

VISUALIZING THE INVISIBLE: Digital Studies on Representing Non-Visual Architectural Experiences

JULIO BERMUDEZ, ALBERT C. SMITH

College of Architecture+Planning, University of Utah, Salt Lake City, UT 84112, USA.

bermudez@arch.utah.edu, asmith@arch.utah.edu

AND

SETH STRIEFEL

Abstract. During the last several years our architecture school has gone through the process of fully digitizing the studios. We, as faculty are learning much about the advantages and difficulties of teaching architectural design in this new electronic environment. This knowledge has been included in our development of a beginning design communications course that offers an important improvement in regards to our changing teaching situation. This short paper presents one project from this course that introduces our students to the use of digital media for dealing with non-visual and subjective content —something quite contrary to what is usually associated with the teaching of digital graphics. We believe that this project breaks new ground for teaching and investigating the nature of computer graphics and through it into the very essence of our experience and understanding of architecture.

1. Introduction

“Art does not reproduce the visible; it renders visible.”(Paul Klee)

A major task of architectural education is to teach beginning students the graphic language of architecture in relationship to media. Most effort is understandably devoted to mastering the conventions, rules, and techniques of architectural education (i.e., orthographics, perspectives, sketching, model building) following the traditional use of analog/digital media. Although some attention is paid to depicting the phenomenological nature of architecture, these efforts are typically devoted to cover only its visual aspects. In other words, little or no attempts are made to cover the wider, richer and perhaps most profound issues of architectural phenomenology. Many authors such as Alexander (1964), Bachellard (1979) and Rasmussen (1959) have recognized this situation. Similarly, the teaching of media, particularly computer graphics, usually remains constrained to techniques or uses prescribed by the software.

Our pedagogic intention was to address these graphic and media shortcomings. Thus we designed an exercise that addresses the multiple non-visual dimensions of our architectural experience. The premise was simple. Since what cannot be represented cannot be thought or communicated and since architects and designers are highly visually literate people, it would be more accessible to them if these invisible aspects of architecture (i.e., sound, touch, smell, etc.) were made visible by presenting them graphically. In other words, by developing visualization means to depict non-visual phenomena, we would not only acknowledge these dimensions but more importantly we might then consider them seriously in our design work. We were interested in investigating the potential for a representational methodology to explore and inquire these concerns. The result was a project termed “Visualizing the Invisible” that occupied the last portion of a semester-long process of getting to know (architecturally) the New Museum of Fine Arts on campus.

2. The Class

We organized the semester in three parts that moved from direct experience and perceptual awareness to analytical and critical studies to experimental representation and media studies. During the first part of the semester we asked our students to produce a series of conventional hand drawings of the Art Museum. The results were freehand experimental sketches and then orthographic drawings that were all built out of each student’s own direct experiences with the museum. The pedagogic emphasis here was on developing perceptual awareness, discipline, freehand drawing skills, and knowledge of architectural representation conventions. The second part required the students to develop a series of computer graphics that demonstrated their architectural understanding of the Museum’s Great Hall. The results were a

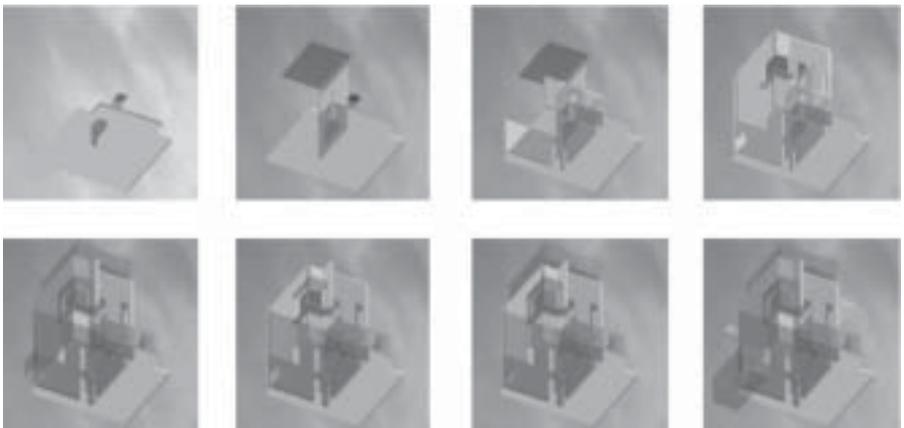


Figure 1. Recomposition study of analytical pull-apart demonstrating the building grammar.

sequence of images explaining the architectural syntax of the building (i.e., architectural diagrams, fundamental building assembly, massing and tectonics, circulations, envelope and structure). The purpose was to develop analytical skills to study the formal order of space in conjunction with learning the architectural communication and digital media skills to convey this logically and appropriately (see Figure 1).

3. The Project

The last part of the semester involved the subjective qualities of the Museum's Great Hall. Here representation and media were to become an expressive yet abstract instrument used to capture the metaphoric nature of architectural sensations. The students were asked to represent the intangible, the unmeasurable, the unseen and only felt as the end of a progressive realization of architectural attributes. Using the 3D digital models they had developed in phase two, our students were to create four alternative depictions of the art Museum's Great Hall that dealt with: (a) the *sound* of the place, (b) the *smell/taste* of the place, (c) the *feeling of the body* in the place (kinesthetics), and (d) *synthesis* (an edited combination of all three). Each representation was to express different sensorial conditions found subjectively in the objective realm.

4. The sound of the place

Students were encouraged to unleash the compositional sound of the great hall through a careful, intentional yet intuitive play of the architectural "pentagram", "notes", and spaces at their disposal. The procedure was simple and required them to: (i) build a full wireframe of their 3D model; (ii) selectively enhance, delete, or (de)(re)form this notation. Lines, shapes, spaces, etc. were to play loud and clear; and (iii) look at concepts of notation, composition, rhythm. (See Figures 2a & 3a.)

5. The smell/taste of the place

Aromas are the most powerful means to bring back memories, yet they are mostly invisible and rarely discussed in our discipline. Expressing aromas visually suggests gaseous interpretations. And what about tasting? Depicting flavours visually suggests textural and liquid interpretations. The procedure prompted students to: (i) consider representations that address the contradictions that smelling and tasting pose to architectural tectonics; (ii) construct/develop renditions of their concepts; and (iii) consider the concepts of *evanescent*, *immersive*, *plastic*, *atmospheric* (see Figures 2b and 3b).

6. The “bodily feel” of the place (Kinesthetics)

Students were asked to consider how their physical self sensed the UMFA great hall. Did architecture pull or push them in some particular direction? Did the wall attract or repel them? In this case, the learning steps were to: (i) develop a ‘structural’ analysis of the architectural/sensorial forces causing strong kinesthetic sensations; (ii) create as simple a 3D tension diagram addressing only the essentials of how their bodies felt; (iii) include abstract depictions of the source(s) of the force(s), the dynamic effect(s) resulting from the forces at play, and/or the one that feels the force(s); and (iv) study the concepts of *tension*, *dynamic*, *force* (see Figures 4a and 5a).

7. Synthesis

A mature encounter with architecture involves an experiential synthesis or co-presence of multiple sensations, emotions and thoughts. Hence, the students were

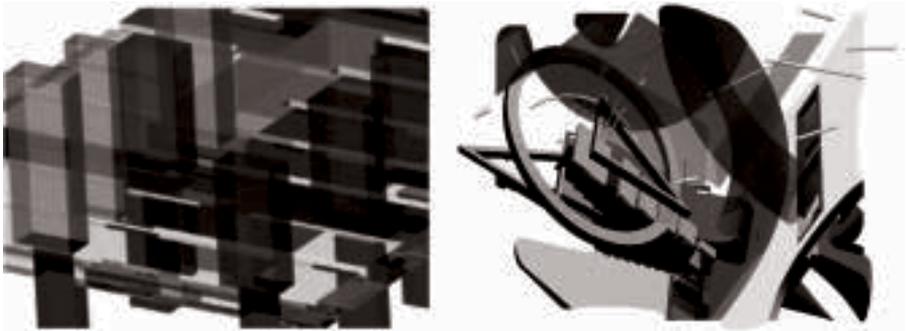


Figure 2a. Visualizing the sound of architecture using principles of rhythm repetition and dynamism (left). Figure 2b. The smell/taste of architecture is expressed using geometrical and colour associations to atmospheric and textural qualities (right).

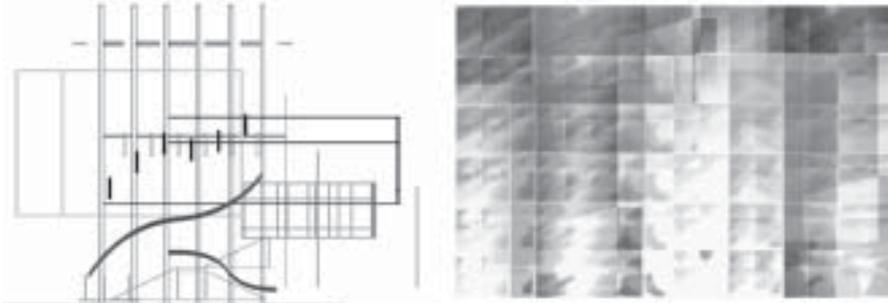


Figure 3a. The graphic representation of the Great Hall uses principles of rotation and rhythm to express visually the ‘musical’ composition of the place (left). Figure 3b. The taste and aroma of architecture are shown using overlapping atmospheric textures (right).



Figure 4a. Kinesthetics is dealt with, using formal manifestations of constrain and release (left). *Figure 4b.* In this synthesis, the non-visual senses are synergistically combined to produce an altogether new interpretation of the whole (right).



Figure 5a. Kinesthetic sensations are captured using visual elements suggesting deformation, movement and lightness against a relatively stable background (left). *Figure 5b:* The synthesis is a construction that utilizes the three previous interpretations but strengthening with a new synergism. Figure 5b combines Figure, 3a, 3b and 5a.

asked to produce a graphic summary that resulted from the synergy of the previous three layers. In this final phase, the assigned procedure was to: (i) overlap all three previous representations; (ii) study and play with the result(s) to get familiar with the whole; (iii) edit the work so as to produce a totalizing and clear view that expressed a *new* realization of the place; and (iv) examine the principles behind *layering, comprehensive, surprising, synergy* (see Figures 4b and 5b).

4. Conclusions

The task was to *make visual* phenomena which, by their very definition, were *non-visual*. The fact that this appears impossible made it a most remarkable and useful tool to investigate digital architectural graphics. After all, architecture is indeed experienced as multifold sensory phenomena, much of which is non-visual.

In order to make the non-visual to visual translations, students had to establish new and original metaphoric correlations to the graphics field that made sense as architectural expression. Doing so demanded radical and abstract transformations of the existing architectural grammar and media. The more successful works came from students willing to improvise and experiment within a large framework (as opposed to force a pre-conceived idea into a literal graphic representation). This process opened up their overall understanding of space and architecture and extended their representation and media toolbox.

More precisely, the final project made our students learn:

- (a) The multiple and rich layers of sensations that compose our experience of architecture.
- (b) The nature of non-visual perceptions and the incredible power that we can find in visualizing them because it allows us to think, communicate, and hence use them for design.
- (c) The potential of the computer to address and expand the metaphoric world of the designer and thus challenge the limiting preconception/association of digital media to drafting, documentation and the objective/analytical issues of architecture.
- (d) That digital media can allow us to inquire about architecture in new and hitherto impossible ways.
- (e) The nature and role of conceptualization, metaphor, analogy, caricature, grotesqueness, exaggeration and symbolism.
- (f) A new set of skills and vocabulary in digital media.

In general the studio was full of excitement and a true pioneering atmosphere of experimental inquiry. We believe that the success of this project was due to the fact that the class was provided with a strong foundation in architectural graphics and media conventions (part one and two of the semester) allowing the students to expand and improvise in new and unusual areas. Digital architectural graphics were thus used as a way not only to feel and think but also to extend students' awareness and understanding of architectural experiences beyond the visual.

References

- Alexander, C. 1979, *The Timeless Way of Building*, Oxford University Press, New York.
 Bachellard, G. 1964, *The Poetics of Space*, Beacon Press, Boston, MA.
 Rasmussen, S.E. 1959, *Experiencing Architecture*, The MIT Press, Cambridge, MA.

