



Architecting the Aesthetics of Light: The Preference for Color

The world of color that we see and experience is not limited only by our eyesight, but also by the light that illuminates the objects we are viewing. By designing and tuning the light, we can enable people to see far more than they had expected and, in fact, give them a visual experience that they hadn't imagined but definitely prefer.

Creating great spaces that attract people and make them want to stay or return is part art and part science. Successfully marrying an understanding of peoples' behavior and preferences with the tools and materials available requires attention and a deft touch. When done well, the results can create competitive differentiation and brand preference.

Visual appeal and experience has become even more crucial with the development of online storefronts. Software engineers and artists have joined forces to create visual experiences that engage visitors. Yet despite 16 million colors and broadband connectivity – not even the best website can replace the physical experience, the richness of color, the sensory impact of textures, and the experience of touch.

In contrast, designers and brand managers are working hard to create physical spaces that are comfortable, or dramatic or engaging and to create a more enjoyable experience. New lighting innovations that have their genesis in art and science are playing a valuable role in creating those experiences and environments that people prefer.

Point the Fixture. Change the Lamp

For so many, lighting is that simple and an assumed commodity. Brightening or highlighting a display, a work of art or a seating arrangement is often addressed by simply adding more of the same light. Functionally the approach works but it ignores the potential of lighting. The truth is that it's now possible to use lighting as a valuable design tool to create visually appealing and dramatic spaces that provide competitive advantage and deliver the energy efficiency and savings expected of the latest lighting technologies. Lighting should be considered an asset to be deployed strategically, not simply an install and forget commodity

Discover Color

It's not news that the colors we see as reproduced by even the best man-made light aren't all that they can be. We have been taught that there are ranges of color, represented by the color rendering index, and that in some cases the lighting is considered perfect with a score of 100 points in its representation of color. The reality though is that "100" doesn't represent all that we can see, and in fact, a higher score does not always translate to visual preference.

Imagine you had a box of 64 crayons with which you were drawing beautiful colorful scenes only to discover that there were actually 128 different crayons – imagine the

world you could create if you colored outside of your box of crayons.

Why Xicato

Art and science. Making a difference with lighting is about understanding how people react to lighting, what they prefer, and what draws their attention and then using that knowledge to apply innovation and technology. We visit and talk with retailers, hoteliers and restaurateurs, lighting designers, architects and luminaire manufacturers. Our color scientists design user studies to gauge reaction and preference. And then, our engineers go to work designing light. We don't design luminaires or fixtures or create lighting designs, we design light so that people can see more natural, richer or vibrant scenes.

Primary Research

Our Vibrant Series™ light started as a simple question of lighting designers, merchandisers and brand managers. We asked "How could the environment you're designing work better?" The answer, "Show me more. More clearly, with more impact and more emotion." The answer made perfect sense and seemed very similar to a fairly common experience with televisions. With LCD televisions, picture resolution, contrast and color representation were widely and positively accepted and most people watched happily. And then the LED backlit LCD screen came to market and we all discovered that there was more color to be seen, that contrast was greater and that we preferred this new richer view of the world. The challenge then was to have a similar impact with light.

Xicato quickly understood that to "show more" would mean changing the color gamut area – which is exactly what happened with LED televisions — and that the key would be to discover what people

really preferred. (If you've ever adjusted the color and tint on a television then you know how easy it is to create colors that aren't appealing.)

Xicato's color scientists and engineers began "tuning" and experimenting with new color gamut areas that were broader than what is realized by current light sources – essentially coloring outside the box. Xicato's light portfolio already included the Standard and Artist Series®, each representing different levels of color rendering. Overlaying new color gamuts would introduce a new dimension to the light.

We then enlisted independent lighting application researcher, Dr. Colette Knight, to design and then carry out research with shoppers and some of the top lighting designers in Europe. Conducted at the Instituut Lichtontwerpen in Amsterdam, Dr. Knight created a mock-up shop and proceeded to test viewer preference for different lighting scenarios using Xicato's Standard, Artist and test and development versions of what is now our Vibrant Series.

Results Summary: Lighting Preferences Become Clear

All of the lighting scenarios that shoppers and lighting professionals viewed were widely recognized by the participants as having good, high quality white light. However, the results indicate that even when the choice is amongst high quality lighting options, there can be a profound effect on the image of the products and people's impressions. There are real and measurable preferences for displays that appeared more vibrant, particularly for reds, pinks and blues. In one of the scenarios more than 80% of lighting professionals preferred displays lit with the Vibrant Series test modules. It grabbed their attention.

When displays were lit with the Vibrant Series test modules, lighting professionals and members of the public often noted that colors of the items are more striking. In particular:

- Blue and pink colors appear brighter and bolder
- White objects appear brighter, cleaner and stand out more from the distance
- Individual objects stand out more distinctively in a group

Additional results suggest that there are opportunities in some cases to reduce the light level by approximately 20% when Vibrant Series modules are used, while keeping the attention-grabbing nature of the display comparable to what it would be under a Standard or Artist module, thereby offering an opportunity for increased energy savings.

The appreciation expressed by both professionals and shoppers of the light effects of the Vibrant Series test modules strongly indicate that there is a role for these new light sources. They can be used by lighting designers to reveal vivid colors and whites while maintaining a natural environment and can help enrich an in-store experience.

The complete research program and results report is available from Xicato and a summary report can be found on the Xicato website.

The New Vibrant Series™

Vibrant Series LED modules are the result of the long research and development process and they deliver a more vivid and brilliant lit effect than can be achieved with conventional lighting or other LED light sources. The desire and preference for a light source that would make colors appear more vibrant and lively and whites appear

crisper and sharper has now been realized. Now, curators, designers and merchandisers, store planners and store designers can more easily focus a viewer's attention, highlight a particular display and create visual drama that elevates and differentiates the physical space from competitors and online, flat presentations. They can use light to create a unique experience.

The Unique Science Behind the Light

Spectral distribution represents the wavelengths of light that are emitted from any light source. There are differences between technologies and between manufacturers. For LED modules, the spectral distribution is determined by the LEDs, the phosphors, the materials used in the module itself, and the recipe that is used to put all the pieces together. Xicato's color scientists, phosphor, LED and materials engineers work together to develop the recipe and ensure that it can be replicated and that it can withstand the rigors of the lighting environment and deliver consistent color and quality over the life of the module.

A Portfolio of Light

Xicato's portfolio of light consists of the Standard, Artist and Vibrant Series. The light from each of these series is spectrally manipulated to allow for optimal lighting design in a broad range of applications. The Standard and Artist Series® are both tuned for fidelity so that they enable true, natural colors to shine and match our minds-eye's expectation. High fidelity lighting requires that the light represents the R1 – R15 colors that make up the complete color rendering index as accurately as a natural light source as opposed to just the first 8 color samples. Vivid light requires that colors become a bit richer and more saturated without sacrificing color rendering. Even though the

color gamut widens, the visual experience must still feel real and rich. The Vibrant Series achieves this real and richer feeling that many people prefer in a targeted fashion that maintains the warm inviting feel of the environment so that it's comfortable and inviting. It's possible to light an entire space with any of the lights or to layer and design for more dramatic, focused and entertaining spaces—whichever you prefer.

Who We Are

Xicato is changing the way the world looks at and experiences light and enabling everyone to experience it the way they prefer. We're a group of people who believe that with better light, people in any environment will be more comfortable, stay longer, and will choose to be in those spaces. This leads to brand preference and improved business results that support the choice for better lighting.

The true value of Xicato light lies in delivering on the aesthetic and economic potential of LEDs: the quality of light, its efficacy and lower total ownership cost for almost any environment so that you can:

- Create great experiences for people whether they are shopping, dining or working
- Enable compelling and dramatic store experiences and effective merchandising, enabling retailers to sell more
- Design enjoyable hospitality spaces that encourage people to stay longer & purchase more

To learn more about vibrant light and the technology behind it, please visit Xicato's website, www.xicato.com/vibrancy.