

An Analog Digital Language of Vision

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Digital media is transforming the practice and teaching of design. Information technologies offer not only better production and rendering tools but also the ability to model, manipulate, and understand designing in new ways. *The Poetic Potential of Computers* elective design seminar teaches students how to see, think, and form space using both digital and physical media. The course uses a systematic approach that follows the tradition of the Bauhaus principles of craftsmanship and visual perception. Precedents are drawn from the use of light, color, and texture in the visual arts such as the glass collage assemblages of Josef Albers' and Laszlo Moholy-Nagy's camera-less photogram. References are also drawn from Wassily Kandinsky's diagrammatic analysis of still life drawings and Gyorgy Kepes' idea of the language of vision.

The focus of the course is how digital media and physical material can be used interchangeably as instruments in a design environment. The investigation centers on developing methods for seeing, thinking and making of spatial design. A sequence of experimental exercises stimulates students' intuition and powers of analytical observation. This systematic approach helps students explore how space can be perceived and informed by using types of media that are significantly different in their nature.

A previous work, *Between Digital and Analog Civilizations: The Spatial Manipulation Media Workshop* (Neiman and Bermudez 1997), described a three-day design workshop that employed both analog and digital media. We use *analog* to refer to physical artifacts and the physical representation of design, such as tracing paper, ink, pencil, drawing, sketching, and various physical model-making materials. By *digital* we mean using computer information technologies, such as scanning, video capture, image manipulation, and modeling. The workshop involved a five-stage transformation process alternating between making physical artifacts and computer image manipulations. The workshop intentionally did not use any CAD software as a strategy to break down students' preconceptions of computer technologies and to shift the focus to an alternative analog-digital dialogue depicting space. The present effort follows this model of design, augmenting it with modeling software and the techniques of making space through the use of light, shadow, motion, color, translucency, and transparency.

The Bauhaus teaching philosophy centered on the study and use of materials. Focusing particularly on color, light, texture, and materials, Josef Albers explored the assemblage of found objects. Albers picked up a variety of discarded, colored glass fragments, transforming these materials into unexpected dynamic compositions. Through these improvisational experiments, Albers advocated the idea of the studio as a laboratory or workshop where students discover and invent artifacts through seeing, exploring, and situated thinking (Albers 1988 and 1994).

In the early 1920s, Laszlo Moholy-Nagy developed a technique called the photogram or camera-less photograph (independent of Man Ray), to record the temporal movements of light. He employed a moving light source as a creative agent to capture images of nature (Moholy-Nagy 1969). This technique was derived from a rational attempt to paint the penetration of lights through planes. The black, white, and gray values of the photograms revealed the spatial quality constructed by traces of light. Moholy-Nagy used these *light-compositions* or *light-phenomena* to help us see the world with a new vision. His Light-Space-Modulator was a kinetic sculpture that produced a *light chronology* with rotating metal and glass parts. Moholy-Nagy considered his film of this light machine (Light Display Black-White-Gray) more important than the device itself, because it revealed unexpected motions, reflections, projections, and rhythms of light and shadow (Moholy-Nagy 1969). Moholy-Nagy's optical synthesis, through the production of photograms and the light display film, documents space with superimpositions of objects and the interplay between light and shadows.

Wassily Kandinsky developed a visual language that consists of point, line, and plane (Kandinsky 1947). He considered the spirit of art to lie in the comprehension and *vision* of element movements and silent melody (Kandinsky 1947). He developed a method of analytical painting that breaks a still life into diagrammatic forces to express tension, geometry, and repetition. These analyses illustrate the concepts of balance, rhythm, and motion in graphic forms (Poling 1986). These schematic diagrams provide a method for students to examine and analyze the implications of element placements in a scene. This technique transforms the viewing of pictures from natural depiction to diagrammatic analysis through a process of dynamic discoveries.

Gyorgy Kepes' Language of Vision (Kepes 1944) provides a primer for learning basic design principles. Kepes argued that the perception of a visual image needs a process of organization. The experience of an image is a *creative act of integration* (p. 13). He explained that a two-dimensional picture has a spatial field because the different positions of the elements in the picture plane create a dynamic form of movement. Any composition, whether it is a photograph, a painting, or a pencil sketch, can represent the manipulation of objects in space. The play of transparency, superimposition, lines, colors, and light all contribute to a specific sense of space. Kepes further argued that one could derive visual awareness through the process of examining and making spatial configurations of objects. He also stressed the value of experimenting with artificial light sources to model the experience of an environment or a space.

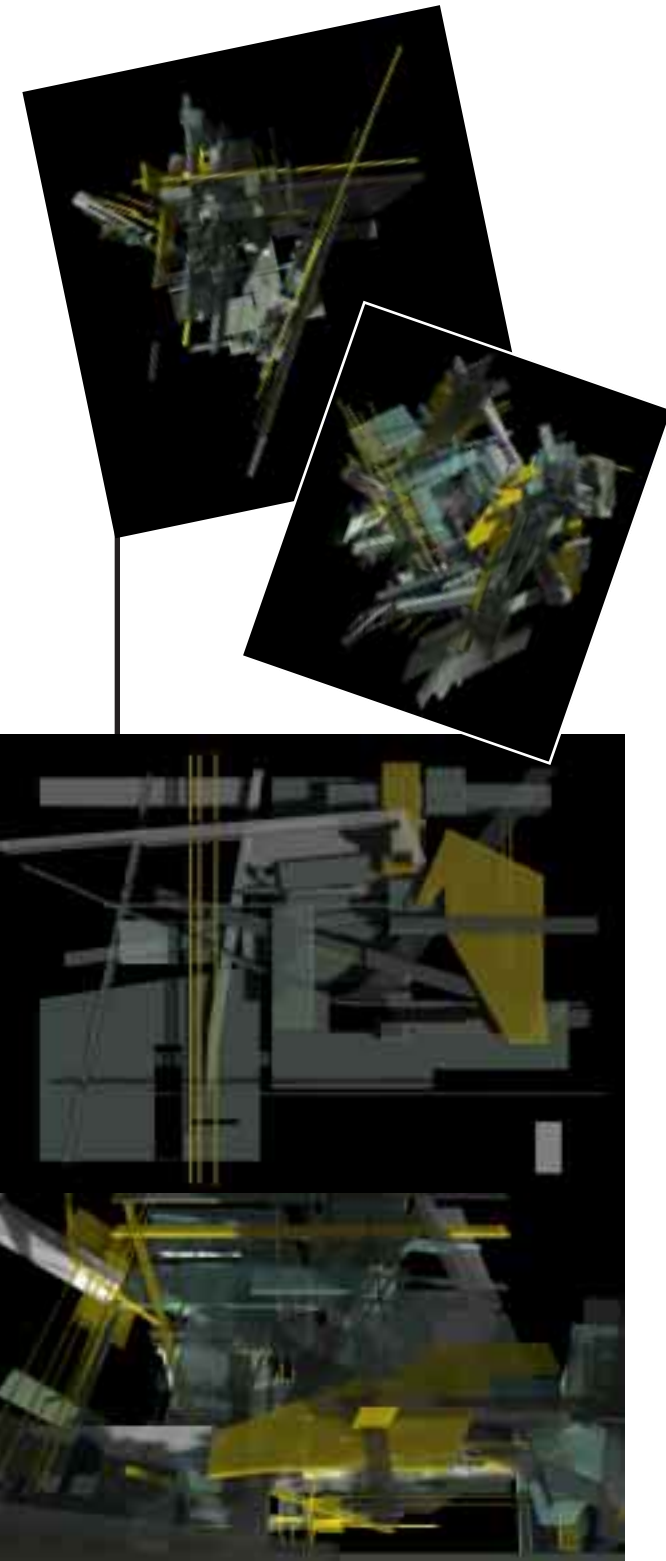
With these precedents, we developed a methodology that explores the concerns and techniques of making space through the use of light, shadow, motion, color, translucency, and transparency. Following the Bauhaus teaching philosophy and the *Digital and Analog* example (Neiman and Bermudez 1997), we focus on the question of how one can incorporate digital media into traditional design techniques. The focus is the development of a pedagogy for experimentation and a language of evaluation for the techniques themselves. We extend the conversation between analog and digital to be a design exercise using different materials. We report our design teaching as an example of how creative vision can be expanded through digital tools.

We argue that, for digital media to be useful and effective in design teaching, it should converse with traditional, analog design media. The conversation should be interactive, reciprocal, deliberate (controlled and based on an established pedagogy), cyclical, recordable, and reproducible. Our methodology promotes the act of design as a discourse, where experiment or play precedes interpretation. The design strategies, tactics, and techniques of this method stimulate intuition and reasoning abilities. We found that, by using these elements in the process of design, students become engaged and enthusiastic.

The projects and methods described are not intended as completed works but act as vehicles for testing various sketch-design techniques through the iterative use of digital and analog media. Ultimately, the pedagogy is about how students can learn to see, to project, to manipulate, and to design. The experiments involve photographic capture and physical craftsmanship, digital manipulation of two-dimensional images, and construction of three-dimensional geometry.

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