Design in the New Media
Digital Design Pedagogy at the SoA, University of British Columbia

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The idea of the Bauhaus education was born out of the conviction that designs for mass production and modern architecture needed a new fundamental design strategy. Today, seventy-five years later, the modern, basic design pedagogy needs to be revisited, as the impact of the Information Technology Revolution on design practice and education is now extensive. The illustrations and reflections on a modern curriculum for fundamental design and communication presented in this paper are derived from the authors' introduction of the new media to design studios at UBC and from design practice.

In the case of the nascent student of architecture, a different, rudimentary approach is required: one calling for the combining of the modern, basic design agenda with the introduction of the new media. The fundamental digital design pedagogy is young and not fully established. This is a considerable problem, since the practice and learning of architecture today is increasingly aided by and dependent upon digital media. Parallel to the traditional methods, the contemporary student of design is now obliged to engage new and dynamic conditions at the formative stage of his or her education. In the recent past, the computer was considered as just another device, requiring the development of mechanical techniques or skills. While those skills still have to be mastered, more recently in design education and practice, IT has become accepted as MEDIA - not just as a drafting or modeling tool. This process is perhaps due to the rapid dissemination of computing literacy and to the progressive accessibility and ease of use of IT. At UBC, Techniques and the Foundation Studio are introductory courses intended to make students engage the new media in parallel with, and complimentary to, established conventions in design.

Keywords: *Imagining. Communicating. Where Do We Go From Here.*

Imagining

Among Chuang-tzu's many skills, he was an expert draftsman. The king asked him to draw a crab. Chuang-tzu replied that he needed five years, a country house, and twelve servants. Five years later the drawing was still not begun. "I need another five years," said Chuang-tzu. The king granted them. At the end of those ten years, Chuang-tzu took up his brush and, in an instant, with a single stroke, he drew a crab, the most perfect crab ever seen.

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Although a wide variety of pedagogical intents and practices pervaded the early Bauhaus through the individual mandates of instructors (Gropius, Itten, Klee et al), it was Moholy-Nagy who immediately recognized the possibilities of the new media of art and mechanical production, as typified in his avant-garde experiments in photography, film, light and projection, typography and sculpture. He was able to exploit the technological revolution and innovations of the day, transforming both his art and his still-developing ideology of design education (figs 1 & 2).

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The modern tradition regains significance today when engaged in the context of the contemporary design studio — a studio where students of architecture often collaborate at a distance, sometimes continents and time zones apart while designing with the new, digital media. Among the fresh issues in design is the growing application of complex surfaces resulting from the proliferation of NURBS modelers. Furthermore, motion models, animation and kinematics are engaged not only in design representation, but also in its generation and in questioning the established nature of the design discipline. Quick prototyping with numerically controlled tools offers the promise of production, upstaging the traditional role of the orthogonal aspect and abstraction in design.

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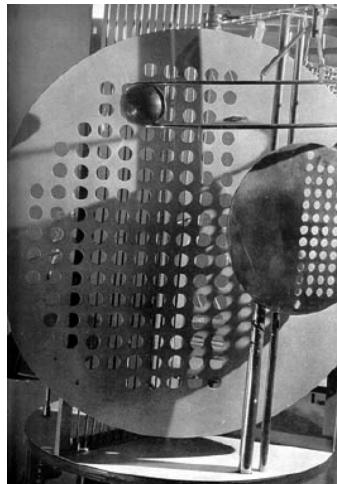*Figure 1 (left). Laszlo Moholy-Nagy, Light-Space Modulator, 1922-30*

Figure 2 (right). Student collage etude, 2001

in design education and practice, IT has become accepted as MEDIA - not just as a drafting or modeling tool. This process is perhaps due to the rapid dissemination of computing literacy and to the progressive accessibility and ease of use of IT. At UBC, Techniques and the Foundation Studio are introductory courses intended to make students engage the new media in parallel with, and complimentary to, established conventions in design.

These introductory design courses assign particular importance to short, manual and machine-based design exercises illustrated in this paper. These problems, set as brief design etudes, are offered throughout the semester and often in parallel to a main project. Digital etudes are tightly framed, addressing the limited aspects of design with the new media, while formulating the pedagogy and fundamentals of digital design.

Communicating

In the Foundation Studio, initial deployment of the new media in the design studio can be simplified when the limits and opportunities associated with it in design process are recognized in advance. The newcomer to computer-aided design might expect instant efficiency as a result of the move to a digital design studio. Yet, even after developing a basic fluency with a given program, this efficiency is not likely to be immediate. Initially, a significant amount of time must be devoted to mastering computing in the design context. It is important to anticipate the "time sink" at the early stages of the digital engagement and to allow for it. The traditional one-night design charette, prior to pinup review, is usually counterproductive, as work on the machine requires planning, time management, and a steady work pace. It is therefore advisable to begin outputting the design material well ahead of the deadline and to document the design process by keeping a record of it. Screens recognized as seminal can be easily captured for future reference. The design process can be documented with frequent captures and prints of the screen state, well prior to final presentation. This documentation in the form of a digital sketchbook can broaden each student's design universe.

Designers often work with reductive models, in an abstraction of reality. Constructing the digital design model in 3D, or even using a simple 2D CAD trace, tends to be time-consuming. Creating models that represent a given design involves a major time investment and exploiting that investment has to be encouraged. For example, the floor plan can be easily
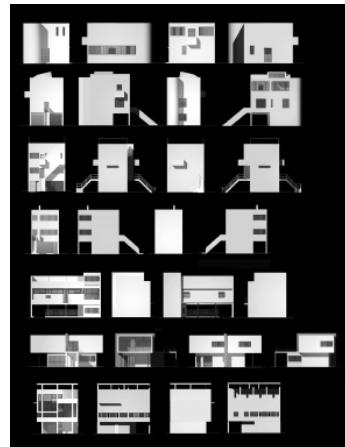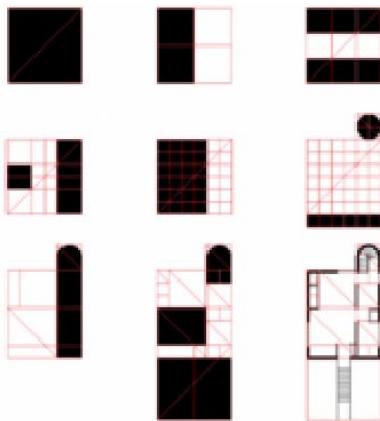

Figure 3 (left). Jerzy Wojtowicz, Le Corbusier Villa Plan Study,1996

Figure 4 (right). Jerzy Wojtowicz, Le Corbusier Villa Section and Elevation Studies, 1996

edited and used to generate a structural grid drawing, reflected ceiling plan or conceptual parti diagram. The geometric model of the project can be used in creating a diagrammatic axonometric view, immersive pictorial space, or a base for the development of elevation or building section (figs 3 & 4).

Digital, paperless design is first viewed on a screen whose resolution is far less than that of the paper hard copy. Plotting and printing from the machine is often an involved process, because what the new student of design sees on the screen is not necessarily the same as what he will get on paper. Outputting the final design from the machine to paper is a recursive process and ample time must be allowed for the editorial process. At UBC, the student basically designs short projects that explore the new media and are often narrative driven. In recent years, we have witnessed the growing importance of the complex 3D digital model in the representation of design and in its generation. New media with strong narrative possibilities are being deployed in the architectural design. The interactive motion models can amplify this potential. Initially, moving pictures entered the design discipline as a tool of representation, offering convincing walk-through, simulation and real time immersion into pictorial space (fig 5).

More recently, motion models are being deployed during design generation. Using morphing or twinning with key framing and with a variety of parametric constraints, the designer can now algorithmically generate a vast array of formal transformations and select from the results of this automated or serial production a condition of particular interest. Those digital motion models, characterized by complex surfaces and kinematics, are often uncritically embraced by students of design who see it as a tempting automata for the generation and testing of design. Combined with the growing popularity of NURBS modelers, this gives the fresh designer the exceptional opportunity to access the magically complex universe of forms**.** However, the enthusiastic embrace of this formalism cannot produce significant results until it becomes more rigorously critiqued by the process of its prototyping, construction, materiality, as well as by the cultural, environmental, economical and social context (fig 6).

A promising aspect of the digital model lays in its inherent ability to be used as data for the production of design and to serve as data in CAD-CAM, or the quick prototyping process. This can potentially create a new relationship between designer, project and object of design, perhaps turning the architect into the digital artisan-craftsman.

Figure 5 (left). Foundation Studio Transformation Plan Study, 2001

Figure 6 (right). Foundation Studio Transformation Isometric Study, 2001
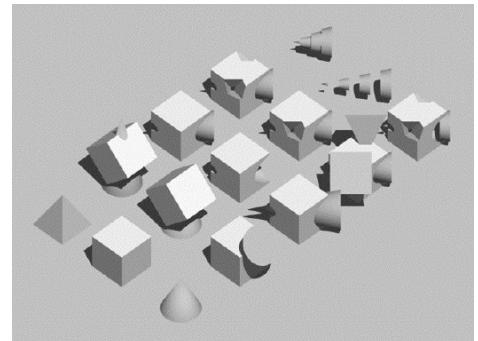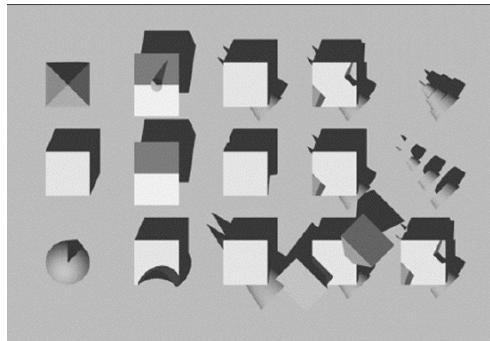
The emergence of computers has been extremely rapid. Has it upset established conventions and redefined the boundaries of the architecture as an established discipline? Evidence of the crossing of boundaries to alien professions exists, not unlike in the early Bauhaus curriculum. Yet, despite the growing engagement and interest in the digital realm, the guiding and effective power of abstraction, established in design conventions, must be acknowledged. The power of abstract conventions in conceptualization remains in place. The two-dimensional, orthogonal projections of plan, elevation, and section developed abstract design notation, which has been well understood by the initiated since times of Euclid (fig 7).

The critique and rejection of it, with the aid of kinematics and complex surfaces modelers, abused by fresh students of design as some form of digital play-doh, is naive. On the other hand, information technology should be now accepted as media, crossing the boundaries of familiar conventions to those of non-architectural disciplines. The nature of these media permits the designer to think more naturally in three dimensions and to a greater degree than previously imagined. However, the ease with which simulated complex surfaces are generated by new media could be disturbing to the additive rigor of traditional design conventions. Today, with ease of visualization and design, digital simulation in the early design stages can enable the collaborator, client, and ultimately the public to develop a full understanding of the design narrative from its conception (fig 9).

The narrative power of the new media might transform the nature of design practice by bringing the client-citizen closer to the design process and by communicating visual information more effectively and more often. Information Technology has to assume the guise of design facilitator, who can impact the nature of contemporary practice through the development of a new relationship with the public. In this context, it will be interesting to further amplify our experiences once the participatory feedback of all design actors is facilitated by the growing connectivity and distributed design practice. The modernist tradition is not substituted but only extended by the Information Technology revolution.

Where Do We Go From Here

As a compliment to the new media and the computer, the SoA simultaneously offers the core course
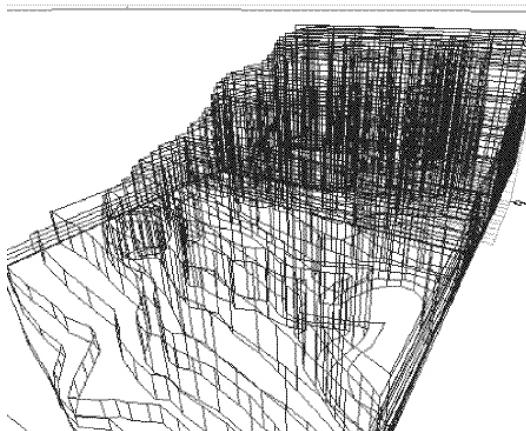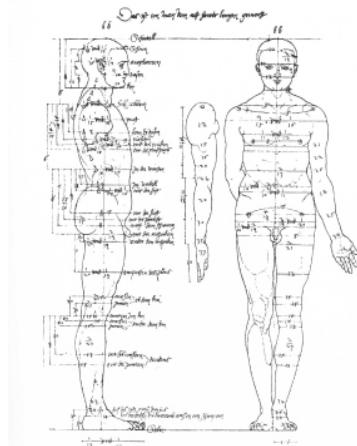

Figure 7 (left). Albrecht Durer, Preparatory Auto-Trace,Vier Bucher von Menschlicher Proportion

Figure 8 (right). Foundation Design, CAD Landscape Model

Figure 9. Farnsworth Narratives, Design Studio Study, 2001

Techniques, which provides fundamental instruction in architectural representation. It presents drawing and representation as critical skills that enable the architect to think and to communicate. We believe that drawing is the language of architecture, where ideas are created, evaluated and developed. As such, it is not an isolated representational process, but integrated into the conception of building. That this more traditional approach is now extended by technology to include digital modeling, imaging and product fabrication, is a historical moment not unlike that faced by Brunelleschi or Durer or Moholy-Nagy, to be seized by students and educators alike.

Just as the discoveries of perspective and axonometry profoundly affected the description and production of architectural space, so too will the computer and the digital age fundamentally alter the manner in which we describe and envision our world. Our immediate challenge is to integrate the manual craft and idiosyncrasies of drawing with seemingly boundless potentials of computer imagery. It seems appropriate then, that one of the more recent mandates of Techniques and the Foundation Design Studio at SoA would involve positioning architectural representation in its larger historical, theoretical and philosophical contexts, as we enter this next century of architectural education.

If I have visibility in my list of values to be saved, it is to give warning of the danger we run in losing a basic human faculty: the power of bringing visions into focus with our eyes shut. Of bringing forth forms and colors from the lines of black letters on a white page, and in fact of thinking in terms of images.

Italo Calvino
Six Memos for the Next Millennium

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Figure 10. NURBS Modeling Study, Design Studio, 2001