

Designing the Lit Environment

TECHNIQUES AND TECHNOLOGIES TO PROMOTE HOLISTIC LIGHTING DESIGN



Research suggests that occupants rarely adjust blinds. An informal walkthrough of two elementary schools in Idaho with a total of 156 south-facing windows with manual louver blinds, found that only 18 of the blinds were open, representing only 10 percent of the potential daylight access. The lighting difference is quite dramatic as seen in the same classroom with blinds up and lights off (above, left) and blinds down and lights on (above, right).

THERE OFTEN IS A TENSION BETWEEN LIGHTING DESIGNERS WHO FOCUS ON DAYLIGHTING design and those who concentrate on electric lighting design. In my experience, the tension arises out of a conversation such as this:

Daylighting Consultant: “Daylight is important for people’s health and productivity, is highly desirable, and can reduce lighting energy use. It is my goal to make sure that your electric lighting is never on. I will design the fenestration system to achieve the specified lighting criteria with daylight only.”

Electric Lighting Designer: “It is my goal to highlight the beauty of the architecture and achieve the specified lighting criteria during all occupied hours of the year, not just those hours when the sun is out. Besides, daylighting can be glaring and I want to be sure the space is well lit even when the blinds are closed.”

Too often, the daylighting consultant and the electric lighting consultant struggle to find a common language and fail to recognize that what is needed is holistic lighting design. The challenge of specialization is successful integration of that specific knowledge. Daylighting consultants and electric lighting designers, even those with a close working relationship, or those who have expertise in both areas, often find it challenging to navigate the two media.

Who needs to be involved to promote successful holistic lighting design? What techniques and technologies are available to progress its evolution? What language barriers and technological shortfalls exist to complicate the issue? These questions will be pursued in this article.

UNDERSTANDING THE PROBLEM

The desire to include daylight and the need to reduce energy use in office buildings has led to the development of lighting control systems that attempt to integrate, or at least communicate between, the two lighting types. These systems hold tremendous potential to reduce energy use in buildings. The general premise is that if sufficient daylight is present, electric lights will respond and either dim or switch off. Unfortunately, in reality it is rare that spaces designed for inclusion of daylight produce the electric lighting energy savings purported during design stages. This is in large part due to dissatisfaction among building users who disable the lighting control systems or fail to operate their blinds in an optimal fashion, therefore reducing electric lighting energy savings. Too often, I walk into supposedly “daylit spaces” and the blinds are down. Research suggests that occupants rarely adjust blinds, and if they do, they are only positioned for short instances of glare. For example, in an informal walkthrough of two elementary schools in Idaho with a total of 156 south-facing windows