

PIXEL *This*

Rendering effective visuals means knowing your medium—and your market

by Tom Glebas, Mark Chaney and Bill Bentley

Editor's Note: This is the first installment in a continuing series on the aesthetics of design visualization.

Design visualization... Ahh, the pixels from which dreams are made!

It's hard not to be awestruck by today's digital scenes and the artistic talents of their creators.

These images are sleek and sexy, and it's only natural that they're all over calendars and the covers of many computer magazines—including this one.

So after what seems like years of envying the top guns of the CAD world, you're ready to try your own hand (uh, mouse?) at it. The time is right. There has never been such a comprehensive array of sophisticated features available for you to create your own masterpiece. Whether you're embarking on production of a rendering, an animation sequence or a clip to embed within a multimedia presentation or for the Web, you can be sure your results will attract attention and draw rave reviews.

Or will they?

Before you start toggling dialog items or rush out to buy the latest upgrade, you should take a closer look at the aesthetics of computer visualization.

Delusions of grandeur

If you fit the profile of most architects, engineers or others who use MicroStation, you're probably not using this medium to create art for art's sake. It's more likely your project deadline is looming and everyone is counting on you to land that big job with a winning (and naturally, highly visual) proposal.

You aspire to communicate ideas—visions you hope will someday become reality.

Left to your own devices, a foreseeable scenario might unfold: Bedazzled by all that photorealism glorified in magazines, on the big screen and in your teenager's latest interactive video adventure, you set off, lemming-like. You experi-

ment with, learn and apply all the latest and greatest rendering techniques like raytracing, procedural textures, environment mapping, radiosity and more. With your processor thrashed to a frenzy, your magnum opus draws toward completion. You step back, beaming with pride, anticipating the adulation of your peers. But something's wrong. Your results are mysteriously unremarkable! Your technical endeavor has left you with nothing more than a technical statement—lifeless... boring... maybe not even the one you wanted.

How could you miss?

Quite possibly, you're aiming at the wrong target. You've poured all your creative energy into generating a photorealistic image to a point where you're barely aware of the actual message you're delivering—and how it's being received.

Think design, not dazzle

Perhaps more than any other technical application, visualization is about communication. But with your visually impressive but virtually impotent creation before you, you feel



like a slave to technology—like the physicist who can explain *ad infinitum* how musical instruments produce sounds... but can't play a tune to save his life.

Don't feel bad; you're not alone. Within the realm of visual communication, people are creating mediocre messages every day. Too often, we forget that the fancy algorithms for ray-tracing and other effects are there to simulate the laws of nature. They are not a substitute for creative expression, using the staples of artistic technique: subject, composition and lighting. Even if communicating design intent is your ultimate goal, you're still subject to the harsh rules of aesthetics so intrinsic to this medium and its audiences.

Real creativity begins when you start to think outside the dialog box, but learning how to use subject, composition and lighting effectively has its prerequisites. Our primary need is comprehension of the visual communication process itself. In general, successful communication begins when a message is received and its true meaning understood.

While this obvious oversimplification doesn't enlighten us much, it does provide the framework for further investigation. If we temporarily ignore the message transmission phase (tools, processes and results—issues typically addressed in technical references) we're left with two issues: first, the purpose for your communication, and second, the viewer's perception and interpretive processes.

Your purpose for your project may guide or constrain your choices for technical approach and final output. That's not to say there is no latitude for creativity, but you shouldn't wait until you have finished to see if your piece works better as a technical illustration for a reference manual or as a sales presentation—or if animation was such a good idea in the first place. Go ahead, experiment and be creative; just make sure you know why you're doing what you're doing. The alternatives you choose should support your original intentions. Giving your audience a sporting chance is half the battle.

Think purpose, not pizzazz

Once you're comfortable that you're on track, you may think the audience's reception is out of your hands. Not true—you'll be surprised how effortlessly they can and will be led in the direction you wish them to go.

Think about how many times you thought you were being clear and concise, only to find out otherwise from a confused, unresponsive or displeased audience. Your objective is not to mislead them, but to guide their perception and response according to your plan. In fact, armed with the most advanced arsenal ever, computer technology may give you unprecedented control. A little insight into your viewers' psyche will help you channel what they see into what you want them to feel.

Viewers perceive, process and respond according to the

three Cs: content, context and quality (okay, that's two Cs and a Q, but the alliterative action may help you remember all three factors). On a daily basis, we assimilate an astonishing amount of information, most of it visual. Through selective editing, we perceive the world as a series of quick edits and clips connected with a blink of the eye.

For example, when crossing the street, we visually encounter nearby strangers, the walk light, the curb, paint lines, cars, objects on the other side of the street—and the list goes on. We're constantly editing these clips, prioritizing them in our minds. The same holds true whether we're crossing the street, staring at a photograph or dreaming. The mystery and marvel are that we reduce this data to relatively simple and manageable concepts.

We have the ability to glean the essence of each scene, to filter the visual noise. We falsely proclaim the light to be green, the sidewalk gray, the street black—when in reality the light is half in shadow and half occluded by glare, the street a patchwork of dark shades of asphalt with curbs that really aren't parallel.



The irony is that we *do* notice these subtle details—subconsciously—when they are missing from an image, and we feel compelled to add them back in—thus the instinctive drive toward photorealism. Clever programmers have developed ways to help us model this reality, but even craftier artisans know the differences between the actual and perceived content of a scene, and how to manipulate the senses to advantage.

Think context, not complex

Color (considered part of content for our purpose) is one of the more familiar factors affecting our response to visual stimulation. We use it in our daily language to describe our emotions—*feeling blue*, *green with envy*, *white hot rage*—and even to quantify our bank balance—not *in the red*. Although each of these associations may be considered good or bad, you should instead try to think of them as merely different. Use

visual stereotypes to your benefit, but don't let your creative thinking become color-blind to new opportunities by falling prey to the usual prejudices.

Context likewise can have a positive or negative, yet fairly predictable, effect. A child's finger-painting, presented in the same expensive frame as a Picasso, will elicit an expected response: The child's work seems awkward and out of place in such a large expensive frame, whereas the Picasso has the context of history and its large size to make it appropriate.

The impact of context may not always be so extreme. A more representative example may be a view of a room without furniture. Is it a closet or an auditorium? Without visual cues, the size and purpose may be indeterminable. Or try this final example: Without shading, can you tell if a circle is a hole, a ball or the concave face of a lens? Context yields the clues that give contents their meaning.

To see the same photograph in a glossy color magazine and a black-and-white newspaper provides a comparison of degradation in image quality. We associate a slick image with a well-planned, professional look, while a low-resolution, black-and-white image conjures up fast turnaround and hasty composition—even if they are otherwise identical images.



with the increasing sophistication of visualization software, the incremental code enhancements have reached the point of diminishing return. Not that photorealism is inherently bad—but it's equally important to use what you understand and use it wisely. Don't let a side-by-side comparison of ray-traced apples and phong-shaded oranges bias your belief in what is right for a given situation.

Future articles in this series will provide specific examples and visualization techniques. Hopefully, you will have already begun to look at images differently, and will analyze them with a more critical eye.

Take responsibility for your message and use the effects that most appropriately deliver it. Always ask yourself, "Will my audience tune in, or will my message be just visual noise?"

If it were art, it would be easier... You wouldn't have to explain it.

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We also judge quality by the times. Take a look at back issues of CAD magazines from just a few years ago. The smooth, shaded images that looked so fantastic then seem primitive today.

Bombarded with special effects, visual expressions seem to demand more and more advanced capabilities. If we cannot capture the viewer's attention and hold it, the rest of the exercise is moot. Once again we're drawn toward technological solutions.

Does this mean you always must employ the cutting edge of visualization technology?

Consider this: Unless our creative application keeps pace