

Designing in Skills

Nurturing Personal Engagement in Design

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Abstract: Potentialities of skills in design are intriguing. Skills open up new perceptions of the world, transform human understanding and engagement with the world itself. Our explorations suggest that leveraging existing designer's skills and training for new skills might remarkably contribute in designing for richness of meaning.

We developed several skills-based techniques and validated them through a number of workshops. These techniques encourage participants to make before thinking, to reflect on the outcomes of making, and proceed by iterations of reflection-on-action. Also developed are techniques to increase the frequency of such iterations to minimize loss of meaning by abstraction, and techniques to foster depth of reflection. We organised these techniques into a framework, *Designing in Skills (DiS)*. *DiS* nurtures personal engagement of designers, compelling a sense of responsibility; it supports designers toward what we call the "first-person perspective", enabling application of individual sensitivities. This paper presents firstly the motivation of our work and the surrounding theory. Subsequently, it introduces the framework and its development, using design cases that have led to its consolidation. It illustrates how *DiS* prepares for design practice and reflects on the theme of experiential richness.

Key words: *interaction design, skills, engagement, first person perspective, expressivity, experience, meaning, aesthetics*

1. Introduction

1.1 The crisis of natural interactions

In a world in which the role of design is over-exploited and applied to all categories of life with disparate connotations, intentions and underlying motivations, the question of meaning arises with strength. How to design meaningful products and systems? In a strictly phenomenological approach, any experience is inherently meaningful: by acting in the world, people make sense of it and find meaning [13]. Thus meaningfulness *per se* is not the aim. The real issue lies in how to design opportunities for a richer meaning to emanate from a system, when interacted with it. "Richness" consists in the ability of a use-experience to respond to one's intentionality, to resonate with one's sensitivity, but also to open up new insights, perspectives and new horizons of sense, within one's social context. Not necessarily everything that is designed *has to* offer "richness" in interaction. On the other hand, we observe that too much has been designed without "richness" as a main requirement. Our choice to focus on this requirement, aims at reaching more balance between rich, poetic designs and functional and effective ones. The relevance of a designerly reflection on meaning shows its importance, within the on-going discussion,

synthesized for instance by Hornecker, on the reassessment of the concept of affordance and its application in the design for tangible systems. Hornecker, among others, advocates the necessity of a different approach, to respond to the failed promises of natural interaction [6].

1.2 Affordances and control

Following the phenomenological line, affordances might be designed for, but cannot be controlled. Exactly in this apparent paradox, lies a focal question, which is destabilizing the scientific communities dealing with human computer interaction. This statement seems paradoxical if the designer claims for absolute control: believing that by designing a system, one can forecast all shades of affordances and the meaning the system will “have”, is the misguiding foundation. What can be designed are *opportunities for meaning to arise* during the product’s use and are *potential* affordances. Every subject interacting with what is designed, will modulate its meaning according to his subjectivity, i.e. his perceptual abilities, prior experiences (and therefore acquired knowledge), socio-cultural background and values. The fact that there is this openness and ambiguity in what is designed should not bother designers. Being aware of it, rather encourages us to indulge in the unknown, to play with the elements of ambiguity and to explore unbeaten paths.

1.3 The discomfort of the unknown

The common (but not universal) discomfort that emerges when acting in the aura of ambiguity, is partly due to the fact that in the world of design (practice as much as research), we are still lingering in the tradition of usability as the ultimate requirement; we are still hesitating in questioning the absoluteness of the requirements set by traditional science. Disciplines promoting usability have traditionally dealt with maximising performances in workspaces, minimising risk and error possibilities, and their approach is rooted in cognitive sciences. Now the concept of designing for user experience is rapidly catching on even in HCI as an alternative to traditional usability metrics [4]. Experiences, offered by products and systems surrounding us, address every aspect of our life, not just performance related activities. The legacy of usability is too often an inhibitor in tapping into the unknown and it is an inhibitor, which is difficult to ignore. Usability goes hand in hand with control and procedures. But these aspects are not always relevant in the design of all everyday systems, since the functional aspect is often not the main one. Ease of use, “heightened legibility and seamlessness of interaction between people and information” [7], which allegedly could be supported by natural interaction, are not the final aim of every design endeavour. They might be crucial in the design of an oil plant control system, but not that critical in the design of a mobile telephone or of an educational system. This perspective has been, since a while, widely explored in the direction of Aesthetics of Interaction [2] [11] [12]. Overbeeke and Wensveen claimed, already in 2003, that interfaces “should be surprising, seductive, smart, rewarding, tempting, even moody, and thereby exhilarating” [14]. Since it is experience design we are now discussing, it is useful to introduce two concepts and their contradiction in order to provide the reader with a clear impression on our stance. After that, we concentrate on describing our take on the matter of experience and we dive into the illustration of how we address experience design.

1.4 Expression vs. Representation

Experiences invest people in their complex whole. People perceive (*aisthesthai*), i.e., become aware through their senses and, therefore, experience. Experiences and the meaning arising through them, is enabled by the

complexity and the entirety of the human body. It is thus the body as a whole that has to be addressed, while designing for experience. When the designer fails to address this entirety and complexity, the design is deprived of its potential expressiveness; the designer misses to design opportunities for meaning to arise. For instance, Jacob's Reality Based Interactions [9] are rooted in skills and expectations of the real world, but they tend to neglect the richness of our *being and acting* in the world. They indeed take into account the perceptual-motor skills, but they do it from a cognitive perspective. This results in designing *representations of reality* (like the AR-Jam Books, example provided by Hornecker in [6] to show how partly representational tangible systems can fail to fulfil expectations of the people interacting with it).

Representations, by definition, are confined in space and time. They abstract some of the elements of their focus and concentrate on those. Redström explains the difference between a "lived" architecture and an image of the same piece of architecture: an image of an architecture, does not convey the spatial experience, since it "removes temporal unfolding", it "fixat[es] perspective", it "enforces the act of perceiving an object as a matter of passive observation from a distance" [15]. In other words it does not allow a personal engagement and an active (dynamic) choice of a point of view, which would allow new opportunities of meaning to emanate during the interaction.



Figure 1 – An evocative visualisation of the power and subtlety of expressivity vs. the platitude of representation. The yellow smiley indeed conveys the message of unhappiness; still it is a simplified, direct and dry message. The profile of Marta Graham dancing conveys a much more complex set of feelings, in which unhappiness emerges, next to many other emotional conditions (yearning, internal struggle, search for new balance and new reference points and so on). Although this image is also a visual representation, it is far richer and more expressive than the abstracted smiley. This shows that, even in representations, there is a wide gradient of expressivity.

When representations are designed, the real world – the world we experience, move in and know – is separated from the represented world of the designed system. Besides, to understand representations, prior knowledge is necessary. This can result in Hornecker's observation that "apparent realism may mislead users to expect the system to behave 'like the real thing'". Consequently, the alleged "natural interaction" fails. Hornecker states that "constraints and information advertising affordances are just as important as affordances" [6]. The problem lies in what Hornecker calls the "apparent" realism and in the "like" real things. Design should not mimic reality; it should reinforce it, add to it, play with it, open up new horizons, make fun of it, unveil its subtleties and inspire dreams. This can happen if, while designing, we work on the expressivity of a system, on its aesthetic potential, instead of defining the way it can represent reality. Especially when designing interactive or intelligent systems, products and services, the merger of the real and the digital are challenging. It often boils down to Ishii's notion that "The key idea of TUIs [Tangible User Interfaces] is to give physical forms to digital information. The physical forms serve as both representations and controls for their digital counterparts." [7].

Van Dijk et al. [1] challenge this engineering way of thinking by stating that: "the essence of tangible interaction design is not just to give physical form to digital state. Instead, the objective may also be to design new roles for digital processes as an element in the larger process of meaning generation, sustained by the embodied engagements of a person with her social and physical environment at large."

How to do design for expressivity is then the next question to address. Methods and approaches to respond to this challenge concerning aesthetics are greatly needed.

2. Skills, the key of meaning and expressivity

Let's go back to what we were arguing about experience. Use-experience is influenced by many factors. As already mentioned before, elements such as prior experiences (and therefore acquired knowledge), socio-cultural background and values have an impact on people's experience. An extensive amount of research has been led on these themes. Being fascinated by the potential that ecological psychology [5] and the philosophical branch phenomenology [13] can mean for interaction design, we focus on people's dynamic engagement in the world. Dreyfus, in interpreting Merleau-Ponty, claims 'embodiment' and 'skilful coping' to be unique characteristics of man; that is, we are able to engage with the world and develop skills while acting in the world [3]. In our research, we concentrate our attention on people's (emotional, perceptual-motor, social and cognitive) skills, which empower to (subjectively) interact with the world, in a continuous dynamic, meaningful dialogue.

Potentialities of skills in design are intriguing. Skills open up new perceptions of the world, transform human understanding and engagement with the world itself. Our exploration suggests that leveraging existing designer's *skills* and training for new skills might remarkably contribute in designing for richness of meaning.

We have developed several skills-based methods and techniques and validated them through a number of workshops. In this paper we present the integration of these methods and techniques into a framework: *Designing in Skills (DiS)*. This is a framework, since it "is a reflection that comes after designs", of which "ingredients are theories, debates and the design process"; it hopefully constitutes a way with which design researchers work to generate knowledge and contribute to theory [10]. The *DiS* framework encourages participants to make before thinking, to reflect on the outcomes of making, and proceed by iterations of reflection-on-action. We encourage them to exploit all their skills, also the non-design related skills, in their design process to enhance experiential richness. We include techniques to increase the frequency of design iterations to minimize loss of meaning by abstraction and techniques to foster depth of reflection. Moreover, we employ a wide variety of generative techniques to address different sensorial configurations and communicate the subtlety of the design insights: videos, documentaries, mappings, blogs for daily reflections and experienceable prototypes (physical hypothesis). And last but certainly not least, The *DiS* framework nurtures personal engagement of designers and compels a sense of responsibility. It supports designers toward what we call the "first-person perspective" enabling the application of individual sensitivities. In conclusion, *Designing in Skills* acts on different levels:

- It supports toward a deep understanding of the designers' skills, so that designers can capitalize on their own expressivity, trust their senses and intuition, and dare to include their own skill's perspective in their design;
- It urges designers to share their "skilful point of view", i.e. their sensitivity, along the design process to catalyse constructive dialogue and reflection among the designers and other stakeholders involved;

- It encourages designers to open up to new design values, contributing to exposure to unfamiliar meaning and richer experiences, in addition to the Cartesian glorification of our cognitive capacities, which seems the primary mode in design nowadays.

By letting designers use *DiS*, we hope to tune them towards skill-based designing in their design practice, in which they explore new design values and directions, in which their designs include their own skill perspective as well as enable users to open up for developing new skills, and in which they share their skilful points of view in the often multidisciplinary projects.

3. Designing in Skills

Before we describe the development of *DiS*, let us briefly look at its origin, our Rights through Making (RtM) approach [19]. During the multicultural RtM workshops, we asked participants to design together through Making, in short cycles of reflection-on-action, in order to overcome the cultural and language barriers and have them trust their designerly skills. However, designing and communicating through Making, instead of *via* talking and thinking, appeared to be difficult. We tried the use of silent presentations and working sessions to force them towards Making. Although these techniques helped them to become aware of the fact that they had to build and present experienceable prototypes, the students were too frustrated by not being able to talk, and lost their focus on and their ability of elaborating deep reflections. We realised that we had to develop methods and techniques to support the sharing of Making. The students needed methods to minimise the use of language, abstraction and reduce the opportunity to pull themselves out of the process and act 'objectively'. They needed methods able to empower them towards Making, by trusting their senses and intuition and building a constructive dialogue via reflection-on-action.

Therefore, we organised a variety of workshops as of 2010, in which we worked with students, designers and design-researchers, which ended in forming our *Designing in Skills* framework, as shown in Figure 2. *DiS* has been developed in 5 workshops. Twice with Master's students during workshops at the Department of Industrial Design of the Eindhoven University of Technology (the first was *Designing for Points of View* and the second was *Hephaestus and the Senses*), once with designers and researchers at the CHIItaly conference in 2011 (called *Integration of Skills and Intuition as Vehicles for Ethics*) and twice with Bachelor's students of the Umeå School of Architecture (called *Dense Spaces 2012* and *Dense Spaces 2013*). Each time, the approach has been fine-tuned, capitalizing on the reflections on the previous experiences. The number of participants ranged between 10 and 40. The length of the workshops spanned from 1 day (at CHIItaly), to a week (*Designing for Points of View* in Eindhoven and *Dense Spaces 2012* in Umeå), to two weeks (*Hephaestus and the Senses* in Eindhoven and *Dense Spaces 2013* in Umeå). The 2 *Dense Spaces* workshops in Umeå were integrated in a monthly project; the outcomes of the work on skills impacted the rest of the design assignment as well.

3.1 The Steps within the DiS framework

As Figure 2 shows, *DiS* exists of five core activities, which we will explain briefly:

1. **Reflecting on own skill.** Participants are asked to choose a personal skill to focus on (e.g. accordion playing or knitting), thus taking a first-person perspective. Every participant, who we call as of now *Person I*, makes a short documentary on the meaning of his skill. In this way, he can directly explore his own point of view and skill, and prepare himself for transferring the findings to another participant.

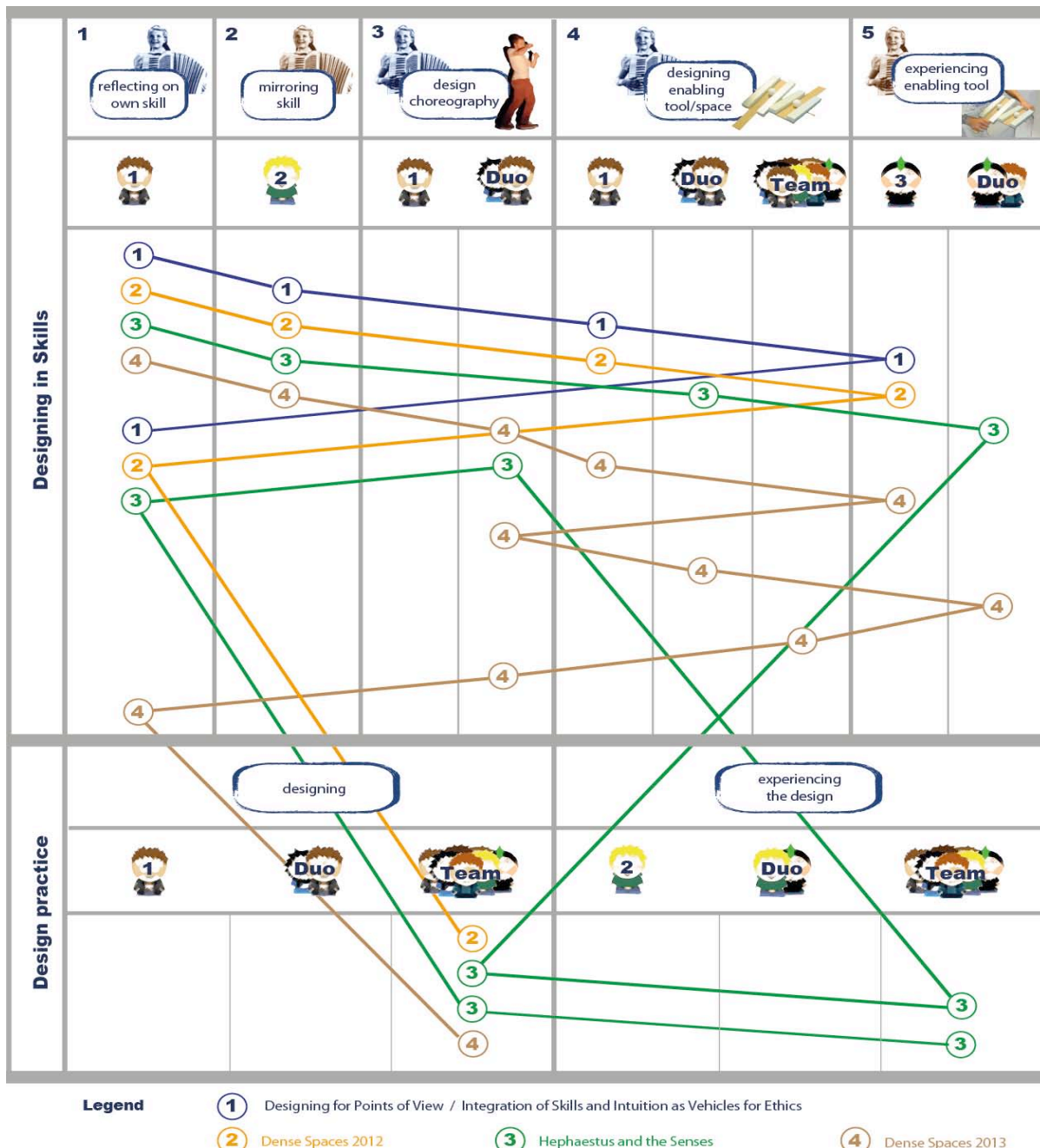


Figure 2 - An overview of the different workshops to develop the Designing in Skills framework. Each column is a step, as illustrated in this chapter. The application of the framework has repercussions on Design practice.

2. **Mirroring skill.** A fellow participant, *Person 2*, after conversing with *Person 1* and trying out his skill, makes a documentary of *Person 1*'s skill, offering his point of view on its meaning. By watching such a "mirror", *Person 1* can scrutinize meaningfulness and his point of view again. This mirror sharpens *Person 1*'s perception and understanding of his own skill.
3. **Design choreography.** In order to properly identifying and richly describing the perceptual motor qualities of the skills, the third step is based on bodily explorations and design choreography. In our case with the help of design choreographer Sietske Klooster, students physically explore the subtleties of their own skills, but also

how these could merge with other people's skills. The process of merging skilful points of view is not an oral discussion but a physical conversation, in which statements can be supported by the bodily experience of the single qualities.



Figure 3 - During *Haphaestus and the Senses* in Eindhoven, Chris teamed up with Hanneke and they explored the cross-section between fixed gear biking and making pasta, as the video [22] shows. After these movement explorations, the students worked on translating these movements into an enabling tool (a small space with a large soft disk to emphasise the transition between increasing and releasing tension). The main purpose of this 'creative body' assignment is to emphasise the importance of using one's own body during the design process.

4. **Designing enabling tool/space.** Subsequently, *Person 1* merges these points of view (his own, the mirror's, and the insight given by bodily explorations) and extrapolates one or more key aspects of his skill. Based on it, he designs an enabling space or an enabling tool, to let *Person 3* experience *Person 1's* meaning of his skill. Since unskilled *Person 3* can never experience *Person 1's* skill in the same way, participants are encouraged to explore all senses and to design their enabling tool beyond the boundaries and context of the original skill. Finally, *Person 3* makes a documentary about his experience of the enabling tool or space. This entire step can also be done in couples or in teams. By creating tools and spaces based on multiple skills, the participants are encouraged to reflect on and react to multiple skills, thus crystallising the core of their own skill and moving toward experiential richness in the combined tool or space.

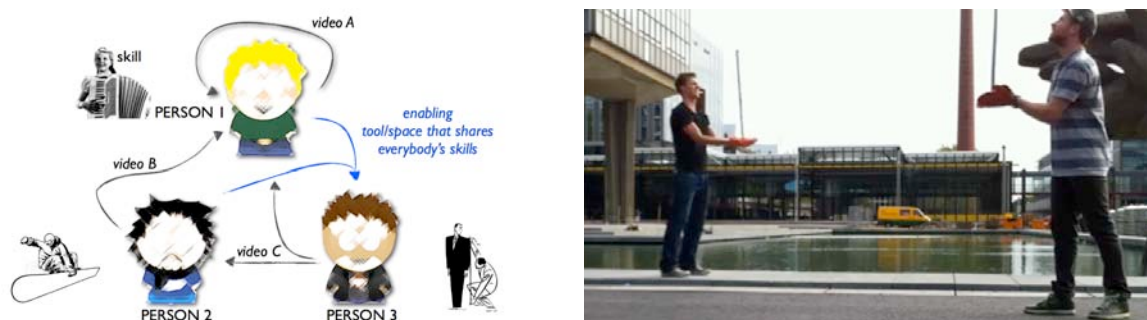


Figure 4 - Chris joined his skill (fixed gear biking) with Robert's skill (hockey), into an enabling tool focusing on control: a glove with a loosely connected stick that can be balanced by facing palms to the sky [21].

5. **Experiencing enabling tool/space.** *Person 3* now experiences *Person 1's* enabling tool. Based on a discussion between the two people and on a reflection-movie that *Person 3* realizes of his experience of the tool, *Person 1* draws more material for further reflections about his own skill. For example, Yves Florack designed a glove-like cutlery tool for Sijme Geurts, to compare the experience of snowboarding to carving smoothly through a sandwich by means of a prosthesis (See Figure 5).

In this paper we only explain the *DiS* framework and reflect on its development. For detailed descriptions of the different workshops applying *DiS*, one can read [16][18][19], or watch one of the movies [20].



Figure 5 - Sijme is trying to learn the skills of making sandwiches with Yves's snowboarding-enabling tool.

3.2 Using *DiS* to prepare for design practice

As said, the aim of this framework is to encourage designers towards skill-based designing in their everyday design practice. Therefore, we included in the latter workshops also general design assignments, to explore if *DiS* (1) helps to explore new design values and directions, to encompass designers' skillful perspective in their designs, and (2) can enable users to open up for developing new skills, through these designs, or to explore if *DiS* (3) helps designers to share their skillful points of view in the often multidisciplinary projects.

In the two *Dense Spaces* workshops led at the Umeå School of Architecture, the technique was applied and connected to a broader assignment of the course. Students were asked to merge findings of the explorations on skills in the design of a space. They had to work on a specific political theme and physical space and (re)design it, according to the previous reflections on skills. In the *Hephaestus and the Senses* workshop in Eindhoven, students first had to design a bread-sharing space during lunchtime (a half day assignment) and the second week of the workshop they had to design an *Engagement Probe* to socially connect en engage people through their skills [12].

4. Reflections

We developed *Designing in Skills* during five workshops. In this chapter we reflect upon aspects that we have observed being relevant, to encourage designers towards skill-based designing. We illustrate these reflections with examples, drawn from the different workshops.

4.1 Speed

We experimented accelerating the process in a way that the time for thinking was out; there was only time for making. Making movies or the enabling tool was a process of simultaneous action and reflection. Participants were forced to trust their intuition in the choices they made, without having the possibility to ground them on elaborated rationalised explanations. On the one hand, this worked very well: no useless talks. On the other, the negative consequence was that the results are not as refined as in other cases. What was especially difficult was to include the mirrored point of view in the design of the enabling tool (using the results of step 2 and 3 in step 4). Being able to transfer designerly reflections into an actual design, requires digestion time. One possible solution is to condense the time available for the single exercises, but at the same time, increase the number of iterations of the same exercises. Within *Hephaestus and the Senses*, we kept the first step short, but increased the time to reflect on the skill via bodily explorations and the design choreography. Moreover, we increased the time of the design process. At the same time, we found that it was necessary to elaborate further techniques to facilitate the

(1) description of the skills' qualities emerging from the exercises and the (2) translation of these qualities in the following design step. This will be object of further explorations.

Videos showed to be a very effective tool to support reflection, during a fast making cycle. One is obliged to take a first person perspective (while filming, one takes his own point of view) and to trusts his intuition. At the same time, one's focus is "designed" on the go, while gathering images, impressions, dynamics, and atmospheres. They work very well under pressure and students are mostly very satisfied of the mode that making movies forces them into and of the results that they generate. Besides, they mostly work visually, avoiding words. Speed can be taken to an extreme, as it was done during the workshop at CHIItaly: we went through all the steps (except step 3, the exploration through bodily movement) in only one day. It is feasible with trained designers; it might be more problematic with students. Supporting them with video templates, can be of help.

4.2 Increased number of iterations

An extra iteration using bodily explorations was introduced for the first time in the workshop *Hephaestus and the Senses*, since we realized that, after having started to design, students were forgetting the bodily awareness that they had been gaining during the explorations of skills. During this workshop, we created the time to go back to the body and deepen the previously done skill-oriented explorations. This action worked very well: it did not just bring the students back to the awareness that they had reached before, but it reinforced it and deepened it. It made it much easier for them to design for it. Acquiring bodily understanding benefits considerably from repetitions, as we experienced in our last workshop *Dense Spaces 2013*, in which students had three iterations of exploration through bodily movement. Therefore, if there is time, iterations of this step are recommended.

4.3 Abstraction

Reflecting on abstraction, addresses the 2 issues raised in paragraph 4.1 *Speed*. During *Dense Space 2012*, students were asked to design a physical space, through their skills, within a given political theme. The inclusion of the skills' qualities into the design of the space worked only partly: although it helped the flow of the joint designerly discussion, the merging of the individual skills' qualities became an abstract procedure. For instance, students abstracted keywords such as "control" or "balance" from their skills, and without further qualifying them, they used them as ingredients for the design assignment they had (See Figure 6). This experience made us understand that also the phase of merging different perspectives on skills requires techniques to support it, in order not to fall into an abstraction that does not contribute to subtlety, expressivity and richness of design.

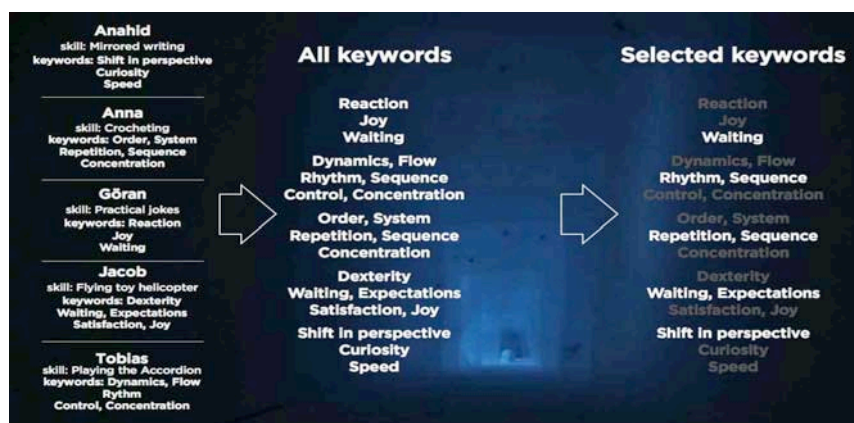


Figure 6 - This image shows how the students merged their skills. After having reflected on the enabling tools, they abstracted a few keywords per skill (left), then they put them altogether (2) and they chose those that had

an affinity (3). Based on these keywords, (non-qualified nouns), they proceeded with their design. A lot of subtlety was lost in this process.

4.4 Preparation for design practice

The aim of *DiS* is to encourage designers towards skill-based designing in their everyday design practice. Therefore, we included also general design assignments in *Dense Space* and in *Hephaestus and the Senses*. In *Dense Space 2013* at the Umeå School of Architecture, students were required to reconnect their experience of Dharavi (i.e. a suburb of Mumbai and the chosen area for the final design assignment) to the reflection on skills and personal sensitivity that emerged from the previously realised enabling tool. In Figure 7 it is possible to see how the space changed, after the reflection on skills.

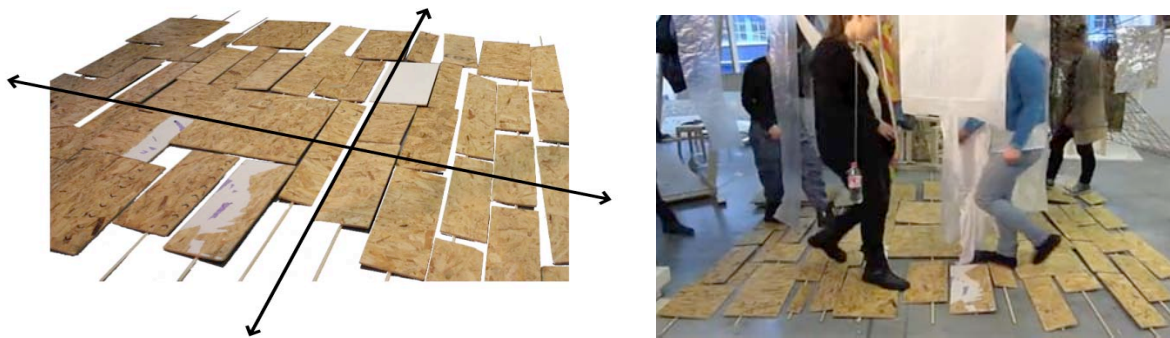


Figure 7 - From a two and a half dimensional space (the object is only the floor but it affects people's stability and way of walking in it) to a fully three dimensional space (where the body is affected on different levels of height, making its acting in and reacting to the space more complex), after the reflection on skills [23][24].

Using this framework, within a clear and very concrete design assignment, helped us in verifying the efficacy of *DiS*. The design dialogue that the students had during the design process is based on experienceability and on reflection on actual engaged actions (one cannot hide behind his skills, his sensitivity comes to the surface in a way or in another). The team dynamics improves, since this approach requires an active approach and an individual engagement, which shows sensitive aspects of the individuals' (design) personality. A natural redistribution of roles within the teams can be observed. The talkers that often steal the floor have to change their attitude and put their reflective abilities at the makers' service, without indulging in personal opinions. Participants, not having the normal chance of hiding behind words, contribute constructively to the design process for what they can *do*, for their actual ability of transforming reality and envisioning a different future.

Hephaestus and the Senses showed that students were able to encompass their skillful perspective in their designs. A large workshop with 80 participants using their designs showed that they were able to open up users for developing new skills through their design. More details can be found in [16].

4.5 Back to Theory

We have initially claimed that our research focuses on people's skills, since skills constitute a tool, which empower to (subjectively) interact with the world, in a continuous dynamic, meaningful dialogue. The introduction and reinforcement, in the *DiS* framework, of a phase on bodily explorations is a direct application of the philosophical thought of Merleau-Ponty, claiming that being in the world and making sense of it, imply a dynamic dialogue, through action-perception, with the world itself. When we introduced bodily explorations as a support to merge the designers' skillful points of view into a shared design, the design discussion gained in articulation and depth and abandoned the domain of abstraction (as it had been happening before, see Figure 6).

Adding this technique revealed to have a dramatic impact on the students' understanding of their skills and therefore ability to act a transformation, which was visible both through their written reflection and through the design work that followed. Students were enabled to aesthetic inquiry, to design for expressivity, for a "richer meaning" and avoid abstract representations. Our explorations show that, through their skills, designers can explore new values and design directions, and share them. At the same time, being exposed to different skills and developing new sensitivities is a powerful way of facing the often multidisciplinary projects.

4.6 Complexity

As the reader might have noticed, this approach deals with complexity, respects it and makes an attempt to treat its components and aspects in a relational way. It does not chop up the problem in separate chunks and treats them as such, since we might lose a lot of richness. It is a design framework that deals with the complexity of the world and the people it caters for. The disadvantage is that this way of working generates and deals with open-endedness, which might be easily misunderstood as lack of clarity and rigour. We realise that, and we know that it requires more effort both to work with it and to read about it. This paper aims at triggering reflections and does not have any claim of demonstrating the effectiveness of the process according to the parameters of traditional science. Hoping that the triggering works, we wish that researchers and practitioners are tempted to try it and play with it, so that a constructive dialogue can be articulated, among all the disciplines contributing to design research.

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