

Introduction

Contrary to other design fields, architecture can be fully comprehended and experienced only when built. In architecture a prototype is essentially inexistent. The architect has to rely on other means to portray his or her building vision. In the semesters that precede the teaching of ARCH 3253_computer applications in architecture, Oklahoma State University School of Architecture's students are exposed solely to various "conventional" representation techniques to communicate graphically their architectural ideas. This course is their first "official" introduction to digital technology as the main venue for the communication of their architectural thoughts. The course focuses prominently on static digital outputs [2D and 3D], but it is not a "technical" CAD class. Integral component of the class are lectures on theories of graphic composition and representation which, if on one hand, are primarily aimed to augment the students' visual thinking and to introduce the impact that digital technology is having in the inventing, representation, and making of design at large and architecture in particular, on the other hand, they intend to broaden the students' inspiration field and [general] design knowledge.

Methodology

ARCH 3253 is a lecture + laboratory course which foresees the use of case studies to accomplish the learning of selected computer programs or software, the development of visual thinking and of graphic communication. If the use of case studies is the common denominator of the assignments associated to the course, the selected built projects have the dual purpose of exposing the students to an array of work by [young] architects outside the national boundaries of the United States and to drastic different site and cultural conditions than what they are familiar with.

Integral part of this course is also a graphic journal. This journal is meant for the collection of research on graphic communication in general [both in their 2D and 3D outputs] and digital communication in particular as well as recording the students own thoughts and exploration as related to graphic and digital communication for the [proper] digital representation of their selected case study. The information collected in the graphic journal is left up to the students. However, they are encouraged to search for imagines of an architectural character which, in return, would aid in stimulating their future architectural imagination and building composition.

The Built Environment Revisited Digitally: an Approach to 2D and 3D CAD Teaching

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There is a characteristic that distinguishes the School of Architecture at Oklahoma State University from other architecture schools in the United States and that is the absence of a design studio in the spring semester of the third year. Among the various classes the students are required to take during this time is ARCH 3253_computer applications in architecture defined in the School catalog as an "introduction to 2D and 3D computer CAD topics and their application in the design process." The absence of a design studio has allowed [me] to morph an otherwise technically oriented course to a course that weaves the learning of the basic of various computer programs with research, writing, graphic and physical explorations.

This presentation shares the pedagogy of the course alongside sample of students' work during the spring 2006 semester.

One should always be curious.
Not a passive curiosity dependent upon information received,
but an aggressive curiosity that compels one to seek things out and ascertain them for oneself.

Issey Miyake, Bodyworks
[Tokyo: Shogakukan, 1983]



Assignments

The course is organized around the progressive development of one project through different assignments. From a roster of three case studies, the students are required to select one, which will be the base for their computer programs learning and digital image creation. It is the students' responsibility, however, to expand the information received in class or placed on reserve in the architectural library with supplemental research. The following case studies were assigned during the spring 2006 class:

Case Studies

- 1.- Ota House Museum
Kazuhiro Kojima
- 2.- Kassai House
Kiyoshi Sey Takeyama
- 3.- Skin-House
Yosuhiko Yamashita

Assignment 1.0

Assignment 1 is a [relative] simple drafting exercise that tests the students freshly acquired AutoCAD knowledge, their drawing layout skills, and their graphic imagination and sensitivity in augmenting the basic drawing with supplemental information paramount for a complete reading and understanding of the selected case study.

During this drafting exercise, the students are encouraged to not just merely copy the plan[s] as published by the relevant source [in this particular case, all the houses were published by GA Houses], which may not have been reproduced correctly, or reproduced with dissimilar graphic conventions than what the students are acquainted with, but rather understand the building prior to draft, and correct the source's floor plans as necessary. The students are also invited to "furnish" the floor plans and create alternative furniture layout using downloadable designer furniture from the like of Moroso, B&B Italia, Cassina, etc. By forcing the use of design furniture in "embellishing" their drafting exercise and give a comprehensive scale to the floor plan, allows, once more, the students to be exposed to exquisite and contemporary design pieces, worldwide architects, designers and manufacturers, and to clever visual communications.

Assignment 2.0

If assignment 1.0 is a [relative] simple drafting exercise where, using AutoCAD, the students simply draft a floor plan of their selected case study, assignment 2.0 rethinks conventional architectural representations and uses the finding to create completely alternate spaces. The assignment is divided in two main parts:

unfolding

Part A of the exercise is to unfold the floor plan and project every plane that encompasses the floor plan in the xy plane. In other words, imagine that you are opening a box and lay flat each side of it. The information that characterized each side of the "box" such as doors, windows, opening, built-in piece of furniture [i.e. kitchen cabinets] and plumbing fixture are, therefore, drawn in elevation. In the unfolding process, however, the thickness of the walls is considered to be null. The unfolding of the floor plan, furthermore, must be done in a way that in its refolding the only [die]cut occurs at the perimeter of the composition.

As part of a graphic exercise, and to augment the students' "expressive language", the rooms that have been unfold are required to be renamed using alternative nomenclatures [i.e. cook for kitchen, or wash for bathroom]. Moreover, a graphic language is requested to explain the diagram so created [i.e. night spaces may be depicted with a gray fill, or windows filled with the views that have been framed].

refolding

Part B of the assignment is two fold and requires physical models as well as an AutoCAD generated drafted axonometric drawn as wire frame. The AutoCAD part of the refolding process foresees to draw, in isometric, first the reassembly of the floor [minus the plumbing fixtures] and then to refold their unfolded plan in a way the students wish with the only constrains that more creases cannot be added during the new folding process [the creases depict the connections between walls, walls and floor, and walls and ceiling]. In this autochthonous assembly, the spaces creates do not necessarily need to have ceilings or floors. The students are also to augment the isometrics with physical models made with [white] cardstock. Even though they are requested to refold the open floor in a way they wish only once, they are as well encouraged to explore the refolding process several times and include the finding in model form into their final presentation.

Assignment 3.1

Assignment 3.1, while continuing testing the students' acquired AutoCAD knowledge by requiring to draft a section of the selected case study, asks the students to use their digital camera to start building a photo library composed of "elevation" pictures of trees, vehicles and people in preparation of the blending of multiple software for the best representation of an architectural idea.

Assignment 3.2

Assignment 3.2 is an exercise in [architectural] graphic communications using the skills the students have acquired in AutoCAD and Photoshop.

The drafting exercises completed in assignments 1.0, 2.0 and 3.1, aside from their main objective to complement the basic learning of AutoCAD, had the intent to expose the students to simple yet sophisticated architectural spaces and prepare them to this assignment. The research component of the course is aimed to simultaneously expand the students knowledge of worldwide architecture and to deepen, in

particular, the understanding of such forces that where influential in the building of the case study selected, such as the architect intention, his or her design philosophy, cultural and site constrains, client requirements, pragmatic issues, building systems utilized in the construction, etc. Having acquired such knowledge, therefore, the students are asked to express, using solely 2D architectural drawings [inclusive of the section required in assignment 3.1], the quintessence of their selected case study. They cannot aid, however, their graphic representation with images of the built house. They are, however, strongly encouraged to use photographs [such as the one required as part of assignment 3.1] that complement and support their graphic expression of their case study. They are also expected to browse through magazines such as How, Print, Communication Arts, books on graphic design as well as computer rendered drawings by architects to supplement their creativity in their output of the assignment.

Assignment 4.0

Assignment 4 asks the students to use their freshly acquired Viz 4 skills to develop a

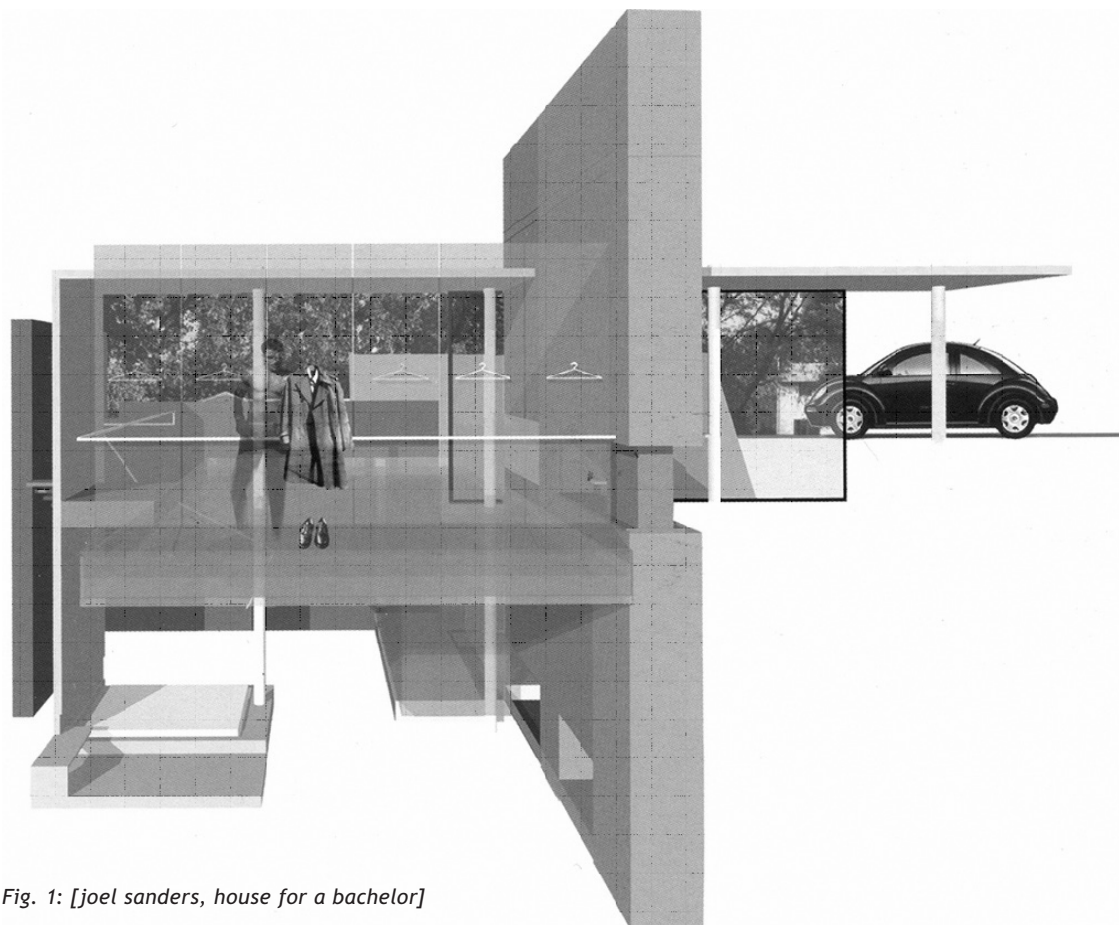


Fig. 1: [joel sanders, house for a bachelor]

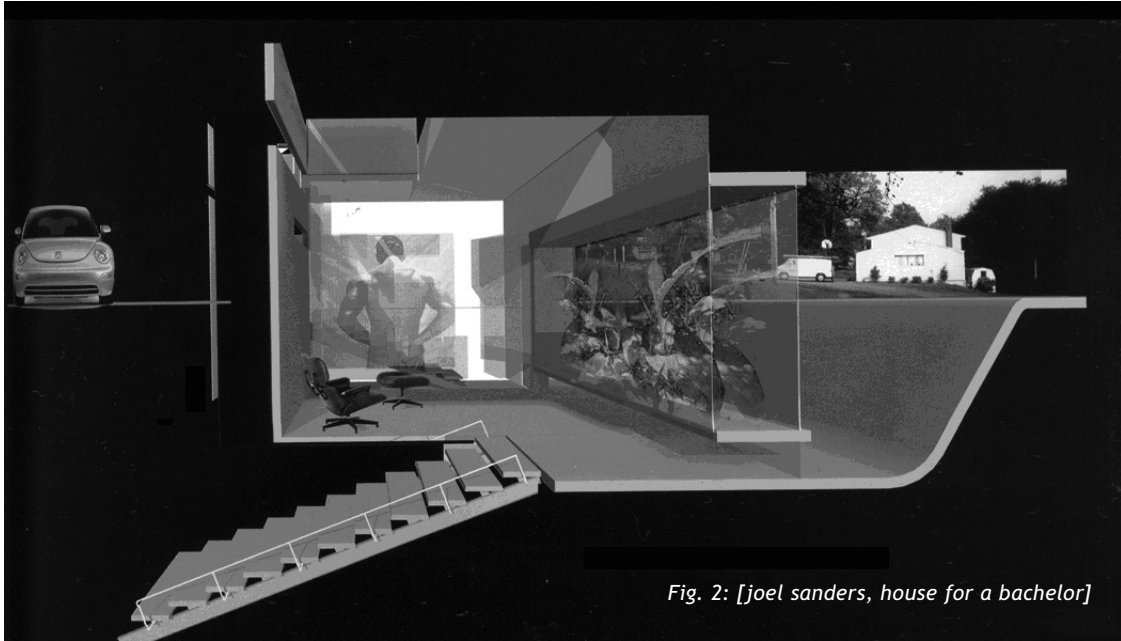


Fig. 2: [joel sanders, house for a bachelor]

sectional 3D model of their selected case study enhanced by the use of Photoshop to create a vibrant, yet abstract, composition. The composition is required to capture the dynamic of the space[s] and be innovative in its representation, yet simple in its organization as portrayed by the example figures 1 and 2 [joel sanders, house for a bachelor].

In the development of their 3D model material and textures are not encouraged, but rather the use of color to portray materiality. To, once more, stimulate the students' graphic and layout imagination, the number 4, marking the assignment, is required to appear in the composition.

Assignment 5.0

Most often the graphic representation of an architectural idea can be compared to a story board. The nature and sequence of drawings present on a board [or multiple boards] has been cleverly selected to communicate and facilitate the understanding of the architecture, and to capture the imagination of the viewer[s]. Assignment 5.0 invites the students to take a possible twist to such architectural representation to produce, for lack of better words, an informative portfolio of their selected case study. If the word portfolio in our profession is associated to a collection of somebody's creative work, here is interpreted as a collection of the students' work about the selected case study expressed in clever,

yet experimental format. The format and the content of this portfolio are, therefore, left to the students' discretion.

Computer programs simulate a human understanding. They are, however, mere manmade mechanisms invented to facilitate the communication between user and computer. The machine does not understand the user interactions in the human sense. It does not understand the meaning of the text typed, or the images drawn. The machine blindly manipulates the data we input.

Maia Engeli, *Storie Digitali*
[Torino: Testo & Immagine,
1999]