to analyze the experimental digital art work may include, for instance, the observation of emergent spatial patterns from subject/object/environments transactions, as the applications of interviews focusing the users – the subjects that transact. Nevertheless, considering the novelty character of the present research propose, some methods and techniques that will be used to address the research problem, some methodological procedures, will be developed along the research development period by confronting emergent questions and specific problems.

**Final Considerations** Concerning Architecture theory and practice, the simulation systems to explore new spatial paradigms associated with so called “emergent organizations” are affirm an way of thinking Architecture even more linked to the complexity sciences, to a complex thought.

The innovative character of the present research proposal draws on the possibility of investigating ways users could affect the space they are immerse in; a space that could be even more understood as a medium, ‘a spatial medium’. The present research proposal investigation does not aim to exclude the designer: the

research central goal is to produce innovative theoretical tools to design ‘space as emergence’, to produce a methodology based on systemic measures of complexity and self-organization to help architects designing for mixed realities environments, to design ‘spatial mediums’, to be effectively systems designers.

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