

Designing for Senses: Exploring Experiential Qualities with Tangible Design

Katrine Høvsgaard Nielsen, Nina Mørch Pedersen, and Morten Winther

IT University of Copenhagen

Rued Langaards Vej 7

DK-2300 Copenhagen S

+45 7218 5000

{ khni , nmpe , mwla } @itu.dk

ABSTRACT

This article points to qualities in the interaction between children with developmental disabilities and tangible designs that offer sensory stimulations. The research focuses on non-goal oriented environments and has been driven by prototypes that materialize three design ideals questioning how tangible designs can contribute to sensory experiences. The qualities emerge in the interaction between child and prototype and will be discussed based on the notion of experiential qualities. By research-through-design the qualities of the design ideals have become visible and the research has indicated the importance of focusing on aesthetics, when designing for sensory and non-goal oriented experiences.

Keywords

Experiential Qualities, Design Ideals, Research-Through-Design, Participatory Design, Tangible Design

1. INTRODUCTION

Playing means being engaged in an activity without having any fixed goals, but just being in it for fun[1]. This, however, does not mean that we cannot learn anything from it. Snoezelen is a pedagogical and therapeutic practice that focuses on multi-sensory rooms for children with disabilities to experience and engage in their own pace and with utilization that places no demands[7]; see figure 1. As such, Snoezelen shares many values with the nature of play. Snoezelen is constituted by the relation between the child, the personnel, and the constellation of the sensory rooms. The constellation of the rooms can be varied through different sensory-stimulating artefacts, sound, and light. Snoezelen offers both arousals of curiosity as well as relaxation for the child.

During six months we have participated in the SID research project. SID is an acronym for *Sensuousness, Interaction and Participation* (in Swedish *Delaktighet*). The project explores how tangible technology can support and develop new forms of interaction in the Snoezelen concept[8]. This exploration is driven by prototypes that materialize questions regarding how tangible technology is relevant in Snoezelen. The prototypes are introduced and evaluated in three different Snoezelen centres

participating in the SID project.

Our role has been to participate as interaction designers and from a research-through-design approach we have explored how children with disabilities in compulsory school age in Snoezelen can be engaged by interactivity, touch, and light.

The SID project includes three design ideals: “*Bodily engagement*”, “*More than a button*”, and “*Essence*”. These have prior to our involvement been set up as part of Henrik Svarrer Larsen’s ongoing research programme and are the basis for the SID-project[8].

In this article, we describe experiential qualities that have been indicated in the engagement between children, Snoezelen practitioners and designs[3]. Although, what is presented in this article comes from designing for the Snoezelen concept, we will argue that this knowledge can be used in other design contexts and use situations as well.



Figure 1 Two Snoezelen rooms

2. THEORETICAL FRAMEWORK

2.1 Design Ideals and Research-Through-Design

Research-through-design allows us to look at possible futures by creating changes in the world through design artefacts[6]. Redström[6] proposes *programme* as a way of framing the research explorations in research-through-design. Being engaged by interactivity, light, and touch is the programme for the design experiments conducted in the Snoezelen centres. Design experiments[6] are used to elucidate our programme based on empirical work. The empirical work comes from introducing our designs to people in the use context[2]. Bagalkot et. al[4] offers “design ideal” as a situated manifestation that connects the programme and the situational experiments. Within our programme of investigating touch in the interaction with tangible designs, three areas are central in the SID project[8]. Obviously, these are reflected in our work and are considered as our design ideals. The design ideals are “*bodily engagement*”, “*more than a button*”, and “*essence*”[7]. *Bodily engagement* refers to interacting with a system through the engagement and awareness of ones body. *More than a button* examines how interaction with design can be more than just digital on/off, but instead offers a gradually alternating feedback that happens co-located. *Essence* explores the opportunities of the design possessing the ability to recognize and change over time; thus, being recognizable, yet unpredictably.

2.2 Experiential Qualities and Aesthetics

Within the interaction design community, Löwgren and Stolterman[4] have argued how the identification and articulation of experiential qualities is useful for both design practitioners and design researchers. Experiential qualities provide transferable knowledge that can suggest conditions for good use relevant for both design practitioners and researchers[3]. With our research we aim at investigating how and when our designs contain qualities that encourages the children in Snoezelen to be engaged in our designs. Udsen and Jørgensen[9] discuss different approaches on aesthetics. As interaction designers, the notion of experience-based approach allows us to investigate subtle qualities that cannot necessarily be articulated by the user, yet still, influences the engagement and experience of the system[9]. With the techno-futuristic approach, Udsen and Jørgensen[9] argues how the engagement of the body in the interaction allows for haptic pleasures of technology; thus, adding new dimensions to the aesthetic experience.

Löwgren and Stolterman[3] identify five main areas of experiential qualities that will serve as a basis for the discussion of qualities we have encountered in our process. In this paper we will use qualities from the areas of *motivation* and *immediate sensation*.

3. METHOD AND DESIGNS

Research-through-design and participatory design have been the central approaches in the SID project. To do participatory design and understand the Snoezelen context we have been engaged with personnel and 25 children in three Snoezelen centres. Several of the children have a lack of language skills, which is why asking through prototypes and looking at actual interaction, allow us to understand how to meaningfully contribute to the Snoezelen practise.

When we entered the project several designs were already outlined. In the project, the designs are not possible product

solutions, but are instead prototypes that facilitate the exploration of the design space. The designs were on different stages, but we have been a part of researching with, and iterating on, four of these designs. In practice, we have participated in the sketching and building process of the design, as well as taking the design to the centres for evaluation.

In this paper two of the designs will form the basis for the discussion. The designs are called *LivelyForm* and *LivelyButton* (figure 2):

LivelyForm reacts when it is being touched by closing and making LEDs light in different patterns. Removing your hand makes the design reopen. When the design remains untouched for a while it lures the user by subtle changes in the light.

LivelyButton is interactive and changing light glows through the fabric on the top. When touching it, two metal spirals start turning in the box; thus, making a perceptible waving movement and changes in the light. The sensitivity of the design can be adjusted to make the design interactable, without actually touching it, but just getting close to it.

The Snoezelen centres have been exploring and evaluating the designs. This has been the foundation for iterating on the designs and indicating experiential qualities.

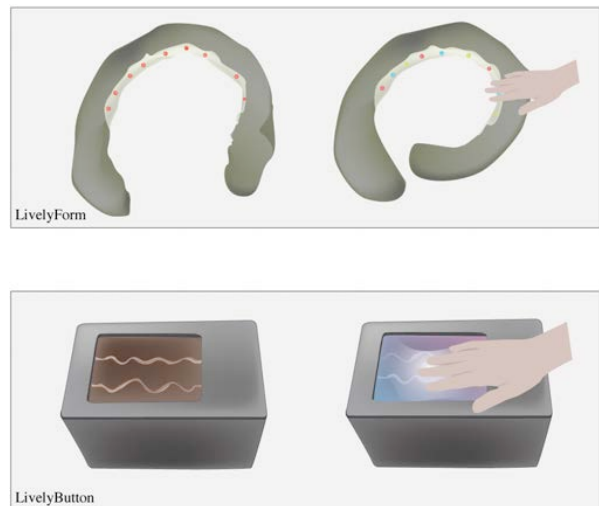


Figure 2 Illustrations of the two designs (*LivelyButton* and *LivelyForm*)

4. EMPIRICAL FINDINGS

4.1 LivelyForm

As we wished to learn about the luring element of *LivelyForm* we decided on experimenting with the light setting in the room. It seemed to have an impact on the children; especially, one of the boys showed greater awareness. His reaction on *LivelyForm* was to lift it up and place it around his neck. Furthermore, he pushed and pulled the design and tried to touch the diodes; however, the material that covers the diodes is not conductive, so it did not give him any feedback; see figure 3. There is a slight delay in the reaction from *LivelyForm*. This delay influences the understanding of the interactivity.



Figure 3 A boy interacting with LivelyForm where the design does not react to touch

4.2 LivelyButton

Our main purpose of *LivelyButton* was to explore the relevance of co-located feedback; action-reaction happening at the site of interaction. As designers, we expected *LivelyButton* to primarily address *hand-to-artefact*-interaction. In use we became aware of the diversity in ways the children interacted with the design; one boy put his cheek to the top of the box, a girl bit in the edge, and several children placed their faces closer to the box looking at the light; see figure 4. One of the boys has a reduced motor function. Nonetheless, he could still explore *LivelyButton*, as the sensitivity was adjusted to switch on the design if he was just close to it with his hands. Furthermore, he had difficulties focusing on the box in a bright room. When we moved to a darker room his interactions with *LivelyButton* became significantly more focused towards the design.



Figure 4 A boy interacts with LivelyButton with his cheek

One girl showed us that using the designs multiple times influenced her interaction with the design. After using *LivelyButton* several times, she reached out for it before it was even plugged in. She also intensified the pressure of her hand on the design. There is no intentional feature in the design to react to this behaviour, but when she pressed the surface harder, the metal spirals had difficulties turning; and the mechanic sound from the motor halted.

5. DISCUSSION

Our findings are all from our process with the Snoezelen practitioners and children, and do not provide any generalisable knowledge or theory. However, we wish to contribute to the

collective knowledge base among interaction design practitioners and researchers alike by reflecting on and pointing out experiences from the children's interaction with the designs. Petersen[5] is, for instance, designing for playful experiences for co-located people in domestic contexts. As we are also not designing for task-solving, but for being engaged in the experience and interaction with tangible designs, the qualities we have investigated in this project could be explored in other projects, such as Petersen's[5] concept about collective and playful family history.

5.1 Bodily Engagement

LivelyButton has shown us that engaging bodily with the design is more than just using ones body to interact with the design. In the previous section about *LivelyButton* several examples were given on how the children sense their bodies by bringing the design close to them. This was also the case for a boy who was introduced to *LivelyForm*. He too, began the interaction by bringing the design close to his body. In the techno-futuristic approach on aesthetics, Udsen and Jørgensen[9] point to examples on bringing the haptic pleasure, bound to physical objects, into digital designs in order to open up for new aesthetic and emotional dimensions in the experience.

LivelyButton has shown diversity in the way the children are touching and engaging with the design. Nonetheless, all children seem to get an experience from the haptic interaction; thus, the design allows for several ways of touching and interacting with it; without losing qualities in the experience.

5.2 More than a Button

Löwgren and Stolterman[3] present the experiential quality *fluency*. He describes it as something that is more than on or off. This is in line with the design ideal *more than a button*. The girl increasing her hand's pressure on *LivelyButton*; thus, getting altered feedback, is an example of a fluid interaction that moves beyond on or off. With *LivelyButton* the way the light changes as a result of time will be explored, but there are yet many aspect of the gradual feedback to be investigated.

We have seen indications of the importance of the tight coupling in '*action-reaction*'. If one interacted with *LivelyButton* for a while it did not return to its luring mode instantly. Comparably, *LivelyForm* is quite slow in its reactions and movement. This pattern of reactions makes it harder for the children to experience that they are the ones controlling the design.

With *more than a button* we have also explored the qualities of the interactivity being co-located. The boy touching the light in *LivelyForm* without getting any feedback from the design paves the way for the question: How would the experience have been different if this action had caused a reaction from the design? The example of the girl biting in the edge of *LivelyButton* suggests some advantages of the designs being co-located. She gets direct feedback simply by acting.

5.3 Essence

Löwgren and Stolterman[3] point to *autonomy* as an experiential quality that allows the system to act on its own based on what inputs are accessible to it. The system's ability to choose its own means can, for instance, be seen in *LivelyForm*'s behaviour of automatically opening when it is not being touched, and; thus, seeking to reach its goal. From an experience-based aesthetic approach, this subtlety can still be regarded as relevant in the experience of the interaction with the design. *LivelyButton* serves us with another example. The girl who made the motor unable to rotate, due to pressing it hard, gave a surprising feedback that also

gave an essence-like quality. Although she touched the design almost as before she now got both sonic and tactile feedback.

Löwgren and Stolterman[3] categorise *playability* and *seductivity* as qualities for motivation. *Playability* is a quality of the need to stay engaged with the design, whereas *seductivity* refers to the emotional and evolving relationship between user and design[3]. Although *playability* refers to the game-like qualities, the idea of “*just-one-more-time*” is interesting in the sense of, not forcing the children to stay engaged with the design, but the design motivating them to stay engaged. Some of this motivation comes from the seductive qualities in the establishment of relation between user and design. Whereas Löwgren and Stolterman use the notion of progression in the seductive quality, it seems in our case more relevant to think of it as process; a process that does not require improvement or continuity.

6. CONCLUSION

In this paper we have shown a variety of qualities in the aesthetic experience of tangible designs in Snoezelen. Working with three design ideals has proven useful as a frame for designing for our design programme about touch, light and engagement.

We have seen the importance of being able to explore designs close to ones body. *Bodily engagement* also showed how diversity in the way of touching and interacting with the design could give a relevant experience; especially, if the design is not used as we, as designers, would have imagined.

More than a button has suggested how co-located and gradual feedback in the interaction allows for an aesthetic experience and how the experiential quality of fluency seems relevant in our design space; however, an understandable coupling seems important.

Essence has given us indications for further investigation. The idea of interacting with the design in the same way but getting a different feedback and the idea of autonomy in the design as the subtle ability of the design to perform its own will seem relevant.

Our designs have been explored with practitioners and children from Snoezelen and it is difficult to claim that our findings are relevant to other contexts. However, we do believe that the qualities used in this paper can be relevant in other interaction

design settings as well; especially in areas that focus on non-goal oriented play-like processes similar to those in Snoezelen.

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