Communicative Lighting Preserving Creative Expression by Challenging Standards and Diversifying Applications

Satoshi UCHIHARA
Uchihara Creative Lighting Design Inc.

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ABSTRACT

The scope and significance of light on the culture and development of human societies throughout history is nothing short of astounding. From ancient times, light has provided essential substance for life and spirituality, spawning cultural diversity and artistic inspiration around the globe. Indeed, from the rudiments of civilization to the Enlightenment, throughout the Industrial Revolution to contemporary societies, the lighting technology that humankind has brought into this world has enhanced civilizations, driving advances in productivity and ever higher standards of living. And yet, we presently stand at an important crossroads, where evolutionary factors are taking us in new directions, and a choice must be made about the course and meaning of lighting in our lives. Paramount to this issue is the growing significance of LED as a source of light and the behavioral change it is causing within our industry. The technological innovation driven by LED has drastically changed the systems of manufacturing and distribution and, thus, is transforming the economy. Perhaps, equally significant, this influence has begun to alter the philosophy and culture of our industry. The direction of this evolutionary process is not automatic, however. We lighting designers, lighting equipment manufacturers, and astute judges of life quality through lighting, have a choice to lead or be led by recognizing the constraints of industry standards and reactionary views of technology, and what can be done to remain flexible and artistically expressive. In this effort, my belief is that we must remain sensitive to the delicate connection between light and people, as a means to an important new priority that I call Communicative Lighting.

KEYWORDS: communicative Lighting, Diversifying LED Applications

1. The communicative purpose of lighting

By tracing the evolution of applications developed for communication, it is evident how thought and creativity have evolved. However, contrary to the astounding technological advancement and the sheer volume of information that has simultaneously multiplied, it seems that the effectiveness of human communication has not progressed equally. Alas, there seems to be a tradeoff between the quantity and quality of interaction. So it seems with lighting, as well, and it is my desire that light, being tossed about in the rapid currents of modernity, will not lose the true ideal of existing “with” humanity and, instead, be regarded as much more than merely a source of illumination that varies only in degrees of intensity. Light is expression, and I am optimistic that the following projects will illustrate the creative ways in which lighting and technology can be used in expressive ways.

2. Communicative lighting design in Uchihara Creative Lighting Design

2.1 Byodo-in Ho'ou-do World Heritage Site in Kyoto, Japan

The Japanese national treasure, Byodo-in Ho'ou-do can be seen on the face of a Japanese ten yen coin and is recognized as a World Heritage Cultural Site. Uchihara Creative Lighting Design (UCLD) was selected to design lighting for its nine-hundred-fiftieth year memorial event. Nine-hundred-fifty years after its creation, this unique architecture remains unparalleled in character and beauty, and exudes artistic charm in any kind of light. Given the extraordinary presence of this structure, we were taken with awe at the challenge of creating lighting that was suitable for its character.

The wooden architecture of Byodo-in Ho'ou-do has lasted so many years by relying heavily on certain technical aspects, such as design and construction skills, as well as the availability and choice of...
materials. And the skills needed to maintain the structure have been passed from generation to generation. According to the current caretaker Monk, fifty years ago, the structure was deemed to be irreparably slanted and in need of rebuilding. Overwhelmed by the symbolic significance of Byodo-in Ho'ou-do, I was surprised by this information, indeed, but I was both amazed and moved by the monk's story about the painstaking human efforts and remarkable skills involved in this endeavor. According to the Monk, brilliant craftsmen of the age were recruited to preserve this exceptional architectural treasure.

For this building, the past fifty years have been but a small part of its history, and one can logically assume that there must have been other incidents of rehabilitation throughout its many years of existence. And at every instance of refurbishment, there must have been a high cultural consciousness and the best craftsmen of the time trained and recruited. I felt then as I do today, that such impressive human achievement is almost tangible in the serenity of this beautifully crafted building. Therefore, my concept was to provide an experience of encountering history through a form of lighting expression that could surround the structure in an eternal "flow" of timelessness. We released light onto the surface of the adjacent pond to benefit from the natural, constant, fluctuating reflection, thereby projecting a visually eloquent "flow" onto the structure in ripples of light, revealing an ambiance consistent with our imagination of Byodo-in Ho'ou-do's glorious history (Figure 1).

2.2 The Utsukushima Environmental Expo: Beautiful Fukushima Future Expo 2001

In 2001, there was an exposition in Fukushima prefecture of Japan named Utsukushima Future Expo, which we used as another opportunity for innovation in communicative lighting. We arranged LED units with enclosed solar-powered batteries throughout the twenty-hectare site, to serve as a symbol of environmental lighting design, as the system relied completely on natural energy sources. The products, in combination with the elements of solar power: storage battery, a luminous control system, and LED, were already used for different purposes, but we included a sensory system to try a fresh idea.

The sensor had a small microphone, which reacted to sound and the vibration of air communicated through a thin pipe. We strapped this small object with a four-bulb LED, with only a small added interface, so it could "chase" wind passage with light, as if the light was being illumined. The three-thousand lighting objects that lit up at once on the energy of the evening breeze and solar batteries represented a harmonious balance between humans and nature in a manner rarely experienced by people in daily life, thus transforming our concept into a magnificent environmental lighting design. This form of illumination was heartwarmingly complemented and further energized by the pleasant cheers of admiring children (Figure 2).

2.3 Maihama: A Commercial-use Facility

Our next featured project is a commercial facility that we worked on in the Japanese city of Maihama. The notable function of our design on this project was the controllability of illumination. Our main focus was to express something completely different from the white-colored light that people were most accustomed to when LED products started to appear on the market. The semiconductors, which lit up on their own, were positioned on grids in basic molecular arrangement, and each molecule was connected to its upper, lower, left, right, and four diagonal neighboring...
molecules, and was programmed with communicating parameters between each connection in speed and intensity. Basically, it was a system that sent and received stimuli at any given point to its neighbors in the form of light. The parameters were random and the single color of white light moving continuously as rippling water or smoke pushed forward the light-blinking patterns that were formerly limited to regularly controlled movements (Figure 3).

3. A Respectful Plea to Challenge Standards

These examples are an attempt to show our innovative efforts at UCLD to develop concepts that can communicate the character of our projects. With the demand for lighting design spreading to large scale public and commercial spaces, and various other urban environments, however, lighting design for residential or living environments seems to receive less innovative attention. And sadly, creative design still lags in the whole of Asia, even though people certainly appreciate it.

Contributing to this condition is the seemingly growing acceptance of fluorescent lighting for every room, not because people love it, but because it's economical. And white LED, in particular, has attracted widespread attention for its effectiveness in brightening spaces, and it has developed rather rapidly as a result. However, since we have reached our brightness goals, brightness should now be subordinate to quality. This is among the reasons why the discussion on white LED should not be centered on output only. Indeed, as personal interests in the living environment rise, it will become increasingly apparent that bright, monotonous lighting is insufficient for nurturing the rich sensibilities that are inherently human.

Moreover, in response to the growing appreciation for energy conservation, the lighting industry is promoting simple user regulations to limit the use of incandescent light in support of fluorescent light. I am sensitive to these important environmental issues, to be sure. However, this type of industrial rhetoric misses the point, as human creativity and intelligence can and should supersede regulations in devising solutions for society's problems. The focus would be better placed on environmental awareness combined with the challenge and purpose of innovative lighting ideas as a means to cultivating the wisdom and creativity associated with the desire to always improve.

For these reasons, I would like to introduce my respectful plea to question the standards of our industry. I'd like to begin by addressing the switch panel which, in a typical household, is a fixed object placed on walls in one or two locations. This standard has not changed much, and it shows no sign of doing so in the near future. I'd like to challenge this standard. For the household lighting environment, the switch is the only interface for its user. Nevertheless, we have not bothered to consider helping people communicate in the many functions of lighting, such as color, softness, and synchronization with other conditions.

The electrical infrastructure in the living environment has also been left unchallenged, without much progress. For me, it begs the question: Why do we have an infrastructure to supply power to the ceiling (mainly for lighting fixture cables) and to the wall (mainly for switch panels) and to the floor or the lower wall close to the floor (mainly for tap outlets), but are only given a single function within the room? Although the power-sharing electrical infrastructure is constructed within the architectural space, we can clearly see that it is not used for spatial effectiveness. One example is lighting modulations, higher and lower positioning, and mobility. I would like to make it a point to have at least three and, perhaps, over ten access points in some places, thereby providing an efficient electrical power infrastructure in the service of the preferred lifestyle and activities of the occupants within the space.

Another reason why we have not been able to create better function and design lies in the fact that many lighting facilities all over the world are connected to a strong electric power supply of over 100V. A lower voltage could efficiently supply an LED, making it possible to realize a compact, mobile package that could easily be connected or disconnected, and free from existing safety regulations.
4. A Proposal for Diversity in the Development of LED Applications

Sharing ideas relies largely on the imagination and creativity that are innate to humans, as we use verbal input to interpret what we believe others are trying to communicate. Herein is an important analogy with lighting design. However, with widespread attention given to LED light sources versus the entire lighting system, the power to support communication is restrained. But if we could resist clinging to the hardware compatibility of an existing system, such as LED, we can nurture new sources and new markets, without diminishing what we currently have. What I am advocating here is application diversity.

Amid the aforementioned conditions within our industry, I would like to advance a proposal for more attention dedicated to lifestyle lighting with a sketch of a system that exemplifies how LED can be a contributive element in daily life (Figure 4). Imagine an LED panel that could fit in one's palm, with a simple design divided into a nine-point grid, allowing the user to choose horizontally between 3000k, 4500k, and 6000k for color, and vertically for dimming, and could recall personal data preferences. Imagine that it could easily connect or disconnect the LED lighting part by magnetized adjuster joints that could transfer a 100V power supply to a 12V. Imagine that the lighting mechanism could combine the switch and the lighting fixture to allow a choice of connection locations, ceiling, wall, and any other infrastructure access points, as a switch panel or as a lighting device (Figure 5). The character of such an LED panel could be that the lighting expression becomes the switch indicator, and the unit becomes the lighting fixture. Such a concept could improve usability with ease, and it could bring light and the user closer together, both physically and emotionally.

New markets have been established with mobile appliances and downloadable music, and with a palm-sized, multi-functional lighting system, it could prove to have the same potential by applying the features of sensor technology and personal data management, among others. This may present daunting challenges, but I express these ideas without reservation in the name of innovation and, thus, I urge you not to think about the limitations of such a concept, but the possibilities, as they are seemingly endless.

For the betterment of this wonderful market, it is time to reevaluate applications that appeal only to compatibility with existing light sources. There is little doubt that the evolution in lighting technology will further enrich our lives, but this enrichment must be pursued in ways that involve more than merely enhancing volume and brightness. Leaps in technology, such as LED, often force us toward standardization and simplicity, but there are ways to stimulate creativity with application diversity, as we strive to illuminate societies with respect for history, culture, diversity, and progress. My view is that a change must occur in our attitudes toward lighting, and that we must recognize that technology provides the tools to facilitate dreams, not the chains to bind our creativity.

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