This paper describes a 10 week, 3rd year architectural design studio, taught by the author, that explored the use of film and video techniques in the design process. The exploration was of (1) the potential of recently available personal computer software and hardware for image and video capture, manipulation and recording, and (2) the potential for application of video, informed by film theory, in the early stages of architectural design.

**The Opportunity and Challenge of Video**

During this century a tremendous amount of artistic energy has flowed into film and video. It is arguably the most popular art form and is part of our daily lives. Today's students have grown up with aggressively presented film and video. Video, not drawing, is generally the artistic language they have learned to read.

Film and video are able to express over time and with sound — closer to the way we understand the world than static drawing. Recent advances in hardware and software on personal computers make video nearly as accessible as word processing. We need to give our students the ability to express themselves in this medium and to develop theories and methods for its use in the design process.

**BACKGROUND**

The studio described in this paper evolved from the work of previous studios taught by the author that used computer animation and video editing.

First attempts at computer animation by students often result in erratic one-pass walkthroughs of completed designs. Later the animations become smoother, more conscious of a viewer, and may include sound and multiple animation clips with smooth transitions between them. An advanced animator may use chroma-keying, filters, superimpositions and other effects. At some point the video animator may want to explore the rich body of work and theory that has developed in cinema and video during this century, and apply the results of that exploration not just to expressing a completed work but as a kind of video sketch for design development.

That exploration and application was the focus for this studio.

**The Approach Taken in the Studio**

The studio explored what in film theory, method and technique could inform the use of video in architectural design — to begin to understand this new tool from those who have thought most about it.

The studio had several goals: Develop a knowledge of the tools, develop an understanding of film theory and criticism through research and
application; develop a personal adaption to each student’s design approach to design; and develop a studio vocabulary and point of view.

In a warm-up exercise, students created an animated visual composition in an application called Working Model. Working Model allows creation of 2D physical settings and then animates them according to physical laws where gravity, physical properties of the objects and initial conditions can be specified. The exercise developed an awareness of dynamic composition that exists and changes over time and thus needs choreographing. Figure 1 shows frames from a 2D animation. In a follow-on exercise, DXF files of the Working Model animation were exported to Upfront, a 3D drawing and animation application, and turned into a 3D animation to introduce the added effect of viewer location on the composition. Figure 2 shows frames from a 3D animation.

NOTE REGARDING FIGURES: The essence of the work in this studio involved techniques enabled by video techniques and informed by concepts from film theory. This usually involved camera movement, sound, a sense of time, rhythm, transitions, transformations, color and cinematic montage. Often the image and meaning was not even discernable without motion and sound. Nevertheless, graphics and frames from videos created by the students are included with this paper in the hope of giving some idea, however limited, of the nature of the studio work.

Figure 1: Movement composed in Two Dimensions

Figure 2: Movement viewed in Three Dimensions
Next, each student independently researched readings on film history, theory and method. During a following group discussion, students shared quotes that they felt indicated aspects of film that had implications for architectural design. Common themes discussed were storyboarding, scripting, aspects of time and motion, relationship to literature, sound, ideology, scene composition and the relationship between film and architectural theories.

In a similar exercise that followed, students found sections of videotaped movies showing special capabilities of film that inspire potential uses in architectural design and illustrate the concepts discussed following the readings. These sections of movies, most lasting only a few minutes, were shown to the group and a discussion, followed each presentation. A local filmmaker took part in the discussions. Of particular interest to many students were issues of sound and time. This was not an exercise in “find how film shows architecture” but rather how film deals with more fundamental issues of representation that could have implications if cinematic techniques were used to augment conventional representational techniques during conceptual design.

During these research exercises each student found an issue in film theory that was personally interesting and created a video exploring that issue. Typical issues were sound, time, scripting and storyboarding. This first video project gave the students an opportunity to give substance to the exciting ideas generated while researching film theory and footage. Knowing the tools and applying them is an important part of learning to see in the cinematic world — the education of vision. During the video project, students learned the animation and video editing software that was used the rest of the quarter. Learning the software provided an excellent opportunity to focus on methods of filmmaking such as camera movement, lighting, sound and techniques of editing. Students reported that they looked much more closely at what was happening in films after learning about animation, sound and editing tools. Figure 3 shows storyboarding for an animation. Figure 4 shows storyboard scripting. Figure 5 an intention sketch from a storyboard and Figure 6, frames from a video montage.
In the next exercise, students used the insights and skills gained in the previous exercises to create a video for site analysis and initial design explorations for either a place of worship or a small breakfast diner located near the campus. This gave them a chance to develop cinematic concepts within the framework of architectural design. Figures 7 through 9 show frames from these animations.
In the final exercise for the quarter, the students did a schematic design for a mini world's fair in which each student designed a national pavilion. Students created short segments of video that functioned much as dynamic study drawings montaging site analysis, initial concepts and approaches to physical solutions. Figure 10 shows frames from a video study for the Iran Pavilion. The students also produced a 90 minute video tape which included many of the videos produced during the quarter.

Figure 8: Site analysis with horizontal orientation. Both figures 7 and 8 are from the same site analysis.

Figure 9: Frames in a video study for a place of worship. Sound included chanting overlayed with reading a shopping list contrasting spiritual with everyday life.

Figure 10: Frames from a study video for the Iran Pavilion. Sound included music and both real and abstracted background sounds.
The students used Upfront to model and create walkthrough and solar animations, Premiere for video editing and Photoshop for editing animations. Canvas and Fractal Painter were used for creating images and editing single frames. All work was done on Macintosh Hiu's, Centris 660 AV's and Quadra 700's. Transfer and storage was done with a server running AppleShare and having a total disk capacity of 1500 megabytes. Scanning was done with a HP Irix color scanner. Video input was done with a variety of VHS and SVHS cameras into a VideoSPigot video capture card or directly into the Macintosh 660AV. Videotape recording was done directly from the Macintosh 660AV. Printing was to laser and ink-jet color printers. Recording sound was directly from CD on the 660AV's and from built-in microphones and sound input jacks on all machines. Most of the videos were produced with a frame size of 320 by 240 pixels and played at a speed of 15 frames per second.

Students came to the studio with basic computer literacy. Most, but not all, had done some basic computer modeling and were familiar with a drawing and paint program. Students learned the software through demonstrations in the studio (often the first hour of the studio session was a demonstration), working through tutorials provided with the software, and working through study manuals such as the Adobe "Classroom in a Book" texts for Premiere and Photoshop. Students began producing videos with Upfront and Premiere by the end of the second week of the quarter and were comfortable with all software by the fifth week. Strata Studio Pro was introduced in the seventh week for those students who wanted more advanced rendering and animation techniques. DNA was used to export models from Upfront to Studio Pro.

Film Theory

Cinema as a new art had to struggle with its relationship to photography, itself struggling with painting. Later it has also had to accommodate the introduction of sound and color. These contentions have resulted in a rich legacy of film theory, methods and techniques.

Film theory is a pluralism of theories. As with theory in drawing and architecture, it reflects on aspects of the art and is not prescriptive — and certainly not prescriptive with respect to application for architectural design. Nevertheless, the writing and works of those who have struggled to define and understand film are of interest as we seek to apply the apparent potential of film theory and techniques intelligently to architecture.

Most contemporary film theories begin by breaking with the naturalist attitude that goes back to Plato — that the critique of a work of art is how well it succeeds in reproducing reality. In the area of film, this break with the naturalist occurred in the 1970's. Earlier film theorizing by Rudolph Arnheim, Sergei Eisenstein and others was appropriate to the classic silent films which subscribed to a belief that cinema copies the perceived world and is set before it - the "profilmic". These theories are of interest when we begin to explore the use of cinematic technique in architectural design. They relate to a visual model based on cognition, perception and psychology that we are familiar with in architectural drawing, deriving from still photography, literature and theater. There are theories from which we can learn much about how film can represent the real, a traditional task in architecture and one often prized as a potential in computer graphics, but there are also contemporary theories that are based more on theories of language than on visual cognition. In these contemporary theories, the issue is between the literal representation and the hidden symbolic or ideological meaning.

Some caution is necessary when interpreting theoretical remarks meant for completed works and the standard artist/patron relationship, since the use of video for architectural design involves, as with study drawings, incomplete and personal works. Issues concerning what is signifier and signified, and addresser, addressee and observer are further complicated by electronic tools that are now available to capture and process images, including individual and collective video images.

There are many interesting film theory issues that were outside the scope of this ten week design studio. Among issues that may be explored in future studios are scopophilia (relating to visual pleasure and voyeurism), the gaze (and related gender issues), and
narrative space (the relationship of cinema to the codes of figuration inherited from the Quattrocento, notably perspective).

Application of Film Theory in Conceptual Design

Study drawings depend on a shared understanding that has not yet had time to develop with regard to video sketches. The studio was just a beginning to finding new tacit assumptions that can apply to this media.

In video, what are the "marks" that we make on the "page" if we intend to create a video study drawing for an architectural task? There is the choice of materials to compose — a video taken, a photograph or sketch scanned, a computer animation generated, music or other sounds recorded. There is the composition of those elements into a video — tracking, superimposing, overlaying, filtering, morphing, overlapping with effects, shaping the frame — which develop what is seen and how it is experienced. Video, like any other tool, is intrinsically problematic in that it is neither neutral nor transparent and has significant issues regarding what it can signify and how it goes about doing that. What is the message of this medium and how is this intertwined, as it is in any medium, with its content?

A primary concern of film theory has been the relationship of the ambiguous and symbolic content of film to the apparent reality of the filmed scene. In a study video for architectural design it isn’t necessary to create the illusion of the reality of the finished design any more than a thumbnail sketch intends to do the same. A study video should have a level of ambiguity, symbolism and multiple representation similar to a study drawing.

Computer animations assist our ability to know shape and may emphasize that aspect of design, while video extends our senses to time and sound. Students found that the montage created with conventional computer animations was much more suggestive for the purpose of design development than the highly shape-oriented, unmanipulated computer animations.

The key to the successful use of film techniques is the availability of video editing applications for personal computers. The video editing application provides easily learned, highly interactive tools for editing and combining clips of computer animation, video capture, pictures from any source, multiple sound clips and applying special transitional effects, montaging, overlaying, filters, and chroma-keying. By giving full access to techniques used in cinema the video editing provides a video "sketchpad" that facilitates visual play. In some cases, such as morphing, transitional effects, superimposition and filters, a video-editor provides access to digital film techniques that have only recently been introduced to cinema, and for which theory has not yet had time to respond.

The video editor is critical in that it is an interactive environment not only for composing videos, but also for looking at them. Video sketches can be played, stopped, examined frame by frame, reversed, and viewed back and forth repeatedly a few frames at a time in order to understand the meaning. The highly interactive nature of personal computer based video editing and viewing makes video for design possible.

The all-electronic methods of creation and editing allow for spontaneous work in a way that was not previously possible.

Studio Observations

Video may change the way we use and perceive study drawings —

The study drawing may take on a new implied meaning of being an image in a storyboard for a video. Even if no video is produced, the study drawing could be understood as a storyboard drawing for a potential video and so have the meaning of a potential scene from a video rather than a static drawing. It is a different way of organizing our thinking about a drawing — Eisenstein states that "each sequential element is perceived not next to each other, but on top of each other" — thus montage. Together with computer aided drawing, painting and animated modeling, video may lead to the first fundamental change in design drawing since the time of Leonardo Da Vinci.
Video introduces considerations for the dynamic into architecture —

Because of video's orientation in time, working with video may increase our awareness of the cycles of use, of the day, of the seasons in the environment, of the life of a building and the cycles of growth and decay in an environment. Because videos can include sound, this potentially expressive element in design can be represented in our design process for the first time in an integrated way. Because videos may be examined frame by frame, video also gives us a way of capturing and examining transitions and transformations that occur in small time increments — a way of capturing a moment. In another area of concern to architecture, methods of technical analysis can show results in dynamic ways. Animations can help us understand such things as structural reaction to stress, lighting levels, heat analysis, patterns of use and dynamic ways of configuring the building space. Video provides a means of studying and integrating dynamic information.

Video tends to increase experiential considerations in design —

Video site analysis can provide abstraction while still maintaining a complex richness of interrelated ideas, sights, sounds, textures, people, weather and uses — a feeling of being there rather than the distancing abstraction resulting from modeling and diagramming. During design conception, the feeling of being there continues, at times in a dream-like state representing a complex collage of ideas and geometry — like a personal memory of the future — impressions of something not yet clearly understood, but which become clearer as the design progresses.

Video challenges the way we work —

Our methods of design and design evaluation depend on models and printed material. Computer animation walkthroughs begin to require video means of projection but can, to a limited extent, still be grasped by sequential printouts. Video includes sound, effects over time and complex imagery which cannot be meaningfully be represented by still images and thus requires video projection. Perhaps future publications of the ACADIA proceedings will contain a CD ROM.

References

Arnheim, Rudolph. Film as Art. Faber, 1958 originally 1933.


