

Active Light in the office

A subtle blend of natural and artificial light improves wellbeing and encourages creativity

Our eyes perceive an incredible number of visual stimuli every day in the office. Optimum light is just as important for health, motivation and performance as it is for the completion of specific tasks. Treating light in an office space as part of a holistic lighting ecosystem means that it can be actively used to improve employee wellbeing and boost creative potential.

Both natural daylight and artificial light affect humans on three distinct levels. Light supports perception in visual terms, light plays an emotional role by influencing our moods and light is biologically significant because it is directly connected to a wide range of physiological processes. Over the course of 24 hours, light is a subtle companion, meeting the diverse demands of a modern life in leisure time and in the workplace, indoor and outdoors.

Daylight is the original light source, connecting with people through an elementary relationship and shaping human behaviour since the dawn of time. It may not necessarily be visible or even noticeable, but light defines how we experience the world through its many delicate facets, such as light colours, shadows, contrasting intensities and changing directions. However, today people in industrialised countries spend around 80 per cent of the day inside – with reduced exposure to the essential dynamics of natural light. Lighting technology innovation in recent years has made major strides in terms of generation, distribution and control, greatly expanding the raft of possibilities offered by artificial lighting design. Active Light from Zumtobel opens up this potential and takes into account the special relationship between humans and light. Natural light is the model for Active Light, which blends subtle changes in light colour, intensity and direction at the right time and for the right activity, helping put the crucial lighting dynamics back into everyday life in a range of different applications. In the office, Active Light enhances wellbeing and helps produce a creative atmosphere.

The working environment influences motivation, innovation and creativity

Design Works! With this headline and seven supporting theses, the journal *OrganisationsEntwicklung* (Organisational Development) recently championed new approaches to architecture: “Facilities are just as diverse as the ideas that are born in them, as diverse as the people who work in them.”¹

Discovery of a new kind of receptor in the human eye has added a fresh dimension to our understanding of the effect that light has on wellbeing, mood and general health. It was only shortly after the start of the new millennium that light-sensitive ganglion cells on the retina, which incorporate the light-absorbing pigment melanopsin, started to appear on the radar of mainstream science. The ganglion cells



Natural Light is the model for Active Light. Light has a visual, emotional and biological impact on people. © Zumtobel

containing melanopsin have their highest sensitivity in the low-wavelength spectral range and are therefore particularly receptive to blue light. These discoveries have served to emphasise the key role played by natural light during the course of the day and the year, for both humans and nature. The elementary relationship with nature is not just reflected in these physical connections.

Social psychologists at the University of Bretagne-Sud in France have gone as far as suggesting that the weather situation has an impact on human behaviour. When the sun is shining, we are more open, more confident and more likely to share our telephone number with someone than when the weather is dull and wet. It is also interesting to note that even something as simple as a good weather forecast had a positive effect on the size of the tip that people leave. The shining sun or the pouring rain can therefore have a direct influence on social behaviour and issues of personal finance.²

Lighting designers are tending to increasingly focus on Human Centric Lighting (HCL). In addition to the visual and emotional elements, this approach requires biologically effective light to be thoroughly taken into account. Enjoying some fresh air and stretching the legs outside, even on dark winter days, helps the body benefit from a higher dose of light. This in turn has a positive effect on the hormonal balance and the full range of bio-chemical processes in the body. The more time people spend indoors, the more likely they are to lose the natural rhythm of their internal clock, which may lead to poor sleep quality and health issues. Each person is an individual with different requirements when it comes to adapting to new conditions, but studies have nevertheless shown that a loss of natural rhythm can have notable long-term consequences for our health. Biologically effective light activates and supports people in office environments.

Light is now regarded as a key factor and one of the most significant design elements for the satisfaction and motivation of employees in the workplace. A user study conducted by Zumtobel in cooperation with the Fraunhofer IAO research institute into the perceived quality of light in office workspaces³ has only served to emphasise this fact. Despite increasing recognition of the role played by light, almost 57 per cent of respondents reported that they had no or limited means of adapting their lighting solution to reflect individual needs and changing work situations. In addition, 60 per cent of participants in the interactive section of the study selected a lighting level of 800 lux or more. This figure goes well beyond the recommended minimum values for the illumination of computer workstations that are detailed in the latest guidelines and standards. In terms of light colour, the study also revealed different preferences based on age, working hours and individual type.

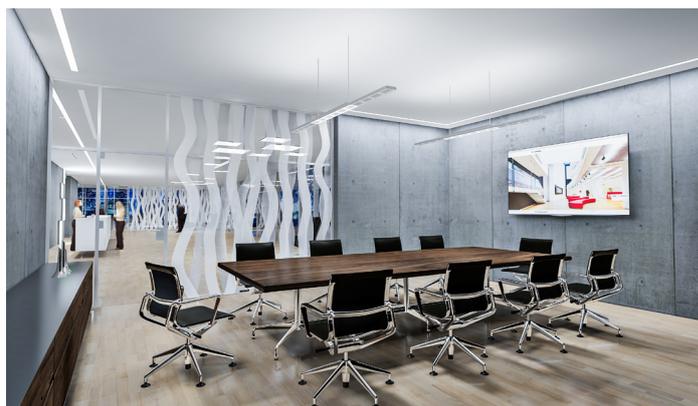
Scope to improve office lighting solutions

Technology will probably never be able to completely replicate the positive influence of nature. However, research into the impact of artificially created natural scenes has shown signs of a beneficial effect. Participants deprived of exposure to daylight reported appreciating scenic pictures in their work environment, while these images also appear to have led to higher productivity and improved quality of work.⁴ Furthermore, the neuroscientist Colin Ellard highlights the positive results of using technology to simulate nature in his book *Places of the Heart*.⁵

Compare office lighting solutions with their natural models and two things stand out: the lack of dynamic change through the course of the day and the absence of adjustments in intensity to reflect the various activities and different visual tasks. Natural sunlight changes its intensity, colour temperature, lighting direction and shadowing throughout the day and the human body is attuned to this dynamic. In contrast, office lighting still tends to deliver a largely static combination of approximately 500 lux and 4000-5000 K – even in communication areas and creative zones. In addition, people who work shifts or late into the night are generally exposed to excessive levels of stimulating blue light at exactly the wrong time. Active Light rejects these traditional limitations and then goes one step further.

Lighting solutions with Active Light are primarily based on a dynamic range that is orientated around natural daylight and the changes in colour temperature and intensity that occur during the day. In this way, Active Light provides optimal support for the human biorhythm. The default illuminance of 500 lux at the workplace stipulated by the standards is often perceived as insufficient, demonstrating how the lighting level should be increased for specific activities or at certain times of day. Innovative technology like tunableWhite from Zumtobel can integrate changing light colours into the lighting scenario as a highly effective design element. That means cold-white lighting moods until early afternoon, followed by lower-intensity warmer light hues as evening approaches. New possibilities in terms of digitalisation and controls also open up further opportunities, helping the light of the future automatically adapt to particular tasks and respond spontaneously to gestures and groups of people.

In addition, we now know that the creative process in the human psyche requires diverse sensory stimulation through a combination of variety and contrast. The theory of divergent thinking calls for cross-connections to generate new ideas, so these kinds of considerations also need to be reflected in the architectural approach.⁶ Active Light uses dynamic light to create contrasting atmospheres in a space. As a result, the same space can be perceived as being open or private, depending



Dynamic Lighting in workspaces using tunableWhite technology differentiates spaces based on time and task and creates possibilities to personalize the solution to individual needs. © Zumtobel

Early twilight



Midday



Late evening



on the specific configuration of the lighting scenario. The shift in room atmosphere is purely down to the change in light, which varies between a cold, sober character and a warm, homely feeling. Bright working light can be juxtaposed with the sensation of subdued candlelight. As we know, the fireplace has enjoyed positive emotional and social connotations for centuries. Lighting design can release these natural emotions. People come together like they always have and are supported in their shared inventive thinking. Indeed, perhaps this “fireplace concept” has the potential to help us finally recognise the positive creative effect of subdued lighting.⁷

Even the increasing number of lighting designers who look to blend norm compliance with a true architectural approach are not always aware of this human side to the lighting story. Nevertheless, new buildings deemed to be efficient and well designed are still opening their doors to users every week. Yet great architecture and lighting design distinguishes itself by truly harmonising with individuals and the continuously changing working world in which they now find themselves. Active Light solutions use Human Centric Lighting to put the focus firmly on the individual, transforming static, passive entities into dynamic, active spaces.

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