Spatial Interpretations in Relation to Designer Intentions: A Combined Strategies Study in an Auditorium with Variable Lighting

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ABSTRACT
From a lighting designer perspective, it is of great interest to know if users will experience the final lighting design as it was intended to be experienced. Therefore, the purpose of this study was to interview the lighting designer in charge about his design intentions and compare this to the user's visual observations. The investigation took place in a real-life university auditorium, where it was possible to monitor the lighting, made up of five different scenarios. 21 informants participated in the study. Combined strategies were used in a questionnaire with semantic scales and a verbal description. In addition to these, the inquiry was followed by in-depth interviews. How the various lighting scenarios affected experienced spatiality, size and shape as well as spatial atmosphere were compared to the design intentions. Discrepancies between the observers' spatial interpretations and the interpretation of spatial concepts are also discussed in relation to the lighting design.
Keywords: Lighting Design, User Experience, Visual Observation, Spatiality, Atmosphere Experience.

1. INTRODUCTION

Today, lighting research is still mainly instrumentally measured and technically oriented. There are only a few studies of three-dimensional rooms and they most often focus on light level and light colour. There is a need for visually experienced research that lighting designers can base their design upon. Therefore, the intention of this research is to gain more knowledge about the relation between the designer's intentions and how users experience design.
This research is inspired and based on knowledge from John Flynn about preference of lit walls and how light can affect atmosphere experience [1]. Additionally, Sven Hesselgren's experimental studies about the experience of being inside a room are another starting point for the present study. [2-3].

2. THE EXPERIMENTAL SET UP

2.1 The experimental site

The University of Gothenburg has a main building which was built in 1907. The auditorium "Sal 10" has an interior characterised by warm beige walls, a white ceiling with stucco work, oak panels and heavy dark red velvet curtains. The lighting with different pre-programmed light scenarios was designed in 1998 by the Swedish lighting designer Torbjörn Eliasson.

2.2 The designer's intentions

In an interview the lighting designer says that this lighting was designed to fulfil three main purposes: first to give a functional lecture light that not only makes a speaker visible but also supports note-taking, the second desired effect was to create "a spatial light" –a light from wall luminaries that describes the shape and limitations of the room, and the third goal was to design luminaries that link to the historic architectonic style of the building.

The idea with the lighting design was that recessed ceiling down-lights with low wattage halide, addressed by the designer as "light-machines", should provide the main light level needed, supported by special designed brass luminaries with incandescent bulbs: the ceiling-crown, the track-railing and the wall-luminaries. The incandescent light was chosen to associate with the historic light of the building and to provide, for the eye, a light that seemed to give the main lighting. Additionally, up-light from the compact fluorescent lamps in the ceiling crown above the podium, were used to decrease the contrast between the recessed luminaries and the ceiling to avoid glare. The crown should, besides being beautiful, also provide a point of focus. The artificial light is designed to work together with the daylight, which, in this study, was excluded from the room by heavy curtains.

Eliasson talks about the incandescent light as a mood provider: *"In a way they have the task to delude the eye, to delude the experience. One believes that the light comes from the ceiling crown and the track that follows the room.... So that was a part of our intention - to avoid letting the recessed luminaries, the light-machines be so clinical, to perform a bit of magic, so to speak."*

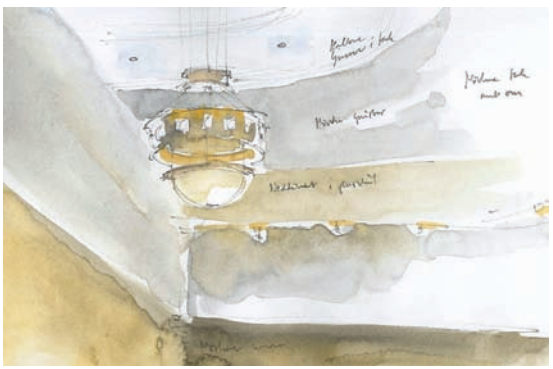


Fig.1
Sketch of the interior, by the author.
Fig.2
Sketch of the ceiling crown, by the author.

The Auditory scenario: is the brightest light situation with all luminaries fully lit.

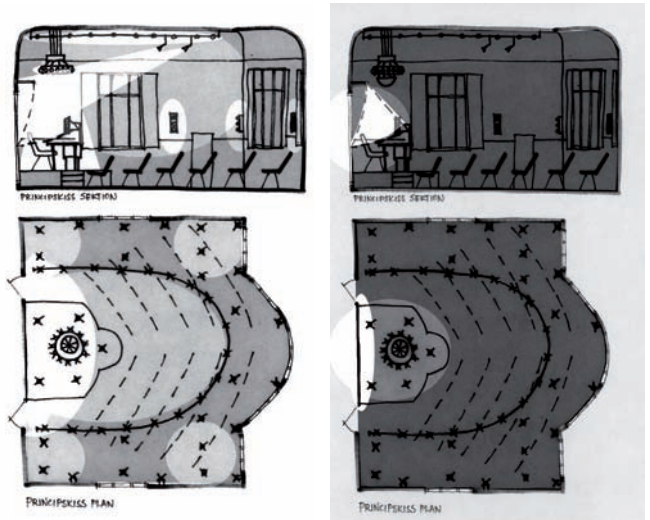
The Lecture scenario: the up-light in the ceiling crown is off while the crown's other light sources are dimmed to approximately 75% (visually estimated). Additionally, spotlights and OH projector are lit, directed towards the podium.

The Display scenario: the total light level is more down-regulated to 75-50% of the auditory scenario. The OH projector is lit, but no extra spotlights.

The **Mood scenario:** is similar to the display scenario, but much darker, about 25% of the auditory scenario, and has neither OH, nor spotlights lit.

The Picture showing scenario: is the darkest scenario with no incandescent light and following no wall light. Only

the recessed down-lights are weakly glowing. The OH projector is the main light source.



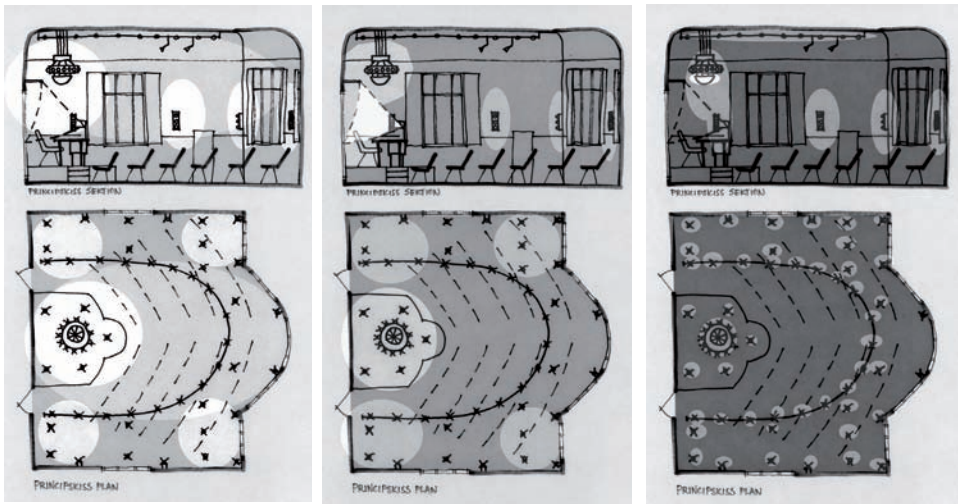


Fig.3 The room in lecture light
Fig.4 Lecture
Fig.5 Picture showing
Fig.6 Auditory
Fig.7 Display
Fig.8 Mood

Table 1. Principal sketches of the author's experience of the lighting distribution at each scenario.

3. THE INVESTIGATION METHOD

Design is a multidisciplinary field, a fact that is mirrored by the methods used: combined strategies with mixed-

methodology design [4]. The methods in this study are also linked to a colour research tradition with regard to visual appearance [5-9].
21 informants (9 of 21 were architects) have answered a questionnaire and also given a spontaneous written description of the room in each scenario, and filled in seven-step rating scales with regard to the appearance of spatial shape and size as well as spatial enclosedness; they were also asked to sort out a number of relevant adjectives describing the atmosphere. The questionnaire was directly followed by a 1.5- to 2-hour open-ended interview between the researcher and the informant, in the room [10]. The scenarios were put in random order for each of the interviewees, who sat at two different places in the room.

4. RESULTS AND DISCUSSION

4.1 Judgements of spatiality

An initial hypothesis from the author's pilot studies and lighting designer experience was that lit walls should make the room more delimited and distinct. Surprisingly, the picture-showing scenario and the mood scenario both of which are the darkest scenarios, have been judged to be the most *delimited* scenarios, even though the lecture- and the auditory scenarios are also delimited to a great extent. Another interesting result is that the informants interpreted the concept "delimited" in several ways: not only in how they regarded a room with distinct lit walls, but also how they felt excluded from the lit inner space or from the daylight by the curtains.
A higher light level together with more up-light enhanced the experience of an *open* and an *airy* room. Scenarios such as the auditory scenario and the mood scenario, with an out-spread light distribution and warm wall light were estimated as more *enclosing* than the lecture scenario characterised by directed light. The concept of "enclosing" was interpreted in two contradictory ways with emphasis either on embracing or being closed.
The lecture scenario and the display scenario are both bright scenarios with distinct lit walls that were judged to have a high level of *closeness*. Surprisingly, the auditory scenario was not judged to be especially *close*. A reason may be that the light level in the auditory scenario is too high with glary wall luminaries compared to the other scenarios − a hypothesis drawn from an experiment about restricted space described by Sven Hesselgren [3-4].

4.2. User experience meeting the designer intention

The display scenario was designed with the ambition of making the room as beautiful and pleasant as possible, displaying the room itself. Furthermore, the intention was to make it bright as well as to provide a secure atmosphere. Most informants have left positive loaded words for the display scenario, supporting it as bright and pleasant.
In contrast, the mood scenario was designed with similar aims as the display scenario but much darker, with an intention to create an atmosphere of a Swedish Christmas morning with candle lights (the *Lucia* tradition). The mood scenario light could be said to fulfil a criteria for a mood atmosphere with warm light colour that enhances the surrounding oak surfaces, a low light level with barely glowing incandescent light, soft contrasts and more down- than up-directed light. However, this ambition seems only to have been partially fulfilled according to one half of the informants; these polarized answers are of great interest. The evaluation of the mood scenario resulted in only three persons labelling

it *pleasant* and six persons said it was *unpleasant*.
One informant describes the mood scenario in the following way:*"A very subdued lighting; in spite of this, the room feels somewhat festive. "Like the traditional Swedish "Lucia" morning? We are in a room of expectation. Something is going to happen, but it is not here yet. The room of dawn."*
This cosy light was not possible to understand unless one disregarded the building's and the interior's function, size and style. The mood lighting can be said to create a private atmosphere, which in this case, is in conflict with the official atmosphere of this room.

4.3. Focus created by directed light compared to a luminous object
There is a great difference between illuminating a focus point or creating a luminous object as a point of focus, like the ceiling crown. The lighting designer comments the polarised opinions the informants have regarding the mood scenario by saying that the cause may be the lack of a focus point within the scenario: "*It is very important that everything is not down regulated, but that there is something to rest one's gaze on, a distinct direction, a certain point of focus*." This is an interesting aspect even though there are several aspects that interact. This informant's evaluation of the mood-scenario partly supports the designer's theory: *"The room has a peculiar light, it is a yellow light, but it is still experienced as dark and cold. It is somewhat tomb-like. Light that does not give light in a way. The podium becomes a clear central point, yet the light feels too diffuse. The room has a somewhat contradictory nature, delimited but diffuse."* The designer claimed that the ceiling crown should be regarded as a focal point. In contrast, there seems to be an imbalance in the mood scenario between the strong fluorescent light in the opaque glass bowl of the large ceiling crown and the ceiling that gets more attention than people beneath the podium would get. One informant writes: "*Now is the centre really above the podium. The person below sits in some kind of obscurity, in spite of the fact that a lecturer, and not the lamp, should be in the centre*."
Additionally, supportive findings are found in the other scenarios. One informant describes the out-spread light in the auditory-scenario as: "*It feels a bit like an "active stand-by-position" in the whole room, since the lighting lacks a focal point*." Another informant sums up the same scenario as: "*Nothing is emphasized and in my opinion that creates some kind of uncertainty*."
About the light in the directed picture-showing scenario, one informant writes: "*The focus is totally directed towards the stage. The experience of the room decreases when the indirect viewing field receives less impression*."

4.4. Light that includes and light that excludes
The shifting light scenarios showed that a light that covered both podium and public in the auditory scenario was evaluated as creating a democratic atmosphere inviting the whole audience into a conversation: "*The centre of the room is not that clear anymore (due to the dark OH projector). The even light activates the whole room. I feel that I "belong to it", even though I am sitting at a distance.*"
On the other hand, spotlights directed towards the podium, as in the lecture-scenario seem to exclude the public from the conversation, and, according to the interviewees, make an audience quiet. In this case, the lighting design fulfils its purpose according to the scenario labels. One informant describes the lecture scenario in the following way: "*The*

room has a distinct focus on the podium. The rest of the room becomes anonymous and less important; an obvious stage and an obvious place for the audience. The white light is in contrast to the subdued light and the room becomes both clear and unclear. Distinct limitations are still given by the wall lighting." An informant that saw the display scenario with added OH projector light and spotlights was of the opinion that this light created a distance towards the podium: "*One feels more like an observer than a participant*."
A couple of informants associated the OH light in the dark picture-showing scenario with intimacy and storytelling in front of a bonfire.

5. CONCLUSIONS

That light has a very large impact on spatial experience, spatial enclosedness and atmosphere was not an especially surprising result. However, from a lighting designer perspective, the finding that the darkest scenarios were judged as being more delimited than scenarios with more wall-oriented light was unexpected.
The informants succeeded in associating almost every scenario with a function related to the designed scenario labels, except for the mood scenario, which a majority of the informants found hard to associate with a given function. This mood light scenario displayed a conflict between what is usually regarded as cosy atmosphere lighting and the official character of the auditorium. Moreover, a focused directed light is both able to relate to an intimate atmosphere and contribute to a light that can be experienced as excluding. The informants expressed an opinion that the room without directed light at the podium was fitting for a more democratic conversation.
A real-life study in a complex space like this should be regarded as highly context-related, especially with cultural differences of light experience in mind. There is a need for many more studies of lit spaces that will contribute to the puzzle of knowledge. However, only by lifting the designer intentions and relating these to user experience can we make this tacit knowledge explicit and discussable.

REFERENCES

1. Flynn J. E., Spencer J., et al. "Interim study of Procedures for Investigating the Effect of Light on Impression and Behavior", *Journal of the Illuminating Engineering Society*. Vol. 3, No.1, 1973, pp.87-94.
2. Hesselgren S., *The language of architecture*, Studentlitteratur, Lund, Sweden, 1969.
3. Hesselgren S., *Man's perception of man-made environment*, Studentlitteratur, Lund, Sweden, 1975, part I, p 365, part II, p. 281-282.
4. Groat L. and Wang D., *Architectural Research Methods*, John Wiley & Sons, INC, New York, 2002.
5. Fridell Anter K. and Billger K., "Colour Research with Architectural Relevance: How Can Different Approaches Gain from each Other?," *Color Research and Application,* Vol. 35, No. 2, 2010, pp. 145-152.
6. Fridell Anter K., *What colour is the red house? Perceived colour of painted facades*, Doctoral dissertation, KTH Architecture, Stockholm, 2000.
7. Billger M., *Colour in Enclosed Space Observation of Colour Phenomena and Development of Methods for Identification of Colour Appearance in Rooms*, Doctoral dissertation, Chalmers University of Technology, Gothenburg, 1999.
8. Hårleman M., "Study of Colour Shifts in Various Daylights: Dominantly Reddish and Greenish Rooms Illuminated by Sunlight and Skylight", *Colour: Design & Creativity*, Vol. 1, No. 1:8, 2007, pp. 1-15.
9. Hårleman M.,Werner I. B. and Billger M., "Significance of Colour on Room Character: Study on Dominantly Reddish and Greenish Colours in North- and South-Facing Rooms", *Colour: Design & Creativity*, Vol. 1, No. 1.9, 2007, pp. 1-15.
10. Kvale S., *Interviews: An Introduction to Qualitative Research Interviewing*, Sage Thousand Oaks, 1996.