
A Wall Hanging as an Organic Interface

Landin, Hanna

Swedish School of Textiles,
University of Borås
501 90 Borås, Sweden
hanna.landin@hb.se

Vallgård, Anna

Swedish School of Textiles,
University of Borås
501 90 Borås, Sweden
anna.vallgarda@hb.se

Worbin, Linda

Swedish School of Textiles,
University of Borås
501 90 Borås, Sweden
Linda.worbin@hb.se

Abstract

We are developing a dynamic textile wall hanging as an interface to the atmosphere of a room. Atmospheres are elusive. An atmosphere is the result of an ongoing negotiation between the activities in the room and the expression of the material objects, the lighting, the temperature, and the boundaries of the room [4, 8]. The wall hanging will play an active part in that ongoing negotiation. The activities in the room will influence how the textile wall hanging changes structure, form, color, as well as the pace with which it happens, and the activities in the room may in turn be influenced by the expression of the wall hanging.

Keywords

Smart textile, textile interfaces, textile expressions, wall hanging, atmosphere

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design

Introduction

Textiles can be seen as organic interfaces to our surroundings. They can make us act and interact in certain ways. An upholstered chair makes us sit

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Figure 1 This picture show three conductive textile samples in different knitting stitches. Front: knitted copper with viscose. Center: knitted blue mohair with brass. Back: knitted turquoise cotton with stainless steel. All samples are made at The Swedish School of Textiles on a circular knitting machine by technician Tommy Martinsson

differently than we would on a wooden or metal one. Blankets can keep us warm and thus makes us stay places we would otherwise leave. Carpets can invite us to lie or play on the floor. Clothes enable us to interact with others without concern for our privacy or health, and so on. Also, textiles are ubiquitous.

At the Swedish School of Textiles we are exploring and developing new smart textiles. Textiles, which can attribute to our pleasure, actions, or interactions in new ways. One part of this research agenda is to explore textile computational composites [5, 6]. We look for ways in which sensors, actuators, and microcontrollers can be part of, or embedded in, the textile structures and thus constitute new textile expressions.

In one of our ongoing projects we are developing a series of dynamic textile wall hangings that in different ways influence and are influenced by the atmosphere of the room. The project has two parallel tracks. One is to develop new principles for dynamic textile expressions through the use of servomotors in combination with textile techniques such as knitting, weaving, and printing and various yarns and dyes. The other is to explore the resulting expressions by placing them in a context of use. In this track we develop the dynamics of the expressions—their dependencies and pace of change so that they engage with the specific uses of a room (e.g., a classroom, a waiting room, or a room of consolation).

Textile expressions

In the track of textile expression we explore how servomotors can be integrated as actuators in a dynamic textile expression.

We have through previous projects identified and learned how to work with some interesting material qualities such as color and structure change, light, or heat emitting abilities, electrical conductivity (see Figure 1). Based on these properties we print, knit, and weave a series of textile samples that we then can combine with the servomotors. More specifically the material qualities relevant for this project can be divided into:

- Light emitting/transporting textile material (optical fibers and/or electroluminescent wire)
- Good conductive textiles for data transmission/sensors (typical metal yarns like copper or steel) or bad conductive textiles for heat generating (typical made from carbon and steel yarns)
- Color changes due to temperature or light conditions (thermochromic or photochromic ink)
- Structural changes due to the flexibility of more traditional textile materials (like elastic materials in various knitted or woven structures).

In the current set-up we have mounted 16 servomotors on a wall covering an area of approximate 2x3m. Mounted on this we investigate how and whether the textile samples can produce interesting dynamic expressions through the movements of the servomotors. For instance, in one version we are designing a textile in which the motor movements can change the permeability in the structure of the textile—as means to explore the textile as a continuous vs. discontinuous surface. In another version we are designing a textile in which the patterns and thus the color combinations changes due to movement at specific places on the textile. In a third version, we use

the motors to change between a two and three-dimensional pattern in the textile.



Figure 2 These mock-up photos exemplify what changes in an interactive wall hanging could be like. The mock-ups were made by Margareta Zetterblom for an earlier project experimenting with textile and sound [7].

Contexts of use

In the track of contexts of use, we are looking for a deeper understanding of designing with these new principles for dynamic textile expressions. Specifically, we are looking into how these expressions can influence the atmosphere and activities in a room and in turn how the activities can be sensed by the textile and thereby partake in shaping it's expressions. We are studying how to design for an ongoing negotiation between textile and use in context, over time [1].

In this light, the wall hanging can be seen as a user interface to the atmosphere of the room; however, the user will not be able to minutely control the changes.

The changes will rather be subtle and indirect consequence of the users' actions and interactions. This means that we as designers are responsible for the interpretation of complex situations in a future we have no or little knowledge of. We might over time become more familiar with reversible and ongoing material changes of this kind and thus more readily know how to design with them, however, we are not there yet.

We have chosen to start with three types of rooms that have an identifiable context of use, a classroom, a waiting room, and a room for consolation. Each can provide different perspectives on the relation between atmosphere and context of use. In each room we will experiment with different textile expressions and different dependencies on how they changes.

Classroom –

In the classroom we study the dynamic textile as a mirror of the atmosphere. For instance, if the pupils are running around making noises in the classroom, it will be reflected as increased activity in the expression of the wall hanging and vice versa.

Waiting room

In the waiting room we study the dynamic textile as inverting the atmosphere. For instance, the wall hanging will be more turbulent if the activity in the waiting room is calm. As waiting can be tedious the activities in the wall hanging will offer some subtle form of distraction and passing of time. Indeed, we envision the wall hanging having a spectacular party when no one is there.

Consolation room

The experiments in both the classroom and the waiting room explore rather straightforward cause and effect relations between activities and the expressions of the wall hanging and the atmosphere. In the third study we explore a more sophisticated relation between the context of use and the textile expressions.

In the consolation room the wall hanging will relate to the atmosphere in a more subtle way. It should not disturb nor call for attention yet through its range of expressions it should contribute to an atmosphere suitable, for instance, for some of the five stages of grief: denial, anger, bargaining, depression, and acceptance [3].

The design of the wall hanging for the latter contexts will depend upon the findings from the first.

Discussion

This project is carried out according to the philosophy that "function resides in the expression of things" [2, p. 166]. We believe that the possible functionality of the wall hanging solely lies in its expressions and changes thereof. Thus, the first track's material experimentations in search for new dynamic textile expressions are pivotal to the design of the wall hanging for the various contexts.

We also find it important to clarify that the wall hanging is not to be understood as an information display. It is part of the interior of the room to be compared with lighting or furniture. Just as the colors of the room is

part of staging the atmosphere so will the wall hanging albeit it will do it dynamically in context over time.

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Example citations

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