BORROWING FROM ANIMATORS: INTRODUCING ANIMATION EARLY IN THE DESIGN PROCESS IN ORDER TO BETTER REPRESENT SPATIAL ENVIRONMENTS

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ABSTRACT

Current technology allows us to combine traditional animation techniques and hand drawn sketches to produce quick virtual "walk-throughs" of proposed architectural interiors. This paper will provide examples and illustrate this technique. This method adds the element of time to traditional drawings, which is necessary for a better spatial understanding. The combination of current technology and hand sketching allows a resulting video to be made in hours rather than days.

INTRODUCTION

Spatial representation has been a longstanding communication challenge for interior and architectural designers. The issue of scale and the three dimensional qualities of our built environments versus the two dimensional qualities of our communication techniques is the root of our problem. Recent technological advances have begun to provide us with tools to expand our history's limits of representation. With computers and current software, we now have the ability to create three-dimensional renderings and animated "fly-bys" or "walk-throughs." These short animations provide exciting new ways to communicate elements of a proposed design. However, these techniques are rarely explored at the beginning of the design process. Due to their time and computer memory consuming characteristics, current 3D animations are used primarily after all the major design decisions have been made. My students and I have been researching Japanese animation techniques and developing ways to introduce these methods to early schematic design exploration. The final result is a series of short animations produced in a few hours rather than several days. This animation technique utilizes both hand and computer generated sketches as a basis for the animation. This method retains the sketch-like quality which has been proven to be a more effective way to communicate preliminary ideas about a proposed design.

PROBLEM STATEMENT

James J. Gibson, considered one of the most important 20th century psychologist's in the field of Visual Perception, explained spatial perception as a series of affordances of which many are built on our senses connection with movement. Our understanding of our environment is not made up of one view, but of multiple views taken over time, a cognitive collage that we then reconstruct in our minds. Our traditional representational methods have often ignored this. Because of this oversight, designers and architects tend to think of our environments as static places built of stone and mortar, when emotionally and perceptually they are dynamic and ever changing as we move in and out of them. Over the last ten years, technological advances have begun to affect the way designers think and communicate their ideas. Three dimensional rendering software and animation capabilities within this software have allowed designers to explore their conceptual environments in ways that seem to mimic our spatial perception, but do they?

There becomes a soft line where the drawing moves from abstract sketch to life-like rendering. This is also when our perception moves from constructing to critiquing. In our constructive phase the right side of our brain looks beyond the drawing convention errors to imagine the implied environment. The near life-like rendering triggers the left side of our brain into a critiquing mode where we identify all of the faults of light, shadow and texture mapping the computer can't seem to solve. The problem lies in the visual effects of the computer generated environments and the process of their construction. Computer generated environments for architectural and interior representations have a tendency to be seen as flat, emotionless, abstract creations. Those rendered with a time consuming attempt at realism might get closer to the intended result but at high cost of time and equipment. The necessary information to complete these highly rendered images and videos makes it impossible to construct at the beginning of the project when ideas are still evolving into spaces. Hand drawn sketches and renderings on the other hand, provide an emotional or artistic component to drawings that highly rendered computer images lack. However, they are static images of our previously mentioned dynamic environments. Utilizing one method without the other often falls short in creating an impression of place that our perceptual mind understands. Irvin Rock, the renowned psychologist in Visual Perception stated, *"The mind does not simply record an exact image of the world, but creates its own picture."* Humans are "meaning makers" regardless of the abstraction; our minds try to make meaning of what we see. Donald Hoffman in *Visual Intelligence: How We Create What We See* explains that when we perceive depth it is always a constructed perception. This leads us to understand that we do not watch the world. Instead we construct it with our

minds eye, taking our collage of cognitive information mixed with memories and experiences to create an understanding of where we are, what we see, or where we have been. Because of this, we need very little information to perceive a space, but we need the right information to understand it.

METHODS

The ability to provide a timed based representation with quick results is an ideal solution. Pursuing that goal began as a search to see what other visual artists do to achieve similar goals. One such art form that is always in search of creating the illusion of depth with still images is animation or more specifically, 2 ½ D Animation. Traditionally this was known as cel animation. Common examples of this technique are early feature films by Walt Disney. This method painted scenes on celluloid acetate commonly referred to as a cel. The painted cels depicted characters or scenes in the foreground and were layered over a background painting. The composite created the entire scene. The camera would then meticulously photograph the composite and the composite would be shifted or changed and another photograph would be taken. Often hundreds of these photographs would be needed to animate a single scene. In this type of animation the illusion of depth is obtained when the foreground elements move at different speeds than the background elements. Thanks to the computer this traditional time consuming process happens quickly and with very little effort on our part. Many current Japanese *anime* movies utilize hand painted scenes in combination with computer-animated overlays. Films like "Ghost in a Shell" (particularly the scene chapter titled, "Wandering in the City"), illustrates a beautiful collage of spatial images set in motion. One layer travels over the next in order to give the perception of both movement and a sense of depth in the scene.

To create a similar visual effect in an interior representation, my students have been hand sketching as they would normally do for any project. However, instead of composing their perspective drawings as a single layer on one sheet, they are asked to separate their sketches. They are separated into foreground, middle ground and background elements. This is easily accomplished by tracing over the original sketch and creating a different drawing for each layer of the original sketch and making sure that elements are drawn out even if they were hidden in the original. Completing the hidden elements is important as some of the originally hidden features will be exposed later on in the process as the layered drawings move over the top of each other to create the illusion of depth. The drawings should be kept loose and sketch like. We must remember the inaccuracy of the sketch invites our minds to construct the image rather than critique it. Le Corbusier's interior sketches often contained perspective flaws however, due to the

gestured nature of these quick sketches the spatial qualities of his drawings are often universally understood, despite the inaccuracies.
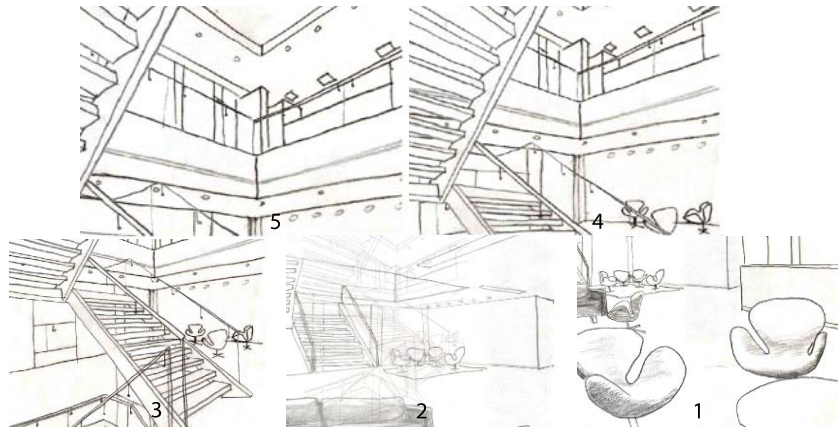
The first step in the process once the sketches are traced by hand is to scan them and open them up in *Adobe Photoshop*. Each drawing layer needs to be consistently scaled and the background needs to be removed from the lines. In addition the drawing needs to be exported into a (PNG) *Portable Network Graphics* file. This file type removes the page qualities of the scan and leaves only the lines. The step allows the drawings in the next phase to be placed one over the other like clear cels. The .PNG files were originally imported into *Macromedia Flash*, however many other software programs offer the ability to create animated sequence drawings. Our current software of choice is *Adobe After Effects*. We also use this program to create short multi-sensory videos that replace our traditional mood boards. When all of the .PNG files are imported it is important to sketch out the intended movement through the drawing being created.

We have found that keeping this simple creates the best results and usually creates a video that contains only one or two movements, a simple "pan" and then a "zoom" or a "zoom" and then a "pan." Keep the movements similar to a person walking through a space. We start the animation sequence by focusing onto a small part of the overall drawing and then moving the camera (panning) across the composition until the focal point is reached. Remember not to pan so far that the edge of the drawing becomes exposed. The illusion of depth is created by keying each layer (foreground, middle ground and background) differently. This translates as moving each layer across the screen at different intervals from each other. Typically the foreground will move farther in a 5 second period than the background layer and it's this difference that provides the magic. A few important things to remember is the movement should happen horizontally along the horizon line of the original perspective sketch and zooming should occur towards the original vanishing point. These key factors help the illusion of depth to be maintained. When the images are sequenced together they create a virtual walk through with the perceived illusion of depth and movement, similar to an Anime film. (See figure 1) The combination of several "mini walk-throughs" create an overall impression of a space that the mind stitches together to form a cognitive understanding of the environment, without the need for every detail or design decision to have been completed.

Figure 1: *animation image sequence*

Scene w stair (3) stair camera zooms in (4) and then pans up into atrium

Scene 1 camera pans left across room and dissolves into scene 2 w/ stair as scene 3

Note: Screen shots from student animation (2008)

SUMMARY

By utilizing technology along-side hand sketches, we can provide the perceptual illusion of movement so essential in understanding an environment. This animation technique also addresses the sense of spatial depth that is often missing in our traditional representations and most importantly these quick computer generated animations engage our clients early in a conversation about spatial sequence and dynamic movement in our designed environments.

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