

# DESIGN EDUCATION AS RESEARCH PLAYGROUND

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## **ABSTRACT**

Most design researchers working in Design Schools are involved in design education. These two activities, research and education, have the potential to feed and inspire each other, because they are both based on the same underlying mechanism of generating design knowledge, both relying on learning by doing, yet both from a different perspective. This paper will illustrate the synergy between design education and design research with the case of the research domain of Tactual Aesthetics, a domain that was in large part explored and developed in collaboration with design students and in the context of design education.

*Keywords: Design knowledge, learning by doing, synergy, tactual aesthetics*

## 1 INTRODUCTION

Design education aims at developing designers on different aspects: design knowledge, design skills, design sensitivity, and design personality (personal stance), it involves the development of a student's *awareness* and *sensitivity* for these different issues. Design education is therefore not only a matter of knowledge transfer; for each one of these domains of development, *action* is required: learning by doing, learning from experience [1]. Altogether, design expertise can be characterized as a designerly ways of knowing [2] emerging from design experience [3].

Within design schools, design researchers (albeit researching *for* specific domains of design, or researching the design process itself) are often involved in the design curriculum. Yet, researching and educating are not always related to each other, and may be perceived as two different activities, where research informs education, but not vice-verse.

This paper will argue that design education offers a creative playground for the development of new fields of design knowledge, and will illustrate this statement by describing the development of the design research field of *tactual aesthetics*: designing products that are pleasant to touch. The case of the development of tactual aesthetics will show that education through research and research through education creates a beautiful synergy between student and tutors. Both follow a same process of exploration and discovery. Both share curiosity, fascination, and the thrill of developing new insights. This paper will first develop the insights of knowledge generated in designing, in researching and in education. Next, it will introduce the different elements that our curriculum has to offer to make this synergy happen.

## 2 GENERATING DESIGN KNOWLEDGE IN RESEARCH & EDUCATION

Design is often described as problem solving, yet the underlying mechanism is very different from solving a puzzle. When solving a puzzle (e.g. jigsaw or crossword), the solution is unique and pre-given. One *finds* the solution. Design is a matter of *creating* a solution for a specific problem, knowing that the possible solutions may be multiple. Design is therefore in its essence an exploratory process into the unknown. It is not finding what already exists (and was hidden), but creating what is not there yet. It is *through* this design process that designers develop their design knowledge and design skills. Designing is a process of learning by doing: the design knowledge and skills are *generated* from the design process. Because designing is looking for solutions that do not exist yet, the knowledge generated from a design project may contribute to the general body of design knowledge within the design community, and thereby be relevant for other designers. This design knowledge is therefore

often shared among designers by presenting their design projects at exhibitions and conferences, and publishing in design journals and books.

In design education, developing a student's design knowledge and design skills is achieved by this same process of learning by doing: it is in the design process itself that students develop their knowledge and skills. Moreover, students contribute to each others development by sharing their experiences, and by presenting their findings to each other. Moreover, design education can model its design exercises to focus on specific area's of design, thereby generating specific knowledge and skills on a particular topic. It is through the design exercises in design education that specific research domains can be explored. Design education is therefore the platform par excellence for design researchers, to develop in collaboration with the students new insights in design.

Design researchers involved in design education have the opportunity, through the design and design-related exercises, to collect the design knowledge generated by the design students, to analyze and reflect on this knowledge, to translate it into design theory and design tools, and to evaluate these theories and tools within design education again. This cyclic process of knowledge generation between education and research is illustrated in figure.1 It is this cycle of knowledge transfer that keeps both education and research vital, exploratory and in continuous development. Because of this vitalizing, exploratory energy, design education could be seen as a research playground, where design researchers and design students meet to explore the unknown.

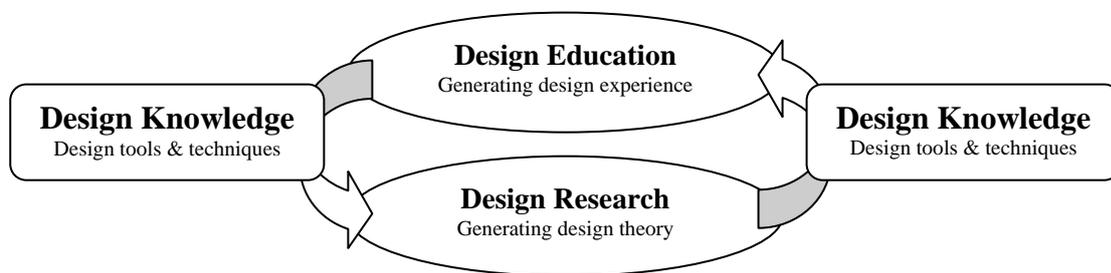


Figure 1. The generation of design knowledge from the synergy between research and education

### 3 THE ELEMENTS OF THE DESIGN PLAYGROUND

The curriculum of the faculty of Industrial Design at the Delft University of Technology offers several opportunities for design researchers to participate in education, thereby enriching the design education and simultaneously their own research.

First, researchers can be involved in the general design courses of the bachelors and master programs. These courses are focused on the design process as a whole, yet each course has its own emphasizes. Within these general courses, researchers are involved based on their general insights in the design process, and not based on their specific research area. Therefore, researchers participating in these courses as design tutors have the opportunity to see how his/her own specific topic is addressed and managed by students in a broader context, especially how it is addressed in the context of the other aspects of design. It is through these general courses that design researchers stay in touch with the general practice of design.

Second, design researchers contribute with their own expertise within their research domain to specialized design courses. As a researcher in tactual aesthetics in design, I was involved in several courses where tactual experience is a relevant aspect. Examples of such courses are: the master course Product Use, Understanding and Experience, design courses for first year students emphasizing the aesthetics of product design with a specific assignment on touch, design courses for master students including specialized workshops (such as Exploring Interactions), electives for master students (such as Multi Sensory Design [4]), and mentoring graduation projects on one's research topic.

Next, researchers develop their own (elective) courses, which focus specifically on design education within their own research field. In my case, I developed the elective tactuality in the past ten years [5], aiming at the development of the students' awareness and sensitivity for the tactual aesthetic aspects of product design, and their knowledge and skills to design for pleasant tactual experiences.

## 4 EXPLORATIONS IN THE DOMAIN OF TACTUAL AESTHETICS

When starting the research domain of Tactual aesthetics ten years ago, the overall research questions addressed the development of insights in the phenomenon of the tactual experience, and simultaneously of design tools and techniques to design for pleasant tactual experiences. The first initiatives with design students were merely explorations through making. In several pilot-workshops, students were asked to create objects that were pleasant to touch, objects that reflect the experience of music, and so on. These first explorations led to the awareness of the fact that touch is a tacit experience, difficult to express in words, thereby difficult to access. It became evident that to develop the research domain, we need a conceptual framework to make it accessible. Once the framework is developed, it is used to explore the different aspects of tactual experience: its pleasantness, its meaning, and the construct of specific tactual experiences such as intimacy and non-functional touch.

### 4.1 A conceptual framework to describe the tactual experience

The conceptual framework describing the phenomenon of tactual aesthetics is constructed through grounded theory, using as data stories about tactual experiences, collected using questionnaires. It is common practice within grounded theory, where the theory emerges from the data, that the results are discussed with peer-researchers. In this case, the results were discussed with the students that participated in the courses Tactility, and assessed on usefulness in the practice of product design. In each course, a refined version of the framework was presented, worked with, and assessed on consistency.

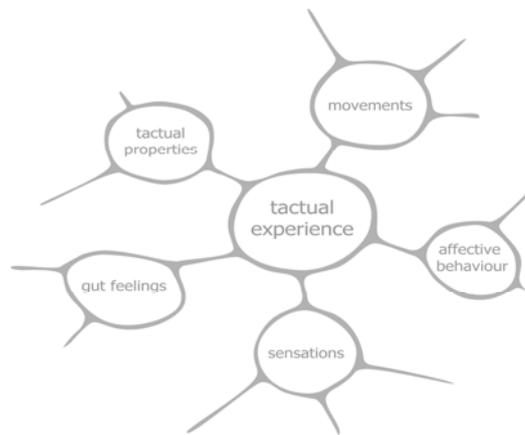


Figure 2. The five domains of tactual experience

This eventually led to the final version presented in the thesis 'Aesthetics of Tactual Experience' [6]. In this framework, the tactual experience is described through 5 domains (figure 2): motivations to move, tactual properties of the objects, affective behaviour of the object, bodily sensations of the user and gut feelings of the user. Together, these five domains can be characterized as the body language of objects. It is the insight that touch between people and objects can be understood as body language that opens up the phenomenon to designers to actually design for it. The relevant design questions in designing for touch is: what do you want the object to express through its body language? What are the appropriate properties and behaviour of the object, and what are the appropriate bodily sensations and emotions of the user?

### 4.2 The Tactual Experience Guide

Like for wine tasting, a conceptual framework including a set of descriptions of specific aspects is meaningless without personal experiences that illustrate these descriptions. To support students in exploring their own experiences and thereby giving personal content to the framework, a tool is needed to systematically assess the 5 different domains of tactual experience. This tool, the Tactual Experience Guide, was developed as a set of 6 mind maps: 5 for each domain of tactual experience, and one concluding mind map to assess the over-all aesthetics of the experience. This mind-map structure allows students to explore and document their findings in a free and associative way, going back and forth between the different domains. The maps were developed, assessed and discussed in the course Product Use, Understanding and Experience, where students had the assignment for the lecture on touch to use the Guide to explore a specific object, and to redesign the object to elicit a new defined body language, based on the findings in the Guide. Again, in each course a refined tool was

presented and assessed with the students, to eventually result in the final version that is now used in the different courses and graduation-projects.

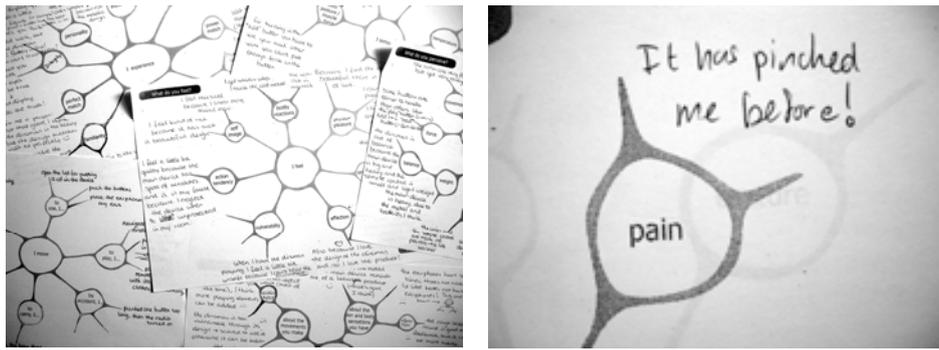


Figure 3. The tactual experience guide used and developed through the courses

#### 4.3 Tactualization and communication tools

In design, sketching tools mainly address the visual aspects of designing, neglecting the other senses. Especially in the first phases of design tools to sketch for the other senses are lacking [7]. The course Tactility revealed that when designing for touch, students don't sketch with pens or on a computer, because they soon discover that these are not appropriate means. They explore different modes of expression instead. In the very first stage of the design process, 2D collages are used to communicate the desired experience one is trying to achieve, leading to specific insights into how to create these collages. Students find out that to communicate in an empathic way, these collages need to show people that are actually experiencing touch. Figure 4 shows an example of pictures that were used to express specific experiences. Once the desired new experience is defined in collages and words, students discover that creating 3D collages to illustrate the different tactual properties that will contribute to this experience (figure 4) is a fruitful first stage in materializing. Next, to integrate these findings, the tactual sketching is done through modelling, using all kinds of materials such as clay, wood, dough, or any material or object that is appropriate to explore the tactual properties of the design. Despite the insights gained so far, tactual sketching is still a difficult aspect of design for touch. Students become frustrated because the model is so far remote from how it should feel. In contrast to visualization, 'Tactualization' is clearly a domain that still needs to be developed.



Figure 4. Examples of 2D and 3D collages

#### 4.3 Feel good organic shapes: creating a typology

One of the design exercises in the Bachelor's first years program is to transform a piece of clay into a shape that is pleasant to touch when holding it in different positions (figure 5). The clay models are shaped without the students looking at them. Next, a second clay model is made, a styled version of the first one. The aim is to make it look beautiful, next to feeling good. The result is a visual and tactual aesthetic shape. Currently, there is no theory on the pleasantness of organic, curved shapes, yet such a theory and insights in how to create them would be beneficial for the design process. Working as a researcher on tactual aesthetics in this course allowed me to observe how the models were created, to discuss with the students what shapes were promising to go on with, and eventually to collect the first (only tactually aesthetic) models for a first attempt to establish a typology of organic shapes that feel good. The analysis of the models, and the resulting insights, are directly beneficial for the next group of students following the course. The input will allow them to create models that are more

sophisticated, and that will explore tactual aesthetics more in depth, thereby, in turn, contributing again to the theoretical insights.



*Figure 5. Different organic shapes created to feel good*

#### **4.4 Insights in the benefits of non-functional touch**

In the elective 'Tactility', students create a collection of objects that are pleasant to touch. This led to the insight that many objects are touched just for the sake of the touching, without a functional purpose. This behaviour was defined as 'non-functional touch', such as clicking with a pen, or chewing on it, swinging it, and so on. Students discovered that they each have their own preferred non-functional behaviour ("I'm a real swinger", "I'm a real stroker", "clicker", and so on. The students analyze what benefits this behaviour has for them.



*Figure 6. Objects created for pleasant, non-functional touch*

Throughout the years we discovered that specific behaviours can be related to specific needs of people, such as the need to concentrate, or to daydream, to pass time, to unstress. Students explore what tactual properties elicit this behaviour and the desired effect, and create a perfect object for it (figure 6), leading to general insights in required tactual properties for specific desired effects. Future courses will explore how these characteristics can be applied to functional product to give them additional meaning.

#### **4.5 Insights in specific body language of objects**

In the second part of the course Tactility, students work on an individual design project of 4 weeks. The project starts with the analysis of an existing product they do not like to touch, because of the personality the object expresses through its body language. For example a stubborn remote control, a mean lash curler, a hysteric kitchen utensil, and so on. During the exercise, students formulate the experience they would like to have with the product, what its body language should be. These desired experiences are starting points for the re-design, making each design project an exploratory research project into the specific domain of that specific experience. The general question underlying these research processes is: what tactual properties will contribute to the desired experience? These explorations into a specific experience can be seen as small scale research projects. For example, one of the recurring themes is that objects feel as if they don't care about the function they are performing, or as if they are dead. Also, students explore how objects can be designed to feel as if they care about their performance, as if they were alive and cooperating in an engaged way. Presenting the findings to each other allows the students to experience and comment on each others work. Again, collecting these findings as a design researcher, and presenting them to the students of the next course, allows for more subtle and sensitive design solutions.

#### 4.6 Reflections on beauty in tactual experience

During the course PUUE, students assess the aesthetics of the tactual experience of an object of their own choice by using the Tactual Experience Guide. The starting point for this aesthetic assessment is the insight that tactual aesthetics is very much related to the object 'feeling good', rather than the object 'feeling beautiful'. However, after some years we started to question this starting point with the students during the course Product Use, Understanding and Experience. Students discussed and wrote a short reflection on the concept of tactual beauty. Does it 'feeling beautiful' exist? And if so, how does it differ from 'feeling good'? Most students agreed that beauty in touch exists. It is involving imagination, and represents a 'higher level' of aesthetics than just 'feeling good'. For the students, the results were inspiring for their redesigns. For the design researcher, the results were opening up a new approach to tactual aesthetics. The results will be analyzed more systematically, leading to a first tentative to describe the beauty of touch in product design.

### 5 CONCLUSIONS AND DISCUSSION

The title of the paper refers to design education as a research *playground*. The concept of a playground represents the prerequisites that design education and design research should have to ensure this synergy between the two. In this research playground, design researchers and design students meet to create new insights together, through designing and reflecting on these designs, thereby generating design knowledge. Students that felt uncomfortable in the Tactility courses were the students that expected a step-by-step method to design for pleasant tactual experiences. This playground does not follow other rules, than the rule that one should have an open, creative mind, motivated to create something new without on forehand knowing what this could be. Learning by doing, moreover, learning by exploring. Playgrounds that offer such experiences are playgrounds where one is actually challenged to build, to create constructions that grow through insights and experience, without having an initial plan. Examples of such experiences are: building rafts, tree-house, sand-castles, and so on. Every new construction is more elaborate, complex and smarter than the previous one. One of the most important aspects of such activities is that the building (in our case the designing) is experienced as an attractive process itself, where failure may even be experienced as one of the fun parts, in any case parts where one learns the most (see figure 7). Important ingredients are: passion for the research domain, curiosity, and the pleasure of adventuring into the unknown.



Figure 7. Building tree huts, sand castles, rafts, etc. together: unplanned, organic processes leading to creative structures that generate insights, sensitivity, knowledge and skills.

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