Visual Concepts and Sensory Experience of Light Environments

Johanna Enger

1) Lund University, Faculty of Engineering, Environmental Psychology, Lund, SWEDEN. Email: johanna.enger@arkitektur.lth.se

Swedish Research Project on Perceptual Metrics for Lighting Design

A Communication Tool for Visual Light Quality

The only established tool to measure light quality is the International Lighting Standard (EN 12464-1), which is based on a simplified interpretation of the way vision works. This may result in oversized lighting systems that affect both well-being and energy use. The projects sets out to develop new measuring methods by seeking to define light experience in a spatial context in which light, colour and space interact. The studies presented here are part of a major research project that has the overall objective of creating definitions and a concept model for light quality based on visual and emotional aspects of light experience. The process has resulted in a vast collection of both descriptive and associative concepts that defines light quality, of which a number has been selected for to be validated in the studies. The method used for the visual assessment of the character of light environments is similar to that used in sensory science.

Definitions, Concepts and Measurement for Light Experience

In an initial full-scale study conducted in two identical office-like experimental rooms, 20 subjects were asked to assess six basic concepts for visual experience of light. (Fig.1). The two rooms had different light settings and colour schemes according to two diverse design concepts. The brighter room was similar to a standard office space, while the light and colour scheme in the darker room, with simple means, was made to resemble a sunset. The purpose was to investigate whether the method was useful at all and whether the concepts were appropriate for visual assessments (Table 1). In a follow-up study six scale models were set up according to a typology which enabled assessments of light quality in systematically varied light and colour settings. 36 concepts for light experience were assessed by 17 subjects of mixed ages. The selection provided a basis for a concept model that describes the experience of light.

Results and Conclusions

Although the project is still ongoing and the conclusions preliminary, the results from the two studies show that visual assessment of light qualities in spatial contexts is possible using the collection of concepts. They also show that the observer perceives a light environment as a whole, including both light character and colour setting. As an example the light was described as Dull, Homogenous and Sharp in Model P (Table 2), but as Even and/or Homogenous in Model N and T although the light setting was identical. Another finding was that a room is perceived as Distinct when the light environment provides enough contrast. A comparison of the results for Models M, S and N shows that contrast and distinctness can be created both through a varied light or a variation in colour contrast. The conclusion is therefore that the approach is useful for creating a basis for a concept model that describes the experience of light.

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Reference


Table 1 Results from full-scale study, mean value. N=20, Scale 1-7

Table 2 Results from scale model study. N=17, Scale 0-9. The concepts listed here had a mean over 4.5 and a standard deviation below 2.10.