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Creative realities of the aesthetic field: hybridism between art and digital architecture

Abstract

The architecture has been expanded in its own complexity through computing resources, promoting significant changes in its forms, renouncing the appearances of the common scope and exploring new experiences with unusual versions and also, creating visual metaphors for a new world. The spatial forms are created by several principles, with many scientific motes to explore, in an intense and systematic use of digital medium, thus arising processes of aesthetic explorations common to the digital arts. The digital architecture can materialize signs through a diversity of references, subverting to the form the desire of an expression translated in a character of beauty.

Keywords

Hybridism. Digital architecture. Visual expression. Digital art.

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REALIDADES CREATIVAS DE CAMPO ESTÉTICO: HIBRIDACIÓN ENTRE EL ARTE Y LA ARQUITECTURA DIGITAL

REALIDADES CRIATIVAS DO CAMPO ESTÉTICO: HIBRIDISMO ENTRE ARTE E ARQUITETURA DIGITAL

Resumen

La arquitectura se ha ampliado en su complejidad por los recursos de la computación, la promoción de cambios significativos en la forma, la renuncia de la gama común de las apariencias y la búsqueda de experiencias con versiones inusuales, creando metáforas visuales para un nuevo mundo. Las formas espaciales se crean a partir de varios principios con muchas motas científicas para explorar, en una utilización intensa y sistemática de los medios digitales, lo que resulta en procesos de tenencias de plástico comunes a las artes digitales. La arquitectura digital puede materializarse signos de una muy amplia gama de referencias y, subyacente a la forma en que el deseo de expresión traducido en un carácter de la belleza.

Palabras clave

Hibridación. Arquitectura digital. Expresión visual. Arte digital.

Resumo

A arquitetura vem sendo ampliada na sua complexidade pelos recursos da computação, promovendo mudanças significativas nas formas, a renúncia das aparências do âmbito comum e a busca por experiências com versões inusitadas, criando metáforas visuais para um novo mundo. As formas espaciais são criadas a partir de princípios diversos, com muitos motes científicos a explorar, numa utilização intensa e sistemática do meio digital, surgindo assim processos de explorações plásticas comuns às artes digitais. A arquitetura digital pode materializar signos de uma diversidade muito grande de referentes, subvertendo à forma o desejo de uma expressão traduzida num caráter de beleza.

Palavras-chave

Hibridismo. Arquitetura digital. Expressão visual. Arte digital.

1 Introduction

Several computational techniques, can transform elements such as, plans and polygons into curved and non-linear forms, developing a kind of unusual model. By means of the irregularities of processes, operated by the machine, the insertion of codes with open variables can result on unusual geometries. Supported by resources from many areas, many experiences have contributed to create objects that go beyond the trivial limits of architecture. As well, many concepts and procedural steps of design to explore have become increasingly sophisticated.

The work following by computational calculations, can offer new hybrid nature phenomena, structures and existing exercises combined, also can generate new objects and practices. In this perspective, the feed results performance machines, whose signs taken and processed are not clear. Even the more complex functions, those that deal with the physics of movement, of unknown or undetermined formerly transitions, the mathematics of chaos, of biological functions useful for adaptation - what could be pure arbitrariness -, might be a concept to explore, bringing computers to the core of experimentation to propose as a result special spaces.

In addition, many geometric constructions are coming from circulating information, impregnated by the media. As a result, how the expression of new models in the digital context can be understood? With multiple visual references, recognised, through contamination and hybridism among, how the architecture framework is affected? In this kind of indiscriminate circular causation, is very naïve to think that it has not influenced the contingent order of its form of expressions. Thus, the objective of this article is to present some discussions and examples about the new models arising from the digital, whose origin from various strategies (often founded on scientific discourse), and whose result are not always obvious. It arises in this context of digital culture, where visual aesthetic is pursued, to propose new experiences.

The hypothesis raised in this article is that there is no more possibility of accurate detection for models, but that doesn't stop a poll. Once that arise so many diverse areas, appropriations and also the modes of fitness do indirectly, adaptable to a variety of circumstances. In other words, the models are not always self-evident in terms of what were borrowed, specially in terms of authory; the creative foundation, or the concepts that comes from different fields of knowledge. Inevitably, the complexity of the form, cannot be entirely comprehended, without achieving the process that the form was generated.

In polls of new models that support in science, great objectivity, investigating several possible issues, making the universe of human

knowledge is exponentially magnified (PICON, 2003). However, the results are not restricted only to that part. We live in a time where everything is questioned and this knowledge in systematic steps laminate goal can be referred also in more open perspectives. While the universe of science is inexhaustible source of research (everything acquires expansion into new approaches), there is also a ballast of contingencies, operating fluid with more free targets, where mainly the research in the field of the arts is his will.

From the discussions on the aesthetics of the architecture of Roger Scruton (2010) and Paul Angelier (2004); digital architecture of Branko Kolarevic (2000; 2003), Brian Massumi (1998), Antoine Picon (2010; 2003); the raids on the media context and the numeric environment of William Mitchell (2008; 2009), Vilém Flusser (2007), Arlindo Machado (2000) and Edmond Couchot (2003). This essay not only looks at unstable and controversial terrain, but also, aims to understand the foundation of new processes and how the different media has affected the production of architecture. They are decisive vectors in the implementation of new models in digital arts. The approach of these scholars have developed this particular problem, and this article also intend to joining in that discussion.

This can be considered an exploratory research, a method of inductive approach (after considering a number of theories, within its own particularities). For that will be presented explanations of the digital arts and how they contribute to the development of architecture, being more evident when observed through analogy or metaphor
Digital architecture can be established under many accents, as a field of investigation driven by action, and whose conditions are diverse, with several project goals and simulation process. In any circumstances, what is composed by "digital matter": can be altered, distorted, and deformed infinitely in plastic processes (MACHADO, 2000).

In these models, it is essential to note that the artistic dimension of architecture is not relegated to later plans or past, as still today in many circumstances is assisted. What sets this plastic character is something of his essence, constituting him part of core, as a central step to establish the creation of feelings and states of mind of aesthetic character, fundamental transformers experience of living an architectural space. The domain of matter, building techniques, is the essence of art, by property in print so determinant and vehement the enunciation intense and substantial.

2 Art in the creative process of architecture

In a preliminary approach, art can be understood as part of the creative process, expressing and transmitting qualities in their perceptual effects, covering aspects of the sensible. The art is not what adheres to architecture after that meet functional programs, physical factors, specific legislation, *etc*. To avoid pejorative senses usually condemned by excessive attachment to seduction caused by appearance, it looks to recognize creative conduct procedures, and in this case, mainly related to its poetics. In matters involving the area of human sensitivity faculties, the *aisthçsis*, the affections are those revealed in its springs (PASSERON, 1997). The sensible aspects of art are not disconnected of the creative process, where it is possible to observe the authoring in the primary causes, in the specificities elaborated from its beginnings.

It is in the core of the design processes, art can be understood as an expression to be gradually conquered, because is not given beforehand, it cannot be reached immediately. In this way, its denotation is not unequivocal; his appearance is never quite obvious. The artistic aspect, or the "aesthetic" of architecture reaches its flow in its own expressiveness, an accomplishment in the scope of the visible, intelligible when other conditions are not clearly presented (SCRUTON, 2010).

Taking into consideration that it will be more useful to look at the problem through its convergence, several cases has been taken in its early experimental objects, whose characteristics are delivered by the practice of digital art, and that may take architecture (because many cases are still only esthetic experiments), exhibit with notoriety in public spaces, such as museums, conferences and fairs. As an for example, at the Beijing Biennale and also at AAG (Advances in Architectural Geometry), whose 2014 biennial meeting was organized by the architect Eric Owen Moss in Paris at the Pompidou Center, which was coordinated by Fábio Gramazio and Matthias Kohler in 2016. In the last event, the architectural projects of Hernan Diaz Alonso, Andrew Atwood, Devyn Weiser, Peter Testa, Marcelo Spina, Elena Manferdini, Florencia Pita, Herwig Baumgartner, Marcelyn Gow, Tom Wiscombe and others, allowed the public to get interesting and challenging experiences. As one that can instigate the most conservatives (as well as those irreducible to these proposals), where the spatial forms intertwine, its variables in the intense and systematic use of the digital médium.

In this respect, the intention of being architectures, as it includes the human in rehearsal and behave, in terms of an ambience and a scale (referring to the concept of occupied places -, place to exercise these activities and to acquire experiences), but whose artforms are exploited as a parole of space in terms of invention. On the other hand, from the examples of several architects and contemporaries studios (such as Greg Lynn, Marcos Novak, Kas Oosterhuis, Stephen Perrella, Morphosis, UN Studio, NOX, Sulan Kolatan, Asymptote, Decoi, Douglas Garofalo, Joel Sanders, Xefirotarch, *etc*.) and in its various circumstances observed, many

digital operations are also performed with the computer operating its aspects of arbitrariness.

The case of the New Urban Lobby project of the MRGD Architects group, for example, takes the method of fuzzy logic and also behavioral algorithms. Several operations are carried out by the Group, were given following scripts applied to its lines, taking various possibilities in the calibration of the *hair algorithm* of the software *Maya Wavefront*. Another case is Dubai Waterfront Hotel, projected by Jerry Tate Architects, whiches develops a multiple floor building, from experimental diagrams in *MEL-scripting* (*Maya Embedded Language*). Most unusual are also the experiences carried out by Kokkugia (Roland Snooks, Casey Rehm, Fleet Hower, Bryant Netter), whose approaches give priority to digital techniques of Swarm Intelligence, Agent Bodies, Fibrous Assemblages, Recursive Formations and Generatives Design Approaches. These authors allow a set of variables, usually indiscriminately allocated by the machine, as well as sequential computations of expressions in previous data are not foreseen by the operator. These techniques that explores scientific concepts, (for example, the thresholds being obtained) seem to have little purpose, goals of those in which the architecture always looking for.

Several of the examples built by these architects, have in common the development of proposals that are fundamentally ambiguous and cannot be easily framed in a single bias. As they are created in the pluralism of options that the machine can allow and it is not always belongs to the recognized universe and so can also be uncanny. Were released, from the beginning, according to experimental conditions (some never will be a "digital sketches", because 'tectonic' cannot be guaranteed, as well all the typical limitations from the architectural field).

These conditions, are marked by a complex confluence of art, under the various free stages, openess, indeterminism, chaotic, or than it is nurtured by many principles of science, often regarded as trickery required to a particular implementation, capable of employment the openess of ideas and concepts. In these circumstances, these examples might be precisely the point of intersection or even deflection between the fields and make us rethink the life that can still be built in the near future.

3 The visual expression: indiscriminate circulation

Without imposing aesthetic and ideological references to restrict the area the knowledge, the more different examples may have the foundations to the development of these models.
Results from there part of the enormous diversity and asymmetric cases found (PIAZZALUNGA, 2005). The importance of these issues also are intensified because the computer, offers through a digital interface, the ability to bring together different forms of current manifestations, simply called "media", whatever it was visual, animated, interactive, *etc*.; favoring processes of exchange and mutual contamination (Figure 1).

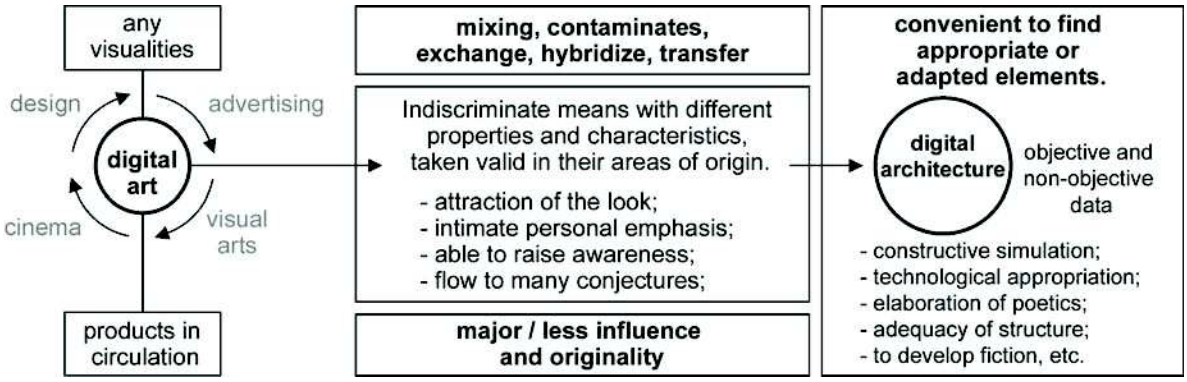

Figure 1: diagram of the generic formation of the signs and the transit between art and digital architecture.
Source: LIMA, 2015.

At the same time that art supposes to bring to our senses or the spirit of aesthetic character, different degrees of that approach, also contribute to a trivialization of the effects. The different disciplines (design, advertising, film, Visual Arts, *etc*.) can treat its resources within its own specificity, but keeping the processes of exchange between disciplines. The strategies aims to provoke influences on people, that are distinct experiences, caused by artists, designers, advertisers, *etc*. As the computer becomes more and more a common tools, approaching these "creative processes", digital architecture also influences its own field, bringing projects with unlikely results.

In the creative process, the digital data are also characterized as center of contingency, being susceptible to various propositions, mutations, displacements, metamorphoses, *etc*. Transform the information is a typical task of the computer, because the data is in progress, ready for new statements whenever is necessary and to generate images that can be references in new developments. "*The deformation or training by signs is the very condition of thinking existence, it is original*" (LEVY, 1997, p. 34). This model becomes the result of several contingencies, inserted codes with specific behaviors and needs to be considered in the architectural context, a type of design procedure (KOLAREVIC, 2000).

Whenever the form is designed without the limits imposed by the materialistic aspects, the variables required or imagined can be tested. As well as the creative process is something inherent to the project, it was exponentially expanded, when the most natural transformations are implemented, in stages whose properties are impossible to do in the physical world (MACHADO, 2000). In this space, the distortion offered by the machine (computer) can easily produce new intentionalities, to move a initial sense and detract from their characters. In general, different qualities of disturbance are appropriated, new motes with profuse structuring, creating several ambivalences between codes that transfers itselves between different domains.

In these models prevail processes of language being tested, where the origin and the form development are marked by a hybrid enunciation, resulting from the intersection of different areas, through certain violations

of its features. "*As the living species, the species of language have relations between them, and these are far from harmonious relations*" (LYOTARD, 2000, p. 49). The work in this case is really relevant, since the Greek word *hýbris* indicates that is the result of distinct species, understood also as "excessive". These areas will have certain convergent characteristics, in a shared structure, essentially interchangeable and controllable; as well favored by aspects of the common digital language. "*Far from disperse in other arts or in other media, the numeric contaminates, insidious, but irreversibly. Its power of contamination occurs due to the simulation and its power of hybridization*" (COUCHOT, 2003, p. 269).

These digital models highlight the problem of an forged identity following by visual limits expressed mathematically: the potential to exist under any aspect, is connected with the digital space, whose characteristic is the immateriality, the absence of gravity, its artificial aspect of simulation of a place (MACHADO, 2000), creating several problems of ambiguity and also a privileged domain for artistic expressions. These examples emerge, promoting new questions about the form and its utility, that not only refer to the computer, but also making it more clear an irregular technological model, unusual and alternative practices, and reinforcing a deep commitment to create new experiences .

The computational medium itself is also a tool to make the process more dynamic and the images that is obtained, permeates the context of electronic media, on your sign mark whose characteristics are also forged in the collective imagination and subsequently required in this architecture. So, on that premise that everything is valid, "*the pluralism of the postmodern condition, allowed to authorize all architectural postures*" (MONTANER, 2002, p. 8).

On these models can be observed, several irregularities and, as if the architecture were at the level of an object to be probed, there's a frantic search for new characters of its constitutions. The whole volume is given a concurrent process, and the intense, complex and capable of strong impressions by the uncanny is vehemently pursued, disintegrating objects outside homology (ANGELIER, 2004). The fact that it does not belong to a single logic of designing and adopting common aesthetic principles, does erupt in this contemporary scene the most extravagant proposals, as well as, more and more resources of the computers are used within its limits.

4 The computational form: relationship between art and science

The complexities of artistic and architectural creation, sought to relate to concepts and principles developed in other disciplines, as in Computer Science, Mathematics, Evolutionary Biology, Molecular Chemistry, Behavioral Psychology, Cognitive Sciences and Cybernetics, reaching multidisciplinary features (SANTAELLA, 2012). There are several syncretic features between art and digital architecture, intermediated by digital streams, capable of performing every kind of confluences in their constituent modes, mainly from themes of science. Source bases still mathematics, physics, biology,

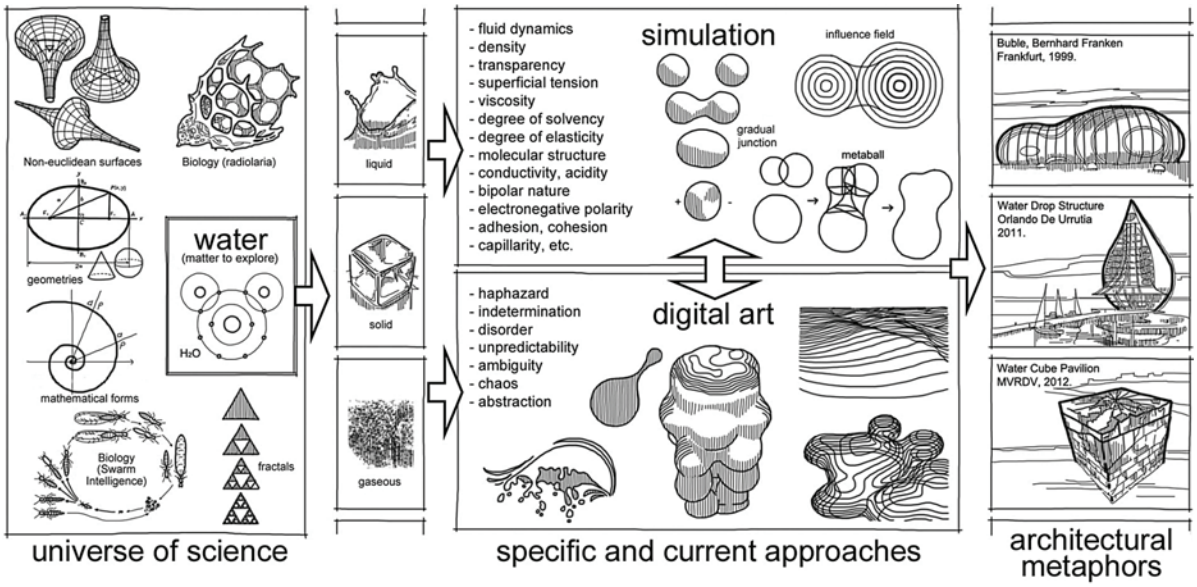

Figure 2: Example of as the exploitation of a particular scientific issue (in this case, water), the various possibilities of typed laboratory studies (deepening increasingly its characteristics and properties). Are raised all the expertise already acquired: as a concept of science is necessary to move in any direction, explore and contribute something already studied previously. Then are tests and simulation processes and also, much of the influence of digital arts, in more stages and also experiences detached released, resulting later in crucial interferences in architecture studies, where buildings may appear with combined characteristics of these attributes. They are immediately recognized when their appearances are languages based on analogies or architectural metaphors.
Source: LIMA, 2015.

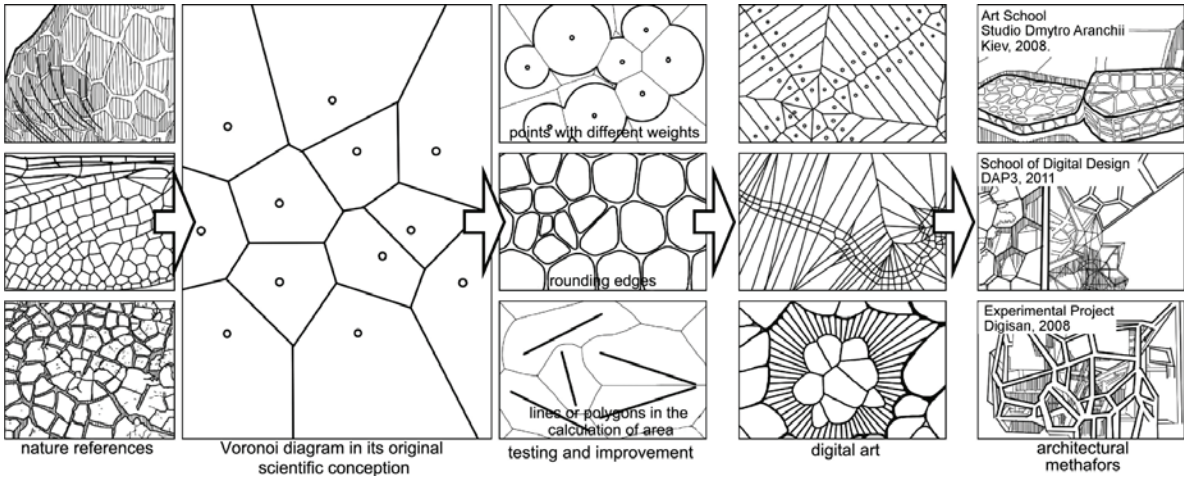

Figure 3. Many scientific finds are observed from natural phenomena, such as the formation of convex polygons designed by Georgy Feodosevich Voronoy, a Russian mathematician born in 1868 in the region of Ukraine. This diagram shown important relations of space division and cell structure, ostensibly exploited (EL DALY, 2009) and with new insights that arise: the creation of cells with different weights applied in specific points (degrees of importance or priority); rounded transition between cells, increasing the geometric and structural performance; use of straight lines or polygons instead of points for cases not defined by elementary geometrical entities, *etc*. That sparked hundreds of expressions on digital scopes, influencing the current architecture projects based on these concepts.
Source: LIMA, 2015.

etc., add the entire list of geometric properties of knowledge, obtained in the past and which can be tested in their minimum constitutions (see Figure 2).

The decisive influence of art occurs, because it is free in its initiatives; can extrapolate the "hard principles" of the materiality/physicality, properties of the substance? The tests need to be controlled and the results are yet, considered experimental at that level. In an overview, the computational medium driven by these aspects must also be enhanced through mediating languages, between its potential and the growing human desire to interact (with what?). Based in mathematical logic, codes need to be incorporated into computer languages, not only extending their performances, as well as meeting new reasoning possibility to not be previously reached without the assistance of computers, in the creation of visual and intuitive interfaces also, manipulating the data under new conditions (see Figure 3).

In these new geometries, it is not enough to just say that they are not Euclidian, but recognize its properties the lead to be that way. In the various operations carried out with the machine, many of them incur procedural stages and simulate physical properties. For example, any geometry to be defined by the parameters of the water, can shape impossible data in the physical world, in layers capable of setting the viscosity, transparency, and so on, occurring at the same time.

In addition, long before they are geometries themselves, many were computed only as systems of rules and restrictions. Before they contain clearly defined, visible, and describable geometric properties, the initial factors involved could not be grasped in an obvious formal response. One of the main features of virtual space is also enabling an abstract process, where things are done by the object's approximation schemes. This coincides with "*one of the essential characteristics of project problems is that often they are not visible, but they must be found*" (LAWSON, 2011, p. 61). All the problems at once can be faced, but on the contrary, the data collected will writing a restriction of syntactic features. As the information pointed out certain problems, the machine can be programmed generically to fulfill that solution, without effectively is already constituted a prior geometry.

Also the qualities of free exercises in the virtual space, with different strategies of simulation to test the architectural characters and preview the project, might encourage unusual features. A "place" is founded where the distortions of matter and the conceptual ambiguities are accepted and imputed. For example, the systems can create wind vectors, capable of affecting a certain model, alternating direction and intensity. You can't predict exactly how it will affect the model and how the result can benefit other decision making. Initial operations can be traced by mathematical expressions (models defined by parameters), but in the end, its complexity may be as describable as the geometry of a mist.

So, these new models "*put in crisis* (understood here as change, rupture in process development and disturbance in relations of continuity) *different systems of representation*" (PLAZA; Tavares, 1998, p. 15). The various

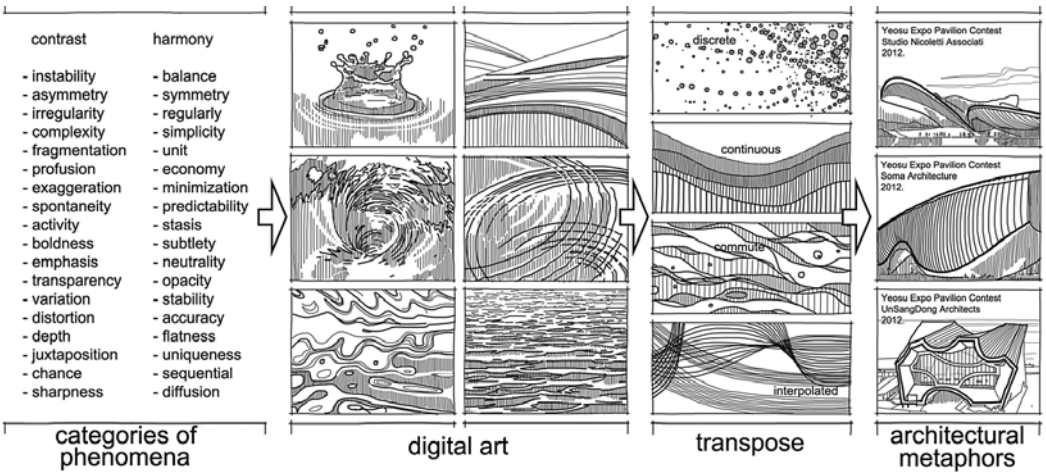

Figure 4. Several phenomena of art were minutely studied by Gestalt psychology, clarifying features of Visual settings. These phenomena are also produced in digital art resources, where other developments are facilitated by conversion modes used in computer software, able to generate a spatial architectural forms without numbers.
Source: LIMA, 2015.

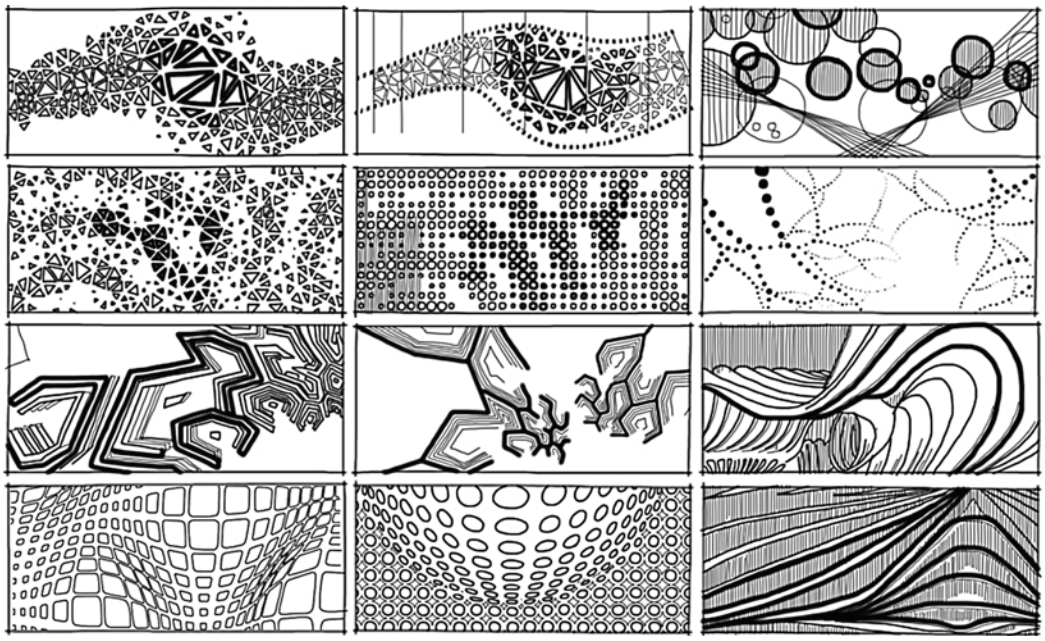

Figure 5. In the past the use of visuals was very limited: they were applied only as a surface effect, being considered with great prejudice by architects. Currently members of the digital arts, can undertake in the formation of complex volumes, where also a number of quantified lines produces the impression of typical of contemporary phenomena: electromagnetic forces, electrical discharges, physical changes, data conversion, emission of particles, or noise transmission failures, *etc*. These are phenomena of science often transported to the collective imagination in the form of images (visual fictional constructs) fairly exploited by video, cinema, design, *etc*. In short, these representations are not reliable images of the phenomena, but the way in which artists found to express purpose, reaching the global perception of the users.
Source: LIMA, 2015.

languages founded by the experiences of the scope of art also refer to perceptual characteristics (Figure 4). The categories of phenomena, is decisive to influence the perception of objects in various sensitive aspects; and seeks to effectively understand them, not as something abstract that which escapes.

The categories of perceptual phenomena of Visual forms have been ostensibly studied over the years, as elements of experience to be used in specific conception (DONDIS, 1997). It appear as pulses and can be abstracted from cases, variables can be used so very conscious in achieving some effect. "*There is no reason why visual forms do not associate with what they tell us*" (ARNHEIM, 2002, p. 6). The examples are aligned and produce an effect, so the art is used as a visual sign of transfering of meaning (when identified) and aesthetic impulse is not always clear or qualified.

Within this world of unstable phenomena and significant architectural models still fall under conventions, systems of codes to be recognized and functions that need be performed. Are cultural and metaphors meet, even partially, to certain expectations building (PICON, 2003). Even though still located inside of these logical, many ideas can break conventions and provide new advances. Apparently, one of the best ways to recognize a system appears to be in full operation from that established limit. So, often they are located on the edges of an architectural context, passed by the extreme form, by the extraordinary, singular tectonic experience (see Figure 5).

Much of the architectural essence is in artistic, which in turn can be an allegory or an metaphor. It is expressed by allusion, different idea of statements; providing other possibilities of understanding, a vocation for broader senses. The architectural appearance serves as the foundation to engage this essence, synthesizing a surface and, in other words, "*what does not appear*" (HEIDEGGER, 2010, p. 45).

This object has characteristics, properties and still can be abstractly understood (this arrest doesn't do rationally, because it has greater affinity to affective states). "*We make not necessarily stable language combinations, and the properties of these formed are not necessarily communicable*" (LYOTARD, 2000, p. 16). The capture of this art condition occurs in free field, where can manifest itself as its presence, even if captured by the senses, is not literal. This perception takes place discreetly.

5 Final considerations

The most varied sensible manifestations are dialoguing in the contemporaneity with the architectural space. There are these spaces a multitude of possibilities to explore, capable of providing new expressive and fundamentals that should not be overlooked. This makes it increasingly evident that this model of reality in which we live in, is also another fiction (after all, everything is built, and can also be transformed, thought of in order to meet our most intimate needs).

The arguments offered by art, in what concerns its doing (and not just as a concept, when of the theoretical problems and deep of its existence), are absorbed in architecture as a set of procedures especially estimated. This use of art is not a simplification of his virtues, but rather, able to also raise this architectural production, providing new directions to the dimensions of space.

Just as it happens in certain artistic processes of this contemporary era, contemporary architecture also has an undefined corrosion of its models, the characteristics of which are not possible to be completely extracted or irrefutable. It is possible to grasp only some references, of the visuals changes, whose parameters until recently were from science fiction film; or of the inviolable and chaotic forms present by arts; and yet, the experimental processes of environments with eccentric or even surreal settings of design. On account of these complexities, the definitions shall be always imprecise, combining art, science and technology, and where the symbiosis creates new spaces of thought.

The continuous possibility to walk through, such a hybridized land, can cause new insertions, new adjacent regions, can be explored. Speculate these limits of ownership, these juxtapositions and crossings, favor the rearrangement of what is a comfortable terrain, usually done in stereotypical repetition.

Problems are more evidend and arising from the needs of an audience increasingly dependent on this digital medium. Influenced daily by hundreds of médium in circulation and, taking a set of explicit new needs of cultural production, thus also directly transferred to contemporary architectural design. These models tend to be part of our sensitive world, mainly of animistic states, affecting the way you act, think (make it up as new experiences and influence other approaches).

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Author's note

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