

# ColourVision—Controlling Light Patterns through Postures

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**Abstract.** *ColourVision* is an interactive installation that empowers people to step into an intensive dialogue with colors. Physical seating postures such as active, relaxed or reflective positions are captured, translated and trigger a rapid change of the room's color. The installation was planned and executed for the Museum of Perception in Upper Austria, where we wanted to create seamless communication between the visitor and the color that would lead to an aesthetic experience in the space and let people experience the psychological effects of different colors.

**Keywords:** light installation, responsive environment, body interface, interactive art.

## 1 Introduction

In an article that analyzed the psychological effects of environmental colors on the human body, Stone et al. [5] claimed that “red and yellow are naturally experienced as stimulating and disagreeable,” and that “these colors focus people on the outward environment,” and that “they produce forceful, expansive behavior, whereas green and blue are experienced as quieting and agreeable, focusing people inward, and produce reserved, stable behavior.” Olafur Eliasson's *Room 360°* for all colors [2] is a good artistic example on how a person can be encapsulated within a light-space and perceive an intensive experience of colors (see Figure 1a). In contradiction to monochromatic light-spaces with one light source, his installation captures the visitor constantly through continuous changes. In addition to Eliasson, we wanted to create a dialogue between the body language of the visitors and color changes. Responsive environments, such as those described by Moeller [4] in his participatory light installation *Electro Clips*, were inspiring in the ideation phase. Bullivant [1] documented how spaces can rearrange themselves and include a wide audience, such as the light installation *ICE* from Iwai, where participants can *paint* colors on a digital surface with their hands (see Figure 1b) or *Sky Ear* [3], a playful public installation based on color interactions (see Figure 1c). Winkler described the challenges for artists to create such an experience in his participatory sound and light installation *Light around the Edges* [6].

Combining a lighting installation with an interface that interprets the body positions of a person and visualizes them in a space through color seemed a way to



**Fig. 1.** Different artworks that served as inspirations (from left) (a) Olafur Eliasson: 360° Room for all colors (Photograph by <http://www.flickr.com/photos/fabianmohr/259818925/> reproduced under Creative Commons License, <http://creativecommons.org/licenses/by/2.0/>) (b) Toshio Iwai : ICE (Photograph by <http://www.flickr.com/photos/mikichui/3596926827/> reproduced under Creative Commons License, <http://creativecommons.org/licenses/by/2.0/>) (c) Usman Haque : Sky Ear (Photograph by <http://www.flickr.com/photos/vrocampo/538832031/> reproduced under Creative Commons License, <http://creativecommons.org/licenses/by/2.0/>).

enable participants to quickly communicate with a light space. The natural, seamless interaction with light was important for creating this installation as visitors should step into an intensive color experience and reflect on the effects of colors on themselves without being distracted. *ColourVision* combines color changes corresponding to the participants' body language and lets them glide into an intensive dialogue with the environment.

## 2 ColourVision



**Fig. 2.** Initial animation from the ideation phase showing different seating positions and the resulting room colors: (from left) (a) activity, (b) reflectiveness and (c) relaxation

### 2.1 Technical Setup

A camera on the ceiling in the center of the space is attached to a PC with video analysis software written in C++. Participants were tracked in a chair from above and the resulting data was sent to a DMX converter that digitally controlled the different colors in the space. The installation consists of 45 x 58 watt fluorescent RGB lamps arranged in a half circle, with 15cm of space between them. A rear projection foil serves as a diffuser with sites at a distance of 65cm to the lamps in order to present a planar lighting experience. We shaped the projection foil in a curve so that no spatial edges or corners are perceived in the view area (Figure 3).



**Fig. 3.** Implementation: Different colors generated through diverse seating positions

## 2.2 Posture and Color

The implemented body interface controls the room through posture. Red, for example, is activated through an open, active seating position. Green is the color for introverted reflectiveness as generated if a person takes a thoughtful, closed position. A person, sitting on the chair in a stretched, relaxed position plunges the room into a cool blue as the color for calmness (Figures 2 and 3). Playful interactions with the body interface were perceived positively. Some of the participants were exploring the interface in different ways and climbed on the chair or sat on the floor to experience the responses of the installation. Different emotional color impressions were reported from the participants: Asked about their emotional state when exposed longer to one color, for example red, the participants reported an increased level of “nervousness.” An intensive exposure in a relaxed posture to the color blue was described as “peaceful.”

## 2.3 Personal View

From an artistic standpoint, the interaction with light and colors is a magical experience for me. People can let themselves glide into a fluid color experience, while all edges disappear and a space made out of light encapsulates them fully. The longer perceived colors triggered different emotions in me that I had not previously associated with colors. With my background as an electrician and my later studies in design and art, I feel that many different aspects of my education are applied to this work. My knowledge of the technical feasibility of the project was interesting as well as the spatial design of the installation. Even more intriguing were the aspects of how a person controls such an installation. The fluid level of interaction that incorporates a rapid change gives the visitor the freedom to participate in the installation and become a part of the artwork.

### 3 Discussion

By applying an interface that lets people influence a color space, we hope to contribute an inspiration about how people can interact seamlessly with embedded technology, and— if applied correctly—provide a smart, usable solution for a very simple interaction. By bridging the gap between experiencing colors and controlling them, we hope to encourage more people to explore the area of interactive lighting design. Regarding the received positive feedback, we were encouraged to expand the topic on a larger scale. Smart media façades, equipped with color mixed LEDs that can be embedded in the architecture of buildings, provide an interesting area of interactive lighting design that has just briefly been explored thus far. If these structures know how to interpret people's behavior, an interesting dialogue between humans and buildings can be established. In this sense, such installations can make spaces appear smart and reactive.

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