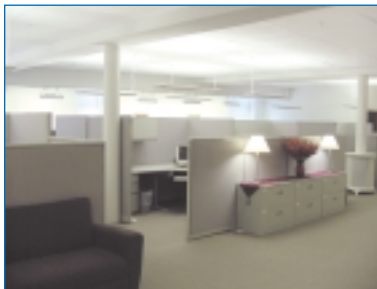


Lighting Quality & Office Worker Productivity

SUMMARY OF KEY FINDINGS

The question this study addressed was, “Can different forms of realistic office lighting affect the performance of office work or the well-being of employees?” An office was furnished as a typical open plan workplace for nine workers, and two experiments were conducted with a total of 6 different lighting conditions. Both experiments collected data from temporary office workers, who were hired to work under one of the lighting installations for a complete day. During that day the participants carried out tasks involving many forms of clerical and cognitive office work, evaluations of the physical environment, and assessments of their mood. The results showed that occupants appreciated quality lighting and had preferences that were consistent with our predictions.



Light Right Consortium,
Albany Research Study
Dimming Control Condition

❖ Lighting designs that provided direct/indirect lighting and wallwashing were rated as comfortable by 81%–85% of participants. By comparison, designs that provided only downlight (2x4 troffers) were rated as comfortable by 69–71% of participants. The most preferred design provided direct/indirect lighting, wallwashing, and occupant dimming control of the overhead lighting for their workstation. This design was rated as comfortable by 91%, the highest percentage of the six conditions. (see figure 1)

❖ Satisfaction with the lighting influenced other areas of preference. People who are more satisfied with their lighting rate the space as more attractive, are happier, and are more comfortable and satisfied with their environment and their work. This is the first time that this complete path has been demonstrated.

❖ In addition to occupant preferences, the study also found that the presence of personal control had a measurable impact on the motivation of office workers to perform on tasks. Normally, the persistence and vigilance of office workers will decline over the course of a workday (see figure 2). However, the presence of personal control of their lighting increased subject motivation allowing workers to sustain their performance—they persisted longer on difficult tasks and were more accurate on a task requiring sustained attention.

❖ When using the dimming control, subjects showed a wide range of illuminance (desktop light level) preferences. On average, people with dimming control chose lower levels than current practice. However, although people on average chose lower illuminances, the diversity of preferences suggest that if a fixed lower ambient room illuminance is chosen it must be supplemented with some means of providing higher local light levels for those who prefer them.

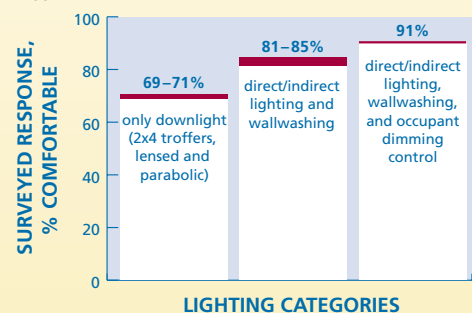
Light Right CONSORTIUM

RESEARCH STUDY | Albany, NY

The Light Right Consortium brings together interested parties and researchers to work toward a common goal—to use research as a basis for market transformation towards quality energy efficient lighting.

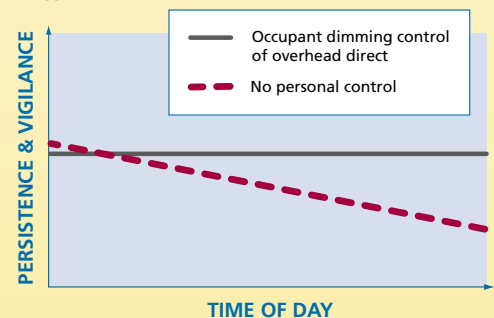
www.lightright.org

FIGURE 1



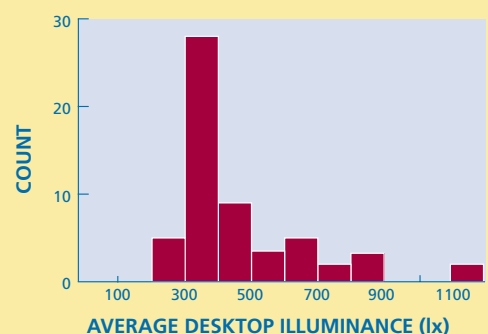
Six conditions were provided and rated by comfort level. The addition of room surface brightness and personal control improved occupant comfort.

FIGURE 2



Occupants with dimming control had increased motivation and were able to sustain their persistence and vigilance over time, as compared to those without any control of the lighting.

FIGURE 3



Mean desktop illuminance chosen by participants with dimming control. Includes data from both between-groups and within-groups designs.

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The Light Right Consortium project is managed by Pacific Northwest National Laboratory, operated by Battelle for the US Department of Energy.

PROJECT SPONSORS

Light Right Consortium gratefully acknowledges the Project Sponsors listed below who have contributed equipment for the Albany Research Study.

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Q&A

How do we define “productivity” and how can it be measured in an office environment?

Productivity is defined in economic terms as output produced per unit of labor (or other factor of production). When it comes to productivity in a non-industrial setting such as offices, the definition of productivity extends beyond worker output per labor hour to include numerous aspects of individual and organizational success, such as the quality of the output, occupant satisfaction, employee attraction and/or retention, health and comfort of workers, company image, and financial success.

An emerging approach to studying knowledge worker productivity focuses on mental building blocks and psychological processes—those skills and abilities that are characteristic of information processing work in general. Examples of these mental building blocks include attention, vigilance, memory, creativity, mental computation and comprehension. Examples of relevant psychological processes include motivation, persistence and effort. Researchers from several different scientific fields have developed measurement tools for assessing these various skills and processes.

What is direct/indirect lighting?

Direct/indirect lighting is an approach to office lighting that provides some light directed downward, toward the work surface, and some light upward, toward the ceiling. This is most often accomplished from a single lighting fixture suspended from the ceiling.

What is personal lighting control?

Personal lighting control refers to the ability for an individual to change the light levels in their workstation or desktop and surrounding surfaces. This can be accomplished in many ways. Dimming equipment that controls overhead lighting can be permanently wired, wireless, with hand-held control, or computer based. When controlling light from overhead fixtures, care should be taken to not affect the light at adjacent work areas that might impact other office workers.

Other personal control options include undercabinet task lights or free-standing desk lamps. Undercabinet task lights are especially important with respect to reducing shadows that otherwise would create a dark surround on the inside of a workstation. Free-standing desk lamps have the benefit of being moveable so the occupant can put additional light where they need it most.

For more information about the Light Right Consortium and the Albany Research Study please visit www.lightright.org.