THE INTEGRATION OF CINEMA IN THE DIGITAL DESIGN STUDIO

Paola Sanguinetti
University of Kansas
School of Architecture and Urban Design
1465 Jayhawk Boulevard, Lawrence, KS 66046
paolas@ku.ed

Abstract

The appropriation of cinematic techniques into the computer-design interface allows immersion in the virtual model using the camera view. This paper describes three approaches to film in the early stages of design in fourth year architecture studios.

1. Introduction

Most software used in architectural modeling includes a camera interface view. Using the virtual camera, architects can set up multiple views to simultaneously build and explore space, and to create walk-through or fly-through animations, which are short movies of a project. I integrate film studies in architecture studio to inform the use of virtual cameras in the design process. This paper describes three approaches using film in the early stages of design: cinematic structure, film as site, and transcoding transparency.

2. Film analysis in digital studios

The three methodologies described here were used in 4th-year architecture studios over five semesters. I introduced film studies for a variety of reasons: the School of Architecture has “digital or paperless studios” where students must own and use computers. Most digital studios used CAD software to expedite producing architectural drawings, using the computer for drafting and producing 2-dimensional drawings. Some studios used 3D-modeling software, creating final renderings of models from CAD production of presentation images. I wanted to tap this software’s potential during the design process. In exploring the connection between film and architecture, my goal was to integrate in preliminary design stages the virtual camera as a device to frame and simulate the experience of moving through space. The projects began with film analysis following three steps: scene selection, diagrammatic analysis, and physical and digital modeling to synthesize ideas. I chose relatively recent films to engage the students’ interests while providing a relevant depiction of contemporary urban experience to students coming from the suburban or rural Midwestern United States.

2.1. Cinematic structure

In this approach, the class studied how different directors constructed space with the camera. Each student selected a film, then a scene. First they broke the scene’s sequence down into stills, a series of single frames. They recorded their sequence analysis using annotated diagrams and sketches, documenting the sequence of images, camera angles, aperture, montage, composition, and focus. Analyzing individual frames established a connection between the movie camera and the cinematic space it recorded. After dissecting the scene’s structure, physical models were used to translate the 2-dimensional analysis into 3-dimensional material. The physical models also aided the construction of digital models. Once in the digital realm, students used the virtual camera to inhabit the model’s spaces, effectively mimicking the angles, aperture, and movement of cinematic camera. For example, one student selected a scene in Being John Malchovich where the viewer’s plane of reference continuously changes. As the camera moves through walls and ceilings, the walls of the previous room become the floor or ceiling of the next room. His study model was a wood structure of stationary opaque planes and movable translucent panels. The physical model was designed to have no base, no top or bottom. Animating the computer model choreographed the virtual camera’s
movement with the sliding of panels, the roll camera with the digital model’s rotation. Bitmap images of the film were applied to the digital model to match the film’s texture and color. The model design was revised for the path of motion of the virtual camera, by relocating the stationary pieces positions, or by sliding or pivoting of the translucent panels (See Figure 1).

The visualization and modeling techniques used to analyze film were then used in the architectural design development, the digital model produced in this exercise become the source of design concepts to be integrated with the building program.

2.2. Film as site

In this approach, cinematic immersion supplemented site analysis in two projects: ACADIA’s student competition for the Berlin Inforum, and the master plan for the World Trade Center site in New York. Film was a way to visit places quite remote from our location in Lawrence, Kansas.

For the Berlin case, students watched Wings of Desire and Run Lola Run, observing the cinematic techniques to describe the city. In Wings of Desire, Berlin is fragmented, divided by the wall. This boundary is expressed by juxtaposing two temporal experiences in the same space: the chromatic time of the living with the grayscale timelessness of the angels. In Run Lola Run, the urban experience is non-linear. Two spaces are compressed in the cinematic frame and time is looped and stretched. Students were asked to: (1) select scenes from each film to establish a comparative analysis of Berlin, (2) translate the ideas generated from the analysis into physical concept-models, and (3) produce a digital model and animation. The models produced 3-dimensional maps and surfaces representing the spatial and temporal qualities of the city in their texture and other material properties. As an example of Berlin’s decay, a student applied bitmap images of the wall’s graffiti to his digital model. He represented the sense of speed depicted in Run Lola Run in the animations as blurring, or as digital materials with elongated specular highlights or ray-traced reflections. Digital morphing techniques showed the evolution and transformation of Berlin’s urban morphology with the destruction of the Berlin wall (See Figure 2).

The digital models and rendered animations became idea sources for the students’ design proposals. This occurred as the students developed, used, and transformed the formal compositions of their digital models. It also happened as students appropriated the experiences captured by the virtual camera in the animations. The results emphasized the materiality and surfaces properties of the Inforum, both through articulation of the building’s skin as a media and information surface.

In the site analysis case for a World Trade Center master plan, students looked at films of New York to get a sense of the city beyond the images connected to September 11. Because none of the students had been to New York, there was a risk that their work might simply become planimetric organizations of functions on a site as presented by the media. Before addressing the complexities of the programmatic brief provided by the Lower Manhattan Development Corporation, I asked students to assemble a New York documentary. They combined sequences captured from film with animations they produced from a digital model of Manhattan. Here the virtual camera was a tool to explore the spaces created by abstracting the city’s morphology into a digital model. The first group of students looked at Manhattan. This black and white film from the late 70s reveals the many nuances of texture in the city and juxtaposes the decay of contemporary culture with a romanticized view of Manhattan. The students created a computer model that expressed this duality as two mirror images of the city. On one side decay is represented as morphing volumes. On the other side, cultural growth is expressed as chiseled transparent boxes (See Figure 3).
The second group of students selected Wall Street, Oliver Stone’s depiction of the city in the late 80’s. The corrupted materialistic system was expressed in the film as a physical entity, in the verticality of the city and the urban grid of tall buildings with an array of generic offices and expensive apartments. The group made computer models of specific urban locations such as the subway stop, Times Square, and the trading floor of the New York Stock Exchange. To represent the relationship between the reduction of the individual to a commodity and the compression and globalization of space, the students’ animation showed the fluctuations of scale and proportion between these urban spaces with the density of noises and people.

These two projects used film to provide the direct experience of site. The students appropriated the filmmaker’s vision and translated into the spatial vocabulary of the architect, as seen in the resulting computer models and animations.

2.3. Transcoding transparency

The third study is a more open-ended approach to film as a medium. The focus is on the experience of transparency as a phenomenon manifested in film at many levels, ranging from physical to psychological, from the condition of looking through reflective glass to the act of seeing ourselves in dreams.

Students chose films conveying an experience of transparency, then a scene to be analyzed. They developed physical models to study and map the patterns of light, the movement of the camera, and other cinematic techniques from their chosen scene. This time, the three-dimensional models were produced at full-scale. The physical models, as installations pieces, reintroduced the phenomenology of transparency in material terms while also engaging our bodies. These installations were in essence screens, abstracting the composition of the cinematic frames. The screens also revealed other aspects of transparency, from the fluctuations of moiré patterns in the surface of a stretched veil to a structure of translucent layers defining a crystalline volume. For Bernard Tschumi, “neither space nor concept alone is erotic, but the junction between the two is” 3. In this sense, each screen contained and dissolved the perception of space from mental construct into sensual experience. The screen distances our bodies from the space beyond, all the while letting have glimpses of it, and therefore we feel a desire to be in that space. Here the physical model, the screen, is a threshold into virtual space. Phenomenological reality is spliced into virtual reality, by recording the physical effects of the screen such as the translucency of fabric in light or the flickering of metal, and combining them through mapping and editing with the digital model (See Figure 4).

3. Discussion and Conclusion

These three techniques enhance the design process, providing students and architects dynamic modeling techniques. Students acquired technical skills ranging from the understanding of the digital interface, the use of
the virtual camera to produce similar cinematic effects to the use of video-editing. In each case, physical models were used in the analysis of film facilitating the transition between one kind of virtual space into another through tectonic means. The results range from explorations of forms that sometimes can only be built in the digital realm, to expressions of material qualities beyond the traditional model-building materials used in architecture. The most significant results were in strengthening and enriching the preliminary stage of design. The first introduction to film focused cinematography and sequence. With the knowledge acquired from the analysis of cinematic structure, students produced complex models and animations to explore various ideas associated with our perception of time and space, such as compression, blurring, folding, etc. The second approach to film focused on the movement of the camera and the actors, and the mise-en-scene. By looking at film as site, students were able to understand qualitative aspects of a city they had not visited, and developed a concept of place, albeit mediated by the the director’s cinematic vision. The third technique focused narrativity and editing. In this study of the phenomenology of film, students experimented with the connection between the construction of the real and the virtual and explored aesthetic and material aspects of transparency.

With the virtual camera architects are able to understand space in four dimensions. Once immersed, the visualization of the mind can be explored in virtual space to create virtual environments and to experience material, scale, and light, as we design, construct the digital model. The virtual spaces produced in these projects illustrate a layered condition. William Mitchell describes this condition in City of Bits, where he proposes that our direct physical experience not only has the same value as the images mediated through film, television, and the Internet, but also that the urban environment and therefore our concept of public space are being restructured by the code of the computer. The results of this project suggest that the study of film in the conceptual phase of design expands our understanding of contemporary culture. As a result, the architectural project, like film, could be conceived as a story and a site, mediated through computation, and simultaneously layering digital information with cultural meaning.

Endnotes

1 Lev Manovich defines transcoding as the condition where the cultural meaning of new media images is affected by “the structure of the computer image.” Lev Manovich, The Language of New Media (Cambridge: MIT Press, 2002), 45

2 see List of Films

3 Bernard Tschumi, Questions of Space (London: Architectural Association, 1990), 54

4 In my experience the maximum length of an animation should be 3 minutes. In contrast, we can study at physical model or read a printed drawing for much longer

5 In film theory, narrativity refers to the processes by which a story is both presented by the filmmaker and interpreted by
the viewer. The term must be distinguished from narrative, which refers to the story itself.


6 “The city is a series of sampled bits meshing together in our mental maps… The most difficult question in this esoteric materiality is what is the value of architecture or rather how can architecture can become a valuable part of this experience.” William Mitchell, *City of Bits* (Cambridge: MIT Press, 1995)

**List of Films:**

1. Cinematic Structure
   - *Run Lola Run* (1999), Tom Tykwer, director
   - *Chunking Express* (1994), Wong Kar Wai, director
   - *Being John Malkovich* (1999), Spike Jonze, director

2. Film as site
   a) Berlin Inforum
      - *Wings of Desire* (1997), Wim Wenders, director
      - *Run Lola Run* (1999), Tom Tykwer, director
   b) NY documentary
      - *Manhattan* (1979), Woody Allen, director
      - *Wall Street* (1987), Oliver Stone, director

3. Transcoding transparency
   - *City of Lost Children* (1995), Jean-Pierre Jeunet and Marc Caro, directors
   - *Pi* (1998), Darren Aronofsky
   - *The Matrix* (1999), Andy and Larry Wachowskis, directors

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**Paola Sanguinetti Rivas**

Associate Professor

Bachelor of Architecture, 1992, University of Kansas

Areas of interest: Digital tectonics CADCAM fabrication simulation of environmental and material conditions