

Pedagogical Laboratory of Potential Architecture

PORADA Sabine

Professor EAV, Ecole d'Architecture de Versailles

EVCAU Research Team EAPS, Ecole d'Architecture Paris La Seine

msporada@wanadoo.fr

The increasing instrumentation of the design process can transform it into a site of virtual: architectural, structural, psychological, sociological, ..., experimentation. Thanks to that, architecture that was never thought as a scientific discipline seems at last to enjoy a virtual laboratory of pure research. This visionary space of experimentation of potential architecture must assure the return of performances obtained in the constructed environment. But, to make such a future certain, one has to start with pedagogy, where the laboratory of potential architecture must constitute a real construction site of the imaginary.

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“Ouvroir”* of potential architecture

The following way Claude Parent has described the 90's design process in his architectural office: “Getting into a drawing room I see only backs, twenty backs curved on the screen forming a hedge of shields and exist toward me in a non receptive attitude. I disturb. I am the intruder ... Screen focalize all the interest, and only if one places oneself between the reader and it, nothing can break this “contre nature” link, The qualifying order is reversed; the millenary method, which consisted to begin by a raw idea then a sketch and to introduce precision progressively at each stage with the aim to arrive at the end to details, is no more actual. The detail (as price to a 5 % precision, and area to the cm²) is demanded at the beginning of the study, at the sketch stage. The natural hierarchy is inverted.” (3)

Today's technological market tools allow experimenting hypothesis directly on the screen, with the trial and error method described above.

In such a way, these tools concerns design as well as learning. Let's see if it is time, at least in architectural design, to replace the concept of visual thought that animate the late century by virtual experimentation one.

Screen experimentation can as well, concern working methods and design hypothesis, and can be applied to idea and objects of design. It helps the visualization of the passage from thinking to space critallized by virtual exploration, not only of its spatial parameters, but also perceptive ones. This way, virtual experimentation permits to conduct the control of internal vision, and can also sharpen the imaginary of architects and students of architecture.

Muse and computer: contemporary architecture

Contemporary architecture distinguishes itself on the plastic side. No more inspired by historical constructed artifact typology, contemporary architecture innovate the formal aspect by orient-

ing itself toward natural and organic forms. This elasticity seems to be revealed from inspiration arrived from other domains than architecture, and enjoys the potentialities given by new instrumentation that proposes considerable formal sophistications. From one side, Internet delivers analogies arrived from scientific and artistic domains; from other side, computer modeling offers architects algorithms for complex forms creation. This way, these forms issued outside the historical architectural typology become accessible to architects but also become manageable and buildable.

Actual computer programs allow to describe in formal language “spatio-temporal” models, physical phenomena and mathematical complex surfaces, they permit also to visualize temporal process evolution. Until now, these kind of transformations of field forces where applied to program data for analysis. It seems possible at present to study temporal transformations of urban territory or building morphology by the use of morphing procedures. Thus, the principles of dynamic architectural programming should allow architect to answer to the undeniable acceleration of the urban process and complexification of forms and functions.

Therefore, technology acts at several levels as: an advanced digital tool, a new paradigmatic impulsion, a spring of inedited references.

This great upheaval tangles the minds. All tendencies taken together, we are in front of an apparition of a new type of architecture sometimes called Hyper, others times Cyber, or even Trans architecture. Most projects remain theoretic or experimental, and provoke sharp critics or euphoria. The rare realizations resemble more to architectural sculptures, but there are among them incontestable architectural realizations.

The experimentation tracks on computer increase each day. If representation issued from these experimentation serve mostly as new

sources of formal inspiration, let not forget that the sketch creation is done also on functional quantitative criteria. Therefore, when programs of diverse ambiance calculations will be an integral part of design environment, we could then speak of Computer Aided Experimentation (CAE). We enter into an era where, thanks to the new instrumentation, architectural space will be dwelled before being materialized on site: certainly virtually inhabited thanks to captors that will serve to “sculpt” this space first, and then to explore it before dwelling it.

Pedagogy: imaginary site

The study of contemporary architecture tendencies influences our pedagogy, as we attach ourselves notably to the springs of actual architecture. By essence the architectural project is a potential architecture. It has links of kinship with the virtual architecture of literature and painting. From this comes the idea of pedagogical exercises described below. Rather than using the computer to recreate reality or to produce virtually its clichés, it must be used to elaborate conceptual representations. These images of meaning can transform virtual architecture into a space of signification. This space will be the result of new technology, and its normal that the same technology serves as a learning tool to create it. As the experimentation of potential literature has served the learning of how to write literature, virtual experimentation of potential architecture can serve learning architectural design.

Our pedagogical method is analogy. It concerns the learning of elaboration of architectural space inspired from artistic or poetic images, and concerns too the learning of creative methods issued from other domains of creation. We try to reveal to the students how different creators: writers, poets, painters express spatial concepts in their works with the specific means of their creation domains. Then, the student has to discover

these notions in architecture. He first sees how they have been historically formed in the architectural professional language, then he analyses and tries to produce them virtually on the computer by purely architectural means. After, he experiments these notions virtually, with the intention to learn how to manipulate them. "Potential architecture" issued from these experimentation replaces advantageously the paper architecture of the past, because it can be experimented virtually. There, the student begins to understand that potential architecture do not only bend to the material constraints but takes into consideration the psychological constraints of perception.

"To see the idea" – hypertext.

The objective of the dissertation asked from the fourth year students is firstly a learning of reflection. Our dissertation 'See the Idea' concerns architectural notions.

Each student in accordance with his sensitivity chooses a poetic text that will serve as a starting point to approach the spatial concept he wants to think about. In this sense, Poetry appeals to imaginary leaving an important part to interpretation. But, the poetical expression of concepts also obeys to specific rules of Poetry. From this fact, reflection on resources and limitations of analogy that have been taken from other domains of expression and creation is the beginning of this experience. Our aim is to teach the means of expression peculiar to architecture that can translate the same feelings. It can concerns the "hidden dimension", preserving the being intimacy, the space time scale relations, monumentality, lightness, nourishing no doubt on the material character of the constructed architecture, of multiplicity that presents a vision of plurality and complexity of architecture, of architectonic power, ... Learning through the analysis of some projects and realizations, the student must establish by what properly architectural means these

notions express architecture.

Documents such as referent images feeding the vision, analysis schemata and operational schemata are assembled by means of hypertext in a sort of "designer's digital sketchpad," where he navigates to construct and argument his discourse. The writing form of this dissertation is hyper-textual, and the result is presented as a computer site available on a CD. The dissertation structure is a mixed texture of hypertext relations. (see <http://www.versailles.arch.fr/siteM4d-/acceuil.htm>)

At that time where hyper-textual writing appeals to numerous purely theoretical critics, as its practice is not so current, it seemed to us important to know how it can help the reflection learning. Therefore, in this exercise we have taken the risk to study in a practical way the cognitive impact of hyper textual writing. The experience of such a dissertation writing aimed at architectural notions shows that some precautions must be taken:

This writing do evidently bring nothing to reflection, if it is done a posteriori, as a simple aim to present the dissertation;

- It is used as a *contre sens*, if illustrations replace reflection: relations between text and images must be well determined.
- These two precautions taken into consideration the hyper textual writing must permit:
- To evaluate in a more free manner than with a pre established plan an ensemble of notes, to explore them one by one, to superpose them, to treat and organize them progressively in a coherent thinking; that way it allows to elaborate a more flexible thinking;
- To induce the superposition at least of two-reflection logic: linear and transversal. In the case of our dissertation: the first, takes into consideration the historicity of the studied notion and its development through time until today; the second, imposes a cross analysis of

all annex notions by which the main notion express itself; they are generally considered as keys words. The conduct thread of these reflections is to superpose the linear reflection with the reflection by analogy, and oblige a constant verification of each step;

- To oppose length, digression and divagation. The obligation of economy of the narrative imposed by the reading of a screen page requires the choice of dense and unforgettable words, and operative images full of meaning;
- To escape redundancy: rather than to illustrate the text, images must present results of the words analysis. This obligation to think by image must serve the vision education of future architects. To the increasing inflation of prefabricated screen images - pure visual artifice - it opposes a true culture of space representation.

More than enounced aim - learning reflection - the hidden aim of this exercise is to demonstrate to students the potentialities of conceptual representations concerning elaboration of the project's idea, and to reveal the importance of exploration of analogies issued from other domains of creation. Such a "contemporary writing" has also the advantage outside the dissertation: the techniques based on interdisciplinarity allows the use of different supports as sources of inspiration during the creation of the architectural project. (5)

"From real to virtual": learning creation on computer

Same logic is applied to the pedagogical exercise of third year plastic expression. The aim of this pedagogy is the training of student's imaginary and his initiation to creative approaches. Learning is made through the handling of different type of space: pictorial, spatial, real, virtual, etc. and through diverse scales of representation.

Knowing the influence of artistic researches of modern painting on architecture, we propose stu-

dents to choose a painter work. During an exhaustive analysis of the painting, the student deepness notions of composition, plans, axis, ... The first step is a transformation of the painting into an architectonic milieu through a personal interpretation of the student. At this stage the imposed scale of work is internal space.

The real model accompanies the work done on a 3 D virtual model on the screen. At the beginning it is only a simplified representation done in an easily modifiable matter that can easily adapt itself to the propositions issued from screen manipulation.

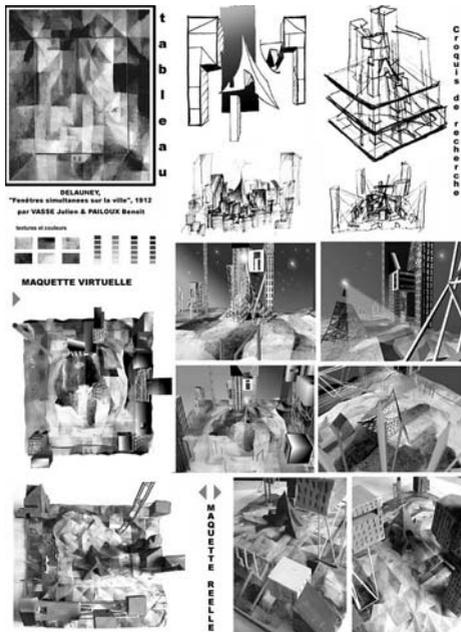
It is important to understand that real and virtual models of this exercise serve to verify design hypothesis during the creation process, and in that way they are nearer to design representation than to industrial prototypes. Virtual modeling is done by "groping", the idea clarifies itself step by step until details of form and matter built up. Textures are not those found in the standard data bases (glass, brick, marble, etc.), but those taken from the chosen painting.

The last stage is the modeling from the same painting of an urban scale space. The student must transform his vision, his analyzes and elaborate sketches in accordance to the new scale.

The real model serve to show what are the specific effects of the representation that can be created virtually and that cannot be recover on the real model. Or to show the effects of 2D representation, as those of the paradoxical perspective, that are reproducible only in particular conditions.

The exercise has for real vocation to put into practice virtual experimentation on the computer.

In opposition to methods of modeling turned to communication of the project already designed, this method allows the student to compose a sort of urban place or a small city directly on the screen. At the same time he will produce a material model to communicate his project and to under-



stand the difference between virtual and real.

As the objective of these two exercises is not only computer program teaching, but also design learning, it is natural that among the tools of this apprenticeship among computer programs are also traditional tools as sketch and real modeling.

(See the school site, training, computer learning, “formation, enseignement de l’infographie”)

Conclusions

Our pedagogic experience has validated the hypothesis made during our previous experimentation and researches:

- Thanks to an appropriated use of computer tool it is possible to increase the imagination during the creation of the idea of the project.
- Design approach that we call “design by analogy” is reinforced by the use of computer and Internet Before employing computer for space

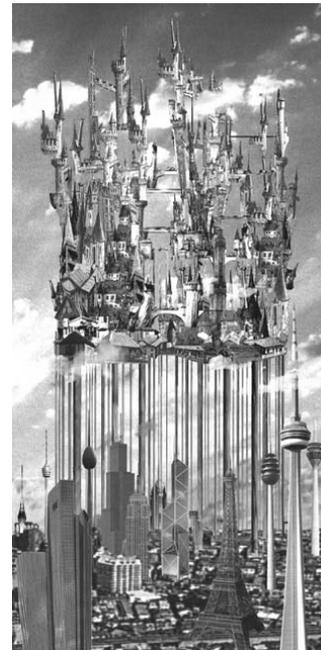


Figure01 Screen virtual experimentation of forms, textures and colors, third years students works

Figure02 Italo CALVINO “Invisibles towns”, Zenobia’s potential architecture: expression of lightness and suspension, fourth year dissertation Conclusions

modeling the designer uses it to transmit directly on the screen representations issued from diverse origins into a source of architectural inspiration.

- Concerning the plastic approach, far from introducing repetition and formal simplification, a cleverly used computer tool allows to tie again with singular and complex forms, and with a highly qualified and personalized craftsmanship.

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- * With reference to the OULIPO expression - "Ouvroir"(1) of potential literature, a kind of experimental workroom of potential literature founded by Le Lionnais and Queneau, 1901 to 1984.1