

Health effects as driver for the use of LEDs

J. Hildebrandt & E. Opøien

DTU Photonics, Technical University of Denmark

INTRODUCTION

LEDs are known to be the typical choice when you want energy efficient lighting. But in fact LEDs can provide much more than just energy savings - They can improve your life. The goal of this project is to use the health effects that can be achieved with LEDs as a Driver for public institutions and facilities to invest in new more sustainable LED light sources.

THEORY

Several studies have recently proven that the light intensity and the color/hue of light greatly impact your health. And this is where the LEDs get into the picture, as they provide a perfect platform to precisely control these parameters.

It is specifically the blue light that is interesting, as it is proven that it is the most potent wavelength on the cells in the eye. By exposing your eye to blue light you will suppress your production of melatonin (sleep hormone) while stimulating your production of serotonin ("happiness" hormone).

Below is a list of health and psychological effects that potentially can be achieved by conscious control and selection of your light source.

- Prevention of depression (especially SAD)
- Increased of quality of sleep
- Increased short-term memory
- Increased learning
- Prevention of dementia

METHOD

To achieve the goal of this project, a literature study was made to map out the potential health effects of light. This was then combined with a user research to understand how the knowledge of the health effects could be leveraged to the needs from a specific user. A lamp design is then suggested to the chosen user that will contribute to an energy efficient and sustainable future, while fulfilling his health requirements.

RESULTS

Nursing homes was selected as the user, since they had the most benefits from the health effects. A concept and prototype was presented and approved by a nursing home to be tested for further trials.

CONCLUSION

The goal was partly achieved, as the nursing home is considering further investments in energy efficient LED lighting with health effects.