

# The dialogue-labs method: process, space and materials as structuring elements to spark dialogue in co-design events<sup>1</sup>

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Facilitating participation has become one of the cornerstones of co-design, and a number of methods, techniques and events intended to inspire design participants and scaffold collaborative ideation and concept development have been developed. However, an aspect that is yet relatively unexplored in co-design literature is how different methods and techniques can be productively combined. In this paper, we present and discuss the *dialogue-labs* method, which provides a structured way of generating ideas through a sequence of co-design activities. In our analysis of the method during 18 sessions and based on iterative reflection, we focus on its three key structuring aspects: the *process* how *dialogue-labs* sessions are orchestrated, the *space* in which the sessions unfold, and the *materials* that are employed. In addition to understanding the specific *dialogue-labs* method, our discussion of *process*, *space*, and *materials* may yield insights into how other co-design methods are analyzed and further developed or combined.

*Keywords:* Design, Workshop, Innovation, Ideation.

## 1 Introduction

Practitioners from different fields of research and design have understood the importance of involving diverse groups of users in the generation phase of novel artifacts, products, and services, and thus facilitating participation has become one of the cornerstones of co-design (Brandt *et al.* 2005). Underpinning this approach is the supposition that stakeholders, which includes users, can contribute productively through involvement in the design process since they bring privileged insights into the domain that designers are trying to address and the ways in which future products and services may fit into and affect that domain. In this paper, we address how stakeholders can be involved in the ideation, concept development and early prototyping phases of co-design. Within this field, there exist a variety of methods, techniques and events intended to inspire design participants and scaffold collaborative ideation and concept development. Such methods include Future Workshops (Kensing and Madsen 1991), Interaction Relabeling and Extreme Characters (Djajadiningrat *et al.* 2000), Metaphorical Design (Madsen 1994), Inspiration Card Workshops (Halskov and

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Dalsgård 2006), Design Games (Ehn and Sjögren 1991, Brandt and Messeter 2004), Make Tools (Sanders and Dandavate 1999), Contextmapping (Sleeswijk Visser *et al.* 2005), and Fictional Inquiry (Dindler and Iversen 2007).

Many of these methods and techniques focus on discrete stages of the design process, e.g. the generation of a variety of ideas in Brainstorming sessions or the radical rethinking of an existing design concept in the case of Interaction Relabeling. An aspect that is yet relatively unexplored in co-design literature is how different methods and techniques can be productively combined. In this paper, we will present and discuss how this can be done within the frame of a particular co-design method, the *dialogue-labs* method (Lucero and Vaajakallio 2009), which provides a structured way of generating ideas through a sequence of co-design activities.

At its core, the *dialogue-labs* method has three key structuring characteristics: the *process* by which the method unfolds in time, the *space* in which it is set, and the *materials* available in the lab setting. Our findings from extensive use of *dialogue-labs* during 18 sessions have shown these three factors to play an essential role in how co-design unfolds in practice. In addition to presenting the *dialogue-labs* method, we will therefore also discuss these three structuring aspects. We will argue that this discussion can inform the use and contribute to an understanding of other co-design methods and techniques. Even though many co-design methods employ a variety of materials in order to scaffold the design process, the relations between *process*, the *physico-spatial* situation and *materials* are relatively unexplored in academic contributions to the field.

Resulting from the methodological stance of the paper, the intended audience is both *co-design practitioners* who may be inspired by, adopt, employ or transform the *dialogue-labs* method in their design practice, and *co-design researchers* who may, in addition to the presentation and discussion of the specific *dialogue-labs* method, find inspiration in the discussions of sequences of concept development events (i.e., *process*), the role of physico-spatial environments (i.e., *space*) and the selection of design objects (i.e. *materials*) in co-design. In this paper we discuss the *dialogue-labs* from the design process point-of-view rather than look at the specific product that is the outcome of the process. We of course take the product into account in order to understand the potential of the method (e.g., as part of our evaluation we have interviewed participants in order to evaluate the resulting concepts), but it is the overall setup of the *dialogue-labs* method that is at the heart of our discussion in this paper.

The structure of the paper is as follows: First, we introduce related contributions in co-design that employ the notion of *design labs* or workshops as settings for design activities. We then explore in more detail what characterizes the roles of *process*, the *physico-spatial* environment and the design *materials* in such settings. In this section, we primarily draw upon work in the fields of situated and distributed cognition in order to scaffold subsequent discussions of our findings. We then introduce the *dialogue-labs* method through its three main structuring characteristics (i.e., *process*, *space* and *materials*), and present four empirical examples of applying the method in co-design projects. Finally, we discuss the interrelations between the method's three key characteristics, followed by conclusions.

## 2 Related work: design labs and the role of *process*, *space* and *materials* in co-design

In order to situate our work on *dialogue-labs* and scaffold a discussion of our findings, we will first give an overview of related contributions related to the notion of *design labs*. Then, we will outline a series of theoretical contributions that address the role of *process*, the physical environment or *space*, and design *materials* in co-design.

### 2.1 Design labs

The notion of *labs* in design has diverse connotations. In the field of Human Computer Interaction (HCI), there has been a tradition of setting up Usability Labs (Nielsen 1994). As the name implies, the main purpose of these labs is to test the usability of interactive technologies. The understanding of labs in this context is heavily inspired by the natural sciences in which a lab is a controlled setting where the parameters of experiments and trials can be controlled, and in which the same experiment can be repeated. However, within the realm of design, labs often bear different connotations with regards to different metaphors used to describe co-design settings. According to Binder and Brandt (2008) metaphors such as *workshop*, *studio* and *atelier* all entail attractive characteristics for design research, but the metaphor of *design labs* is superior in terms of addressing the transparency of the process, experimentation and documentation. As such, *design labs* are often set up as creative spaces intended to scaffold inquiry and development for some or all phases of design processes.

As an example of this, the Design Collaboratorium (Buur and Bødker 2000) emerged as a way to overcome the limited notion of Usability Labs. This approach emphasizes workshops as a vehicle for collaboration in which the real use context is addressed, the emergence of use is studied, and where different stakeholders work together in an integrated design setting. However, because the main goal of the approach is to bring together the development team, user involvement varies greatly across projects, and in some cases users are not involved at all. Another example of the *design lab* metaphor is given by Binder and Brandt (2008, p. 121), who describe Design:Lab as “a platform for a collaborative inquiry that is based on design experiments.” In other words, Design:Lab (Binder 2007) is a collaborative space of designerly exploration that takes advantage of a controlled environment and uses experimentation to go beyond observation in the real context towards prototyping possible changes. Design:Lab takes place in real context (e.g., factory), combining the existing work environment (e.g., production room) with more controlled areas (e.g., factory cantina). In Design:Lab authorship is shared meaning that lab partners have equal rights when it comes to authoring the design work. The lab provides a setting for exploring the design space with the people involved, and thus its outcome is not the final design but rather the ground to start the actual design.

There is another group of *design labs* that is setup in artificial contexts. In the Design Lab (Brandt 2006) users and other stakeholders engage in a conversational design practice based on a series of design events focusing on collaborative inquiry and participatory design. During the sessions, data from field studies (i.e., video ethnography and probing) is fed in the form of design artifacts (i.e., ethnographic video-snippets in the form of cards) to bridge the gap between the lives and experiences of the different stakeholders. The sessions are driven by events, working with the design notions of “staging, evoking, and enacting.” Johansson and Linde (2005) take a similar approach in collaborative design sessions where designers and future users build future

scenarios using data from probing and video snippets as sketching material. In the Co-Experience Environment (Ivey and Sanders 2006) users were invited to co-design a physical environment for co-experience. A small group of users with shared expertise were recruited to allow the research to evolve as an activity of equitable collaboration. For the Co-Experience Environment participants previously worked on a probe package that later helped the designer to create two spaces. Users were invited to experience these spaces and give feedback on the overall experience. As such, in their case users were not actively involved in the design of the first two spaces but provided inspiration for the design of future co-experience environments. In addition, some studies have emphasized envisioning future opportunities with potential users in real context (e.g., in an office) and on the move (e.g., going to visit a client) while users perform their everyday activities in order to understand both *what is* and *what could be* (Iacucci and Kuutti 2002; Vaajakallio and Mattelmäki 2007).

## ***2.2 The role of process, the physical environment and design materials in co-design***

Although the abovementioned labs have different aims and configurations, a common denominator is that the *process* of how activities unfold in them, their physical setup or *space*, and the different types of *materials* that are employed in them are important factors in how they work. The same holds true for the *dialogue-labs* approach that we will discuss in this paper. For this reason, we will now examine the role of *process*, *space* and *materials* as structuring elements in design in order to bring together different perspectives that can inform our discussion of the *dialogue-labs*.

### ***2.2.1 The role of process***

The works of Schön (1983, 1988) have been highly influential in understanding the design process. In Schön's terms, design unfolds as a *reflective conversation* between the designer and the materials of the situation. Employing different types of materials and media, the designer explores potential outcomes; however, the materials of the situation speak back to the designer (*situational back-talk* in Schön's words) and prompt the designer to reflect upon his/her moves. In this perspective, design can then be construed as dialogical, simultaneous processes of action (as the designer employs and transforms the materials and components of the design situation in order to achieve certain objectives) and reflection (as the situation speaks to the designer and prompts reflection upon both the designer's actions and the nature of the situation). This dialogue with the materials of the situation can take on many forms. A prominent example is sketching, which according to Buxton (2007) can be considered the quintessential design activity. In design, sketching is not only a question of representing an *a priori* formed concept, rather the process of sketching in itself becomes a way of exploring the design situation and potential future design concepts. This emphasizes a processual view on design as a process of emergence and unfolding while the designer experiments and explores conceptualizations in action. Buxton's notion of sketching is not limited to paper-and-pen drawings, it also embraces the wider set of designer explorations through different media.

One aim of co-design is to bring in several perspectives to the topic under scrutiny, which often includes people who have no prior design experience, or who are unfamiliar with the topic that is being studied. Sleeswijk Visser *et al.* (2005) have stressed the importance of sensitizing participants to the topic before the actual co-design session.

They have focused on the process of setting collaboration and introduced a sequence of research steps that they call contextmapping. In contextmapping, co-design activities evolve from simple activities or exercises to more demanding ones (Ibid). By emphasizing the process view, they highlight the role of a step-by-step process that allows participants to become increasingly aware of their own experiences. In our experiences with conducting *dialogue-labs* sessions, we have often sensitized participants to the topic of the design process by involving them in probes studies (Gaver *et al.* 1999) and contextual inquiries (Holtzblatt *et al.* 2004). However, end-user involvement has not been considered a prerequisite as the *dialogue-labs* procedure relies on the new associations evoked by the *process* and the given tasks, the particular setup or *space*, and the available design *materials* with an emphasis on provoking future opportunities rather than developing complete concept designs or a holistic understanding of the users. The method can be employed without the involvement of potential future users e.g. when developing a theoretical framework as presented in Section 4.2. However, we encourage end-user participation in *dialogue-labs* in different ways: directly as participants of previous user studies and as visitors playing the role of experts, or indirectly through user data and materials. In this way, the *dialogue-labs* method is set up to increase the likelihood that the users' perspectives will be embedded in the design concepts that emerge during the sessions. When compared to e.g. co-design sessions in the contextmapping study, where the created artifacts and stories related to them are the main inspiration for designers, in *dialogue-labs* we are more interested in the actual dialogue sparked while creating and envisioning alternative design solutions.

### 2.2.2 The role of space

Research into areas such as *embodied*, *distributed* and *interactive cognition* can yield insights into how and why design materials and the physical space influence the design work in practice. *Embodied cognition* (Wilson 2002) is an umbrella term for studies into cognition as it arises in the relations between the human body, mind and the environment. Different strands of embodied cognition abound, but a unifying tenet is that cognition is dependent on the physical body and the enviroing situation. Wilson (Ibid) highlights some of the consequences of this perspective, including the notions that cognition is dependent on our physical bodies and motor-sensory system, that cognition is always situated and dependent on the given context, that we offload cognitive activities into the environment in the sense that we overcome mental limitations such as memory by delegating cognitive work to artifacts that help us think (e.g., calendars and checklists), and that the environment thus becomes part of the cognitive system. These notions are related to Hutchins' work on *distributed cognition* (Hutchins 1995a), in which cognition is studied as an activity that takes place as interchanges of information across a system of human and non-human agents (e.g., one of Hutchins' well-known publications is entitled *How a cockpit remembers its speed* (Hutchins 1995b)), rather than seeing cognition as a purely intra-mental activity.

In *How designers work*, Gedenryd (1998) develops the notion of *interactive cognition* to describe the work of skillful designers, denoting the interplay between mind, action and world. Examples of interactive cognition in design can be found in techniques such as sketching and prototyping in which the exploration of potential outcomes unfolds in the interplay between the designer's mind and actions and the design situation. These

techniques enable the designer to (re-)create aspects of potential use situations and experiment with them, making them in Gedenryd's terminology *situating strategies* that "serve to make the world a part of cognition" (Gedenryd 1998). These techniques often rely on so-called *inquiring materials* which are intended to scaffold design inquiries: "An 'inquiring material' does not function as an end product of design, but as a means for the inquiry that design is" (Gedenryd 1998). In some cases, designers even go a step further than appropriating the materials at hand and develop new tools and technologies intended to facilitate specific design explorations, so-called *inquiring instruments* (Dalsgaard 2009).

What these perspectives emphasize, their differences notwithstanding, is that the physico-spatial design environment and the materials employed in design processes are crucial to the way design processes unfold in practice. The design environment and materials serve to support not only *pragmatic action* (Kirsh and Maglio 1994) - manipulating things to carry out a specific task - but also *epistemic action* (Ibid) - exploring and understanding the situation at hand through action and manipulation of materials. The motivation for bringing these perspectives to the fore is that the *dialogue-labs* method relies heavily on specific configurations of space and materials; in our discussion of how and why *dialogue-labs* work, we will therefore draw upon these perspectives.

### 2.2.3 The role of materials

When addressing aspects of design materials in *dialogue-labs*, we have found Agger Eriksen's (2009) classification of the materials into *basic*, *pre-designed*, and *field/project specific* useful. According to her, *basic* design material consists of ready-made objects such as pen and paper, clay, disposable cups, etc. They are brought into the co-design gathering without specific meaning and the meaning is attached to them through reinterpretations according to particular needs. *Pre-designed* materials have been especially selected and created for the co-design session such as printed images, video clips, foam and paper models or mock-ups. Both *basic* and especially *pre-designed* material can be either general or *field/project specific*. This classification is relevant to *dialogue-labs* as the method includes all three material types in a mixture of generative tools, videos and prototypes.

In co-design literature, there are numerous examples of how diverse design materials such as video, paper documents, mock-ups, prototypes and posters can be employed. For instance, Inspiration Card Workshops (Halskov and Dalsgaard 2006) is centered on collaborative concept generation using cards that represent various aspects of the use domain and different technologies that may be employed in future design solutions. In a related method, although directed at analysis rather than ideation, Buur and Soendergaard (2000) employ Video Cards - still images of video segments - to scaffold collaborative video analysis and thus inspire and inform the design process. In some co-design methods, the design materials are framed in a certain way in order to highlight specific characteristics or to direct specific types of design actions. For example, in the Fictional Inquiry method (Dindler and Iversen 2007), different materials and artifacts are used as *props* that support a fictional framing of collaborative workshops. This framing is intended to help participants transcend their preconceptions of the use domain and existing technologies and spur their imagination so they may transcend these fixations. An example of how materials can influence design is found in Kelley's

description of the IDEO Tech Box (Kelley 2001, p. 144), which is a shared repository of physical artifacts and materials that can inspire design projects. Generative tools such as Make Tools (Sanders and Dandavate 1999) are another example of how tangible design materials can allow ordinary people to express their ideas through building simple mock-ups or collages. Brandt (2005) has described these types of materials in co-design as *things-to-think-with*.

### 2.3 Summary of the related work

The *dialogue-labs* method presented in this paper was inspired by the *design lab* metaphor. We have identified a lack of studies that focus on the relations between the *process*, the physical arrangement or *space*, and the variety of design *materials* in co-design events. A number of contributions have addressed the role of design *materials* (e.g., Binder and Brandt 2008; Sanders and Dandavate 1999) and *process* (including timing and roles) in design (e.g., Sleswijk Visser *et al.* 2005). Building up on this earlier work, in this paper we aim to take aspects of *process* and *materials* and integrate them with *space* into an overarching structure.

### 3. The *dialogue-labs* method

The *dialogue-labs* method was originally developed for the ‘Augmenting Mood Boards’ case in 2007 to establish a creative space for dialogue among researchers and end users (i.e., industrial designers), to jointly generate ideas for interactive support tools and to develop them further together into concept. In the ‘Augmenting Mood Boards’ case, the physical *space* of the *dialogue-labs* was designed to look and feel like a design studio, setting the scene where end users and researchers would engage in discussions during co-design activities. Hence, we started to call the method *dialogue-labs* (Lucero and Vaajakallio 2009). The method, as is discussed in this paper, has been applied for the last four years altogether 18 times in four different design research projects conducted both in academic and industrial contexts (see Table 1 for an overview).

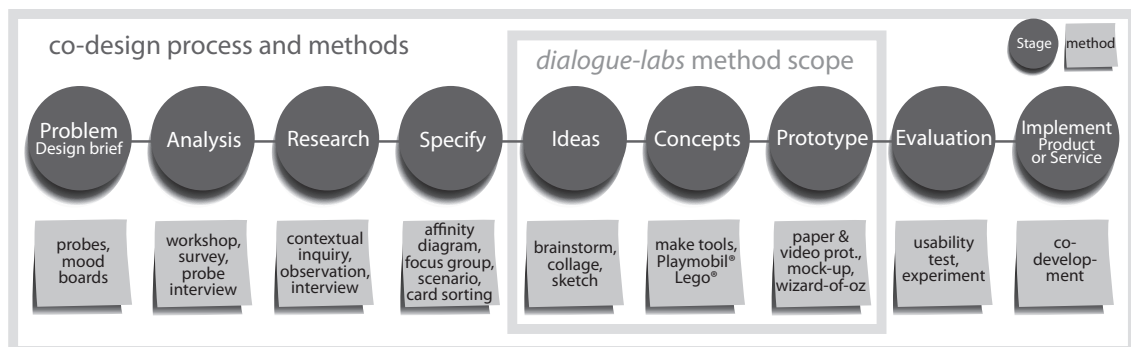


Figure 1. Stages and methods of a co-design process. The scope of the *dialogue-labs* method covers the *Ideas-Concepts-Prototype* stages.

*Dialogue-labs* are primarily used in the middle stages of the design process to support researchers and designers in creating ideas and concepts for future designs together with relevant stakeholders and end users. The scope of the *dialogue-labs* method as it fits into how we typically orchestrate co-design processes is presented in Figure 1. The findings from user studies that take place in the *Problem-Analysis-Research-Specify*

stages of the design process (e.g., probes, contextual inquiries, interviews, etc.) usually provide the content for the *dialogue-labs*.

To clarify the *dialogue-labs* method and its characteristics compared to other workshop methods, we will highlight and discuss three main structuring aspects of the method: *process*, *space* and *materials*. We focus on these three aspects because *dialogue-labs* presents a specific assemblage of the three that has proved fruitful in practice; in a broader perspective, this also opens up for a wider discussion of how these concerns can be understood and addressed in design research and practice. In *dialogue-labs*, the *process* and *materials* emphasize the means of approaching problems from different angles and of facilitating different designerly inquiries through the use of tangible props and design materials in the collaborative design dialogue. *Space* links the *dialogue-labs* method to a Design:Lab (Binder 2007) type of approach but in which the physical surrounding, a meeting room, has temporarily been transformed into a design studio with sofas and coffee tables to create a relaxing, creative and inspiring environment. In the original ‘Augmenting Mood Boards’ case, this set-up mimicked the specific context where the future design solutions would be used. However, apart from a few modifications, the original physical arrangement has remained mostly unchanged in the following *dialogue-labs* sessions as it successfully accommodates distinct locations within the space. The three structuring aspects (i.e., *process*, *space* and *materials*) in practice form an intertwined structure and atmosphere for *dialogue-labs*; however for the purposes of presentation in this paper they are discussed separately in the following sections.

### 3.1 Process: Sequences of design action and reflection

The *dialogue-labs* provide a clear step-by-step *process* to make sure that time and available resources are well spent, and the results documented accordingly. Participants move within the room according to prearranged design spaces where different tasks can be found at each location. This creates overall frames for the two-hour session with specific time limits i.e., eight rounds of 15 minutes. Inside this frame there is freedom for participants to reinterpret the tasks given to find a meaningful focus. The strict time limits resemble with brainstorming; it encourages creativity and obtaining a large amount of ideas without careful evaluation. The sessions are planned for a total of two hours, with a short five-minute break in the middle, and consist of the following parts (Figure 2):

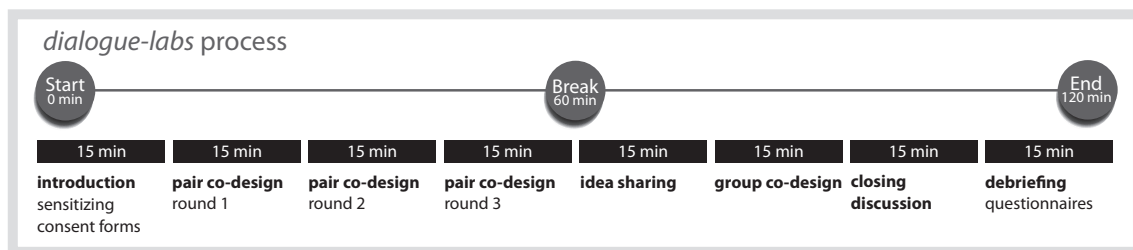


Figure 2. The *dialogue-labs* process. Two-hour sessions are structured into eight rounds of 15-minute activities (with a short five-minute break after one hour) involving work in pairs as well as with the complete group.



### 3.1.1 Introduction (15 min.):

To create a comfortable and relaxed atmosphere, participants are greeted and introduced to each other when they arrive as if they were coming to our home. As in every workshop it is essential in the beginning to explain the main purpose of the session. We begin by reading together a summary of the main findings from previous contextual studies. The purpose of introducing these findings is twofold: first, they act as frames by providing the main contents of the sessions. Second, they allow us to create empathy with end users, as they are the experts in the specific domain that is being studied, who find the topics discussed in the sessions familiar. The summary of the findings from previous studies may come in the shape of a definition, a visual diagram or a PowerPoint presentation. The presentation of the findings is followed by a short discussion to build a shared understanding of the main theme of the session. Finally, all participants must read together and sign a consent form to allow the organizers to further work on the ideas generated during the sessions.

### 3.1.2 Co-design rounds in pairs (3 x 15 min. = 45 min.)

Each *dialogue-labs* session involves between four and ten researchers, designers, stakeholders, managers, and potential end users, plus one or two persons to facilitate the sessions. Participants work in pairs, which allows overcoming the main challenges of group dynamics; it is easier for two people to reach equal participation compared to groups of three or more. Thus, we recommend having an even number of participants that can be divided into pairs. The end-user participants can be experts in the specific domain that is being studied and have ideally participated at previous stages of the research (e.g., as participants in probes or contextual inquiries), thus providing the knowledge on the current situation and the future possibilities. However, this is not a prerequisite, as was mentioned earlier. In case there are enough end-user participants involved in the session, the participants form pairs so that there is at least one domain expert in each pair. Based on the previously defined structure of the session, each pair is asked to think of new ideas, scenarios, or concepts in relation to the main purpose of the session. Each pair spends on average 15 minutes in each of the three locations they decide to visit. This relatively short 45-minute co-design part typically results in various ideas.

### 3.1.3 Idea sharing (15 min.)

Participants are called together as a group to share some of the ideas that emerge after visiting three locations and discussing in pairs. The group may decide to go through each pair's ideas in order. However, often it occurs that as one pair is presenting their idea, another pair naturally jumps in and continues the presentation by introducing an idea of their own that complements the original idea.

### 3.1.4 Group co-design (15 min.)

The complete design team elaborates upon and evaluates some of the proposed ideas. In some sessions, *idea sharing* (Section 3.1.3) and *group co-design* are combined into one long discussion that takes a full half hour. The structure proposed here is flexible enough to support whichever strategy fits best with the design teams. As mentioned previously, some teams will naturally prefer to separate the sharing of ideas from the

co-design of new ideas, while others will prefer maintaining the flow of a long discussion that seamlessly transitions between idea sharing and idea generation.

### 3.1.5 Closing discussion (15 min.)

To round up the discussion, the complete group sits together around a coffee table for a final activity on what would be an ideal solution that might summarize the best ideas that emerge during the session. Physical mock-ups (e.g., Playmobil®) and Play Acting can provide support in the process of presenting, discussing and modifying ideas.

### 3.1.6 Debriefing – questionnaires (15 min.)

Finally, all participants fill-in a questionnaire to assess the quality of the ideas that emerge from the session by rating them on a 7-point Likert scale (where -3 is very bad, 3 is very good, and 0 is neutral). Beforehand, participants must collectively agree on which idea to rate (one per location) by writing its name down on the questionnaire. Filling in this questionnaire provides the facilitators an indicator of what participants felt were the best ideas, which may help the facilitators focus their next design steps.

### 3.1.7 Extra: interpretation

Immediately after each *dialogue-labs* session short interpretation rounds are conducted. The interpretation team usually consists of one or two facilitators. In this interpretation the main ideas that emerge during the sessions are summarized by means of sketches on A3-sized sheets of paper. Keywords are placed next to the sketches to describe the main ideas behind each concept. These sketches allow facilitators to have an initial overview of the quantity and quality of the ideas. Each A3 sheet and the ideas are coded to identify the co-design session, and the number of the idea.

## 3.2 Space: Configuring the physical design environment

The second key characteristic of the *dialogue-labs* method is *space*, which allows aligning content to different locations, providing an inspiring space and moving around the room. A large room or office (e.g., 5m x 6m x 3m) is used to allow for different locations to be set up within the *dialogue-labs* space, each of which correspond to a specific activity in the *process* outlined in the previous section.

As previously mentioned, the basic content for the *dialogue-labs* consists of findings from user studies conducted in prior stages of the co-design process. Hence, activities and locations of the *dialogue-labs* environment are aligned to set the *space* according to these findings (Figure 3), which can be the stages of a process (e.g., the ‘Augmenting Mood Boards’ case in Section 4.1), categories of a theoretical model (e.g., the ‘Playful Interactions in Mixed Reality’ case in Section 4.2), or other structures based on the available findings (e.g., the ‘Playful Services for Growth Economies’ case in Section 4.3). While the basic idea of having several *locations* or *design spaces* within the *dialogue-labs* remains unchanged, the content used to provide the structure is project-specific and must be defined anew every time. Providing this basic structure encourages discussion around specific relevant topics for the design process or ongoing research. Each *design space* (Figure 3) has a corresponding location within the room, materials, and task that is formulated in an abstract-enough way so that participants feel inspired to

think beyond the *status quo*. In each location instruction cards are available as reminders of the situation, the materials, and the task.

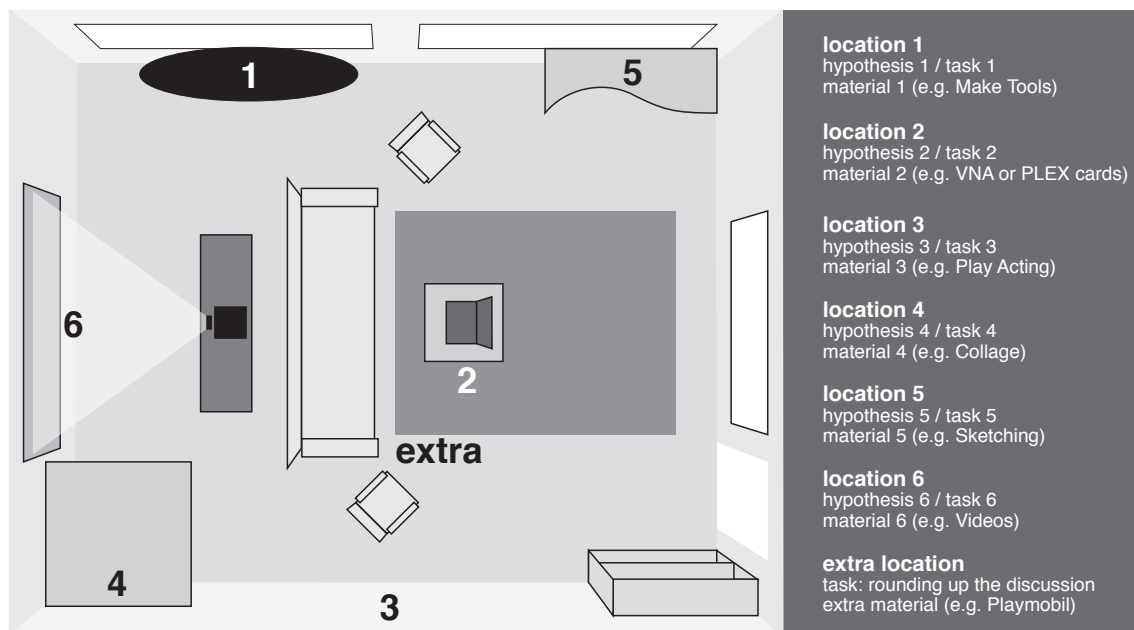


Figure 3. A typical spatial layout for *dialogue-labs* sessions. Hypotheses, materials and tasks are aligned to different locations. The hypotheses are based on the earlier findings and thus can be stages of a process, categories of a theoretical model, or other structures.

*Dialogue-labs* establish a spatial frame akin to a theater stage, in which the physical environment supports specific situations, dynamics, dialogues and creative outlets. The general setting and the furniture are chosen and arranged with two things in mind; so that it inspires and stimulates participants, and provides enough room to accommodate different design locations. Additionally, setting some of the design stages by an open window can help participants transport themselves beyond the physical space of the *dialogue-labs*. For instance, many participants have found inspiration from observing nature during a *dialogue-labs* event. The effort put in preparing this space is later rewarded by the participants' dedication while participating in the sessions.

The *dialogue-labs* provide a dynamic structure with several distinct locations that encourages participants to move about the room during the session. This results in opening up the design problem and tackling it from a different perspective without breaking the overall creative flow of the session. These forced transitions every 15 minutes also provide breaks to approach a new task with a fresh mind. Having a combination of moving around the room, standing up and being comfortably seated at a couch in different parts of the session invites participants to keep the kind of dynamic and active attitude needed during the session compared to being stationary for 45 minutes.

### 3.3 Materials: Shifting between different tasks and modes of inquiry

The third and final quality of the *dialogue-labs* is the use of different *materials* (and tasks), which allow participants to build a common design language and provide them with different entry points to the design problem. The selection of props typically includes some that are reminiscent of real objects such as magazines, postcards or red

eyeglasses, as well as more abstract ‘building blocks’. Videos and prototypes are also introduced as part of the design materials. Scattering the props around different locations in the room, allows introducing versatile provocations without overwhelming the participants with a large selection of props available all at once.

According to our experiences from employing the method in a range of projects, providing a wide range of materials for expression allows participants to find a common dialogue style that is appropriate for them in that particular situation. In the context of co-design activities, building a common design language may help participants reach a relaxed and creative mood since they are not forced into any specific work or design mode. Thus, the material should have varying abstraction levels, ranging from abstract props such as Velcro-covered shapes, Playmobil® (Figure 4, left), or Play Acting, to the more concrete collages (Figure 4, right), videos, and sketching. As an example, we have laid a Playmobil® scale model on a coffee table during the *closing discussion* (Section 3.1.5) to stimulate playfulness with physical elements (Figure 4, left). The Playmobil® can be arranged to depict a given situation or can be left in the box for participants to start exploring them. Using the physical figures, one participant may present an idea, which another participant can change or elaborate upon by bringing in a new figure into the scene, or by taking the same figure used by the first participant and explaining how the original idea changes.

By engaging in activities that rely on visual and tangible materials the complete design team is able to approach a given design problem from different entry points and thus come up with novel design concepts. The aim of having these different entry points is to find something that will trigger participants and motivate them to begin the generation of ideas. Participants may feel inspired by the overall *dialogue-labs* setup, by the materials or tasks available at the different locations, or perhaps more importantly by the ongoing conversation with the design partner.

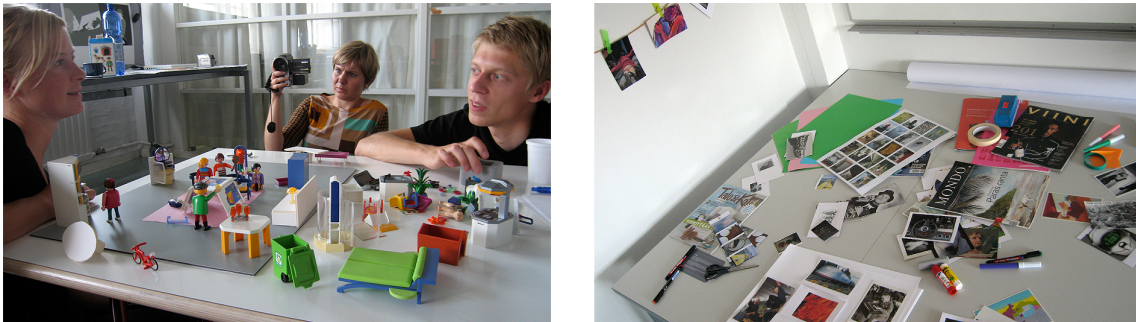


Figure 4. Materials used in *dialogue-labs* and their varying abstraction levels. Discussing around a table using abstract props such as Playmobil® (left). Building a collage using concrete images from magazines (right).

The materials in *dialogue-labs* can support the design dialogue in several ways. Besides working purely as inspiration, the props are sometimes appropriated in the enactment of design ideas solely on the basis of their visual characteristics to communicate and negotiate design ideas. They also provide access points to shared situations, which in turn scaffolds joint idea development. Finally, experimentation with tangible props provide means to test vague thoughts before they are clear enough to be verbalized.

### 3.4 Summary of the dialogue-labs method and its three main structuring elements

We have presented the three main elements of the *dialogue-labs* method (i.e. *process*, *space* and *materials*) and how they form an overarching structure for co-design events. The *process* provides a clear step-by-step procedure for a two-hour idea generation session in which participants work in pairs. The *space* is carefully crafted to align content to different locations, inspire participants and encourage them to move around the room. Finally, the *materials* are the means for participants to build a design language of their own and to provide different entry points to the design problem. Having discussed these three structuring elements separately in this section, we will now analyze how they work intertwined by means of four cases where *dialogue-labs* have been applied in practice.

## 4. Four examples where *dialogue-labs* have been applied and the relations between *process*, *space* and *materials* in practice

The *dialogue-labs* have been used in four projects (Table 1) as part of research activities in both academic and industrial contexts, namely at the Eindhoven University of Technology in the Netherlands, at the University of Art and Design Helsinki in Finland, and at Nokia in Finland. A total of 18 sessions have been conducted and studied within these four cases between August 2007 and April 2010, in which 42 people have participated with varying education level, age (between 22 and 46), and gender (24 male, 18 female). In all these cases, the *dialogue-labs* were applied in ideation activities for future designs.

Table 1. Overview of the four *dialogue-labs* cases

Case	Context	When	Participants	Sessions
1. Augmenting mood boards	Academic	August-November, 2007	12 designers 4 researchers	7
2. Playful interactions in mixed reality	Research	February-April, 2009	7 researchers 3 designers 1 programmer 1 manager	7
3. Playful social interactions	Industry	October, 2009	4 designers 2 researchers 1 manager	2
4. Playful services for growth economies	Research	April, 2010	6 researchers 1 manager	2
Total	-	-	42	18

Designers' and researchers' participation in *dialogue-labs* has taken on different forms. During the sessions our role as design researchers has ranged from being facilitators (cases 2, 3 and 4), to active co-design partners with a heavy involvement in the entire design process (case 1). The *dialogue-labs* provide a flexible enough framework that supports these different roles. When taking the facilitator role, *dialogue-labs* provide a framework that invites participants to take new standpoints thanks to the sequence of activities (*process*), the physical setting (*space*), and the props employed (*materials*).

Judging by our current experiences with conducting *dialogue-labs* events across these four cases, the method represents a productive combination of the three structuring aspects of *process*, *space* and *materials*. In order to examine this claim, we will also

provide concrete examples of how these three elements are aligned in the different locations of each *dialogue-labs* environment. Although only one example is provided for each case, the combination of these should provide an idea of how they work together (e.g., videos and collages were used in all four cases). We will now present these four cases.

#### 4.1 Case 1: Augmenting mood boards

The ‘Augmenting Mood Boards’ project explored ways in which new technologies such as augmented reality could provide support for professional users (i.e., industrial designers) in their work. In the *dialogue-labs* event, participants explored the following task: *how would you keep track and make connections with the different contents you have for a mood board?* Prior to the *dialogue-labs*, a series of contextual user studies with designers was conducted using a diversity of methods such as probes (Gaver *et al.* 1999) and contextual inquiries (Holtzblatt *et al.* 2004). Based on the findings from the previous studies, we organized *dialogue-labs*, which consisted of co-design activities with practicing designers to develop future ways of creating mood boards with augmented reality. We aligned activity and process by setting the physical space according to the six stages of the mood-board making process (i.e., collecting, browsing, piling, building, expanding, and presenting), which we had previously identified in the aforementioned user studies. As a result of applying *dialogue-labs*, two interactive prototypes were implemented and evaluated with end users: the Funky Coffee Table (Lucero *et al.* 2007) and the Funky Wall (Lucero *et al.* 2009). A detailed account of the ‘Augmenting Mood Boards’ case can be found elsewhere (Lucero and Vaajakallio 2009).



Figure 5. Aligning *process*, *space* and *materials*. Discussing with the scenario cube in the ‘Augmenting Mood Boards’ case (left). Prototyping ideas with Make Tools in the ‘Playful Interactions in Mixed Reality’ case (right).

Regarding how the three main structuring elements of *dialogue-labs* were aligned in the ‘Augmenting Mood Boards’ case (Figure 5, left), one of the six locations was related to the process when designers select, group, pile, and make connections between the contents for their mood boards. We created a scenario cube measuring 20 cm on each side, which represents the following situations where people connect things: 1) A DJ browsing different sounds, deciding which tracks make for a better mix, 2) a naturalist (e.g., Charles Darwin) adding a new specimen to their collection, 3) a cook with a rack full of different spices and flavors, 4) dancers and the set of movements that make a dance piece, 5) a tailor touching different fabrics for their latest design, and 6) a librarian visually keeping track of the available books. The purpose of the scenario cube was to trigger discussions based on the examples contained on its six sides. This

location was set on a wall that was covered with white paper and Post-it® notes that varied in color and shape.

#### **4.2 Case 2: Playful interactions in mixed reality**

The ‘Playful Interactions in Mixed Reality’ project explored the creation of playful user experiences and interactions in the context of mixed reality. The Playful Experiences (PLEX) framework (Arrasvuori *et al.* 2011) is a categorization of playful experiences based on previous theoretical work on pleasurable experiences, game experiences, emotions, elements of play, and reasons why people play. Researchers working on the PLEX framework were trying to understand the role of playfulness in the overall user experience of a product or service. We used *dialogue-labs* as means to test the relevance and applicability of the PLEX framework in the design and evaluation of interactive artifacts. Participants of the *dialogue-labs* event explored the following task: *based on the PLEX categories ‘sympathy’, ‘control’, ‘completion’, ‘submission’ or ‘simulation’ and using the Make Tools found on the table, build prototypes of devices that create playful experiences from the perspective of ‘spatiality’.* We assigned 20 PLEX categories to different locations, activities, and materials in the lab context. Hence, participants began their idea generation by using one of the PLEX categories as a starting point. The MAA prototype (Reponen and Keränen 2010) was discussed during these sessions.

Regarding the alignment of the three structuring elements (Figure 5, right), two main topics were identified to guide the exploration: ‘spatiality’ and ‘social interaction’. These *dialogue-labs* sessions included four locations so each topic was assigned to two locations. Abstract physical materials (i.e., Make Tools) aiming to stimulate the participants’ thinking and allow them to prototype their ideas were laid on a high table by a window.

#### **4.3 Case 3: Playful social interactions**

The ‘Playful Social Interactions’ project was the result of a collaboration between Nokia Research and Maemo, the former acting as facilitators and the latter as stakeholders. The Maemo team wanted to create novel application concepts in the domain of Augmented Reality that would evoke playful social interactions between users. We organized *dialogue-labs* sessions both to foster idea generation as well as to continue our work on the PLEX framework. In these sessions, we introduced the PLEX Cards (Lucero and Arrasvuori 2010) and its two related idea generation techniques as new materials for use in *dialogue-labs* sessions. The cards were created to communicate the PLEX framework categories to designers and other stakeholders who wish to design for playfulness. One of the outcomes of these sessions was the Collecting Faces video concept (Holopainen and Ollila 2010).

On the relations between the three structuring elements (Figure 6, left), participants were asked to generate ideas from the perspective of three PLEX framework categories: *fellowship, exploration* and *thrill*. The participants were given the following task: *using these PLEX categories, think about how new services or interaction concepts could create playful social experiences.* Three videos were shown from a laptop set on a coffee table while participants were seated on a couch. These videos were presented without sound to prompt reactions and inspire the teams to explore beyond the contents of each video. The intention here was for participants to assign new meaning to these

videos as they were watching them. The PLEX categories were presented to the participants by means of the PLEX Cards.

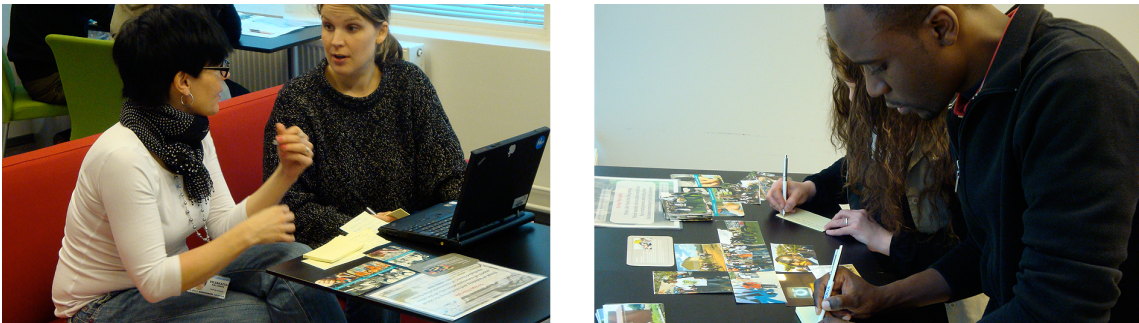


Figure 6. How *process*, *space* and *materials* were aligned. Watching a video in the ‘Playful Social Interactions’ project (left). Creating collages in the ‘Playful services for growth economies’ project (right).

#### **4.4 Case 4: Playful services for growth economies**

The most recent use of the *dialogue-labs* was the ‘Playful Services for Growth Economies’ project. The main goal of this project was to create novel concepts and applications for all literacy levels of youth in growth economies (i.e., Africa). The stakeholder team consisted of a Nokia Research unit located in Nairobi, Kenya. Based on their experience and knowledge of the local culture, the stakeholder team defined three topics for the participants to focus their exploration on: ‘employment’, ‘education’ and ‘entertainment’. We set each of these three topics in different physical locations of the *dialogue-labs* environment so that each team would be exposed to these topics while coming up with new ideas. The participants were given the following task: *think about how the images could embody aspects of ‘employment’ using the PLEX categories of ‘thrill’, ‘expression’ and ‘submission’*.

Regarding the alignment of the three structuring elements in the ‘Playful services for growth economies’ project (Figure 6, right), one of the three main topics identified by the researchers from the Africa team was ‘employment’. We collected a mix of random abstract images from magazines together with more specific photographic ethnographic material. The material was placed inside a large green box, which was then put on a table. Using these materials, we asked participants to create a collage. We told participants to try to use the images as a source of inspiration instead of trying to assign literal meaning to them. Participants were also presented with three PLEX categories to start their exploration from: thrill, expression, and submission.

#### **4.5 Summary of the four dialogue-labs examples in practice**

As can be observed from these four cases (Figures 5 and 6), *dialogue-labs* have been applied in a variety of contexts, using different materials, and for different purposes. Each case presented us with a different challenge in terms of aligning *process*, *space* and *materials*. While in the first and fourth cases the co-design exploration was rooted on previous fieldwork in relation to a specific user group or use context, for the other two cases the exploration was broader and used a theoretical framework (i.e., PLEX) to guide the co-design work. These four cases aim to illustrate how *dialogue-labs* can be used for co-design activities that tackle design problems that are very different in nature.



## **5. Discussion: the interrelations between *process*, *space* and *materials* in *dialogue-labs***

Taking a meta-perspective on our findings from employing and analyzing the *dialogue-labs* method, the reason we have found the method useful in co-design practice is that it both invites and scaffolds different ways of making sense of, exploring and shaping the design problem and situation. Our offset for this paper has been to explore the premise that the particular assemblage of *process*, *space* and *materials* is key to understanding the method. In the remainder of the paper, we will discuss these aspects and their interrelations.

### **5.1 Process: supporting different idea development strategies**

One of the main benefits of the *dialogue-labs* method is that it provides a clear structure by means of a step-by-step *process*. Idea generation workshops have become common practice in companies. A varying amount of people are invited to these workshops (e.g., 4-20 people), which can last anywhere between one hour and a full workday. During these workshops a number of ideas are generated using different brainstorming techniques. The success of these workshops largely depends on the facilitator's skill to keep people motivated and focused. However, often participants end up being frustrated by spending endless hours locked in a meeting with an unclear focus, with poorly documented outcomes, and with no clear way of how to take those ideas further. With the *dialogue-labs* method, we have tried to introduce a clear structure that boosts creativity in a limited time frame of two hours, thus improving both the efficiency and effectiveness of the session.

*Dialogue-labs* prompt facilitators to think well ahead of the session in order to plan how the different types of content, tasks and materials will work together. As facilitators consider the interplay between these different factors, they may gain a better understanding of the design problem and potentially become more aware of how participants perceive the co-design activities they will be involved in. According to our experiences, careful planning before the ideation session increases its chances of success. The main idea is to avoid last-minute improvisation before the co-design event.

In practice, we have observed that the proposed *process* supports different idea development strategies. Breaking the contents of the sessions into separate locations makes participants think of different aspects of the design problem from new perspectives. For example, during the 45 minutes of co-designing in pairs, participants are forced to move to three different locations in the room. We have observed three different strategies used by the participants. First, some pairs begin the exploration with the tasks and materials that are available to them in the first location. Then they move to a second location that has different tasks and materials and continue to evolve and shape the original idea further. These pairs then use the third and final location to finalize the idea and bring it closer to a concept using yet different tasks and materials. Second, we have observed other pairs who have started a new idea in the first location; they have put this idea to rest for a while and in the third location they have naturally picked the first idea to further work on it. Third, we have found some participants who are more at ease with exploring three different ideas in the three locations. Although the materials' ability to support converging or diverging ideas also plays a role on these different strategies, the proposed *process* does not enforce a single way of generating ideas on the participants.

Although the *dialogue-labs* provide a clear and structured *process* (i.e., eight rounds of 15 minutes), the method is not a one-size-fits-all solution. The method provides a flexible frame within which the design researcher's personal interpretations and creativity play an important role. Based on their experience and competence, the design researchers can try out different things by adapting parts of the structure or incorporating specific ways of using design tools they are familiar with. No matter how often the method is applied, *dialogue-labs* should feel fresh every time they are applied both for the design researchers and the participants.

Setting up and running *dialogue-labs* sessions can at times be extremely challenging due to available resources and time constraints. First, a dedicated room is needed so that all sessions can be run in the same location. Some organizations have usability labs or meeting rooms that can be adapted to host co-design events. However, on some occasions we have had to use spaces outside our premises. Second, the available space needs to be booked over a long period of time so that the room environment can remain unchanged in between sessions. To tackle this problem, we have tried to organize *dialogue-labs* events in consecutive days or as close as possible to each other. Running two sessions in one day can be heavy on the facilitator(s) and so we usually run only one session per day. However, sometimes it has not been possible to reserve a space for a longer period of time and thus we have had to successively set up and dismantle the environment.

## **5.2 Space: arranging and making use of the design environment**

Revisiting the perspectives of embodied, interactive and distributed cognition from section 2.2, we are prompted to consider the interplay between mind, action and world. In these perspectives, a key idea is that cognition is always dependent on the given context, and the world becomes part of cognition because we draw upon the resources of the environment and offload cognitive activities into the environment by delegating cognitive work to artifacts that help us think and act. In line with Gedenryd (1998) we consider design a preeminent example of interactive cognition in that it is concerned with the resourceful reflection upon and transformation of a challenging situation. Gedenryd shows how designers rely upon the resources at hand and make use of inquiring materials and instruments in order to bring the world into the lab, to make sense of the design situation, and to experiment with ways of reshaping it. In the way *dialogue-labs* are set up, we have specifically aimed at providing an environment and a pool of resources that scaffold these activities in order to effectively support designerly inquiry. In Schön's (1983) terminology, the *dialogue-labs* space is thus set up in a specific way in order to scaffold alternating types of reflective conversation with the design situation.

This setup consists both of a proposed *process* that prompts different ways of construing and addressing the design challenge, a *physico-spatial* environment in which co-design activities can unfold and a selection of *materials* to help think, explore and shape, and a context to employ these three structuring elements through the design brief and orchestration of the event. Although we have made an analytical and presentational effort to address the aspects individually in this paper, separating *process*, *space* and *materials* is not feasible in practice, because the materials make sense because of the context they are in, referring to both the physical space and the situation at hand. As illustrated in Figure 3, the tasks and materials are tied to specific sections of the

*dialogue-labs* space. In addition to the advantages for shared activities and communication among participants, this setup invites specific design moves such as shifting perspectives, transitioning between focusing on the parts and the whole and combining understandings of the different levels of abstraction. The tasks and materials also invite and support sense-making and exploration.

Although the arrangement of both tasks and materials in the space of *dialogue-labs* thus invite and support a series of design moves and offer a shared space for co-design, there are also inherent pitfalls which *dialogue-labs* facilitators should be watchful of. We have seen the benefit of changing physical space as continuously triggering the participants in providing versatile ideas; however introducing new perspectives every 15 minutes may have limited value in later design phases and may not be suitable for all participants. Furthermore, since the method offers alternating perspectives there is a risk that it can be considered exhaustive and lead participants to only consider the points of view inherent in the tasks and structure of the method. In other words, the method may bring about less out-of-the-box thinking than is required in some design situations. In addition to being attentive towards this potential issue, facilitators can take steps towards countering this issue by communicating it to the participants, by formulating open-ended tasks, and by improvising and bypassing the planned sequence of tasks if necessary. As is the case with most or all co-design methods, it takes experience to become a competent facilitator.

### **5.3 Materials: supporting design inquiries and dialogue**

Creating and maintaining a relaxed atmosphere and finding a common design language between two strangers during 45 minutes can be challenging. On the basis of our experiences from orchestrating *dialogue-labs*, we found that prompting participants to find and build a common design language is one of the keys to success in applying the method. Some of the best results came when participants were not told which material they were supposed to work with next but were instead provided with a diversity of media to choose from. Consequently, designing took divergent forms in the 18 *dialogue-labs* sessions despite of similar settings and overall structure. Expressing ideas varied from sketching on paper, experimenting with props, to discussing with almost no visualizations. This notion suggests that providing a wide range of media for expression may help the participants find the appropriate dialogue style for them in that particular situation. In co-design this may help to reach a relaxed atmosphere since participants are not forced into activities they are not comfortable with.

Regarding participants' motivation, the method promotes what can be considered a layered approach to inspire and trigger people's creativity. Our strategy typically consists of first reading the instruction cards together (description), and second, talking within the team (explanation). At this stage, most teams have enough information to begin working on the task. If they feel they still need to build a better understanding of the task, the third step consists of playing around using the objects available on the table (the material). Having things to play with and touch has helped many participants enter the fourth step that is to engage and start performing the task itself (the action). After a few minutes discussing ideas, the teams can sometimes forget the content of the task or feel they are a bit off track. In these situations, the teams naturally go back to the instruction cards or design material and restart the inspiration procedure.

In the terminology of Agger Eriksen (2009), the selection of props in *dialogue-labs* is a combination of *basic, pre-designed and field/project specific* materials. E.g. the Make Tools kit and collage material used in most of the *dialogue-labs* are pre-designed but not case-specific since their ambiguity allows using the same set from one project to another. Magazines and red-eyeglasses were some of the basic design materials provided in the ‘Augmenting Mood Boards’ case, whereas the videos that were shown were project-specific in nature. In all *dialogue-labs*, videos are collected according to a particular project and need; hence they are very much project-specific. The three characteristics of design material have an influence on the resources needed in the preparation phase, and thus should be considered beforehand. Sometimes project-specific material may become general if it e.g. represents certain practices or user group that is of interest to some other project as well.

In spite of the available options provided by the materials to inspire people and get them going in their exploration, we have encountered participants who either find it difficult to start the dialogue or who get stuck. Some participants have begun the work in pairs using abstract materials that are better suited for converging ideas (e.g., Play Acting), which has resulted in long awkward periods of silence. Participants have reported that concrete and approachable materials such as video, collages and sketching are good to begin idea exploration or similarly divergent phases in design. In line with Sleewswijk Visser *et al.* (2005), we have found it beneficial to allow participants to move from easier tasks to more challenging ones to become familiar with each other, accustomed to the lab-setting situation, and to reach a comfortable creative mood. Similarly, on other occasions participants have been overwhelmed by the way we have presented the materials to them. In one session participants encountered a set of Make Tools, a vest and glasses laid out on a table and they did not know what to do with them. Participants were overwhelmed by the amount of options that were given to them simultaneously. Placing all materials inside a box prevents over stimulating participants by having them gradually discover and remove the elements from the box.

## 6. Conclusion

In this paper we have presented the *dialogue-labs* method and examined the roles that the structuring elements of *process, space, and materials* play in this co-design method. The *process* provides a clear step-by-step procedure for a two-hour idea generation session in which participants work in pairs. The *space* is carefully crafted to align content to different locations, inspire participants and encourage them to move around the room. Finally, the *materials* are the means for participants to build a design language of their own and to provide different entry points to the design problem. *Dialogue-labs* combine these three aspects in a structured but flexible way in order to spark dialogue between the co-design participants and thus support idea generation.

Our findings from developing and employing *dialogue-labs* indicate that *process, space and materials* are central to orchestrating and carrying out this type of co-design sessions. Looking beyond the *dialogue-labs* method, we speculate that the interplay between *process, space and materials* is prominent in many other co-design methods and techniques. Through our analysis of *dialogue-labs*, we have been prompted to explore these interrelations in our ongoing work, and we propose that academic contributions within design research in combination with theoretical positions such as embodied, distributed and interactive cognition present a promising foundation for

examining these aspects more thoroughly in future studies. Our discussion of the three aspects in the specific *dialogue-labs* method can hopefully inform and inspire the use and understanding of other co-design methods and techniques, for it addresses a paradox in co-design studies: even though many design projects aim at developing or transforming physical and virtual artifacts and spaces, the role of materials and the physico-spatial design environment is relatively unexplored in the literature of the field.

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