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# Design and semantics of form and movement

DeSForM 2007



**TU/e**

**PHILIPS**

# From *Sensations* to *Activating consequences* and from *Activating consequences* to *Relational stakes*: Theater as a support for the design of experience. Saturn and SoundSpace sound mixers case projects.

## Abstract

This paper aims to present a contribution to the design of form and movement through a theater-based approach to design. The method, based on Alain Knapp's improvisation techniques, prepares and leads designers to focus gradually on the sensations and the activating consequences of a context, and then from these activating consequences to the relational stakes which give rise to the improvisation and construction of human relations. The method is presented and illustrated within the design project of two sound mixers : Saturn and Soundspace.

## Keywords

Interaction design, theater improvisation, sound mixers.

## 1 Introduction

Existing sound mixers are products designed for experts. They require means and skills which are not easily accessible to a wider public. Digitalisation and compression of music files with increasing quality are making music more accessible to amateurs through growing media (Internet, PC, GSM, CD's, MP3). However, despite the great design possibilities offered by these new digital technologies, current sound mixers are not taking advantage of this freedom of shaping, nor are they using human interactive skills as an integral part of their design.

The concepts used here refer to the Ishii's [1] theoretical findings on space and time multiplexed input and output

devices. The improvisation techniques are founded on the emotions and the sensations, and help to build interpersonal relationships that give rise to relational stakes and shared emotions. Particular attention is paid to the relational stakes that emerge from the activating consequences due to the different contexts that have been created.

### 1.1 Approach

Unlike features relayed by technical mechanical devices, which impose, through their internal logic, a shape and a mode of interaction [2], the functional elements of today's products are electronic components that offer great potential in shaping and possible interactions. Nevertheless, the resulting shaping is driven by the electronic internal logic and often converges towards a common technology packed into an well-designed box with many buttons and screens. The projects Saturn and Soundspace are sound mixing desks designed for a wider public. These products are the result of an approach centered on the interaction with music through the product itself, rather than an interaction between the user and the product. So each interaction is imagined and materialized through a system which allows the user to manipulate their sound environment or their sound effects by means of gestures which are meaningful for them, in a context where they can interact with other individuals.



**Figure 1** Improvisation exercise with definite context, product and relational stakes.

These new interactions, based on intuitive exploration and simplicity of use, offer new experiences to the user. We have placed the user as the central element in the design phase. All the concepts presented in the pre-project have been materialized by sketch models. The models were tested on the basis of patterns of use in order to observe, understand and improve the interactions between user and music through the product. The most significant ideas were developed further in the final project.

The improvisation exercises start with context-driven emotions, and then gradually evolve into sensation-driven actions, and finally into relational stakes based on interpersonal actions.

The design concept generation phase was carried out with improvisation exercises, defined in a sensorial context. The figure below presents the improvisation phase between two people in the context of a beach on a sunny day.

## 2 Saturn

Saturn is an innovative sound mixer designed for juniors. The product has simple functions which help you create music at parties or with friends, even without prior experience in the domain. With its storage capacity of 200 Go, Saturn allows you to both listen to and manage all your mp3 files.

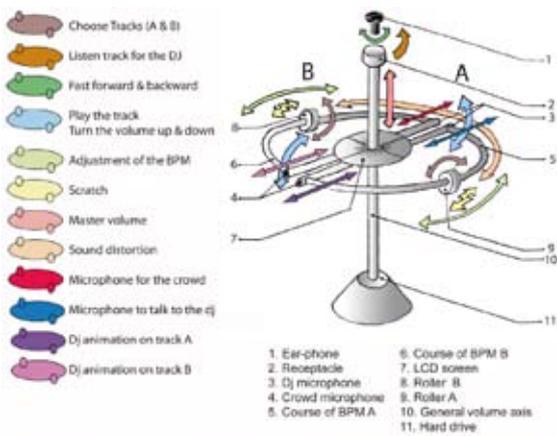
The design of Saturn is naturally inspired by the rings around the planet Saturn, but the lines also come from the attraction Girofoli which, through its rotating rings, combines a sports device and an attraction, providing thrills and sensations which can be compared to some Nasa tests.



**Figure 2** Saturn sound mixer model 1.

The work on textures and colors aims to emphasize the different moving modules. It gives the product a playful identity. This style combines practicality with an attractive look.

Saturn connects two soundtracks. This simplification allows continuous transition from one track to another with no break in the music, which is one of the most important functions of a sound mixing desk. The two half-circles symbolizing the tracks move in well-defined and distinct positions in relation to one another. This easy visualization of the volumes of tracks A and B facilitates



**Figure 3** Saturn sound mixer functional scheme

adjusted whatever the states of the two independent tracks. The volume of these tracks (A and B) is adjustable by means of the rotating movement of the half circles (half circle position high = maximum volume / half circle position low = minimum volume). The scratch wheels allowing the user to change music scan the curved cylindrical axes (like an abacus) in order to slow down or accelerate the rhythm. When activated in scratch mode the wheels distort the sound of each track. A large round screen included in the curvature of the two arcs acts as the interface, allowing the user to visualize the state of the music, the time code and the equalizer.

**3 Soundspace**

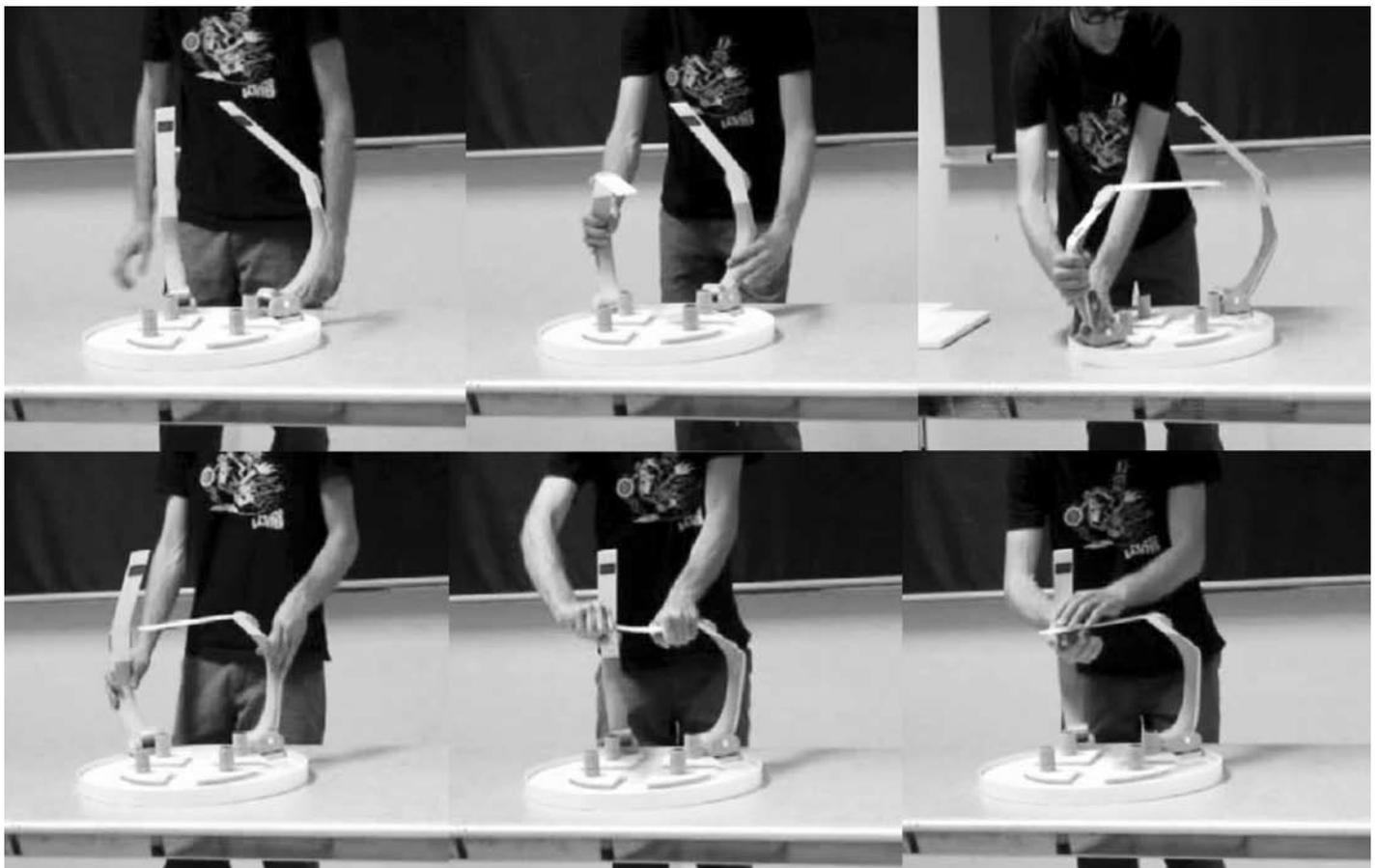
Soundspace is a sound mixer that uses a four-speaker sound system to adapt the sound to the space of the entire room.

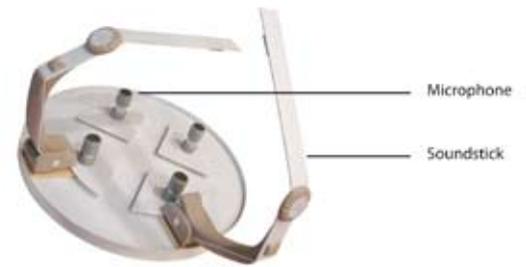
On the table there are four microphones, which correspond to the four speakers – front right and left, rear right and left. There are also two soundsticks which can play a track of music. There is a small speaker at the end of the stick that sends the sound to the microphones. The user then just has to move the stick to the direction of the microphone he wants to play the music in. This way it becomes possible to create stunning surround sound

**Figure 4** mixing the sound

sound mixing and reduces transition errors. Conventional sound mixers often offer poor display features for active tracks, and this can often lead to accidental interruption of music. Owing to its principle and shape, Saturn clearly indicates sound states and the activities of each track. In addition, the information of the interface (digital screen) confirms these actions and states.

In order to bring value to the product and to make it more attractive, Saturn acts on a vertical axis which symbolizes the general sound volume, and which can be





**Figure 5 and 6**

Soundspace sound mixer model 1, and cad model illustrating the sound twist

effects. A typical stereo diffusion is also possible, if a stick is placed between the two front microphones.

To turn the volume up, raise the microphones to bring them closer to the sticks. To create special sound effects, such as increasing bass and treble, the sticks must be twisted (see below).

#### 4 Conclusion

Saturn and Soundspace, through their principle and their shapes, aim at informing and supporting clearly the interaction between the user and the music. The user can activate the sound mixer with two-handed movements through a direct coupling of features and actions that can be performed at the same time. This is not the case with existing sound mixers, where interactions are focused on small, inaccessible and uncomfortable areas. The hands-on quality of these devices makes the music tangible and allows the user to interact directly with the music. It gives the users the opportunity to enhance their ability to operate and to interact on more than one function at the same time. By allowing the user to interact with their environment and with other people, these devices support and promote self expression and creativity, which are vital elements in enhanced interpersonal relations.

The next step will be the development of actual interfaces, in order to test them with different populations such as musicians, children, and DJ's. From these results we will be able to gain vital insights into what is meaningful for the users themselves as concerns their needs and expectations in different contexts of use.

their enthusiasm and their participation in the project, especially to Yannick Bresson and Renaud Gard, for their sharp actor skills.

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This research provides two key findings : from the young designers' point of view, the approach was centred on experience through theatre practice in order to develop a creative perspective on the concept. From the point of view of practical design, the approach has been defined in two steps : putting the features on centre stage, then improvising the object.

This method can be used as a basis to create breakthrough innovation projects for high technology interactive products, for which the actual user experience is central to the success of a product.

#### Acknowledgments

We would like to thank Jérôme Wacquier for theater practice, and the master course students of the Utc for



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ISBN-13: 978-0-9549587-1-8