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Architectural design on the treshold of the digital age: Revolution or regression from a dialogical view point

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1. Introduction

One thing should be perfectly clear: I am not against the use of the computer in architectural design. On the contrary, I think that each technological advancement is a blessing for architects if, and only if, it is correctly used. Of course, in order to be correctly used, any technological advancement implies new theories and innovative points of view about human development. I think we have these new theories and these innovative points of view, but I also think that architects today are eager to use the computer without any theoretical training. A lot of them consider theories to be obstacles for a free use of the computer, more than a way of improving the design processes. They are wrong, and this is the aim of my brief contribution. Which are these “new theories”? I will present some of them very shortly. The dialogical theory by M. Bakhtin is not strictly new, because it was conceived at the beginning of the twentieth century, but English translations of Bakhtin’s book are very recent, and the impact of the dialogical theories is still on its way today. (Muntañola, J. 2007a, 2006) (Camic, C. and Joas, H. eds. 2004) (Ponzio, A. 1998).

Another theory, or better, another “group of theories”, related to my proposition are the “bidirectional” theories developed by J. Valsiner (2003), S. Gottlieb (2003), J. Langer (2003), J. Muntañola (2007) and McNamara (1998) that should change our point of view about psychological and social development. Basically, it implies that our physical, social and cultural environment affects our genes, via our behaviour and our neural activity. Moreover, it implies that we can study the “bidirectional” and reciprocal interactions between environment and genes, and we can know the outputs of them.

So we can change our lives and we can know the reasons for these changes. Finally we know now much better the specific cognitive and sensorial qualities of our human “species” in relation to other animals, and we can use much better the heterochronic specific qualities of our mind and body, using the computer, of course. The analysis of the feedback between brain and machine throughout the design process is, in my opinion, the best way to apply these “new theories” that I have just announced here. Our schools of architecture are excellent laboratories for this task, and it is possible to describe how this task is undertaken. One kind of research can help architects in this way: the study on the cognitive use of objects and spaces in a social environment. This kind of research has already a past, however, now the basic cognitive assumptions are totally different and new. Consider for instance the works by Hutchins, E. (2006), or Kirsh, D. (1995), and the PhD thesis by Muntanyola, D. (2008). The dialogical feedback between the

brain and the machine can be analysed, then, in the architectural design processes (Muntañola, J. 2008a), and in the use of the buildings (Hillier, B. 1999). In all these approaches I follow the adviser of one of the founders of modern mathematics, the French mathematician H. Poincaré, who in his PhD thesis about the necessary differences between geometry and the way our body deals with objects states:

“There are infinite virtual geometries that are all true, we must just use, in the sensible real world, the geometry best suited for our needs in each case”.

(Poincaré, H. 1898)

2. The Architect Is in the World of the Digital Age

Architects find themselves, without planning it, in the centre of the digital age for a lot of reasons. First, because of the impact of new technologies in building, in the use of spaces and in design, three fundamental dimensions of the profession. Second, because of the new mind and body relationships developments, architects are totally submerged inside this discussion, whether or not they want to participate. Third, because the ecological explosion affects architecture and urban planning too. And last, but not least, because the social dimension of cognition impacts architectural design as well as all the sociological theories of today (Muntañola, J. 2008b).

So social sciences, earth sciences and philosophical inquiries are tied together in a very clear fact: architects use computers to design, to build and to forecast social and cultural impacts of buildings and cities. I will try to analyse and to deduce the main problems and answers to this complex digital impact. It is not the first time that architects should confront with changes in design theories and practices. However, this time, the global effect increases ecological, social and mental risks, and opens new chances too. And the speed of these processes is more and more accelerated. Before explaining how we should react to this situation, let us take stand on two theoretical points in order to understand the proposals I want to make in relation to architectural design. These two points are closely related to each other. The first point is fundamental for architects, and deals with the distinction between dialogical versus monological space and time objects: buildings or cities. The second point deals with the distinction between dialogical and Kantian “subjective” transcendental space and time. I will explain these two points immediately, starting with the second one.

Bakhtin, the founder of a dialogical vision of men, rejected the “a priori” philosophical view of E. Kant, about cognitive space and time concepts. Perhaps, disciples of E. Kant misunderstood the Master, but “a priori” space and time concepts have been used as an “original” and “a priori” base for our architectural understanding. Bakhtin states:

“All words, except my own, are other’s words. The immense boundless world of other’s words constitutes a primary fact of human consciousness and human life that has not yet been adequately studied”.

(Bakhtin, M. 1986, p. 143) (Written in 1973)

For Bakhtin, then, intersubjectivity precedes subjectivity in relation to phenomenological space and time understanding.



Figure 1
Monological cities built without any dialogue between children, sexes, age-range, public and private spaces, etc.



Figure 2
Dialogical cities with socio-physical dialogue between boys and girls, theatre and architecture, age-ranges, private and public, etc.

In my studies with children, during thirty years (Muntañola, J. 1973, 1996, 2007a), I found that this theoretical stand by Bakhtin is profoundly true: children and men cannot isolate mental architectural space and time constructions from social interactions. On the contrary, it is the retroactive dynamic interrelation between objects and subjects that produces our “knowledge” and “ability” to conceive, build and use cities, and, in agreement with Husserl’s view on the origin of geometrical concepts, social and physical mental development are two faces of the same coin (Husserl, E. 1962). Of course, Bakhtin is not talking only about scientific space and time, but about the aesthetic and ethic spatial and temporal human qualities too. Another way of analysing this fact is following the French philosopher Paul Ricoeur (Ricoeur, P. 2003), when he insists that it is useless to discuss if building precedes dwelling (social use) or dwelling precedes building. So they have always coexisted together in architectural design and they will always coexist. If this is not the case, simply, then, architectural design will disappear.

This original and fundamental theoretical fact in design, leads us towards the other theoretical point I announced above, illustrated in figures 1 and 2, where the differences between a dialogical and a monological architecture are described. These differences in children’s conceptions of architecture can be extended to our present adult situation. And in spite that complexity increases and the relationships between inner and outer body facts are more and more complicated in adults today, the basic dialogical law remains.

3. How the Technological and Digital Age Affects Architecture

It is important to consider the digital age as the end of the huge global technological revolution and as the beginning of a new more “humanistic” era. I agree, at this point, to the position of my master Lewis Mumford, for years my advisor in these topics. He wrote to me in 1981:

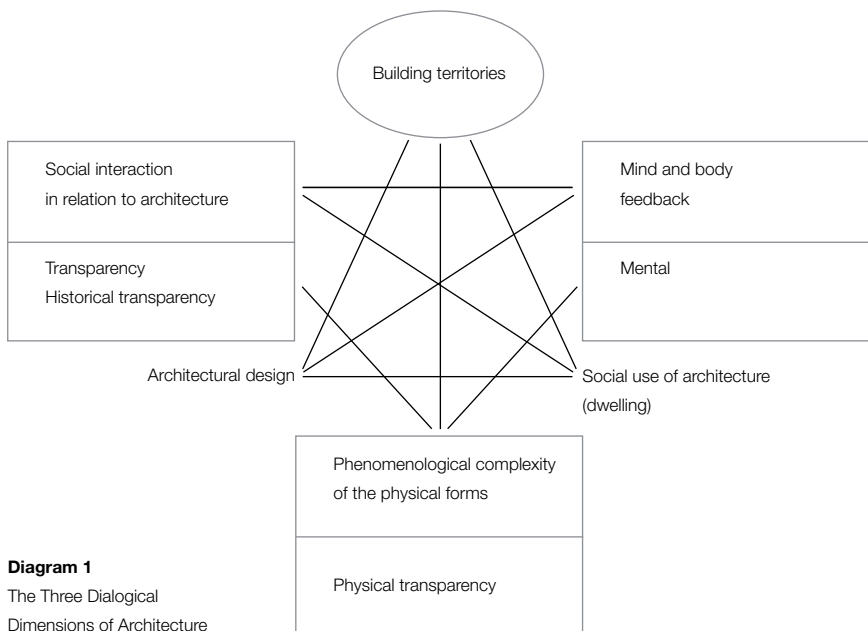
“What I was writing fifty years ago has, in recent years, found the audience I have been working for among the new generation here in America and in other communities too. That gives me great satisfaction”.

So, he was, both, pessimistic, faced with the aggressiveness of urban planning destruction, and optimistic about this new sensibility to life in general. It is then the confusion between technology and digital achievements that is now destroying a good use of the computer. Because the first impression of the impact of all that in architecture is a big surprise: Why, in architecture, have cultural development and scientific success been totally different than in medicine, industrial telematics etc.?

In our school the first impact of the computer was a decrease in the quality of design. Students did not have, neither a “manual” quality nor a “digital” mastering. Now things are better, perhaps they do not have a great “manual” artistic gift, but they improve a lot with the machine. Once more, the machine has no responsibility for bad architecture. Both in architecture and in urban planning the machine increases chances to design in one or other direction. It opens chances and innovative variations, but it cannot substitute our brains (Muntañola, J. 2000a).

Here the position of F.L.I. Wright (Pollack, M. 1997) was broadly more clever those of other architects in regards to the machine. He wrote that the machine should be used by the hands and the brains of the best traditional draftsmen. He was deeply right. So we are then confronted with the mind and body discussion that produces hundreds of books each year. I cannot argue about the totality of the complex situation today, with strong scientific battles (Muntañola, J. 2007a). However, it is necessary to explain the kernel of the matter in relation to architecture. We have three different interactions closely tied: the mind and body interaction (design), the building and social use interaction (specially in planning), and the “technical” to “natural” qualities of architecture or the “phenomenological” richness of buildings and cities (only visual or not, etc.). These three different “dialogies” respond to the three deep qualities of architecture itself (diagram I), and opens an extraordinary cultural realm for the architecture of the digital age. We should now enter inside this new realm.

However, a brief analysis of diagram I can help us on the way. In fact, the three dialogies should be understood together because the fundamental point is that, neither the mind-body relationships, nor the physical form-social behaviour, nor the natural versus technological relationships, are “cause-effect” relationships, but physico-cultural interactions, where the mind, the physical entities (objects) and society (social interactions) are always interrelated. Nobody would state that the mind can survive without a body, or social behaviour without physical places, or technological development without natural precedents, but we should think about the specific architectural qualities of these retroactive relationships.



4. The New Digital Age for a Dialogical Architect: Notes About Good Practices

Architects who follow this dialogical stand that I have just described have in the computer an excellent machine to help them to succeed. A machine is able to improve the three dialogical interactions described in diagram 1, if, and only if, we use it correctly. This right way can be defined by the following rules:

- 1) The computer is very good to represent new objects, but it is very bad to represent the “context” of these invented objects. Historical superpositions of archaeological layers, ecological and geographical data from the beginnings of the human era, information about social use and meanings of places, etc. can be analysed and reproduced by our computers, but they are not usually included in our computerized objects (buildings or cities). On the contrary, our brains work always in historical, affective, and cultural contexts. In order to link properly the scientific, aesthetic and ethical dimensions of architectural design this relationship between “texts and contexts” is crucial, both at mental, social and technological levels, as diagram 1 shows.
- 2) Architectural design is a bridge between reality and virtuality. It is a threshold between past and future, and a basic dimension of human life. However, the digital age, mirroring the economic financial virtual world of development (where, in theory, everybody can be rich, even though we all know this is not the case in reality) substitutes the historical and natural real world by a “virtual” net of virtual objects and virtual subjects. This simulation (an example is the work by M. Novak in the California multimedia lab in Santa Cruz) in spite of the experimental value and televisable media power, is “virtual”, and we should not forget that the behaviour of virtual reality is not the same as “real” reality. Science fiction is not scientific, and in its fiction remains its interest. Architecture is not only architectural fiction, and even though our imagination can take scientific ideas from artistic representations, to confound both dimensions, art and science, is schizophrenic and socially dangerous. In fact, both, science and art, disappear when we want to identify them.
 In a similar way, I can represent Napoleon, but this artistic rightful commitment destroys itself if I “really” believe I am Napoleon. So the correct use of the computer in architectural design should develop a “critical distance” between the network of relationships between objects and subjects in the project, that is virtual, and the real network in the building, cities and landscapes. Computers do not have “spontaneously” the power of this “critical distance” between virtuality and reality in architectural design, they cannot be “conscious” of the work they are doing. But our brains can play the two (or more) roles in a polychronic and heterochronic way. The brain of the artist, the politician, and the scientist is the same. Architects can play different roles if they understood the basic role of design as an interface between previous reality and future objects and subjects interactions.
- 3) So, another important role of computers is to overcome the phenomenological “reduction” of environments that are more and more global and less and less local, when an international network of relationships between objects and subjects claims to be the unique and the “true” one. Of course, this is related to the monological versus dialogical challenge in

education stated in figure 1 and figure 2 above, but there is much more here. Three authors are relevant at this point. First, J. Pallasmaa and his phenomenological battle against only “visual” architecture versus an architecture apprehended by all five senses, as it is the case in more traditional, local, environments, but also in some modern avant-garde experiments (Pallasmaa, J. 2005). Second, Bill Hillier (1999) and his outstanding work to “measure” the sociophysical interactions between objects and subjects in architecture, with the help of the computer. And, finally, Albert Magnaghi (2000) and his “self-sustainable” urban planning, where the local becomes global, and the global and short term investments, are totally dependent upon the previous social evaluation of the cultural and historical values, in a long term, of the local land and local networks between geography and history that “identify” each place to live.

In the three cases, the computer is necessary to undertake what a lot of architects do not undertake throughout their design. In fact, a lot of architects use the computer to design poor phenomenological objects (according to Jurgen Pallasmaa and followers) objects indifferent to social pathologies and desurbanization processes (according to Bill Hillier) and objects that are conceived in a “global financial” world indifferent to the ecological, social and cultural values that identify the place where they should be build (according to Albert Magnaghi). So computers are not, again, the origin of bad design, on the contrary, they can improve our ability to solve very complex architectural problems, if, and only if, our brains use them correctly.

- 4) These three conditions are necessary in order to develop a dialogical feedback between the brain and the machine. The quality of architecture depends upon this possibility. Architects have a strong ethical and political role here too. Of course, one architect cannot change the real world, but a lot of architects can help each other to change architecture and to show the way the digital era can accomplish the promises of a better architecture for all. In the last book by Paul Ricoeur, published three months after his death, *Les parcours de la reconnaissance* (Ricoeur, P. 2004), he states the conditions of these promises when he indicates the significance of the “between” (the interface): between myself and the other, between real and ideal, between virtual and real, between past and future, between natural and technical, between private and public, and between cultures. The digital era can build this “between” in order to accomplish some promises in a dialogical world. However, this achievement demands a network of dialogical relationships “between” the mind and the body, the physical and the social values of architecture (so between individual and social development) and, finally, between the natural and the technical dimensions of our territory (see diagram I).

5. Can the Dialogical Relationships Between Mind, Land and Society be Improved by the Computer?

I would like to conclude with a statement of hope for the quality of architectural design, for better new urban planning policies and for the peaceful use of the land by social groups. This will not be an easy job. We should be friends of the computer, digital tools and networks, in the sense pointed out in chapter three above. Just some references.



Figure 3-4

Dialogical waterfront in empuries (Catalonia, Spain)
 This waterfront in the old Greek city of Empuries in Catalonia, Spain, is an example of a touristic resort able to articulate the old city with the new touristic developments without the destruction of a beautiful “natural” site. This is not the usual way of urbanization on the Catalan coast, this is more an exception.

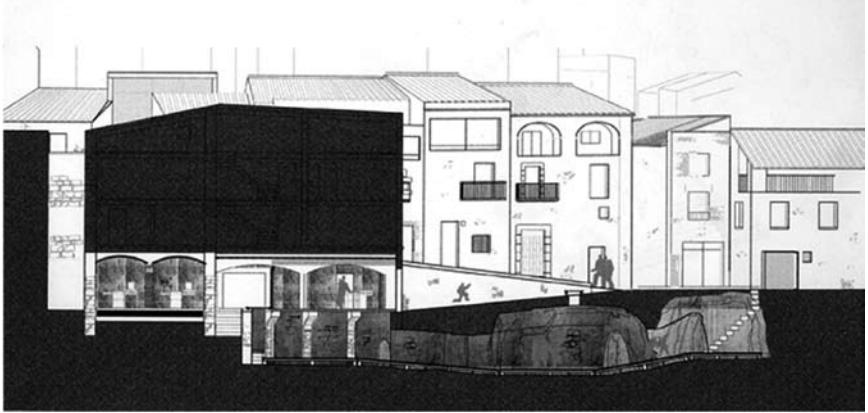
(Made by interdisciplinary teams. Design of the wooden path by Josep Muntanola, Magda Saura Architects. Getty Foundation Grant for the design coordinated by Professor Magda Saura Carulla, Ph.D UCB, USA).



A first reference that has little to do with the digital age (figures 3-4) is a touristic development in Catalonia, in one of the last pieces of land that is still public land because of the old Greek city ruins of Empuries, and because of its ecological value. It is a success in terms of quality and social use, and accomplishes a piece of the Catalan dream of a coast, used by all in a digital age, without the total destruction of natural systems and cultural precedents. The project was undertaken by an interdisciplinary team in the Technical University of Catalonia and had a grant from the Getty Foundation in California, coordinated by Professor Magda Saura Carulla, architect and historian from the same university.

The next references are taken from final projects in the School of Architecture of Barcelona where the digital tools play a key role by following the conditions of “good practices” explained here. There are dialogical references (figures 5 to 9) and a monological reference (figure 10).

I would like to end my contribution with a short consideration on the brain to mind feedback in the dialogical design, origin of the imaginative processes. Each digital program or “tool” has its

**Figure 5-9**

EXAMPLES OF ARCHITECTURAL
DIALOGICAL DESIGN

Different dialogical ways of using the computer in architectural design in the Final Project at the School of Architecture in Barcelona (according to diagram I).

Figure 5

Careful intervention in a medieval village, by taking care of the forgotten old medieval spaces of the underground, and using contemporary architectural means of construction and representation.

own capabilities for a feedback with the brain. There are a lot of them, so it is crucial to know how each program interplays with the brain in a specific and different way. We cannot ask students and architects to do this research by themselves. The “dialogical power” of a program depends upon the conceptual and mathematical bases of it, and upon how these bases affect the dialogical mind-machine interaction (Hutchins, E. 2006). This is almost never thought of in our schools.

Just an example: we know that the digitalization of any curve regardless of its mathematical complexity can be done by the computer with programs on “spline lines”. These programs are based upon the algorithm developed by Castleton in 1953. He used the geometrical and mathematical law of tangency known a lot of years ago but not in the same mathematical formulation. However, the interesting point here is that said he was pushed to this innovation when he observed the way wooden boats were built (and violins) by curving wooden pieces inside a scaffolding that precedes the final form thanks to the tangencies. As architects build a lot of wooden models by bending the material, this is a good way to increase our imagination. This “conceptual” training can also be done in relation to the “memory” of the programs in contrast with the “memory” of our brains etc. Then a list of programs should be tested in relation to the brain-machine feedback, that is, about the dialogical “power” of each program or tool.

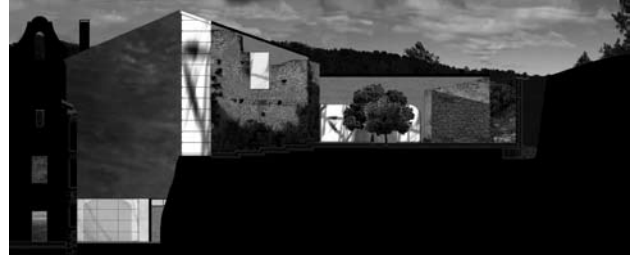
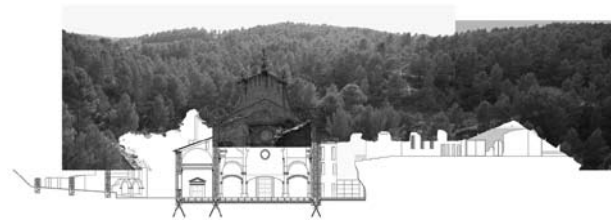
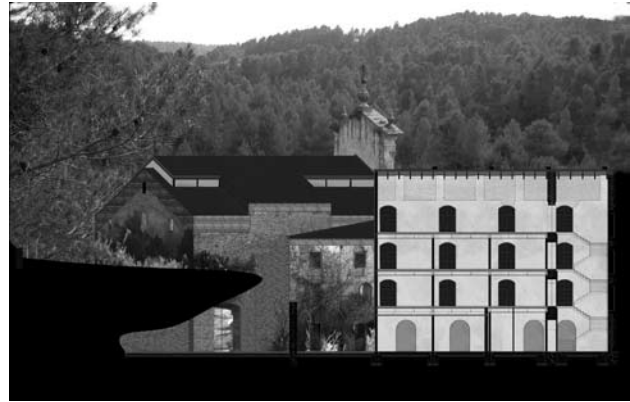


Figure 6,7,8,9

Renewal of an old monastery converted into a hotel. Conception and representation use the computer to design a complementary poetic contrast between the old and new parts of the building.



Figure 10

EXAMPLE OF ARCHITECTURAL MONOLOGICAL DESIGN

An "object" inside the old city of Zaragoza indifferent to the dialogical dimensions described in this article. There are not relationships between project and context, technology and natural landscape, mind and body experience, etc. Simply as in the case of an airplane, the object "projects" a "virtual world" directly in the real sociophysical territory. I do not see this project as an architectural progression, in spite of its "virtual" values and its technological innovations that allow to build this object in the "real" city and accomplish all technical "codes" and laws.

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