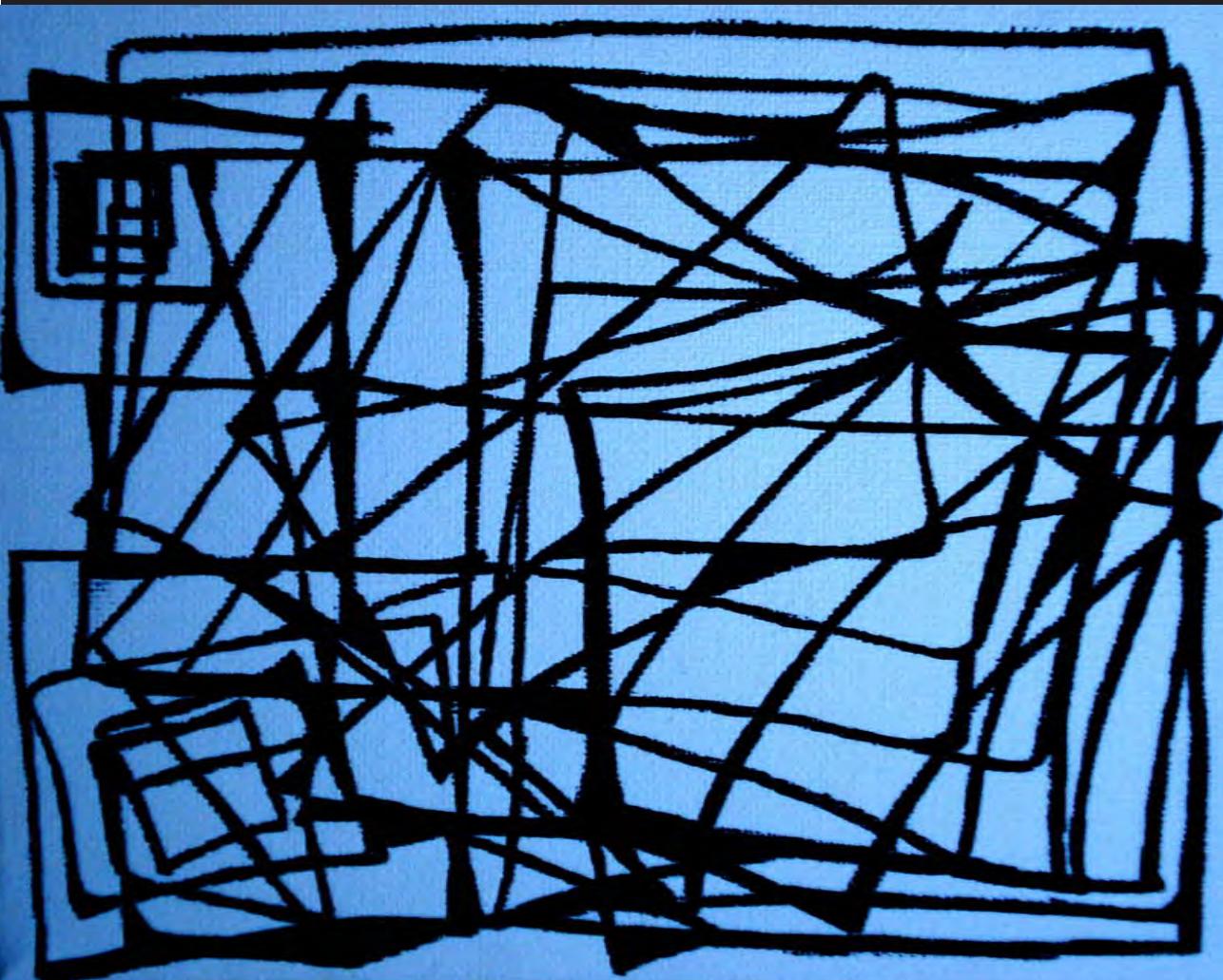


# PERSONAL- AND SHARED EXPERIENTIAL CONCEPTS



DISSERTATION  
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PhD Dissertation  
September, 2009

# PERSONAL- AND SHARED EXPERIENTIAL CONCEPTS

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*Personal - and Shared Experiential Concepts*

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Sidetal: 151

Tirage: 20

Harvard System of Referencing

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# Preface

It is the first meeting in a new promising project. Everyone around the table is enthusiastic about the project and excited to get going. There is a good atmosphere and the discussion travels back and forth. Everyone tries to present their point of view, which results in a broad discussion on very different aspects of the project.

It is discussed how the project should be understood, approached and developed. At the end of the meeting, some decisions are made in relation to the project. Many decisions are related to the different deliverables for the next meeting. At some point someone asks if they have reached an agreement and everyone nods their approval. Everyone leaves the meeting, confident that they know what to do.

A few weeks after, it is time for the second meeting. The team spirit is still high and there is a nice buzz in the meeting room, before the meeting starts. The introduction proceeds without problems, and it is time to recap what has been done in the project since the last meeting. The different participants start presenting their promised deliverables.

In the beginning everything seems fine; however after a few presentations it is clear that there are very different understandings of the project as well as the assignments for the meeting. In fact it seems as if the participants have been working in different directions and with different aims.

More and more questions are asked and soon the presentations turn into a discussion about understanding of the deliverables, the project and its aim. The positive and enthusiastic atmosphere is soon taken over by mild frustration and a slight disappointment.

*What happened?* A few weeks ago everyone nodded their approval, and seemed confident that they knew what to do. Now, it seems as if everyone is pursuing different goals and that nobody really understood each other.

The situation described above could perhaps be taken out of several different contexts and scenarios. Most people, who have been working in teams, probably recognize it, and especially people with experiences from interdisciplinary teams can confirm that this situation is part of many projects.

Lack of shared understanding or frames is just one of the difficulties facing interdisciplinary design teams working in the early phases of innovation. Besides managing their different values, perspectives and interests that cause them to see different things as important, they also have to figure out what their users and stakeholders find important.

In other words, the team has to frame their project around real user needs, problems or opportunities – and figure out what people really want, and at the same time come to an agreement about this framing within the team.

This is quite a challenge - both in terms of enabling the team members to express their personal framing of the project, but also in terms of

making users and stakeholders communicate what kind of needs or problems they have, as well as the potential opportunities, they see. And finally it is a challenge in terms of creating a shared frame within the team.

In this dissertation, this challenge is approached from a ‘designerly’ perspective and based on the initial assumption that the creation of physical artifacts can help both team-members, users and stakeholders to overcome the boundary of not being able to define, express and communicate how they frame a given project or make meaning in relation to their everyday life. And that this clarity will help the creation of a shared frame.

Based on empirical evidence, it was found that not all physical artifacts were able to do so, but that a small group of physical artifacts in a special setting and with a specific set of characteristics was.

The objective of this dissertation is to review how these physical artifacts enabled and stimulated the communication between team members, users and stakeholders in interdisciplinary teams working in the early phases of innovation. And also how they enabled and supported the creation of shared frames within these teams.

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# Acknowledgements

This PhD has been an incredible journey and a significant part of my life for almost three years now. It is impossible to share as little as half of the experience it has been, and maybe that is not even the idea with traditional research documentation. However I feel the need to share a bit of context – in terms of the incredible and wonderful people, who have helped, guided and encouraged me along the way.

Every dissertation, I have read, acknowledges the fact that a PhD is never an individual process. This PhD is no exception. It could never have been accomplished without the kind and trusting help from friends, family and colleagues. I am very grateful to all of you and I hope that I someday will be able to pay you back all the significant time you spent with me.

I would like to thank my supervisors: Nicola Morelli, Poul Kyvsgaard Hansen and Christian Tollestrup for the trust and freedom you have given me during this project. The three of you have made a strong team. You have done everything you could to help me, provided my work with valuable perspectives and encouraged me to do my very best. I could not have made it without your help.

Likewise I would like to extend thanks to my colleagues in the Industrial Design Group including Marianne Stockholm, Finn Schou, Kaare Eriksen, Thomas Arvid-Jaeger, Søren Bolvig Poulsen and Nis Ovesen - for your interest and time.

During this PhD, I have shared parts of the journey with several other PhD candidates: Max Munneche, Brett Patching and Liv Gish.

I really need to thank you all for providing me with both in-depth research insights and totally honest sharing of your own difficulties and struggles: for being true friends.

In Stanford Centre for Design Research, I would like to thank Professor Larry Leifer and Dr. Ade Mabogunje for giving me the opportunity to become a ‘visiting scholar’ at Stanford. Your fireworks of ideas, intense presence, interest and encouragement have been amazing. You are truly the role model for western academia.

In the Stanford Center for Everything (also known as the Kozmetsky Global Collaboratory) my sincere thanks go to Bhavna Hariharan and Syed Shariq. Thank you for your beautiful quest to help young scholars find their own feet and balance in research. And to my ecology: Christopher Han and Neeraj Sonalkar. Thank you for sharing your

vulnerability, passions and visions. For helping me to understand, the true value of letting go, being gentle and patient, no matter what confronts me.

I would also like to extend thanks to all the kind and open-minded workshop participants at TC Electronic, Red Cross, Daimler AG, Region Northern Jutland and in the ‘Good Elderly Life’ project. It has been great working with you, and I hope you know just how important you have been to this research project.

In Copenhagen Living Lab, I would also like to extend special thanks to Thomas Hammer-Jakobsen. Your interest and encouragement has been more than I could ever expect, and your expectations have made me work even harder.

And like so many times before I have to extend great thanks to all my dear friends and family. Thank you for being so patient and ever trusting in me. Your trust has given me something to live up to and your support something to rely on.

And last but not least, my dear Anders thank you for staying close to me through all those hard times, for all your support and confidence in me. For sending me into the world, when I needed new perspectives, and holding me close, all those times when I was almost giving up. Having you behind me makes nothing impossible.

This is all for you ...

Louise Møller Nielsen  
September, 2009

# 1.0 | Introduction

## FRAME OF THE DISSERTATION

## **Motivation and Claim of the study**

This dissertation is concerned with projects in the early phases of innovation - that is innovation projects in the period of time before the brief has been created. These projects are often run and managed by interdisciplinary teams<sup>1</sup>, which assures the necessary diversity in the perspective, body of knowledge, values and goals as well as different professional skills, which are needed in these types of projects (Rosted et al, 2007). However, the different frames, perspectives and assumptions each member brings to the interdisciplinary team also represent a challenge (Hey et al, 2007). They may result in misunderstandings, contradictory interpretations and, in the worst case, conflicts which means that the cohesion in the team is challenged.

Another possibility is that the team-members end up pursuing different goals, and that the team therefore has to spend a lot of time synchronizing the different efforts.

Another great challenge facing the interdisciplinary team working with early phase innovation projects is to understand the scope of the issue and to find the right need, problem or opportunity to approach (Hay et al. 2007).

It does not matter how well the rest of the process is managed, or how well the design is accomplished, if it is based on the wrong problem or subordinate need (Cooper, 1998). Therefore, a great part of the interdisciplinary team's effort in the early phases will be used on researching and investigating the design context and interacting with users and stakeholders, in order to incorporate as well as build upon their insights and perspectives.

This dissertation is motivated by great interest in interdisciplinary teams working in the early phases of innovation.

It will focus on two situations in particular, the first being the interdisciplinary team's creation of a shared project framing, and the second being the interdisciplinary team's interaction with stakeholders and users, in order to understand their insights and perspectives regarding the design context as well as the problem framing.

The key finding in this dissertation is that the creation of physical artifacts in a specific setting, and with a specific set of characteristics can function as important drivers for communicating personal meaning making and creating shared frames. It is found that these physical

<sup>1</sup> A team is a collection of individuals, who are interdependent in their task, who share responsibility for outcomes, who see themselves and who are seen by others

artifacts enable users and other stakeholders to overcome the boundary of not being able to communicate how they make meaning of their everyday life, as well as enable team members to communicate their personal framing of the project.

In other word, the physical artifacts with this set of specific characteristics, reduces some of the boundaries experienced by the interdisciplinary teams both when it comes to their internal collaboration as well as in their interaction with the users or stakeholders.

In the research process, it was further found that physical artifacts with these specific characteristics were not described in any previous research. It was therefore relevant to unfold them in this project, and give them the names Personal- and Shared Experiential Concepts.

In other words, Personal- and Shared Experiential Concepts are conceptualized as part of this dissertation and represent part of the ‘new knowledge’ created in this research project.

Accordingly, the claims of this dissertation is that Personal- and Shared Experiential Concepts are important drivers for communicating individual meaning and creating shared frames in interdisciplinary teams working in the early phases of innovation. And that Personal Experiential Concepts enable users and other stakeholders to overcome the boundary of not being able to define, express and communicate how they make meaning of their everyday life.

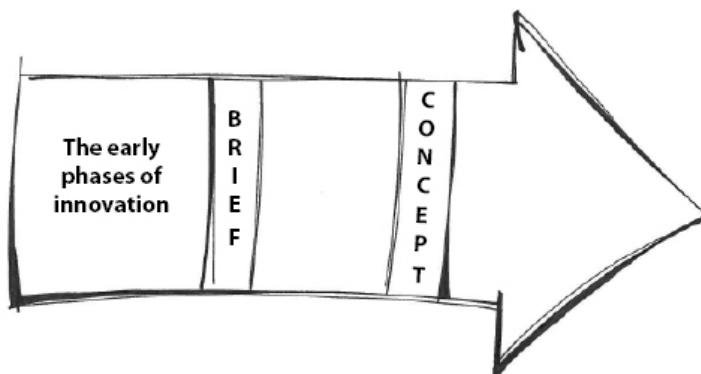
The vehicle for examining and unfolding these claims is a selection of video-documented workshops in real-time, interdisciplinary team projects with organizations including TC Electronic, Red Cross, Daimler AG and Region Northern Jutland. Besides these, a longitudinal study of the user-driven-innovation project: ’The Good Elderly Life’ has also been made, which included two sequential workshops and a more in-depth analysis of the project progress.

In this introduction there will first of all be a brief characteristic of the early phases of innovation. Secondly, there will be a presentation of the challenges, which are facing the interdisciplinary team in the early phase of innovation.

This will be followed by a review of the approaches towards these challenges recommended in previous research. After this the research setting and the research questions will be unfolded. And finally, there will be an overview of the different chapters in the dissertation. However, the chapter starts by briefly positioning this research project within present sets of knowledge.

## **Positioning the research project**

In this research project, the early phases of innovation designate the period of time before the brief and the concept are created. This period of time can be fairly long or very short depending on the project – but what defines it is that there is no final brief or no final concept developed yet.



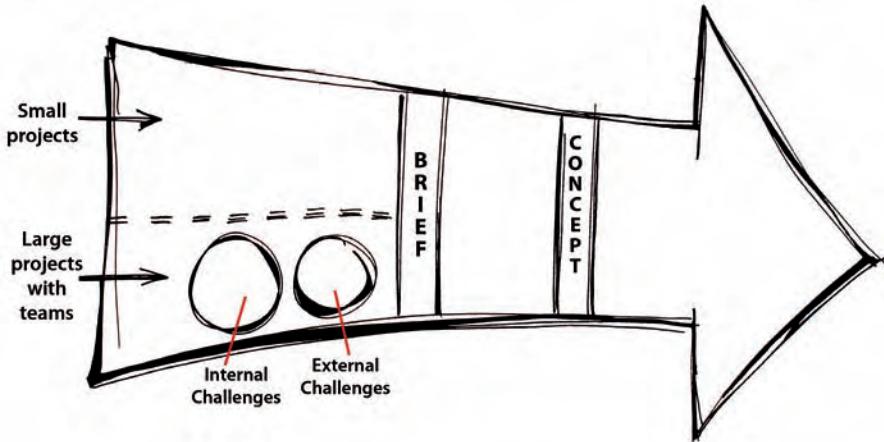
**Figure1.1:** Positioning the early phases of innovation

In ‘Innovation Management and Engineering Design’, this period of time is called ‘The Fuzzy Front End of Innovation’ (Koen et al, 2002), Innovation in the making (Darsø, 2001) or Design of Business (Martin, 2004).

In creative design, the activities in this period of time are called Strategic Design (Friis, 2007), Transformation Design (Burns et al, 2006), or Concept Design (Rosted et al, 2007). However, since this dissertation is directed towards an interdisciplinary audience, it is considered appropriate to use the general term ‘The early phases of Innovation’. The early phases of innovation represent the larger boundaries of this dissertation along with large projects or project partnerships, in which interdisciplinary teams can be found. In smaller projects, it is often not possible to find interdisciplinary teams, and they are therefore out of the scope of this project.

Within this outer boundary, there are two focus points both related to the interdisciplinary teams. The first is the internal challenges in the interdisciplinary teams, as they try to understand the design context and create a shared problem framing. The second one is the external challenges – that is the interdisciplinary team’s analysis, observation and interaction with stakeholders and users, in order to understand

their insights and perspectives regarding the design context as well as the problem framing. This is also illustrated in figure 1.2.



**Figure 1.2 :** The boundaries and focus-points in the dissertation

In the following section, there will be a more thorough review of the early phases of innovation. The insights and perspectives, which are presented, are selected, because they are descriptive of - or related to - the kind of projects, on which this research is based.

The early phases of innovation are characterized by direct confrontation with abstract and strategic questions like: '*Where do we go from here? What do we want to create? For whom? And why?*' (Laurel et al, 2003).

The early phases are positioned before any strategic plans have been made, any final goals have been set or any concept has been developed (Darsø, 2001). Accordingly, the early phases of innovation require a different way of engaging with the problem context compared to traditional problem solving. As Silje Friis describes it:

**'(...) [they] do not just fix problems – they enter projects at a much earlier stage, generating new opportunities and mastering unframed problem solving.'**  
(Friis, 2007:71)

The early phases of innovation can be organized in different ways and are of course adjusted to the nature of the specific project. However, most early phase projects include activities such as information collection/exploration (March, 1991), opportunity identification, idea generation and enrichment, opportunity analysis, idea selection and concept definition (Koen et al, 2002).

Alternatively, the early phase of innovation has been described as a balance between exploring and framing (Darsø, 2001) or as an iterative process of divergence and convergence (Ulrich and Eppinger, 2005).

In practice, it may be identified as a constant shift between exploring and unfolding the project context and combining the insights into a meaningful problem framing or design brief.

In contrast to traditional design projects, a large part of the early phases is used on designing the brief:

**'(...) the groups in this community of practice work 'upstream' of the traditional brief. Their involvement begins before the design brief is formulated, working with user groups and organizations to understand the scope of the issue and define the right problem to tackle.'** (Burns et al, 2006:20)

The early phases of innovation are often managed and run by project teams in order to handle their size and complexity. The teams are working with open-ended and unframed objectives, and engaging in different types of activities. This calls for different competences, understandings and perspectives, and therefore the project teams are often interdisciplinary (Friis, 2007). Typically, the teams include professionals like designers, managers, engineers, ethnographers, sociologists, psychologists, economists etc.

The early phases are also characterized by an extended interaction with stakeholders. This is done to capture the different interests and perspectives in relation to the project, and to assure the stakeholders' commitment to and ownership of the project outcome (Burns et al, 2006).

The outcome of early phases of innovation is the problem framing in terms of the design brief or, in some cases, a number of design briefs, depending on the size of the project and the number of participants. Since design briefs come in many forms and are used in many different connections, the following definition created by Max Munnecke<sup>2</sup> is found useful. The design brief consists of at least three elements:

1. A framing of the project context.
2. An understanding of the values and meanings, which users apply.
3. Insights into the dilemmas or problems, which are central to the project.

<sup>2</sup> Presented in our office in august 2008

In the rest of the introduction the intention is to zoom in on the two focus areas shown in figure 1.2. First, the review will examine the internal and then the external challenges facing the interdisciplinary team. This will be followed by a short review of the present approaches towards these along with a description of the gap in the present knowledge, which this dissertation approaches.

### **The challenges**

Based on the literature review, it is found that there are at least three types of challenges, which interdisciplinary teams working in the early phases of innovation have to overcome. These challenges are:

*1) Diversity 2) Complexity and Ambiguity and 3) Asymmetry or Stickiness of information.* In the section below, a brief review of each of these follows.

#### **Diversity**

When a newly-formed interdisciplinary team initiates an early phase project, each of its members will have an already existing set of perspectives, values and assumptions about what is important in the given project as well as different understandings, which will direct how they think the project should be addressed (Hay, 2007). Their different backgrounds, bodies of knowledge, approaches and perspectives are enabling them to approach this project. However, along with these comes the possibility of misunderstandings, conflict and disagreements, which can slow down the process, or even have a negative impact on performance (Ancona & Caldwell, 1992; Pelled et al, 1999). As Sessa & Jackson (1995) have observed:

**'Although research and theory (...) suggest that diversity have a positive impact on performance, diversity is hypothesized to have the opposite effect on cohesion'** (p.140).

#### **Complexity and Ambiguity**

Interdisciplinary teams working in the early phases of innovation are not only challenged by their internal diversity; they also have to manage the fact that the information available in the early phases is not always complete. As mentioned in the motivation, one of the main objectives in the early phases of innovation is to find the right problem, need or opportunity to approach and to identify the scope of the issue. This requires a wide divergence compared to later parts of the

innovation process, and hence there will be a large set of incomplete and contradictory information, which has to be distilled into a brief. Therefore, this process can lead to both ambiguity and uncertainty within the team and potentially reduce the team's cohesion (Eisenhardt & Tabrizi, 1995).

The challenges in the early phases of innovation can be categorized as complex, because of its many 'unknown unknowns'. The team does not know the unknown information, which needs to be found, and the process/decisions only make sense in retrospect. This also means that modes of actions are limited to probing, sensing and responding (Snowden & Boone, 2007).

### ***Asymmetry or stickiness of information***

As it has been mentioned a few times, interdisciplinary teams are not only challenged internally, they are also faced with great external challenges in terms of understanding the scope of the issue and finding the right need, problem or opportunity to approach (Hay et al. 2007). One of the main external challenges, which the team working in the early phases of design and innovation has to approach, is the asymmetry or stickiness of information. As Von Hippel (2005) argues:

**'(...) each innovator will tend to develop innovations that draw on the sticky information it already has, because that is the cheapest course of action (...) this means that users as a class will tend to develop innovations that draw heavily on their own information about need and context of use. Similarly, manufacturers as a class will tend to develop innovations that draw heavily on the types of solution information in which they specialize.'** (p. 70).

Accordingly, the design team must be careful not to focus only on its solution capacity, but also on gaining the information about needs and context-of-use, which enables them to find the right problem, need or opportunity to approach (Hay, 2007). However, this is not an easy task. For many users or stakeholders it is simply impossible to explain, how they apply meaning to a situation or activity, either because they have done it so many times that they do not think about it anymore, or because they find it hard to define or articulate (Krippendorff, 2006).

### **Delimitation**

Apart from the challenges named above, several organizational or political challenges are also present, which might have an impact on teams working in the early phases of innovation such as organizational resistance, when it comes to implementing radical new solutions, or

difficulties when initiating collaboration between different departments and so forth. But since the focus of this dissertation is on the interdisciplinary team, the organizational and political challenges are not within the scope of the research and will therefore not be described further.

Another set of challenges, which also falls outside the scope of this dissertation, is the challenges related to underlying emotions (Schein, 1999) and interpersonal dynamics (Branford & Huckabay, 1999).

### **Approaches towards the challenges**

This section will provide an overview of the present approaches and recommendations in relation to the challenges in the early phases of innovation based on previous research within the respective fields.

#### **Diversity**

A theme, which seems to reappear in relation to handling diversity in teams, is '*sharing*'; especially shared task commitment has been praised as an essential driver for collaboration and cohesion in teams. In a study from 2000, Carless and Depaola found that task cohesion was a much stronger indicator for performance, compared to both social cohesion and individual attraction to the team. In other words, if team members have a shared task, they often feel more united compared to teams bound by friendship or personal interest.

Clarity of and commitment to a shared purpose or goal is another factor, which is mentioned as essential to successful team interaction (Katzenbach & Smith, 1993). Takeuchi & Nonaka (1986) further observed the importance of creating a shared goal within the team itself, without interference of outside objectives and agendas.

Cohen & Bailey (1997) also point to the positive association between team cohesion and team performance, implying that if the team is performing well, it is more likely to remain connected. Lipman-Blumen & Leavitt (1999) further highlight the creation of a shared vision or mission to be important to the team cohesion, especially if all team members find it both vital for the project and personally ennobling.

#### **Complexity and ambiguity**

'*Sharing*' and '*collective*' are also some of the keywords, which can be found in the recommendations on how to approach complexity and ambiguity. For instance Darsø (2001) emphasized the need for '*shared*

*uncertainty*' in the early phases of innovation, due to the complexity of the problem. And in her study of management teams, Eisenhardt (1999) observed that effective teams handled the challenge of uncertainty and incomplete information by building a '*collective intuition*'. This is supported by Leonard & Swap (1999), who further acknowledge and discuss the management challenges, in terms of diffusing interpersonal conflicts, protecting challenging insights and perspectives, and the fostering of the necessary divergence without losing any perspectives.

### ***Asymmetry or stickiness of information***

The challenges in relation to asymmetry or stickiness of information are often approached by some kind of investigations and explorations of the market, the potential users or the context-of-use, as a basis for the problem scoping and the brief (Ulrich & Eppinger, 2005; Krippendorff, 2006; Lindsay & Rocchi, 2004).

In the Innovation Management and Product Development communities, this kind of research is known as market research or generative research (Merholz et al. 2008). In the design community, these investigations carry names like design research, user research or need finding<sup>3</sup> (Laurel, 2003; Merholz et al. 2008).

In general, research in the early phases of innovation can be divided into two broad categories – quantitative research and qualitative research (Merholz et al. 2008).

Quantitative research represents a macro-level analysis and is for instance able to identify political, environmental, social, technological, economic and demographic changes. Quantitative market research can further provide information about market size, costumer profile, market gaps as well as forecast trends in the marketplace.

The quantitative research is useful, when it comes to understanding and identifying trends and changes in the market. It can provide an insight into *what* is going on and perhaps *how* things are changing, but unfortunately it is very limited, when it comes to understanding *why* changes occur (Cooper & Evans, 2006).

Qualitative research, on the other hand, is useful when it comes to identifying *why* changes occur, as it is able to provide micro-level contextual insights on for instance user context, lifestyles, behaviour and values.

<sup>3</sup> A term especially used in the design community at Stanford University and in design consultancies in the Bay Area (CA)

Qualitative research is a tool for understanding user behavior, as well as for discovering unmet and unarticulated user needs (Cooper & Evans, 2006).

Another difference between the quantitative and qualitative research approach is that the former investigates a broad and overall sample, searching for explicit and quantifiable information, whereas the latter investigates a very narrow sample, searching for tacit and emerging insights (Munnecke & Van der Lugt, 2006).

Even if the quantitative approach and qualitative approach are quite different, most researchers agree that they must be seen as complementary and that they play different roles (Munnecke & Van der Lugt, 2006; Merholz, 2008).

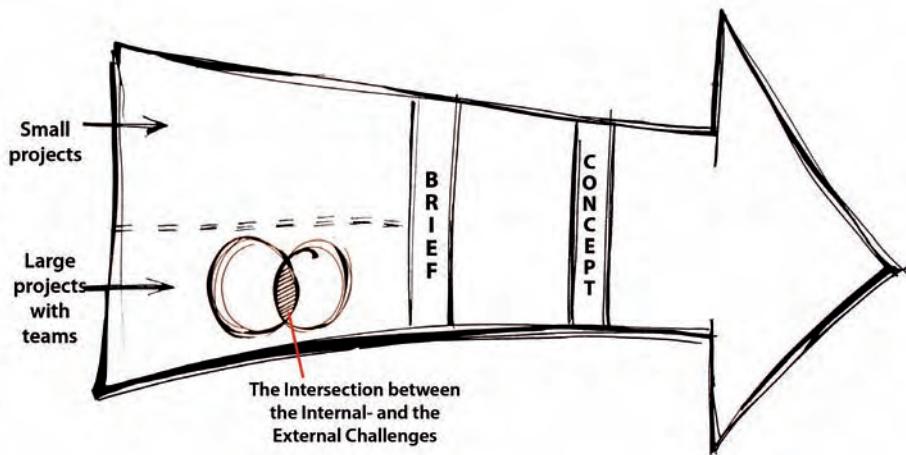
Some research groups even emphasize that in order to understand the increasing complexity of people's lives, they have to be equally valued and integrated in the innovation process (Rocchi & Lindsay, 2004; Cooper & Evans, 2006).

### **Gaps in the Present Knowledge**

One of the main gaps in the present knowledge, which occurs when viewing the challenges in the early phases of innovation along with recommended approaches towards these, is the intersection between the internal and the external challenges.

In current research, the focus is either on the team and how to handle the diversity, complexity or ambiguity within the team, or the focus is on the interaction between users and stakeholders and how to manage the asymmetry or stickiness of information. However, no one looks at the intersection between the two.

In practice this division between the internal and the external challenges does not exist, as both sets of challenges are present at all times in the early phases of innovation, even if the team designates different people or different kinds of activities to approach these. The intersection between the internal and external challenges is therefore identified as a gap in the present knowledge, which will be approached in this dissertation. This is also illustrated in figure 1.3 on page 12.



**Figure 1.3:** Gap of knowledge to be investigated in this dissertation.

### The Research Setting and the Research Questions

The aim of this research is to build upon the present approaches or recommendations in relation to the internal - and the external challenges and to look at how insights from different perspectives, approaches and methods can be integrated and synthesized. Besides this, the objective is also to introduce a more hands-on approach to the challenges.

This study will view the interdisciplinary team's work in the early phases of innovation as an effort of meaning making and thereby as a process where the participants are translating personal insights and integrating these with user-research into a comprehensive and shared project framing.

Another central issue of this research is direct interaction with users and stakeholders: meeting them in person and not only through a user-research report, which can become hard to translate into products and/or services. The assumption behind is that direct contact encourages different perspectives, expertise and approaches and prevents the attempts and possibilities of creating a wall between the designers and the researchers as well as between the design team and the users/stakeholders.

A third and defining issue of the present research has been the creation of physical artifacts as a way of creating a shared language between the different perspectives, as well as to underline the importance of co-creation and ownership. But also to help users and stakeholders to overcome the boundary of not being able to express, what they find

meaningful, and how they make meaning of their everyday activities. The inspiration for this derives from the later parts of both design- and innovation processes. Here prototypes and models are often used to support communication, to test possibilities and compare ideas etc. The intention in this dissertation has been to use the creation of physical artifacts in the very early phases, and to test their usability here, as well. However, in the early phases of innovation it is not possible to model the product or the service yet, and therefore the creation of physical artifacts is used to communicate personal meaning making in relation to either the scope of the project or the problem to be approached, depending on the time and the objective of the creation. The creation of physical artifacts in the early phases of innovation also entails some extra demands of the '*creation process*' and facilitation of this:

- The requirement for creating the physical artifacts has to be kept at a minimum in order to involve as many relevant users and stakeholders as possible (since it is not given that everyone in the interdisciplinary team or among users/stakeholders has modeling-experience)
- The creation of the physical artifacts has to handle a great diversity in terms of different backgrounds and assumptions as well as kinds and levels of knowledge. And it has to contain both the complexity and ambiguity, which may appear in relation to the project.
- And finally the creation of the physical artifacts has to involve a shared experience and shared output in order to build on the insights from previous research, in which 'sharing' is identified as an important tool to handle diversity, complexity and ambiguity in teams.

In practice, the research setting is a number of facilitated workshops, in which the creation of physical artifacts is a central element. The workshops take place in early phase innovation projects and include both members of the interdisciplinary team as well as users and stakeholders with the relevant contextual knowledge. The aim of the workshops is to create a shared framing of the project within the interdisciplinary team and find the right problem, need or opportunity to approach. Depending on the workshop set-up, the workshop either

leads to focus, priorities or the acknowledgement that there is a need for further information. In chapter 3, there will be a more elaborate description of the workshop set-up.

The Research Questions in this dissertation are also framed within this specific workshop setting, and the answers are to be understood in this context.

Furthermore, the dissertation builds on the a priori assumption that all interdisciplinary teams will benefit from a shared frame as early as possible, even though it may be changed to another shared frame later on.

The Research Questions are:

- 1. How can the creation of physical artifacts enable and stimulate the communication between team members, users and stakeholders in interdisciplinary teams working in the early phases of innovation?**
  
- 2. How can the creation of physical artifacts enable and support the creation of shared frames within interdisciplinary teams working in the early phases of innovation?**

### **Summary**

In this chapter, the framing of this research project has been presented. The study is concerned with interdisciplinary teams working in early phases of innovation and focuses in particular on two situations. The first one is the interdisciplinary team's creation of a shared project framing, and the second one is the interdisciplinary team's interaction with stakeholders and users, in order to understand their insights and perspectives regarding the context as well as the problem framing. The internal challenges (diversity, complexity, ambiguity) and the external challenges (asymmetry or stickiness of information knowledge) facing the interdisciplinary teams was reviewed along with the present recommendations in relation to these. It was found that there is a lack of research in the intersection between the internal and the external challenges, and this was therefore selected as the focus of this dissertation. The chapter concluded with a review of the research setting and a presentation of the research questions.

## Overview of the chapters

To provide a further overview of the dissertation, the illustration below provides a brief summary of each chapter and their main conclusions.

<b>Chapter 1:</b> Introduction	Chapter 1 reviews the motivation and claims of the study. It also defines the early phases of design and innovation as the outer boundary of the study and identifies two focus points – in terms of the internal challenges and the external challenges. These challenges are unfolded and the present approaches towards these are presented. A Gap in the present knowledge is identified and the chapter is concluded with a review of the research setting and the research questions.
<b>Chapter 2:</b> Theoretical Framework	Chapter 2 holds the theoretical foundation. It includes both a review of the design perspective used in this dissertation, as well as a presentation of the theoretical framework. The review of the design perspective includes different insights on design – and concludes with the argumentation in respect to why the design perspective is relevant in relation to the early phases of innovation.  In the theoretical framework, meaning is reviewed in relation to individuals, teams and artifacts. This review includes insights in relation to individual meaning making, the creation of second-order-understandings, individual and shared frames, metaphors, models, prototypes, boundary objects etc.
<b>Chapter 3:</b> Research Methodology	In chapter 3 there is a presentation of the research methodology. Firstly the workshop setup is reviewed in terms of Lego Serious Play, and the adjustments that have been made to it, to make it fit projects in the early phases of innovation.  Secondly, it is reviewed how different research approaches, including Action Research and Interaction Analysis, are combined into a hybrid method and used as a central part of the research design.  The chapter concludes by showing how this study is linked to social constructivism and describes its striving for transparency and observable evidence.
<b>Chapter 4:</b> Overview of the Research Material	In chapter 4 the research material is presented. First of all the workshop-portfolio is presented. In this section the characteristics of the workshops are unfolded in order to show the broad variety of projects and organizational contexts, the data comes from. As well as their real-time qualities. After this each workshop is presented in terms of context, type, assignment and participants. And finally, a large set of the physical artifacts from the workshop is presented in terms of pictures and transcripts.

<p><b>Chapter 5:</b> Analysis and Findings I Identifying general patterns</p>	<p>In chapter 5 the general patterns across the six workshops are presented. It is found that some of the models played a more significant role in the workshops compared to other models. And that these models influenced both the communication of meaning and the creation of shared frames in the workshops.</p> <p>When analyzing the significant models more closely, it is further found that their structure was different from the other models, as they had both a 'concept component' and an 'experience component'.</p> <p>The number of significant models across the workshops is also presented along with several examples from the workshops.</p> <p>In the last part of the chapter, the focus is on reviewing the transformation of the significant models from individual models to shared models.</p>
<p><b>Chapter 6:</b> Analysis and Findings II The significant models</p>	<p>In chapter 6 the general findings in relation to the significant models are unfolded. It is also reviewed why the significant models influence the communication of sticky information and meaning making the way they do, and why they support the creation of shared frames in the teams.</p> <p>In relation to this, the structure of the significant models (the 'concept component' and the 'experience component') is identified as very influential.</p>
<p><b>Chapter 7</b> Analysis and Findings III Definitions</p>	<p>In chapter 7 the significant models are explored in terms of definitions. Initially, both boundary objects and metaphors seem to be plausible definitions. However, it is found that none of these definitions fully covers the characteristics of the significant models. It is therefore found necessary to understand the significant models as something new and not previously defined.</p> <p>In the end of the chapter, the characteristics of the significant models are gathered on the basis of the insights from the previous chapters. And the significant models are given the names Personal – and Shared Experiential Concepts.</p>
<p><b>Chapter 8:</b> Conclusion and perspectives</p>	<p>Chapter 8 holds the conclusion of the dissertation as well as a synthesis of the different theoretical and empirical parts of the research project.</p> <p>First of all, it completes the research circle by answering the research questions. Secondly, it unfolds the reliability of the research project and discusses the conclusions with respect to the research design. Thirdly, the theoretical foundation is discussed in respect to the findings, and finally the perspectives and further implications from this study are reviewed and discussed.</p>

## 2.0 | Theoretical Foundation

### LITERATURE REVIEW

## **This chapter**

In this chapter the theoretical foundation will be unfolded. Part of the theoretical foundation has all ready been unfolded in the introduction chapter, in terms of positioning this research project within present knowledge. This was done by identifying the intersection between the internal and external challenges, which face interdisciplinary teams working in the early phases of innovation, as a gap in the present knowledge. And accordingly to make this the focus point of the dissertation (cf page: 12).

Still, it is necessary to unfold the theoretical foundation in two additional directions.

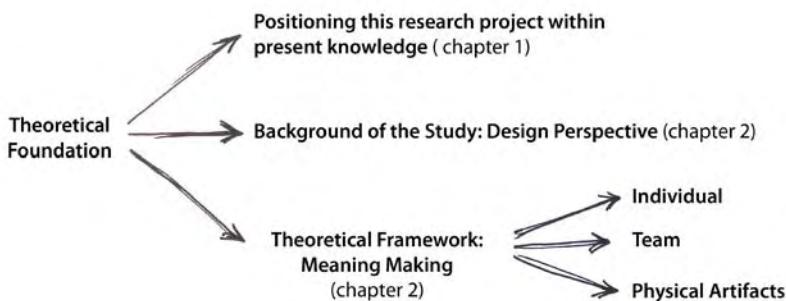
First of all, it is necessary to provide an understanding of the perspective, which is used in this dissertation. As mentioned earlier, the dissertation is directed towards an interdisciplinary audience; it is, however, built upon a design perspective and a ‘designerly’ way of understanding the early phases of innovation. This design perspective influences for instance the development of the workshop set-up. Therefore it is necessary to unfold these implicit insights and understandings from design in this chapter and also to explain why the design perspective is relevant in respect to the early phases of innovation.

The second direction, which needs to be unfolded in this chapter, is the theoretical framework. The theoretical framework is identified and developed in order to understand and interpret the empirical findings. The theoretical framework is going to be used as the lens in which the empirical data (and the complexity it holds) can be framed and understood.

The theoretical framework will have an overall focus on Meaning. Meaning will be reviewed in relation to three areas, which are relevant to the workshop set-up.

First of all, meaning will be reviewed in relation to how individuals are creating meaning, and how this meaning is communicated. Secondly, meaning will be reviewed in relation to how teams are creating shared frames.

And finally, meaning will be unfolded in relation to physical artifacts in terms of how they impact the communication of meaning as well as the creation of shared frames. The structure of the chapter is also illustrated in figure 2.1.



**Figure 2.1:** Overview of the theoretical foundation.

### The Design Perspective

In the following section the intention is to unfold the perspective, in which this research will be accomplished. This is done to make sure that all the insights and perspectives from the design field, which may be taken for granted in this dissertation, are briefly presented to the reader. In detail, the objective is to present insights and understandings in relation to the following questions:

- How are problems or assignments understood and approached in design?
- What is the centre of attention or value criteria in design?
- How can the process of designing be understood?
- In which ways is the design perspective relevant and useful in relation to the early phases of innovation?

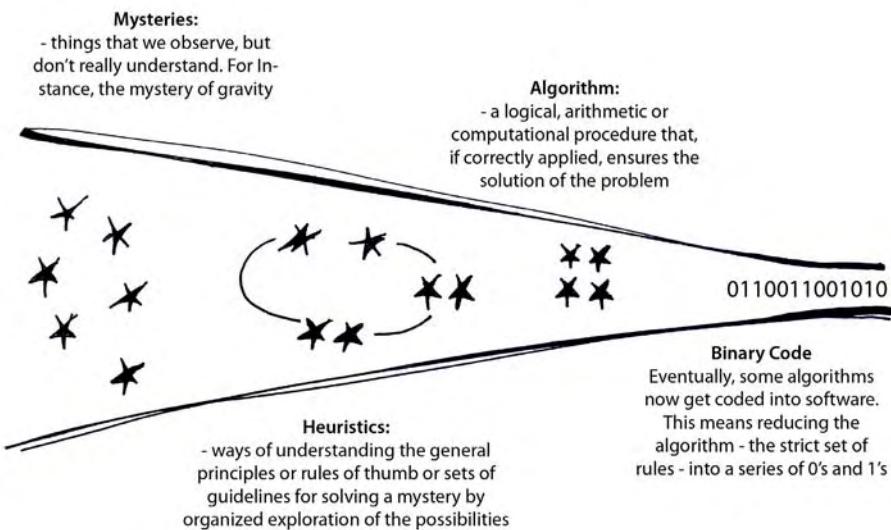
The section is not to be seen as a comprehensive review in relation to the questions, but rather as a brief glimpse into the field. Likewise, only the insights and perspectives considered to be important to this dissertation are presented.

#### ***Problems and assignments in design***

Even though design is recognized as a problem-solving activity (Simon, 1969), it is argued that problem solving in a design context cannot be understood as it is in a mathematical/analytical context (Schön, 1983; Gedenryd, 1998; Martin, 2004). Instead it is argued that designers use design thinking and not analytical thinking, when solving problems.

According to Roger Martin (2004) analytical thinking is characterized by a knowledge funnel, which gradually takes the mystery of every

phenomenon and translates it into heuristics. The heuristics are later transformed into an algorithm and finally - what once was a mystery – may be translated into some sort of binary code. This is also illustrated in the model below:



**Figure 2.2:** The Knowledge funnel (Based on Martin's own illustration presented at the CONNECTING 07 conference in San Francisco, autumn 2007)

Design thinking, on the other hand, is more concerned with the reformulation of the mystery that is escaping the present realm of logic (or generally accepted knowledge funnel) and creating the basis for a new one.

In design methodology this process of reformulating the ‘mystery’ is often referred to as repositioning (Buchanan, 1992) or reframing. Buchanan provides the following illustrative example of repositioning:

‘Traditional graphic design yielded larger signs but no apparent improvement in navigation – the larger the sign, the more likely people were to ignore it. Finally, a design consultant suggested that the problem should be studied from the perspective of the flow of the customer experience. After a period of observing shoppers walking through stores, the consultant concluded that people often navigate among different sections of a store by looking for the most familiar and representative examples of a particular type of product. This led to a change in display strategy, placing the products that people are most likely to identify in prominent positions’ (Buchanan, 1992:12).

The reformulation of the mystery or escape from the present realm of logic is also represented in the kind of problems facing designers, and the way in which designers approach problems, in general.

In 1972 Rittel introduced the term ‘wicked problems’ as a means to understand the types of problems designers are facing. Rittel (1972a) argues that in contrast to traditional analytical problem solving, with a clear definition and one solution, designers are faced with problems with no clear definition and therefore multiple possible solutions. In opposition to the wicked problems, he also introduced the term ‘tame problems’ and explained their difference as follows:

(...) **tame problems can be exhaustively formulated so that it can be written down on a piece of paper which can be handed to a knowledgeable man who will eventually solve the problem without needing any additional information.** This is not so with wicked problems. When I tell somebody the problem is (...) to introduce a new product into our production line, I can write it down on a piece of paper, give it to him and lock him up. But it will not be long before this person will come out again and ask for more information: What kind of a new product are you talking about? How will it affect the other products already in operation? What markets do you expect for your product? etc. (...)

(Rittel, 1972a:392)

Based on Rittel’s work, Buchanan (1992) has listed the attributes of wicked problems:

- **Wicked problems have no definitive formulations, but every formulation of a wicked problem corresponds to the formulation of a solution.**
- **Wicked problems have no stopping rules.**
- **Solutions to wicked problems cannot be true or false only good or bad.**
- **In solving wicked problems there is no exhaustive list of admissible operations.**
- **For every wicked problem there is always more than one possible explanation, with explanations depending on the ‘Weltanschauung’ of the designer.**
- **Every wicked problem is a symptom of another, “higher-level” problem.**
- **No formulation and solution of a wicked problem has a definitive test.**
- **Solving a wicked problem is a “one shot” operation with no room for trial and error [after the implementation/ commercialization].**
- **Every wicked problem is unique.**
- **The wicked problem solver has no right to be wrong; they are fully responsible for their actions.**

(Buchanan, 1992:16)

The generally accepted understanding that designers are solving wicked problems also indicates that designers have a special approach in relation to the problem framings, problem scopes and problem formulations. According to Thomas & Carroll (1979:5):

**Design is a type of problem solving in which the problem solver views the problem or acts as though there is some ill-definedness in the goals, initial conditions or allowable transformations.**

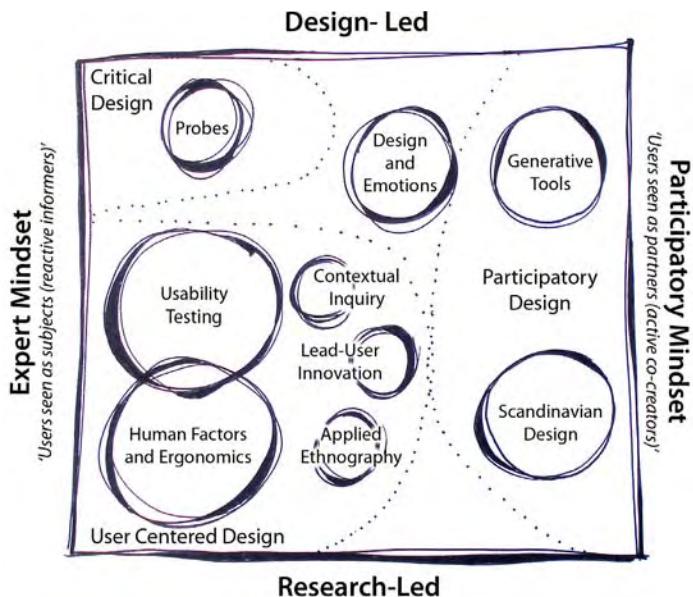
And as a result of this, the designer will approach all problems as though they are ill-defined – regardless of whether they are or not (Thomas & Carroll, 1979). This means that when the designer is given a problem formulation, he or she will look at the problem as only loosely ‘defined’ and assume that the project goal will be redefined during the project. Or as Jones (1970) argues, the design brief will be seen as a kind of map for an unknown territory, rather than a specification for the solution.

#### ***Centre of attention or value criteria in design***

Another characteristic of design, which is described in many different ways, is its human-centeredness. This implies that designing is characterized by great attention and commitment in relation to the user or community for whom the design is intended. Therefore the value of a design is constantly compared to the value it may or may not have to its users. Design activities are even argued to distinguish themselves from other creative and purposeful activities by their human-centeredness (Krippendorff, 2006).

**Designers' extraordinary sensitivity to what artifacts mean to others, users, bystanders, critics, if not to whole cultures, has always been an important but rarely explicit acknowledged competence.** (Krippendorff: 2006:48)

The human-centeredness of design is also evident in the myriad of methods in design also called design-research, user-research or need finding (Laurel, 2003; Merholz et al. 2008). In 2006 Liz Sanders created topography of user research, in which she placed all the present methods and tools in a framework defined by the origin of the method and the mindset applied, when using it. Instead of ranging the different methods, her intention was to create a mental picture of the present approaches and mindsets used in user-research and to present these as equally valuable ways of approaching the challenges of human-centeredness. The topography can be seen in the figure on the opposite page



**Figure 2.3:** Topography of User Research (Sanders, 2006:4).

However, as Sanders' Topography illustrates, there is still a very lively discussion in the design community about how to view the user. The understanding of the user goes from a position, where the user is seen as a subject (reactive informers) to a position, where the user is seen as a partner (active co-creator). From a position where:

**Researchers talk about the people that they do research on as subjects, or informers or users. The people are asked questions and/or requested to respond to certain stimuli and/or observed (...) (Sanders, 2006:5).**

To a position where the designers invite the group of people, who the design is intended to benefit, to take part in the process as co-creators or partners instead of perceiving them as subjects.

Krippendorff (2006) argues that the focus on the user in design often time is misguided, and does not involve the necessary collaboration. Instead of looking at it as THE USER he suggests looking at it as a network of stakeholders, who:

- Are experts in their own worlds and usually are very knowledgeable about the stakes they claim in [a certain] development.
- Are willing to act in support or opposition of [a] development.
- Are willing to mobilize the resources they command: information, expertise, money, time, connections to members of their community, and the power of the institutional roles they occupy.

Krippendorff (2006: 64-65)

This is supported by Bucciarelli (1994), who described designing in design teams as a process of achieving consensus among a group of participants with different interests. According to Bucciarelli, this process is necessarily social and requires participants to negotiate their different perspectives and construct meaning through direct interactions. However, Bucciarelli is not the only one, who has tried to explain the process of design. Like the myriad of methods to user-research and need finding there is also quite an extensive catalogue of design process models.

### ***The process of designing***

In design literature, various examples of design process models can be found, which assume that design can be organized in an identifiable process (Ulrich & Eppinger, 2005; Tjavle, 1979). Especially The First Generation Models, which were introduced in the beginning of the 1960s, assumed that the design process could be divided into a set of discrete steps, which – when followed – would result in a design (Rittel, 1972b). Most First Generation Models are based on the model shown below:



**Figure 2.4:** The most basic design process model

The underlying drive in The First Generation Models was to produce an approach to design based on objectivity and rationality - an approach to design in accordance with the values in science. Within this was also the wish to move from individual, intuitive and experience based approaches to design into more stringent and explicit approaches. Ever since the introduction of The First Generation Models (and later Second - and Third Generation Models) a vivid discussion in the design community has taken place regarding to which extent the models are useful, and to which extent they can be ignored. The argument to keep the design process models is that the increased complexity in the design projects as well as the need to work together with other professionals make it necessary to apply new and explicit methods (Jones, 1970). The argument to skip the design process models is that they

are not useful and do not represent what happens, in practice. Or as Gedenryd (1998:66) sums up in a number of studies:

**On the one hand, [Design Process Models] do not work as prescriptions. People don't use them, because they don't work for their advertised purpose; those who actually tried them failed to reach the stated results. On the other hand, they are also inadequate as descriptions. If you study how practitioners really work, you will find what they really do to be something quite different.**

Parallel with the discussion on Design Process Models in the design community, several studies have been made with designers in practice and design as something separate from science. An example of this is Bryan Lawson's book: *How Designers Think* (1980).

In this book, Lawson argues that designers are very different from scientists in that scientists set out to study the problem, whereas designers learn about the problem as a result of trying out the solution. This means that designers co-develop the understanding of the problem along with the creation of the solution. According to Lawson this also means that designers are more inclined to generate a fairly quick and satisfactory solution, rather than prolonging the analysis of the problem.

This is also related to the kind of reasoning deployed in design.

Roozenburg & Eekels (1991) argue that design reasoning is abductive. Instead of building an hypothesis, which can be tested (deductive reasoning) or gathering a large set of inquiry, on which a rule or argument can be based (inductive), designers start off with a set of seemingly unrelated facts, sensing that they are somehow connected. Both the solution and the hypothesis derive as an end result of connecting these facts.

Another significant study of designers in practice was made by Donald Schön. In his book 'The reflective Practitioner', Schön argues that design is a 'reflective conversation with the situation' (1983:76):

**(...) I shall consider designing as a conversation with the materials of a situation. A designer makes things. (...)**

**He works in particular situations, uses particular materials, and employs a distinctive medium and language. Typically, his making process is complex.**

**There are more variables—kinds of possible moves, norms, and interrelationships of these—than can be represented in a finite model.**

**Because of this complexity, the designer's moves tend, happily or unhappily, to produce consequences other than those intended.**

**When this happens, the designer may take account of the unintended changes, he has made in the situation by forming new appreciations and understandings and by making new moves.**

**He shapes the situation in accordance with his initial appreciation of it, the situation "talks back," and he responds to the situation's back-talk.**

**In a good process of design, this conversation with the situation is reflective. In answer to the situation's back-talk, the designer reflects-in-action on the construction of the problem, the strategies of action, or the model of the phenomena, which have been implicit in his moves.** (Schön, 1983:79)

### ***The design perspective vs. the early phases of innovation***

As described in the introduction chapter, interdisciplinary teams working in the early phases of innovation are challenged by 1) Diversity 2) Complexity and Ambiguity and 3) Asymmetry or Stickiness of information. These challenges can also be found in design projects in general - if not all at once then at different times in the projects. This indicates that some of the approaches and perspectives from design may be relevant to use in projects in the early phases of innovation. This argument can also be supported by the characteristic of the designer, which can be summed up on the basis of the review above:

- Designers tackle wicked problems and approach all problems as if they were ill-defined.
- Designers are human-centred and have a myriad of tools and methods to approach the user (or the network of stakeholders).
- Designers co-develop the understanding of the problem along with the creation of the solution.
- Designers use abductive reasoning and strive for a solution.
- Designers engage in a reflective conversation with the situation.

All of these characteristics or attributes seem relevant, when it comes to approaching the challenges in the early phases of innovation.

In relation to the challenge of diversity in the interdisciplinary team, the design perspective is relevant because of its human-centeredness. The human-centeredness is a focus point, which is shared by all the team members and stakeholders, irrespective of their background or perspective. Furthermore, the aim in the interdisciplinary team working in the early phases of innovation is to find the right problem, need or opportunity, and to accomplish this a human-centred approach is very relevant.

In relation to the challenge of complexity the design perspective is relevant, because of its ability to tackle wicked problems and the co-development of problem understanding and solution. First of all because the problems in the early phases of innovation are wicked, and often

time ill-defined. And secondly, because one of the most plausible ways to handle the complexity in the early phases is by co-developing the understanding of the problem along with the creation of the solution – in a reflective conversation with the situation.

In relation to the challenge of ambiguity the design perspective is also relevant, because of its abductive reasoning and reflective conversation with the situation. In the early phases of innovation, there is no causality, and therefore abductive reasoning becomes a relevant approach along with probing different possibilities.

And finally, in relation to the Asymmetry or Stickiness of information, the design perspective is relevant, because of its human-centeredness and the myriad of methods with which to approach the user (or the network of stakeholders).

Another link between the early phases of innovation and the design perspective can be found in practice, where design is already playing a significant role in the early phases of innovation (GK Van Patter, 2005; Friis, 2007), and where several researchers from the field of business strategy and management praise the use of design approaches in early phase innovation projects (Martin, 2004; Liedtka & Mintzberg, 2006).

In chapter three, there will be a more detailed explanation of how the different insights and approaches from the design perspective are adopted and used in relation to the workshops and the research, in general. In the following section, however, the focus will be on the theoretical framework.

## **Theoretical Framework**

As explained in the beginning of this chapter, the theoretical framework is focused on meaning making. In literature, meaning making is examined in a number of areas for instance in leadership, teaching, organizational learning, religion/ spirituality etc. Meaning Making as a phenomenon derives from the hermeneutics; however in this dissertation the intention is to view meaning making in relation to the creation, design and development of new products, processes and services, and more specifically in relation to individuals, teams and physical artifacts involved in this process of creating, designing and developing. In the first section, meaning will be reviewed in relation to how the individuals are creating meaning and how this meaning is communicated. This is relevant to the dissertation because each member of the

design team as well as each stakeholder will have their own way of making meaning in relation to the early phase project, which they are working on.

Secondly, meaning will be reviewed in relation to how teams are creating shared frames. This is relevant in relation to the dissertation, in terms of the need to create a shared project frame or other aspects of ‘sharedness’ within the team which previous research has shown is important.

And finally, meaning will be unfolded in relation to physical artifacts, in terms of how they impact communication of meaning as well as the creation of shared frames.

### **Meaning in relation to individuals**

**One cannot ignore that designers, engineers, business people, politicians, cultural critics, and users all live in different worlds, act according to different conceptions they bring to what they encounter, and create different meanings for what seems from any one perspective to be the same thing.**

(Krippendorff, 2006:49)

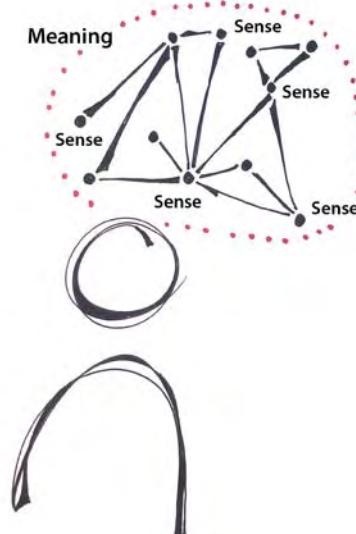
In order to understand the process of Meaning Making on the individual level, it is important to make a distinction between meaning and sense. Whereas sense is immediate, direct and almost unconscious gathering of insights from the surroundings, meaning involves conscious reflection and interpretation. Sense happens throughout all of our senses, whereas meaning involves an intellectual molding (Krippendorff, 2006). The difference between sense and meaning can be explained through the metaphor of a puzzle: Sense is the interdependent pieces, while meaning emerges when the different pieces are added together – into something meaningful.

**Sense is the feeling of being in contact with the world without reflection, interpretation or explanation. (...). Sense is the background against which one notices what is unusual, unexpected or different. Sense is the tacit, taken for granted and largely unconscious monitoring of what is.** (Krippendorff, 2006:50).

The question of meaning is often brought up when something unexpected is sensed, or when an alternative way to combine senses is introduced i.e. if you come home and something in your house has changed from its usual position, you will notice it. Likewise, if you see a person staggering towards you, you might think he is drunk – however after talking to him you may realize that an aggressive type sclerosis is the reason for the awkward type of walking, and this will probably change your perception and attitude towards him.

**Meaning is a structured space, a network of expected senses, a set of possibilities that enable handling things, other people, even oneself. They guide action much as a map shows all the possible paths from where one stands.**  
(Krippendorff, 2006:56)

This connection between sense and meaning is also illustrated in figure 2.5. Each of the black dots represents senses and the whole figure illustrates the meaning.



**Figure 2.5:** Meaning as a network of senses

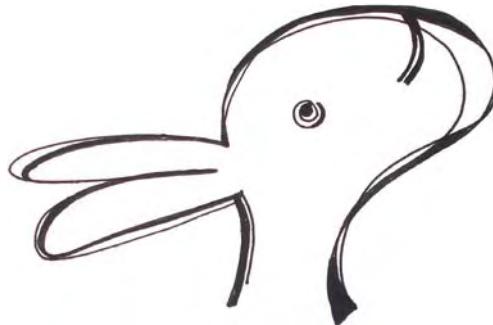
### ***The links between sense and meaning***

As it has been revealed above, meaning can be seen as an explanation of how a sense is embedded in the context of other senses, and the senses' role in this context. Krippendorff (2006) argues that meaning manifests itself in different ways: in perception, in reading, in language, in conversation with others and in re-representation. In relation to this dissertation, the manifestations in perception and in conversation with others are especially interesting.

#### *In perception:*

In perception, meaning arises in the awareness of the possibility of different ways of seeing (Krippendorff, 2006:52).

So, when we notice that something can be perceived in more than one way, we become aware that we are making meaning of things in a certain way or from a certain perspective. A very simple and well-known example of this is the Duck-Rabbit created by Wittgenstein (1953). It can be seen in three ways: as a duck, as a rabbit and as a line-drawing.



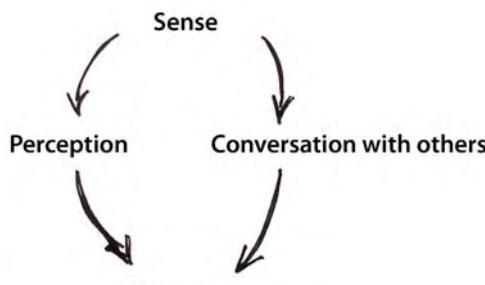
**Figure 2.6:** The Duck-Rabbit (Wittgenstein, 1953:194)

When looking at the drawing, it seems as if it is shifting from a duck to a rabbit, depending on how we perceive it. However nothing in the drawing – as such - is changing. It is in our perceptions or meaning making that the changes occur.

*In conversations with others:*

Questions of meaning can also arise when we become aware that others seem to see things differently, when others use words or handle artifacts in ways we would not or when others account for their world in terms different from our own. Experiencing such discrepancies challenges the obvious of our own perceptions, and accepting the possibility of versions other than our own calls for explanations of these apparent differences. (Krippendorff, 2006:55) This implies our personal meaning making becomes challenged, when we realize that other people see the world differently, and this sharpens our consciousness in relation to how we construct meaning of our own.

In figure 2.7, perception and conversation with others are illustrated as links between sense and meaning, or as manifestations of two different meaning making processes.



**Figure 2.7:**  
The link between  
sense and meaning

### **Second-order-understanding**

Sense and meaning are both 100% personal: they can never be completely shared with others, because they are based on personal experience.

However in the early phases of innovation, it is important for the interdisciplinary team to obtain an understanding of the meaning, which stakeholders apply to the situation or activity in question as well as to understand how the other team members apply meaning. This kind of understanding is often time referred to as second-order-understanding.

**Understanding someone else's understanding is an *understanding of understanding*, an understanding that recursively embeds another person's understanding in one's own, even if, and particularly when, these understandings disagree, contradict one another, or are thought by one to be wrong or appallingly unethical. This recursive understanding of understanding is a second-order-understanding.** (Krippendorff, 2006:66, original emphasis)

Narratives and stories are typical strategies to gain a second-order-understanding, because these already play an important role in people's understanding, explanations, and representations of life. On the basis of previous research, Cochran (1990) has summarized the following links between the narrative and its influence and importance to human life.

**First, we live in story. In human experience there is always before and after, memory and anticipation, without which the present is unintelligible.(...)**  
**Second, we represent life in story. (...) In telling jokes, giving anecdotes, describing an event, writing a life story, or planning the future, we tell stories. (...)**  
**Third, we explain through story. (...) explanation is not concerned with one time or another, but with the change over time represented by the two contrasting states. (...). An explanation takes the form of a story, because it already has the story's form, with a beginning, middle and end.**  
**Last, we understand and comprehend through story. (...) To comprehend, we seek larger patterns and syntheses in which parts fall into place.**

(Cochran, 1990:73)

However, when looking at the situation in the early phase of innovation, for many stakeholders it is simply impossible to narrate or explain how they apply meaning to a situation or activity, either because they have done it so many times, that they do not think of it in anymore, or because they find it hard to define or articulate. Likewise, in the interdisciplinary team it can be difficult to understand the meaning which the other team members apply, because each team member has a certain perspective, professional language and set of experiences. In many cases it is therefore relevant to enter into a dialogue and re-examine how each individual experiences, senses, feels and behaves in

certain situations and investigate how these small pieces of information are provided with meaning in their ‘worlds’.

**While stories can never capture all the meaning that informants bring into a narrative, especially their feelings and tacit understandings, conversation provides a window into the understanding that others have (...). The key to this understanding is unprejudicial listening, avoiding our own categories, and being careful rearticulating these stories in our own terms.**

(Krippendorff, 2006:55)

### ***Metaphors***

According to Lakoff and Johnson, metaphors provide another way for people with different values, experiences and perspectives to gain second-order understandings. In their book ‘Metaphors we live by’ they state that:

**A metaphoric presentation skill is essential to create contact and communicate experiences, which are not shared.** (Lakoff & Johnson, 1980:257)

This means that metaphors become a way to explain values and meanings, as well as a way to frame and restructure understandings. It is therefore interesting to look more closely at present research on metaphors.

It is evident that metaphors function by explaining something about an object, activity or relation in terms of something else. For instance in the metaphor: “there is chemistry between them”, the world of chemistry tells us something about how to understand the relationship between the two people in question.

On the more operational level this can also be explained like this:

**Metaphors operate across two logically independent domains, an absent but familiar domain of experience, the source domain, and a present domain in need of understanding or restructuring, the target domain.**

(Krippendorff, 2006:157)

In relation to the example ‘there is chemistry between them’, this means that the source domain is chemistry, and the target domain is the relationship between two people.

It is further found that metaphors transfer a way or understanding or a pattern of understanding between the two domains:

**Metaphors carry (...) patterns of understandings embedded in the vocabulary of source, from the source domain along the structural resemblance into the target domain, which becomes reorganized regardless of what it was previously.**

(Krippendorff, 2006:157)

In the example used above about chemistry between two people, the

patterns of understanding in chemistry are transferred to the domain of human relationships.

However, metaphors are not just interesting in relation to communication and the creation of second-order-understandings, they also have a very significant influence on our cognition. Lakoff and Johnson argue that:

**(...) most of our ordinary conceptual system is metaphorical in nature.**

(Lakoff & Johnson, 1980:4)

This means that we use metaphors as a way of mapping our experiences into our cognition and thereby making meaning of them. Their research shows that we perceive, understand and structure things in terms of other things. Even if we do not use the conceptual metaphors directly, it is revealed in the way we think and talk about things. For instance, the conceptual metaphor, Love is Magic, can be found in a number of everyday expressions like:

**She cast her *spell* over me. The *magic* is gone. I was *spellbound*. She had me *hypnotized*. He has me in a *trance*. I was *entranced* by him. I'm *charmed* by her.**

**She is *bewitching*.** (Lakoff & Johnson, 1980: 62, original emphasis)

The use of metaphors as a tool to structure our experiences becomes particularly important, when it comes to comprehending things, which cannot be comprehended totally like feelings, moral practices and spiritual awareness (Lakoff & Johnson, 1980). But the argument that our conceptual system is metaphoric in nature also emphasizes the value of communicating through metaphors.

### ***Summary with respect to individual meaning making***

In the section above it has been reviewed how individuals are making meaning and how this meaning making can be communicated to others. It was found that sense is immediate, direct and almost unconscious gathering of insights from the surroundings, whereas meaning involves conscious reflection and interpretation. It was further found that meaning arises both in perception and in conversation with others. In relation to the communication of meaning it was found that when meaning is communicated, it is only possible to create a second-order-understanding of the meaning shared. And that conversation and metaphors were identified as possible ways of creating this second-order-understanding, because both of these are able to capture feelings, moral practices and tacit understanding, which are very hard to communicate. And finally, metaphors were especially highlighted because

we structure our senses and make meaning of things via the use of metaphors or metaphoric features.

The theoretical framework on individual meaning making, which has been reviewed in the section above, is relevant in relation to this study, because:

- 1) It creates insights into how each team member in the design team is making meaning in relation to the project.
- 2) It creates insights into how each stakeholder or user is making meaning in relation to their everyday life and
- 3) It provides insights into how this meaning making can be communicated.

### **Meaning in relation to Teams**

One of the main findings in relation to meaning making is that both sense and meaning are 100% personal. Therefore it does not really make sense to talk about shared meaning within the interdisciplinary team. Instead, it is possible to work with ‘sharedness’ in terms of shared frames. Framing as a concept has received attention from the fields of sociology, urban planning, engineering, linguistics, cognitive science, management science and organizational behaviour. Still, there is no comprehensive or definite definition of it (Stumpf and McDonnell, 2002).

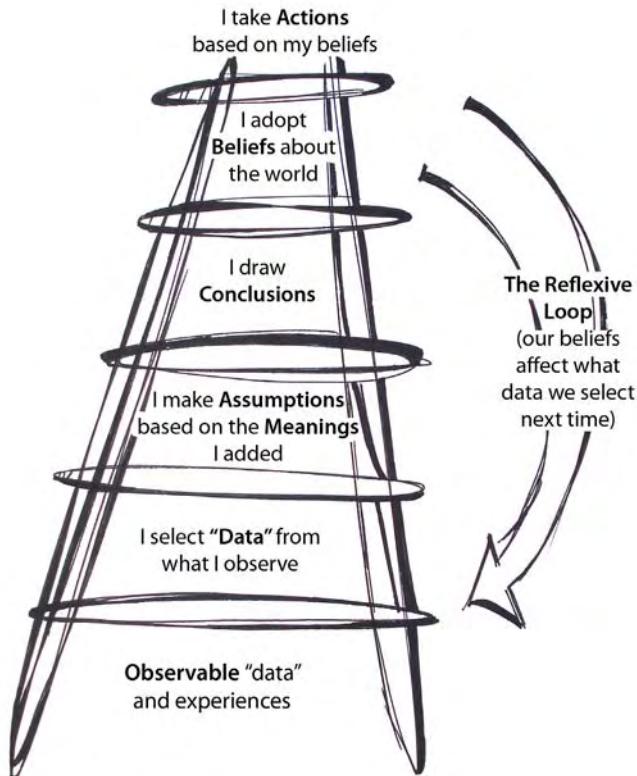
The presentation of team or project framing will be preceded by a brief review of framing in general, which often is defined in relation to the individual. However, even if frames can be understood in relation to both individuals and organizations, this dissertation will mainly use the understanding of frames in relation to teams or projects.

### ***Framing***

Framing as a phenomenon originates from perception psychology and refers to the organization of experiences (Goffman, 1974). All individuals build their own set of framings based on their everyday experiences. However, the framing does not only function as a means to organize information, but also as a filter or screening of all incoming information. This means that the already existing frames shape the ‘rules’ or guidelines in relation to the perception of up-coming situations (Shazer, 1988).

Accordingly, to change an individual's understandings and thereby actions taken, one has to change the person's frames.

Argyris (1990) explains the creation and use of framings through his ladder of inference viewed below.



**Figure 2.8:** Ladder of inference (Illustration from Senge et al, 2001: 243)

On the first step of the ladder the observable data or experiences are placed. This is then selected on the second step of the ladder. The selected data and experience are then structured into meaning and processed to assumptions. On the basis of this it now becomes possible to draw conclusions and at some point adopt beliefs about the world. These beliefs are the basis of actions, but also an active player in the data, which is selected next time. Going through the ladder of inference also means that a frame is created.

In her thesis, Valkenburg defines framing as a device for sense making, which settles the parameters of the problem (Valkenburg, 2000). This perspective on the frame is identifiable in the work of Weick (2001), whose research has been focused on sense making in organizations.

One of the most comprehensive studies and discussions on frames and framing has been developed by Schön. He has described frames as **underlying structures of belief, perception and appreciation** (Schön and Rein 1994:23) and framing as an activity, in which the aim is to construct meaning. He further concluded that frames include implicit assumptions about what issues are relevant, what values and goals are important, and what criteria can be used to evaluate success.

**Problem setting is the process in which we name things to which we will attend and frame the context in which we will attend to them.** (Schön 1983; 40)

In his book *The Reflective Practitioner*, Schön (1983) describes the contrasting frames a design student and his mentor bring into play in a design review, and how their interactions with each other and the framing of the problem produce the final design. In the review, the names of the design strategies were highlighted in particular as well as the importance of shifting frames, when a problem becomes problematic to handle within one framing.

Furthermore, Schön found generative metaphors as a means to frame situations – and thereby also frames as a way of ‘*seeing as*’ (Schön 1983) - that is, seeing something through a lens of something else. He gives an example of this in terms of a framing used in an urban planning project, where a slum area either can be framed as a ‘*blighted area*’, which needs to be cured or as a ‘*natural community*’, which should be preserved. Both frames represent a significant view of the design situation and evoke different understandings of the problem.

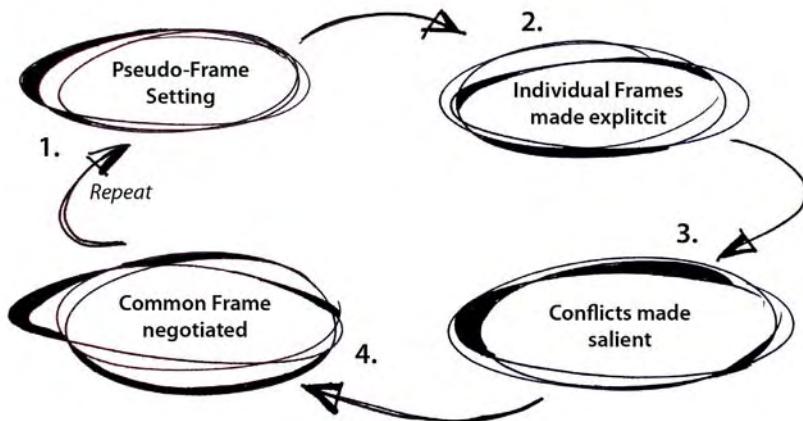
#### ***Team framing and negotiating shared frames***

Valkenberg and Dorst (1998) attempted to apply the thinking in Schön’s book *The Reflective Practitioner* to team design situations. In practice, it involved a study of industrial design students working on projects in teams. When comparing the successful team with the unsuccessful team, it was found that the team’s problem framing played a significant role. In the successful teams, it was possible to identify five different frames used sequentially, whereas in the unsuccessful team only one single frame was used.

In relation to teams, the project frames can be defined as the basis upon which the team pairs problem with solutions (Schön 1983; Valkenberg & Dorst, 1998); this means the selection of a desired end state or goal, which implicitly includes the problem, need or opportunity, or the identification of the problem need or opportunity, which

implicitly includes the desired end state or goal.

In 2007 Hay et al. studied the creation of framing and reframing in design teams working in the early phases of product development projects. They found that project framing and reframing in design teams happen in four different phases. The four phases are reviewed below:



**Figure 2.9:** The four phases of the framing cycle (Hay et al, 2007:94)

#### *Pseudo-frame setting*

Pseudo-frame setting creates an initial understanding of the design situation, the goals, important features, boundaries and evaluation criteria, in this case upon the initial presentation of the project proposal to the class. The proposal sets boundaries around the problem and solution domains and, in some cases, implies strong solution directions. (...) The use of broad, abstract language leads members to believe that they are on the same page. However, the vague nature of these initial agreements can mask deep-level disagreements in goals, assumptions, values and understandings. Individual frames are still hidden.

(Hay et al, 2007: 93-94)

#### *Individual frames made explicit*

The process of interacting with and collecting data from users breaks down designers' preconceptions by informing their point of view and challenging their assumptions. (...) In the process of making these decisions, members often discover their own implicit ideas regarding the project. The consequent sharing of expectations through team interaction makes each member's implicit frame more explicit, and thus tractable material for discussion and debate.

(Hay et al, 2007:94)

#### *Conflicts among individual frames made salient*

Several activities make individual frames explicit, and thus conflicts among them salient, e.g. building a group vocabulary through defining terms, writing

**mission statements and other textual artifacts, labelling user needs and other concepts, prioritising user needs, categorising ideas and dimensioning users. Once conflicts between individuals' frames are made salient, common frames can begin to be negotiated.** (Hay et al, 2007: 94)

#### *Common frame negotiated*

**Teams that made individual frame conflict salient used a combination of user data, discussion and listening to negotiate a shared frame. Dedication of the team to the user centred design gives the team a common anchor against which to tether constantly evolving individual frames, thus enabling the eventual arrival at a shared frame.** (Hay et al, 2007: 95)

Often time it was found that the four phases of framing were repeated in the projects. Still, it was found very useful to go through a full iteration as soon as possible in the project:

**The sooner the team was able to 'get on the same page', as many students described it, the sooner they were able to focus on addressing the needs of their users without differences in understanding and assumptions getting in the way.** (Hay et al, 2007: 95)

#### *Summary with respect to meaning making in teams*

In the section above, meaning has been reviewed in relation to teams. It was found that it did not really make sense to talk about shared meaning within a team, since both sense and meaning are 100% personal. Instead it was found possible to work with 'sharedness' and meaning making in terms of shared frames. The review showed that framing can be seen as a device for sense making, which settles the parameters of the problem, and that a frame can be described as underlying structures of belief, perception and appreciation. It was furthermore found that framing can be seen as an activity, the aim of which is to construct meaning.

In relation to team- or project framings it was found that frames include implicit assumptions about what issues are relevant, what values and goals are important, and what criteria can be used to evaluate success. And finally, it was found that project framing and reframing in design teams happen in four different phases: 1) Pseudo-frame setting 2) Individual frames made explicit 3) Conflicts among individual frames made salient and 4) Common frame negotiated.

The review on frames and shared framing is relevant in relation to the dissertation, in terms of the need to create a shared project frame within the team working in the early phases of innovation as well as a means to create the 'sharedness' within the team, which previous research has shown is important.

## **Meaning in relation to the creation of physical artifacts**

The last area, which is reviewed in relation to meaning, is physical artefacts. Physical artefacts – including models, mock-ups and prototypes - are typically used throughout the development process as a tool to visualize the problem, the solution or parts of these. In other words, physical artefacts are playing significant roles, when it comes to combining insights and meaning making in design and development teams. Some researchers even describe product development as a modelling activity, where the progression between models with different purposes drives the development process, and where the models become an important tool to describe, visualize and sculpture one's thoughts as well as designing or communicating with others (Buur & Andreasen, 1989).

Schön (1983) has also studied modelling and prototyping as part of the design and development process. He argues that when a designer works on the model, he encounters a number of unexpected challenges in the model and responds to these immediately, by using his tacit knowledge-in-action, which is based upon previous experiences. This is done in a process of trial and error, or what Schön has named reflection-in-action.

Michael Schrage (2000) has studied modelling and prototyping in teams. In his book Serious Play he argues against the common assumption that 'great teams make prototypes' and suggests instead that 'prototypes make great teams'.

**In this sense the values of prototypes reside less in the models themselves than in the interaction - the conversations, arguments, consultations, collaborations - they invite. Prototypes force individuals and institutions to confront the tyranny of trade-offs.** (Schrage, 2000:20)

Schrage further argues that prototypes can promote the awareness and empathy between collaborators within cross functional and cross-disciplinary teams and work as a shared medium of communication and collaboration in the innovation process. In his perspective, prototypes can be seen as a tool, which minimizes the competition and discussions within the team and instead creates a place for collaboration (Schrage, 2000).

This is supported by Henderson, who argues that prototyping is more than communication and coordination, and that it plays an important role in terms of the 'social glue':

The analysis reveals that visual representations, including prototypes, are not only devices for communal sharing of ideas but are also a ground for design conflict and company politics, exactly because they facilitate the social organization of workers, the work process and the concepts that workers manipulate to produce a collective product. (Henderson 1999, p.10)

### ***Definitions: models, prototypes and mock-ups***

The term model can be seen as the overall umbrella in which other more specific definitions can be found, such as prototypes and mock-ups. According to Schrage (2000:7):

**A model can be anything from a mathematical equation scribbled on a napkin to a full-scale version of a Boeing 777.**

Within the definition of a model there are the definitions of prototypes and mock-ups. These will be reviewed below.

#### *Prototypes*

Prototypes can – just as models - take many different forms. A prototype can for instance be a scale model of a house or product, a piece of software, a paper-based outline of one or more screens, a video-simulation of a work task or a three-dimensional mock-up of a workstation. (Preece et al, 2002). According to Preece et al. (2002:241): A prototype is a limited representation of a design that allows users to interact with it and to explore its suitability.

Furthermore, prototypes can be used in a variety of ways. They can support designers and stakeholders to choose between different design alternatives, they can be used to test technical aspects of an idea or concept, and they can help to clarify requirements, test usability, or check if a certain design direction is in line with other parts of the design (Preece et al, 2002).

Preece et al. have divided prototypes into two categories: low-fidelity prototypes and high-fidelity prototypes. Low-fidelity prototypes are often made of simple and cheap materials like paper and cardboard. They are often cheap, fast to produce and modify. As a result, low-fidelity prototypes are very different from the final design, and therefore they are not to be kept and integrated into the final product.

High-fidelity prototypes look more like the final design, and they are made of the same materials as the final design. High-fidelity prototypes are more time-consuming and hereby more expensive than low-fidelity prototypes.

In relation to collaborative design, Bødker and Buur (2002) stress the

importance of tangible prototypes as tools to try out future use situations, because one can interact with them and get hands-on experiences. However, there is a limit to the meaning they convey, or as Shaw expresses it:

**Prototypes make very definite statements about the precise nature of what is envisioned and allow these to be tested in the context of use, but do not by themselves convey the reasoning behind any particular feature or alternatives that may have been considered.** (Shaw, 2007:70)

### *Mock-ups*

Mock-ups belong to the low-fidelity category and have been described in relation to various design and developments contexts. According to Merriam Webster's dictionary a mock-up is:

- **a full-sized structural model built to scale chiefly for study, testing, or display, or**
- **a working sample (as of a magazine) for reviewing format, layout, or content.**

(Merriam-Webster, 2009)

Carroll (2000) has studied the use of mock-ups in scenario-based design, and Binder (1999) has studied how users with simple cardboard mock-ups as props can create improvised scenarios in their own environment.

### *Boundary objects*

Many models, prototypes and mock-ups can also be described in terms of boundary objects. The concept of Boundary Objects is described by Star & Griesemer (1989), defining objects that are shared and sharable in different problem solving contexts, that is objects which work to establish a shared context or which 'sit in the middle'.

**Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in common use. These objects may be abstract or concrete. They have different meanings in different social worlds, but their structure is common enough to more than one world to make them recognizable as means of translation.** (Star & Griesemer, 1989: 393)

Star & Griesemer (1989) identified Boundary Objects in a museum context, where, in the beginning of the 1900s and onwards, scientists and amateur collectors used Boundary Objects to create a shared collection of Vertebrate material, which could be useful to both communities. Based on this study Star & Griesemer found that:

**The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.**  
(Star & Griesemer, 1989: 393)

According to Henderson, the most important aspect of Boundary Objects is that they make it possible for different groups to see and understand different meanings in the objects. Boundary Objects shall thus be understood as objects that can give meaning to different participants, even though they have different professional practices and professional languages - different competencies.

**(...) Boundary Objects allow members of different groups to read different meanings particular to their needs from the same material. This is possible, because the material remains flexible in group use and more focused in individual site use.** (Henderson, 1991:450)

According to Miller (2005) it is not only important that the Boundary Objects are created, but that they are co-invented, developed in neutral territory, have a reasonable lifespan, and have real use and meaning to all the participants.

Carlile (2002) have studied the difference between good and bad Boundary Objects or, in other terms, the difference between ‘Boundary Roadblocks’ and Boundary Objects. On the basis of this he has identified the characteristics of a good Boundary Object as follows.

Good Boundary Objects:

- 1) Establish a shared syntax or language for individuals to represent their knowledge.
- 2) Provide a concrete means for individuals to specify and learn about their differences and dependencies.
- 3) Facilitate a process where individuals can jointly transform their knowledge.

However, as Subrahmanian et al. argues:

**Boundary Objects can inhabit several communities of practice and satisfy the information requirements of each of them. This does not mean that use of Boundary Objects requires participants to have shared understandings to establish coordination.** (Subrahmanian et al, 2003: 186)

### ***Summary of meaning making in relation to physical artifacts***

In the section about meaning in relation to physical artifacts it was found that models and prototypes are playing significant roles, when it comes to combining insights and meaning making in design and development teams.

It was further found that prototypes can promote the awareness and empathy between collaborators, work as a shared medium of communication, minimize the competition and discussions within the team and function as the ‘social glue’. The definitions of models, prototypes and mock-ups were reviewed as well as some of the more individual characteristics.

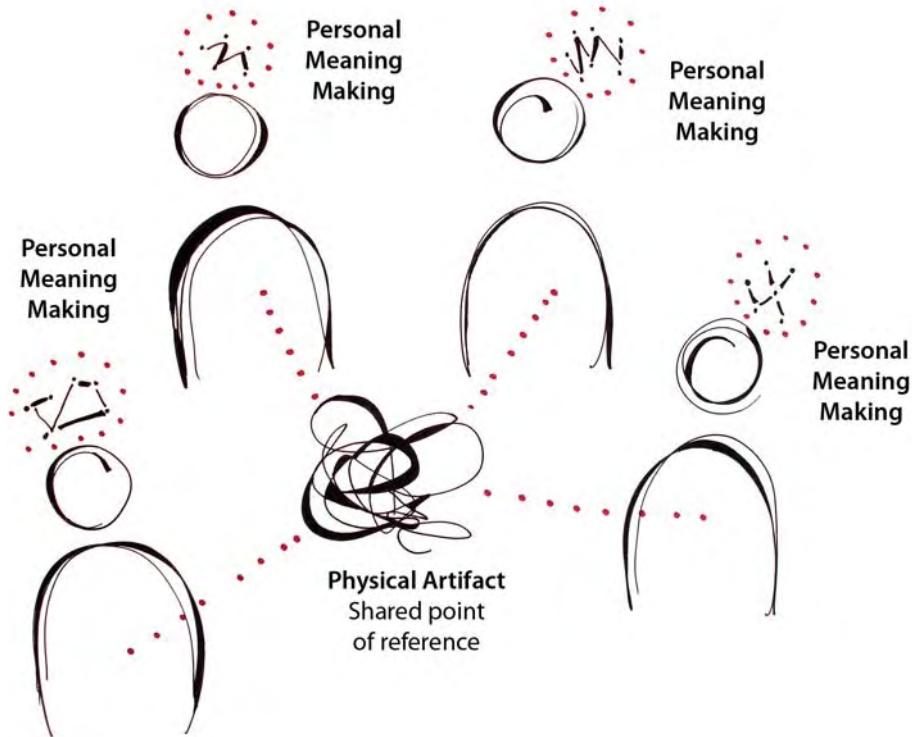
It was further found that models, prototypes and mock-ups can play the roles of Boundary Objects, which makes it possible for different groups to see and understand different meanings in the same objects. Boundary Objects as a phenomenon was also further elaborated and defined, in terms of objects that are shared and sharable in different problem solving contexts. And further research reviewed showed it to be important that Boundary Objects are co-invented, developed in neutral territory, have a reasonable lifespan, and have real use and meaning to all the participants.

### ***Connecting the theoretical framework to the empirical setup.***

In the review of the theoretical framework, which has been presented in this chapter, it was necessary to divide the meaning making into three directions: individual, team, and artifacts. However, in the workshops, on which this dissertation is based empirically, the different types of meaning and the communication of meaning will happen simultaneously. That is: both individual meaning making, communication of meaning, creation and negotiation of shared frames will happen at the same time.

On top of this, the workshops will also include the creation of physical artifacts. As explained in preface, this dissertation builds on the initial assumption that the creation of physical artefacts can help both team-members, users and stakeholders to overcome the boundary of not being able to define, express and communicate how they frame a given project or make meaning in relation to their everyday life. And that this clarity will help the creation of a shared frame. The literature in the theoretical framework seems to underline this assumption, and it indicates that the physical artifacts created by the team members,

users and stakeholders could perhaps function as boundary objects, or at least function as a shared reference point for the team. This is also illustrated in figure 2.10.



**Figure 2.10:** Initial understanding of the workshop setup

# 3.0 | Research Methodology

## RESEARCH DESIGN AND WORKSHOP SETUP

## **This chapter**

In this chapter the research methodology will be unfolded. This means that there will be a review of the scientific methods and philosophies, which have inspired this study, as well as some concrete insights into how this study was approached, designed and conducted. More specifically, the chapter has the following three purposes:

- To unfold the workshop set-up and thereby the creation of the research material.
- To review the research approaches, which have inspired the research design.
- And finally to position the research project and its findings.

These three purposes will be reviewed in the order presented above and together they will create the structure of the chapter. In the first section, the aim is to unfold the workshop set-up and the creation of research material.

### **The workshop set-up and the creation of the research material**

The initial idea in this research project was to introduce the creation of physical artefacts in interdisciplinary design teams working in the early phases of innovation. The inspiration for this derives from the later parts of both design- and innovation processes, where models and prototypes are often used to support communication, to test possibilities and compare ideas etc.

The creation of physical artifacts was seen as a way to create a shared reference point between the different perspectives and thereby create a point of departure for the shared framing. A second reason for introducing the creation of physical artifacts in early phase projects was to help the team members, users and stakeholders to overcome the boundary of not being able to express, what they find meaningful in relation to the project or how they make meaning of their everyday activities.

However, there were a number of demands, which had to be fulfilled in order to introduce the creation of physical artifacts in the early phases of innovation:

- The requirement for creating the physical artifacts has to be kept at a minimum in order to involve as many relevant users and stakeholders as possible (since it is not given, that everyone in the

interdisciplinary team or among users/stakeholders has modeling-experience).

- The creation of the physical artifacts has to handle a great diversity in terms of different backgrounds and assumptions as well as kinds and levels of knowledge. And it has to contain both the complexity and ambiguity, which may appear in relation to the project.
- Finally the creation of the physical artifacts has to involve a shared experience or shared output – in order to build on the insights from previous research, in which ‘sharing’ is identified as an important tool to handle diversity, complexity and ambiguity in teams.

The first process, which was tested as a possible way to create physical artifacts in interdisciplinary teams working in the early phases of innovation, was a consultancy process for business and organizations called LEGO Serious Play™ (henceforth: LSP).

LSP seemed to fulfill the demands described above, and it was directly accessible in this study. However, LSP was not directly adopted. Since it was mainly developed to a business context, it was found necessary to develop a new set of LSP variations, which could be used in projects positioned in the early phases of innovation. This was done by adapting and also further developing some of the main features of the original LSP based on the design perspective reviewed in chapter 2. In the following sections, the original LSP will be reviewed in terms of development, background as well as key features. After this there will be a review of, how the design perspective was used to further develop LSP and to make it applicable to projects in the early phases of innovation.

### **Lego Serious Play – development and background.**

LSP is often described as an accidental spin off from LEGO Group. David Gauntlett (2007) explains the development of it as follows: Lego Serious Play developed out of a problem within the Lego company itself.

(...) In 1996-7, Kjeld Kirk Kristiansen [owner of Lego and grandchild of its founder] was feeling disappointed that his staff meetings did not seem to be able to generate imaginative strategies for the future of the company. He knew that his employees were talented people, and so felt that some kind of tool was needed to unlock their imagination and creativity. During this time, he had discussions with Bart Victor and Johan Roos, both professors and consultants

from the Swiss Business School IMD, who had seen this kind of situation elsewhere. Together they realized that a solution to Lego's problem might be found in the Lego product itself: just as Lego had been telling children to 'build their dreams' for decades, so perhaps adults could be asked to 'build' their vision for future strategy. (p. 129)

According to its developers, LSP is based upon four theoretical directions, which are referred to as 'The Science of Lego Serious Play'.

The directions are: 1) Constructivism 2) Constructionism, 3) Play and 4) Imagination (Lego Serious Play, 2006). In figure 3.1 there is a brief review of the four directions.

Today LSP has been developed to cover a range of applications and is used in various situations and industries. Some of the applications are reviewed below.

- '**Real Time Strategy for Enterprise**' – a sequence of activities in which participants build metaphorical models representing their organization and then combine these into a shared identity of the enterprise; then build 'agents' (any external entity which the organization may have to connect or deal with) and place these in a landscape in relation to their main model; then build different kinds of connections; then consider future scenarios; and ultimately arrive at 'Simple Guiding Principles', which emerge from the activity and help to make future decisions.
- '**Real Time Strategy for the Team**' – a version more oriented towards team-building, in which participants begin by constructing models representing what they bring to the organization; then create a part of an identity perceived by colleagues which they have not included themselves; then they are asked to review what has been built so far and to build a model representing 'the feel of the team'; then to build connections showing how the parts of the team relate; then to reflect on the past ways of dealing with events to ultimately arrive at 'Simple Guiding Principles' for the team.
- '**Real Time Identity for You**' – a simpler process in which individuals build a metaphoric model of their identity at work, then change it to show how they think they are perceived and then again to represent an aspirational version, 'what you could be at your best', and to reflect upon the differences. (Gauntlett, 2007: 135)

For more information about LSP's history and development please see the Lego Serious Play homepage ([seriousplay.com](http://seriousplay.com)), Imagination Lab ([imagilab.org/research](http://imagilab.org/research)) or the book: 'Creative explorations – new approaches to identities and audiences' (Gauntlett, 2007). However, be aware that some of the suggested material is marketing material and not research-based communication.

### **Constructivism and Constructionism:**

The notion of constructivism is developed by Jean Piaget and concerned with how learning takes place – especially for children. Piaget discovered that information and knowledge is not just absorbed, but actively built into knowledge structures. This means that incoming experience is combined with previous experiences into a set of active theories (Gruber & Vonéche, 1977). Seymour Papert extended the constructivism theory into what he called Constructionism. Apart from the building of knowledge structures, Papert argues that learning happens especially when engaging in creation of physical objects – for example with clay or Lego bricks (Papert, 1993). Papert's theories are often referred to as 'thinking with your hands' or 'learning by making'. Furthermore, Papert noticed that when people are making something with their hands, they are in a more deeply engaged state, compared to situations where they are solving abstract questions in their mind. This deep engagement, which Papert noticed, is what Mihaly Csikszentmihalyi later defined as 'flow'.

### **Play and Imagination:**

Play is often associated with children; however, a growing literature is encouraging adults to engage in play as well. It is argued that surprising insights and innovative ideas are more likely to occur in playful environments and through playful behaviour (Terr, 2000; Schrage, 2000). In LSP play is defined as:

**(...) a limited, structured and voluntary activity that involves imagination - that is an activity limited in time and space, structured by rules, conventions and agreements among the players, (...) and drawing on elements of fantasy and creative imagination.** (Lego Serious Play, 2006:4)

Imagination is seen as a central part of playing. Imagination can be divided into three categories: descriptive imagination, creative imagination and challenging imagination. Below, these three categories are defined:

**Descriptive imagination not only reveals what is happening in the often confusing world out there, but it enables us to make sense of it and to see new possibilities and opportunities (...) Creative imagination allows us to see what isn't there. It evokes truly new possibilities from the combination, recombination or transformation of things and concepts. (...) Challenging imagination, often using deconstruction or sarcasm, overturns all the rules and wipes the slate clean.**

(Lego Serious Play, 2006:14-17)

Especially 'creative imagination' is seen as a central part of playing, in general. However, in relation to LSP the 'descriptive'- and 'challenging imaginations' have significant roles, too.

Besides the role of imagination, it is further argued that when adults are playing, it also involves 1) social bonding, 2) emotional expression 3) cognitive development and 4) constructive competition.

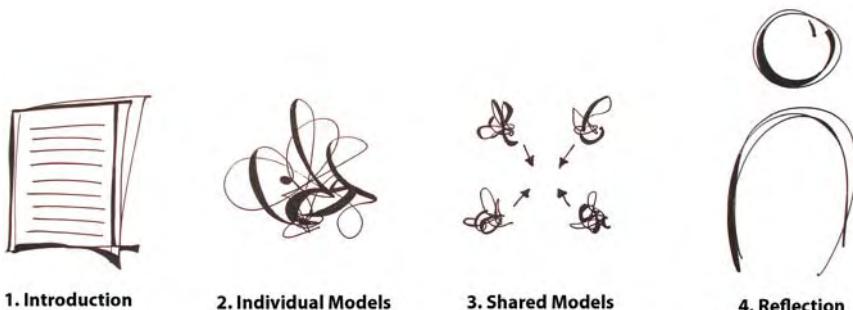
**Figure 3.1:** The theoretical background or 'Science' of Lego Serious Play

### **Key features**

In practice, LSP is a facilitated workshop, where participants are asked different questions in relation to an ongoing project, task or strategy. The participants answer these questions by building symbolic and metaphorical models of their insights in LEGO bricks and present these to each other. An essential part of the LSP is the non-judgemental, free-thinking and somehow playful interaction between the participants (Gauntlett, 2007).

A LSP workshop is divided into four parts. First part is the introduction or ‘skills building’, where the participants become familiar with the Lego pieces and the democratic process of building and presenting, as well as some of the key features like the hand-mind connection and the use of symbolic/metaphoric models.

The next part is modified or tailored to fit each project, situation and context, in which it is used. This part often holds a sub-session where the participants first build a number of individual models and present these to each other; this is followed by a sub-session where they build these models together into one shared model. And finally, there is a reflection and summary of the workshop in relation to the participant experience and the future work. This is also illustrated below:



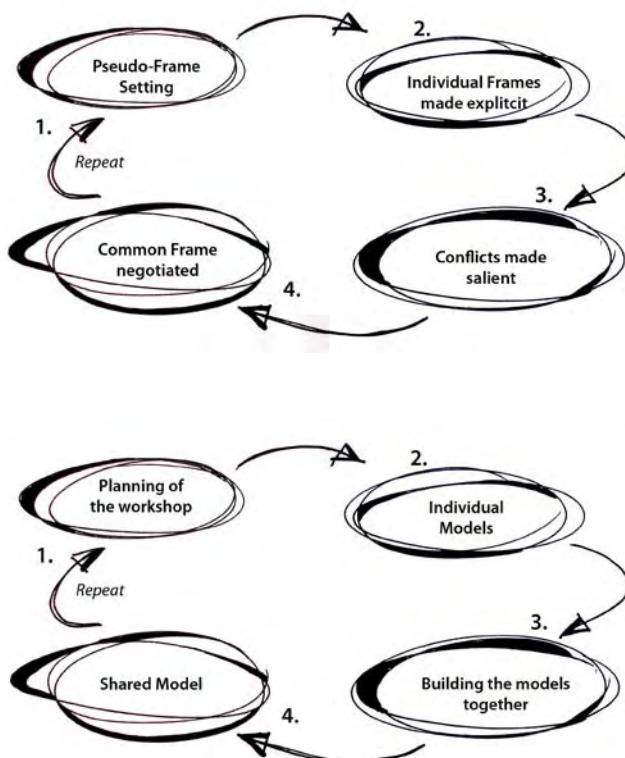
**Figure 3.2:** The four parts of the LSP workshop

LSP can be seen to have similarities with a shared framing process, as described by Hay et al. (2007) in the theoretical framework. First, the objective of the workshop is set, based on the present understanding of the project, task or strategy (pseudo frame setting), and the facilitation of the workshop is adjusted to fit this. This is often done by the facilitator and the project manager a few weeks before the workshop.

Then, in the workshop (after the introduction/skills-building) each participant builds an individual model, which represents their personal

view on a question in relation to the project, task or strategy. When presenting this individual model, they are making the insights and perspective from their personal model explicit to the other participants (individual meaning making made explicit).

In the next step of the workshop, participants are asked to build the Lego models together. In this process they are free to select one or a few or all the models – and even to build new models – to be built together, as long as everybody in the group agrees that it is a shared model. In so doing, the conflicts between the different individual models becomes salient (conflicts made salient) and a shared model is created (common frame negotiated). This is also illustrated below:



**Figure 3.3:** The LSP workshop as a simulation of a shared framing process.

Another important key feature in LSP is that each participant has equal opportunity to express his/her feelings or ideas and become part of the outcome, which emerges during the workshop. This means that the facilitator strives to give each participant the necessary time to ex-

plain the individual models as well as the opportunity to become part of the ‘building together’ process. This is for instance done by controlling the line of speakers, when the individual models are presented and by asking clarifying questions about the models. In the ‘building together’ process, this may be done by making sure that only one discussion is happening at a time and by reminding the group that everyone has to agree on the decisions taken in relation to the shared model.

Another important feature of LSP is that the facilitator (consultant) is not providing ‘*the solution*’ to the project, task or strategy or ‘*the answer*’ to the questions. Instead, the facilitator is concerned with the interactions between the participants, the coordination of the assignments - and the time.

#### ***Further development of Lego Serious Play***

When this research project was initiated, there was no specific application of LSP, which could be used in the early phases of innovation. Therefore, the main focus in the first part of this research project was to design such an application.

After some preliminary tests, it was found necessary not only to design one, but two different LSP applications, which could be applied in two different stages of the early phase projects. The first application was only intended for the interdisciplinary team to be used as a help to create a shared (and perhaps pseudo) framing of the project. The second application included the interdisciplinary team as well as stakeholders and users, as a means to help the interdisciplinary team to understand users’ and stakeholders’ perspectives on needs, problems and opportunities in relation to the project. The first application was called the team application, and the second one the stakeholder application. The reason behind the creation of two applications was mainly to keep the time frame of a single workshop down to maximum 8 hours (with breaks) – and to be able to suit different projects in terms of their development.

The creation of the two new applications was accomplished by adapting and further developing some of the original features of LSP combined with insights and understandings derived from the design perspective (which was presented in chapter 2).

The first perspective from design, which influenced the team application, was the designerly understanding of problems as wicked

and ill-defined. In other words, it was assumed that the initial project descriptions in early phase projects were ill-defined and that the problems to be approached were wicked. In the team application, this can for instance be identified in the workshop questions. The workshop questions were often open-ended and asked in order to ascertain, whether participants had the same understanding of the project focus. An example of a question from one of the team workshops was: *What is a Medical Treatment House?* Another way to identify it was that even though many of the project managers asked for it, their workshop was never initiated by a presentation of the project, because this could indicate that there was one ‘right’ problem understanding or one ‘right’ solution.

Another feature from design influencing both applications, but especially the stakeholder application was human-centeredness. This can be identified in different ways in the workshop. First of all, a broad set of stakeholders and users participated in these workshops. Secondly, the questions were often related to the users’ and stakeholders’ understandings and meaning making in relation to their everyday life. An example of a question from one of the stakeholder workshops was:

*What are the challenges in a professional guitarist’s life?*

A third perspective from design, which influenced the stakeholder application, was the co-development of the understanding of the problem parallel with the development of the solutions. In the stakeholder application, this is for instance identifiable in the combination of the questions, which included a question (or set of questions) with focus on the present problems and challenges, and a question (or set of questions) with focus on ideal solutions or future opportunities.

Besides the influence from the design perspective, both the team – and the stakeholder application include all the key features of LSP such as:

- The four parts (skills-building, individual modelling, building together, and reflection).
- The democratic understanding of the process with equal opportunity to express insights, and
- The facilitator’s focus on the interactions, assignment, coordination etc. in relation to the workshop – and no interference with the content of the workshop.

The two new applications can also be summarized as follows:

- *The team application* – a sequence of activities, where the participants in the interdisciplinary team reveal their different perspectives, perceptions and assumptions about the project by building individual models as an answer to an open-ended question; then, the participants combine these into a shared model of the project. And together they figure out what is necessary to approach first, in the shared model. Ultimately, the workshop concludes with a reflection on its impact in relation to the project and the future development of this.
- *The stakeholder application* - a sequence of activities, where the interdisciplinary team together with key stakeholders and users construct different individual models. First the individual models are asked to tell something about the main problems or challenges the users have (or are assumed to have) in their everyday activities or life, in general. Then the participants build an individual model, which represents the ideal solution or future opportunities. Finally, all the different models are combined into a set of '*guiding principles*' or '*design principles*' for the project – with respect to the user. The workshop is completed by a discussion of the outcome in relation to the project and in relation to the users' and stakeholders' experiences.

### **Research approaches, which inspired the research design**

Since LSP is such a significant part of the situation in which the research material is collected in terms of the workshop set-up and conduction, the research design also has to be suitable for the perspectives and understandings underlying LSP.

#### **Action Research**

In the review of different research approaches, Action Research was identified as the most appropriate approach.

First of all, because Action Research makes room for the researchers' intent to change a situation. Or as Raelin (1999: 16) expresses it:

**Action research, itself, constitutes a process wherein researchers participate in the studies both as subjects and objects with the explicit intention of bringing about change through the research process.**

In this dissertation, the intention to change the situation can be seen as the intention to enable the communication of personal meaning making and creation of shared frames within the interdisciplinary teams participating in the workshops, and thereby supporting their collaboration and development of their project.

Secondly, Action Research was identified as an appropriate approach because it echoes the democratic understanding embedded in the LSP workshops and is consistent with LSP's aim to give the participants equal opportunity to express their insights. In Action Research projects the striving for democracy is based on different backgrounds and with different aims, however:

**Making (...) cooperation transparent is a big challenge to any Action Research Process in order to give it democratic legitimacy, but also in order to anticipate democratic structures in the field of society, where the researchers and scientists are involved.** (Nielsen & Nielsen, 2006:81)

And finally, Action Research was selected because the role of the Action Researcher often takes the form of a facilitator or learning coach. In this dissertation, this extension of the typical researcher role into a facilitator happened both in the form of planning, running and moderating the workshops.

However, the role of the facilitator was always in accordance with LSP understanding of the facilitator, and the basic idea that the significant knowledge and insights are not in the hand of the facilitator/researcher, but in the hands of the participants. And accordingly, that the attention of the facilitator is on the process and not on the content. In the planning of the workshop, this means that the facilitator plans the different activities and questions to be asked in the workshop based on a conversation with the project manager.

In the workshop, it means that the main role of the facilitator is to present the assignments to the participants and moderate the presentation of the models, which are built on the basis of the assignments, but not to interfere with the content of the models as such.

And finally it means that, in the last part of the workshop, where participants are asked to build their models together, the researcher's role is mainly to observe. Sometimes the participants might ask practical questions like '*How much time have we got left?*' or '*May we add new bricks?*' These questions are all answered, if possible under the parole: '*If you all agree on it, then that is fine*'.

The only time the facilitator interrupts the 'building together session' is 1) if the participants speak all at once, 2) if two different discus-

sions are happening simultaneously or 3) in situations where one of the participants is speaking for more than five minutes or about topics outside the assignment.

### ***Interaction Analysis***

In the development and facilitation of the workshops Actions Research was of great inspiration in terms of clarifying the engagement with the situation and the workshop participants, as well as defining the role of the researcher.

However, for the analysis of the research material, the descriptions and recommendations from Action Research did not seem as thoroughly developed and described in detail. Therefore it was decided to take inspiration from Interaction Analysis, and use this as the basis for analysing the data.

Interaction Analysis (Jordan & Henderson, 1995) is an interdisciplinary method for investigating interactions between human beings and objects in their environment based on video documentation. Interaction Analysis is developed on the basis of several fields including ethnography (participatory observation), sociolinguistics, ethnomethodology, kinesics, proxemics, conversation analysis and ethnology.

First of all, Interaction Analysis was selected because of its documentation style. By video-taping the workshops, the distinction between the role of the facilitator and the role of the researcher was made very clear. In the workshop it was facilitator, when watching the video it was researcher.

A second reason for selecting Interaction Analysis was that it assumes that knowledge is social in origin and can be found in people's interaction with each other and their environment. This understanding of knowledge was in accordance with the understanding of knowledge in LSP, which sees knowledge as constructed and learning as something that happens especially when engaging in creation of physical objects. And finally Interaction Analysis was selected because its main assumptions are that verifiable observation provides the best foundation for analytic knowledge, and that the theories built in Interaction Analysis are accountable to its evidence. This resonated very well with the understandings behind this research project.

Many understandings and approaches from Interaction Analysis have been taken directly into the research design of this study. However, it was decided to reduce the collective analysis, and strengthen the individual analysis, in order to enable a focus on the process and on the

single models' development throughout the workshop.

Typically, Interaction Analysis can be described in a number of steps. First, the main researcher creates a content log of the video material in order to make the data easier to access. Then, several researchers with different insights and perspectives are collectively viewing data and initiating the analysis of this by stopping the video-tape and discussing the incidents, which they find interesting. Finally, the main researcher unfolds these incidents by comparing the other researchers' discussions with the data – for instance in terms of transcribing the incidents or making a detailed analysis.

In the study, the main researcher's initiating analysis was more in-depth. This means that the data shared with other researchers was more categorized and prepared.

In the initial analysis of the workshops, all the video-documentation from the workshops was uploaded in the video analysis program called ATLAS.ti. After this a content log of the material was made, which showed who was speaking at what time; about what etc.

In the process of creating the content log, it was found that some of the models played a significant role in the workshops, and these were therefore traced throughout the workshops.

The presentations, discussions or questions related to each of the significant models, which were found in the process of tracing, were transcribed and translated into English and then positioned in documents along with the pictures of the models.

The outcome of the initial analysis was a number of documents, which held descriptions of events, pictures and transcriptions along with some small video clips. This was shown to researchers both from the Department of Architecture and Design, Aalborg University as well as to researcher from Stanford Centre for Design Research either individually or in smaller groups. The material was discussed and the other researchers' insights, questions and explanations in relation to the significant models were collected.

Based on the other researchers' insights and explanations, a more detailed analysis of the videos was made in order to underline and check the findings, for instance by comparing the significant models across the workshops. Finally, the findings of the research were documented.

In the end the research design became as a hybrid between LSP, Action Research and Interaction Analysis, where LSP and Action Research were used as the driver for creating the data and Interaction Analysis as an inspiration in relation to conducting the analysis.

## **Position the research project and its findings**

The final issue, which needs to be unfolded in relation to the research methodology, is the view on knowledge and the view on creating knowledge, which has been applied in this dissertation.

As described above, both LSP and Interaction Analysis assumes that knowledge is social in origin. In relation to the workshops this means that the knowledge, which is presented and shared via the Lego models, does not represent measurable or observable truths about the world; instead these models represented a number of social constructs<sup>4</sup>, which are existing, true or valuable to the participants in the workshops. In other words: personal truths based on personal experiences.

In order to describe how this understanding of knowledge as social constructs influences this study, it is necessary to review some general insights about social constructivism.

### ***Social Constructivism***

In general, social constructivism can be divided into three categories (Wenneberg, 2002). In the first category, social constructivism is used as a critical perspective. This means that the intention is to show that phenomena, which appear to be ‘natural’ on the surface, are actually socially constructed. This category includes for instance SCOT (social construction of technology). In SCOT, it is the understanding that the development of technology is not driven by technological rationality, but instead by different actors and their interests, practices and worldviews (Bijker, 1995).

The second category of social constructivism is concerned with how the society or social order is possible. It offers different theoretical explanations on how the social reality or concrete social phenomena are constructed and functioning (Wenneberg, 2002).

In the third category, social constructivism becomes an epistemology, which argues that all knowledge about reality is constructed. It is argued that facts are created through convention, regardless of whether they are related to social reality or to physical/natural reality. If we agree to add certain attributes to a phenomenon, we create that social fact (Wenneberg, 2002).

In this study the aim is not to reveal a natural phenomenon as a social

<sup>4</sup>A social construction or social construct is any phenomenon “invented” or “constructed” by participants in a particular culture or society, existing because people agree to behave as if it exists or follows certain conventional rules (cited from Wikipedia).

construction (category one), or to explain how society or social orders are possible (category two). It is to observe a number of workshops, where meaning is constructed and shared among a group of people, and to determine how and in which way a number of significant Lego Models influences this.

However in doing so, there is actually a social construction happening as well, in terms of the description (or construction) of the phenomena Personal- and Shared Experiential Concepts. As explained above, the main findings in this dissertation were created collectively, in that several researchers were part of the analysis. This means that social constructivism is used as an epistemology (category three).

Still, this study aims at providing as much observable evidence to substantiate and clarify its findings as possible. Like in Interaction Analysis, this study assumes that verifiable observations provide the best foundation for analytic knowledge, and that the theories built in this study must be seen in the light of its evidence. Likewise, an effort is made to make the research design and the data as transparent as possible.

## **Summary**

This chapter included a presentation of the research methodology. Firstly, the workshop background, set-up and development was reviewed in terms of LSP. Secondly, it was found that Action Research had many overlaps with underlying understanding in LSP and it was therefore selected as a significant part of the research design. Furthermore, it was shown how Interaction Analysis was used as an inspiration for the analysis of the research material. Finally, this chapter explained how this study is linked to social constructivism and elaborated on its striving for transparency and observable evidence.



# 4.0 | The Research Material

## OVERVIEW OF THE WORKSHOP-PORTFOLIO

## **This chapter**

In this chapter, the focus is on the practical part of the research in terms of the research material. As mentioned in the introduction, this dissertation is based on six real-time workshops, where interdisciplinary design teams are working on a number of early phase projects, in a broad variety of contexts and organizational settings.

The purpose of this chapter is to unfold the research material and the contexts in which it was created.

In detail, the objective of this chapter is to present a general overview of the workshop-portfolio and to add '*life*' to each of the six workshops by sharing descriptions, quotes and pictures.

### **Overview of the workshop-portfolio**

In this section there will be an overview of the workshop-portfolio. This will be done by briefly presenting the workshops and identifying the general characteristics of the workshops and the projects, in which they are positioned.

As mentioned earlier, the vehicle for this research is a set of video-documented LSP workshops with interdisciplinary teams, who are working on projects in the early phases of innovation.

There are six workshops all in all. The first four are single workshops. This means that they are part of a larger project, but that the development of the project before and after the workshop has not been documented or cannot be shared due to confidentiality. The four single workshops were conducted at TC Electronic, Red Cross, Daimler AG and Region Northern Jutland. Besides the single workshops, a longitudinal study of the user-driven-innovation project: 'The Good Elderly Life' has also been made, which included two sequential workshops and a more in-depth analysis of the project development.

This means that the dissertation is based on two different kinds of research material. On the one hand there are four single workshops, which have been planned, executed and documented as separate units of data. And on the other hand, there is a longitudinal study with two different workshops, multiple meetings and access to information about the project development.

Furthermore, the workshop-portfolio holds both workshops, where the team application and the stakeholder application were used. The choice between the two applications was taken on the basis of the project and its development before the workshop. In figure 4.1, a more

detailed overview of the workshop portfolio is presented.

Here, all workshops are shortly described in terms of 1) organization or project in which the workshop takes place; 2) the project objective; 3) the workshop type; and finally 4) the material and type of data, which is available from the workshop.

Organization/ Project	Project objective	Workshop type	Material/ Type of data
<b>Workshop 1:</b> TC Electronic	Development of digital sound solutions for guitarists	Stakeholder Application	Workshop/ Pictures and descriptions
<b>Workshop 2:</b> Red Cross	Development of a Base Camp for international disasters management in situations like tsunamis or earthquakes	Stakeholder Application	Workshop/ Pictures and video
<b>Workshop 3:</b> Daimler AG	Incorporation of industrial psychology and team support into development teams	Team Application	Workshop/ Pictures and video
<b>Workshop 4:</b> Region Northern Jutland  <i>Medical Treatment House</i>	Development of guidelines for creating a set of medical treatment houses in northern Denmark	Stakeholder Application	Workshop/ Pictures and video
<b>Workshop 5:</b> Copenhagen Living Lab  <i>The Good Elderly Life</i>	Development of new products and services, which can increase the life quality of elderly people living in nursing homes	Team Application	Workshop and longitudinal study of the project / Pictures, meeting minutes, informal interviews and video
<b>Workshop 6:</b> Copenhagen Living Lab  <i>The Good Elderly Life</i>	Development of new products and services, which can increase the life quality of elderly people living in nursing homes	Stakeholder Application	Workshop and longitudinal study of the project / Pictures, meeting minutes, informal interviews and video

**Figure 4.1:** The workshops - in terms of context, workshop type and documentation

When looking at the workshop-portfolio it is clear that the workshops are set in very different projects, contexts and organizations. This is done to make the insights and conclusions deriving from the research as generalisable as possible.

Still, the conditions around the workshops are the same. They are all set in real-time projects, the workshops are actual parts of the projects and the participants in the workshops are real front-line workers. In other words: there is no time delay, no simulations and the participants are professionals. These conditions are very important in relation to the reliability of the study in that it represents the actual situations in interdisciplinary teams working in the early phases of innovation.

### **Description of the workshops**

In this section more life will be added to the six workshops, in the form of detailed descriptions of each of the workshops including pictures and quotes. The aim is to document the workshops in factual terms, while conveying as much of the workshop experience as possible.

As explained earlier in relation to Lego Serious Play and the workshop set-up, all the workshops are simulating a shared framing process: initially, the workshops are planned and adjusted to the different projects based on the present understanding of these (pseudo-frame setting); then in the workshops, each participant builds an individual model, which is made explicit to the other participants (individual meaning making made explicit). And finally, the participants are asked to build the Lego models together into one shared model, which means that conflicts between the models become salient (conflicts between the different frames made salient) and a shared model is created (common frame negotiated).

This structure of a framing process will also be the structure of the workshop presentation. First, the setting of the workshop will be presented including the context of the workshop, the workshop type, the assignment of the workshop and the workshop participants. Then, the individual models will be presented. However, instead of presenting all the models (which in some workshops amount to about 20), only the models, which influence the shared model and which play a significant role in the workshop discussion, will be presented. When presenting the individual models, the conflicts between different

models will also be presented. And finally, the shared model will be presented.

On the following pages, the six workshops will be presented. The workshop descriptions follow the same standard. However the presentation of the last two workshops (from the longitudinal study) will be more elaborate due to the extended data set.

# Workshop 1

TC Electronic / Guitar pedal

## **Context of the workshop:**

Workshop 1 was conducted at TC Electronic - a Danish company, which develops and manufactures sound-equipment for professionals and musicians. TC Electronic has a large product range and special expertise in digital sound processing. TC Electronics' products range from signal processing for studios and computer recordings to digital guitar effects (in the form of digital guitar pedals).

**Type of workshop:** Stakeholder Workshop

## **Assignment of the workshop:**

The assignment in workshop 1 was to create a new or alternative understanding of the context in which TC will market their future products. In order to make the workshop more specific, the focus was narrowed down to consider digital products targeted at guitarists. In this assignment the objective was also to gain understanding of the insights and perspectives of the users and stakeholders.

## **Participants in the workshop:**

The participants in workshop 1 were from both inside and outside TC Electronic. The participants included three professional guitarists, a hardware engineer, a software engineer, a philosopher, a representative from product management and a part-time guitarist, who also worked as a professional sound-tester at TC.



**Figure 4.2:** Pictures from the visit to a music-instrument shop, just before the workshop

### The individual models

The presentation of the individual models revealed that there were two different attitudes towards the sound present in the workshop. 1) The guitarists' models focused on the guitarists' role on stage and the use of monologue sound equipment, and 2) the engineers' models focused on the guitar pedal with digital sound (which they found much more advanced than analogue guitar pedals, and therefore more relevant). This difference was for instance represented in the model called: 'The Jimi Hendrix Guitarist'



**Figure 4.3:** The Jimi Hendrix Guitarist was created by one of the professional guitarists. Referring to the guitarist at the end of the stage, who gets all the attention. He is a star, who jumps from band to band – in his search for success. He wants to be like Jimi Hendrix and is very proud of his old-fashioned analogue sound equipment.

Another individual model, which was discussed a lot in the workshop and which came to play a significant role in the shared model was the model called 'The Artistic Guitarist'. It represented a new emerging kind of guitarist, who was different from the Jimi Hendrix guitarist.



**Figure 4.4:** The Artistic Guitarist was created by the part time guitarist and sound tester, who was referring to himself as the new artistic guitarist. This new artistic guitarist is a type of guitarist, who was more artistic in his approach to music – and experimenting more with his use of sounds. He is not the stage person, but the kind of guitarist who is experimenting with his band in the basement. And accordingly most of his contact to the music industry and the audience happens through the Internet.

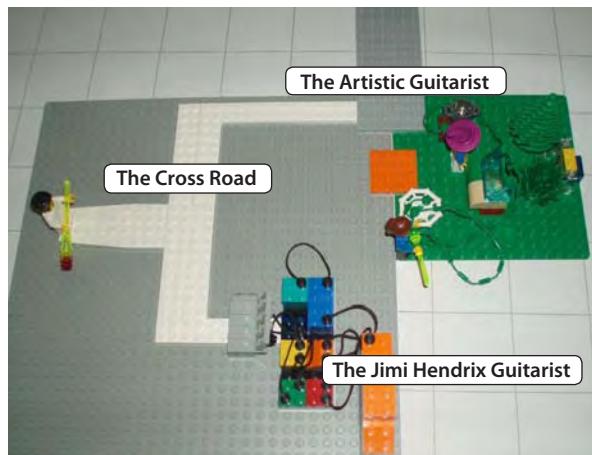
After the presentation of The Artistic Guitarist, one of the engineers asked if digital sound could be seen as a potential advantage for The Artistic Guitarist - due to the possibilities like customization of sound and uploading/downloading new sounds via the Internet. This received a positive response from the part time guitarist/sound tester as well as from the other guitarists, and initiated a further discussion on this.

### **The shared model:**

The creation of the shared model was initiated with some discussion back and forth between digital and analogue sound, and the different types of appreciation which took place. However, due to the time limits of the workshop the participants started to focus on the assignment of building the models together.

The outcome of the workshop was the shared model called ‘The Cross Road’. It symbolized that TC Electronic had to make a strategic choice between The Jimi Hendrix Guitarist and The Artistic Guitarist as their target user, mainly because their needs and approaches to sound are totally different.

As one of the engineers noted: TC Electronic is standing between the two, because they are targeting their products at The Jimi Hendrix Guitarist by using the digital sound technology to imitate monologue sound, instead of developing the potentials of digital sound, as it was suggested in relation to The Artistic Guitarist.



**Figure 4.5:** The Shared Model

# Workshop 2

Red Cross / Base Camp

## **Context of the workshop:**

Workshop 2 was held at the emergency aid organization Danish International Red Cross – department for disaster management. The function of the disaster management department is to assist and provide aid in large catastrophes like tsunamis, flooding or earthquakes. This is done along with Red Cross departments from many other countries.

**Type of workshop:** Stakeholder Workshop

## **Assignment of the workshop:**

In 2005 the Danish department of International Red Cross was given the assignment to provide a base-camp for aid workers during their stay in disaster areas. The base-camp is for situations of emergent disasters like tsunamis, flooding or earthquakes, and it is a temporary installation lasting a maximum of six months. At the time when the workshop was held, two situations, where Red Cross in Denmark had to send out some sort of base-camp, had already occurred. These had – out of necessity - been built on the basis of a camp, which Red Cross had inherited from the civil-defence. The assignment of the workshop was to initiate the development of the base-camp, to gain understanding of the users' insights and perspectives, and defining guidelines on which the development could be based.

## **Participants in the workshop:**

Workshop 2 included a number of participants with different insights in relation to the base-camp. The participants in the workshop counted a nurse working as a base-camp manager, an emergency coordinator educated in logistics in the military, the emergency chief, an engineer, who had been assembling the first two camps, a voluntary aid worker and two industrial design students.



### The individual models

The individual models illuminated a variety of views on the base-camp - that is everything from purchasing, storing and packaging the different goods for the camp to arranging and assembling the camp, and also working and living in it. An example of this was made by the nurse. The model and her explanation showed that she was very concerned about the hygiene and the temperature conditions in the base-camp, and she shared insights about how she was often freezing all night, because she did not find it safe to use the burning stove in the tent while sleeping.

Another example is the engineer's model. This also included the concerns about comfort, but in terms of making the technical system function without spending too much money on it. The engineer's model called 'The Simplified System' is presented below:



**Figure 4.7:** Well, this is a very simple camp (...) We have tried to make a very efficient technical support department. As you see, one of the treasure chests is still full, but the other one is actually empty. The reason for this is that it is very expensive to make all these technical solutions. Therefore, we have to make it as cheap as possible, because otherwise all those who want to get help from the camp end up looking like this [points to the skeletons].

Accordingly, the idea is to make a very simple system (...) without compromising the comfort. So that the people out here can be happy (...) that they survived.

[Workshop 2\_video 1\_00:56:24]

### The Shared Model

When the participants were asked to build their insights together in one model, it resulted in a longer discussion and negotiations about the priorities in the camp. Apparently, it was hard combining the different models.

The final model derived directly from combining the different models. At the end of the workshop, the participants divided the shared model of the base-camp into different modules: a module containing the sleeping area, the toilet area, the kitchen area, the working area and so forth. The model is shown below.



**Figure 4.8:** The Shared Model

As a result of the reflection on the shared model and its influence on the project, an idea about defining certain needs according to the different areas slowly emerged out of the discussion. This idea was also mentioned as prevention against generalized solutions throughout the whole camp – as in the case of the burning stove.

The emergency coordinator, who was in charge of buying and storing the camp, also elaborated on the shared model and the modular structure. He suggested that instead of sending off X numbers of tents and Y numbers of stoves, he would instead store the camp in units that were equal to the modules. By doing so he could more easily adjust to different needs. Furthermore, this type of delivery would make it much easier for the aid workers to assemble the camp.

The engineer responded to this by saying that he had told the logistic department about his trouble when assembling the camp over and over again, but until now nobody had been able to understand him.

# Workshop 3

Daimler AG

## **Context of the workshop:**

Workshop 3 took place at Daimler AG (formerly known as Daimler-Benz AG and DaimlerChrysler AG). Daimler AG is a German car corporation, which both develops and manufactures automobiles and trucks. In addition to the development of vehicles, Daimler also provides financial services. Daimler is a very large organization, which includes many different professions – among this a group of industrial psychologists positioned in Data and Process Management in Ulm. It was in this department workshop 3 was held.

## **Type of workshop:** Team Workshop

## **Assignment of the workshop:**

A project called: Social System Engineering Program was positioned in the very beginning in workshop 3. The aim of the Social System Engineering Program was to provide tools and methods to engineering teams in development projects, in order to optimize their collaboration. The workshop objective was mainly to assure a shared understanding of the project within the team.

## **Participants in the workshop:**

The participants in workshop 3 were all from the project team. They were all employed in the same department, and each one had a background in industrial psychology. Out of all the workshops presented in this dissertation, workshop 3 included the smallest and most homogeneous group.



### The individual models

Even though the models in workshop 3 were created by close colleagues, there were two different kinds of models.

On the one hand, the models were viewing the Social System Engineering Program as a linear process, where the psychologists first should observe the collaboration in the engineering projects, diagnose the situation and then make a number of interventions by introducing different tools and methods - and then finally arrive at an optimized situation. One of these models was referred to as 'The Linear Approach':

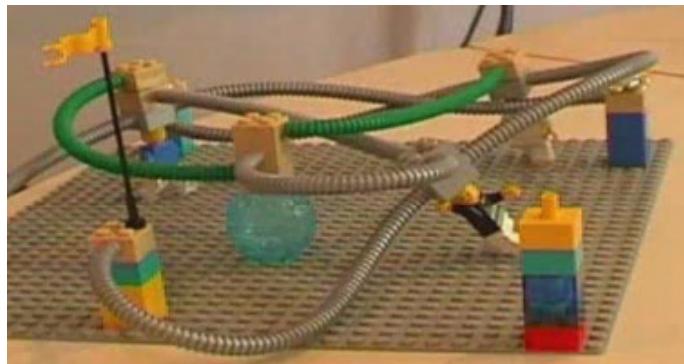


**Figure 4.10:** This is the situations [that we in the industrial psychology group are trying to approach] – [There are] different kinds of projects in the company – and they are complex in different ways (...) Then we are doing a diagnostic. (...) we see the different kinds of the problems, the different kinds of people. We see politicians, we see enemies and problems. (...) and we have the intervention tools for the situation. (...) [And after that the team] now knows how to work on it and they now have the knowledge. And everything is structured for them – and they can work on their aim. And we just see it works and we observe it – then we are free (...)

[Workshop 3\_video1\_00:28:26]

On the other hand, one of the models presented Daimler AG as an organization with many different behavioural levels.

The model that showed that even if the development teams were put together to do an assignment, there could be many different reasons why this did not happen. For instance: personal wishes, directions or even counter orders from the home department. The model is viewed on the following page.



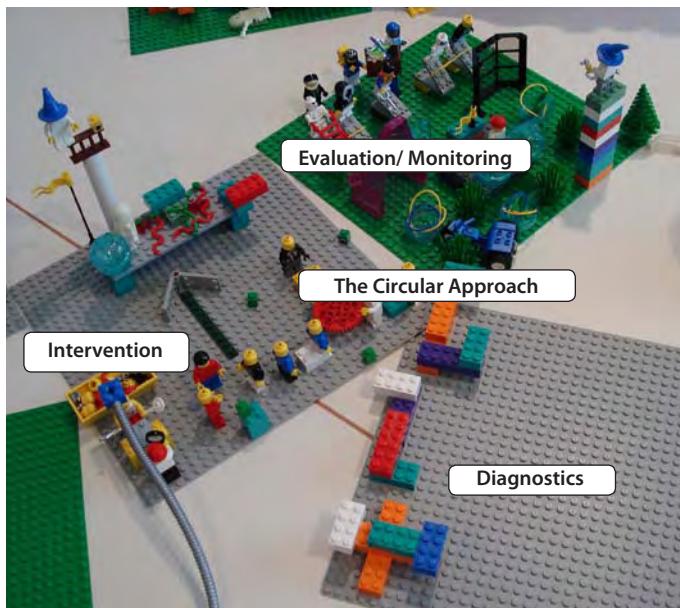
**Figure 4.11:** Here are three people sharing one task, which they should collaborate on. But in the organization there are so many different behavioural levels influencing them and driving them into certain directions. That is also connected with their motives, their plans, their goals (...) And this is also [influenced by]: ‘Where can I get money?’; ‘What behaviour am I rewarded for?’ (...) And so in the end these three people – because these behaviour steering structures show different directions (...) they are completely lost and running away from the task [symbolised by the blue sphere in the middle of the model] – instead of meeting in the middle of it and working on it.

[Workshop 3\_video1\_00:08:48]

### The Shared Model

When the team was given the assignment to build the models together, it caused some discussion. The discussion was mainly focused on whether to focus the chaotic description of the development teams (represented in the model, which they gave the name ‘Running Away from the Task’) or on the idea of diagnosis, intervention and evaluation (represented in The Linear Approach).

However, the shared model ended up combining both the insights from Running away from the Task and the Linear Approach. The result was a model called The Circular Approach. This model viewed the Social System Engineering Program as a circular process, where the psychologists would constantly be monitoring the collaboration, making diagnosis and interventions. This also included the understanding of the Social System Engineering Program as an ongoing task or assignment, not as an accomplishment or time limited project.



**Figure 4.12:** The shared model

# Workshop 4

Region Northern Jutland / Medical Treatment Houses

## **Context of the workshop:**

Medical Treatment Houses is a project initiated by Region Northern Jutland and the design firm Smedegaard and Weis, with financial support from The Danish Enterprise and Construction Authority. The idea of shared Medical Treatment Houses, which can include both doctors, nurses, physiotherapists and other health services, is a response to the shortage of medical practitioners in the northern part of Denmark. The aim of the project is to change the statistics showing that within a few years, the number of citizens without a medical practitioner within a distance of 15 km will increase dramatically. The idea of Medical Treatment Houses is especially going to motivate and attract young female doctors (most doctors in Denmark will be females in future), since it can provide flexibility in relation to working hours and further possibilities in relation to vacation, maternity- and parental leave.

## **Type of workshop:** Stakeholder Workshop

## **Assignment of the workshop:**

The aim of the workshop is to find a set of guidelines or a model for developing these Medical Treatment Houses.

## **Participants in the workshop:**

The participants of the workshop 4 were: From Region Northern Jutland: the coordinator of the project as well as the director of the medical practitioner sector. From practice: one nurse, one secretary and one medical practitioner, who work in one of Denmark's first Medical Treatment Houses. And finally from the area of design: two designers from Smedegaard and Weis, along with an Associate Professor in Design from Aalborg University.



### The individual models

In the beginning of the workshop there were many different models and therefore also many different perspectives on the project. In the model by the director from Region Northern Jutland, the aim to solve the problem of shortage of medical practitioners was very apparent:



**Figure 4.14:** Today, the structure for medical practitioners means that we have a doctor in every little town. And these doctors each have a set of patients. But [this doctor] he will soon be retiring – and this means that there will not be a new one. Because this [female doctor] she does not want to go there and work. And this means that the patient in the town has a problem. That is why we need to find a place, where she wants to work, and she wants to work in a treatment house (...) This is the assignment - as I see it.

[Workshop 4\_video 3\_00:31:46]

The nurse's, secretary's and the medical practitioner's models were very concerned with the physical lay-out of the Medical Treatment Houses. An example of this is the secretary's model:



**Figure 4.15:** I am imagining a light and friendly house with many windows and good air-conditioning. (...) When you come in to the house you will immediately meet a person – in case you have any questions. (...) I would also like a second floor, where the staff can stay between shifts (...) and maybe some outdoor areas.

[Workshop 4\_video 3\_00:00:13]

The designers' and project coordinators' models were generally focused on the guidelines or key issues to be approached in order to make the Medical Treatment Houses function. Issues such as flexibility, to make sure that the Medical Treatment Houses are attractive and inviting enough for the medical practitioners to invest in it. (In Denmark medical practitioners work as self-employed business owners - even

though most of their salary comes directly from the government). Issues like ‘social glue’ or ‘fellowship’, which can drive the development and collaboration in the Treatment Houses, were also important. The model called ‘The Community Mill’ is an example of a model of this nature.



**Figure 4.16:** (...) I have not divided [my model of the Treatment House] into rooms. Instead I have created this [mill], which is the focal point in the community. It can be shared facilities, but at the same time something that keeps the house running [socially]. I have also created a minor zoo (...) It symbolizes that there should be room for diversity. I imagine different types and professionals, who are able to share accommodation (...).

[workshop 4\_video\_3\_00:21:10]

### The shared model

When building the individual models together into a shared model, there was a tendency just to gather the individual models in the middle of the table rather than negotiating which models were important. Therefore the group was also asked to build a set of individual models, which showed most important influences, in relation to the success of the Medical Treatment Houses and afterwards to rate these.

One of the models with the highest ratings was the model called: ‘Pulling Together’ (or directly translated from Danish: Lifting together) It was created by the director from Region Northern Jutland. He explained the model like this:



**Figure 4.17:** Economy is a very important factor in relation to the establishment of these houses. But before that emerge the definition of a need and the definition of a wish to do this. And [when this is settled] it is necessary that some different parties are pulling together. This is what [the model] symbolizes. (...) There is the medical practitioners and the local authorities – a municipality and a region, which are very relevant parties – in the process of making this happen (...) These parties must agree on the project in order to make it happen and they must agree to pull together.

[workshop 4\_video\_6\_00:07:44]

During the reflections after the workshop, The Community Mill and the model called Pulling Together were discussed as some of the most important guidelines in relation to the Medical Treatment House. At some point in the discussion they were even merged together in terms of the idea of Pulling Together, at all levels and at all times. From a specific Medical Treatment House, where the region, the municipality and a number of practitioners have to pull together their interests, and invest together, to the everyday operation of a Medical Treatment House, which requires that different people working there have to pull together to make the place function for the citizens and themselves.

# Longitudinal Study

## The Good Elderly Life

As mentioned above, this research material also holds a longitudinal study of the project: ‘The Good Elderly Life’.

This project is made in collaboration between the Health and Care Administration in the Copenhagen Municipality, Denmark’s largest nursing home Sølund, and the consultancy Copenhagen Living Lab. It was initiated in October 2007 and will be running until December 2010<sup>5</sup>. Apart from the project team, the project involves partners such as Microsoft, the Confederation of Danish Industry, the Danish Rehab Group, Aalborg University etc.

From the beginning, the project was planned to include an extensive ethnological research in order to establish how the quality of life is in a nursing home and identify areas, where future changes would result in the highest impact on the life quality of the nursing home residents. Parallel with ethnological research, a number of workshops were planned and executed.

<sup>5</sup>The project is financially supported by the Danish Enterprise and Construction Authority in the program: User-Driven Innovation. For more information please see: <http://www.ebst.dk/brugerdreveninnovation.dk/aeldreliv>.

# Workshop 5

## The Good Elderly Life I

### **Context of the workshop:**

Workshop 5 was the first of the two workshops in The Good Elderly Life project. In the initial description of The Good Elderly Life project, the focus of the project or the frame for improvement was the nursing home. According to the initial project application the project objective was:

**(...) to gain insight into what ‘the good elderly life’ is, when living in a nursing home and identifying the innovation potentials within elderly care.**

(Erhvervs- og Byggestyrelsen, 2007)

### **Type of workshop:** Team Workshop

### **Assignment of the workshop:**

Workshop 5 was placed in the beginning of The Good Elderly Life project with the intention to ensure an internal clarification and to create a shared understanding of the project within the interdisciplinary team and the many different partners.

### **Participants in the workshop:**

The participants in workshop 5 included two project-developers from Copenhagen Living Lab, an ethnographer doing research in the nursing home, two project managers from the Health and Care administration as well as two deputy managers from the nursing home Sølund (both originally educated as nurses).



### The individual models

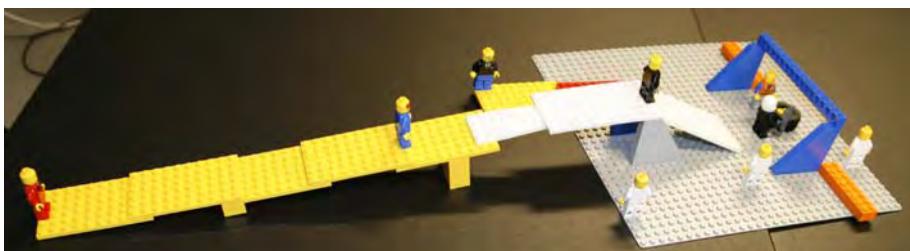
In the first part of the workshop, the models could be divided into two groups. Some of the models stayed within the nursing home context and some tried to look at the elderly life more in general. It was especially the participants from the nursing home and the municipality, who stayed within the initial description. An example of this is the model made by the deputy manager Lene:



**Figure 4.19:** *My point of departure is my job and here you find several different interests. There are those [elderly people] who prefer to be active. (...) But there are also those who think: 'this is enough – let's sit down and relax in our little house' (...) it is far too much (...) It is not necessary to have activities all the time'. It symbolizes that different people want different things.*

[Workshop 5\_video 1\_ 00:16:22]

One of the participants, who built a model related to the elderly life in general, was the project manager Thomas. His model called 'The Good Life' viewed the elderly life not as something separate from, but as part of life.



**Figure 4.20:** (...) *The Good Elderly Life – is here [on the right]. However it is not different from the rest of my life, and the rest of The Good Life (...) you are not different because you are old –you are just in another period of your life. And all the things, which you have experienced (...) are still part of you.*

*[In the elderly life] there is a need for protection, which has not been there earlier – it is more flat, where you live the last part of your life, but there is still experiences. (...) And there are connections back to the life, I have lived – my family, my relatives, who are still part of my life.* [Workshop 5\_video 1\_ 00:21:49]

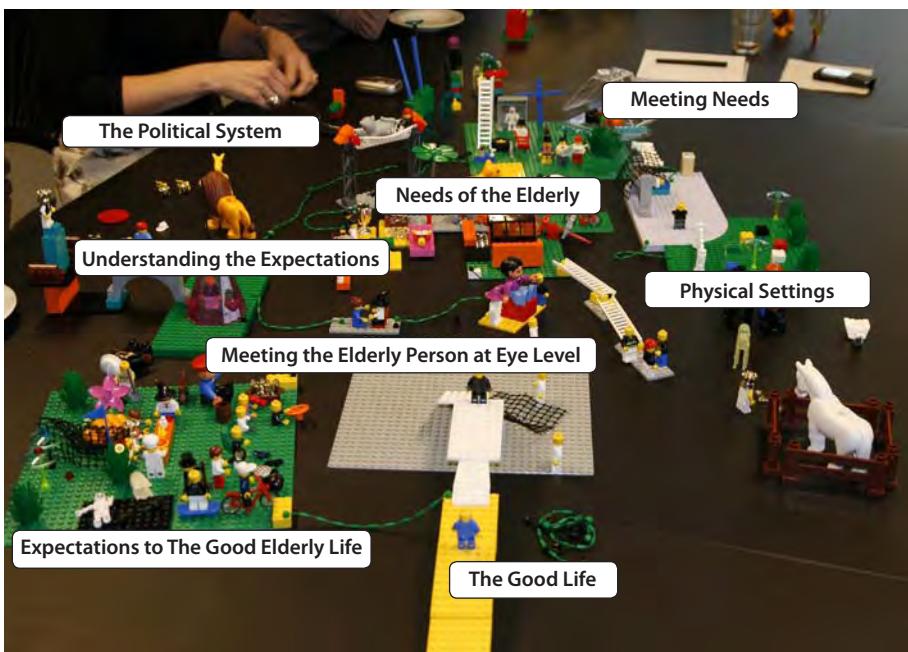
Apart from these two directions there was also a number of models, which included the political and organizational system surrounding the nursing home and The Good Elderly life.

### The shared model

When participants began to build the different models together, everyone agreed to start with ‘The Good Life’ model and then from this build the Good Elderly Life. However, the last part of this plan created some discussions about how to organize the Good Elderly life.

In the beginning, the Good Elderly Life was mainly put together by the different models, which showed the elderly life in the nursing home. However, at some point it was suggested that instead of looking at the physical settings, it would be more important to look at the needs of the elderly people.

The needs of the elderly person became the focus of the shared model, and the understanding of the contexts outside the nursing home frame became a leading idea in the shared model. This meant also that several new and additional models were added to the initial shared model, like a model that showed expectations and pre-conceptions in relation to how the life of elderly people unfolds. The shared model is shown below.



**Figure 4.21:** Pictures from the workshop 5 in the Good Elderly Life project

During the reflections on workshop 5 the impact of the shared model was discussed in relation to the project, and it was found that an understanding of The Good Elderly Life could not be gained only

through investigations within the present nursing home framing. Instead, it required a much more holistic approach. In the time after the workshop this change in understanding also affected the activities in the project i.e. the ethnologist's work.

A few weeks after the workshop, project manager Thomas Hammer-Jakobsen from Copenhagen Living Lab summed up workshop 5 by saying that:

**'We realized that we had to look at needs, experiences and understandings in a broader scope. It is harder than the initial intentions, but it is also important. Otherwise we will just create a reproduction of the construction, which lies within Sølund's [the nursing homes] bricks.'** (Copenhagen Living Lab, 2008).

# Workshop 6

## The Good Elderly Life II

### **Context of the workshop:**

Workshop 6 took place four months after workshop 5. At this time in the project there was a lot of discussion and enthusiasm in the team about assistive technology and its potentials in relation to elderly people.

### **Type of workshop:** Stakeholder Workshop

### **Assignment of the workshop:**

Workshop 6 was implemented as a means to create dialogue with various stakeholders to encourage their involvement in the project and to incorporate their insights and perspectives.

### **Participants in the workshop:**

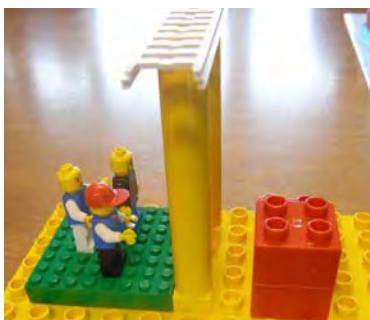
Besides the interdisciplinary team, Workshop 6 also included elderly people, nursing homes residents, relatives and employees in nursing homes. The participants can be seen in the pictures below.



**Figure 4.22:** Pictures from the workshop 6 in the Good Elderly Life project

### The individual Models

In workshop 6 there were many different individual models, which became part of the shared model. In the section below many of them will be presented. The first individual model, which will be presented here, is called The Gate to The Elderly Life. It was built by 76- year- old Eva, who is a resident at the nursing home Sølund. The gate symbolizes the realization and acceptance of being old and voices both frustration and difficulties in relation to the physical and mental situation.

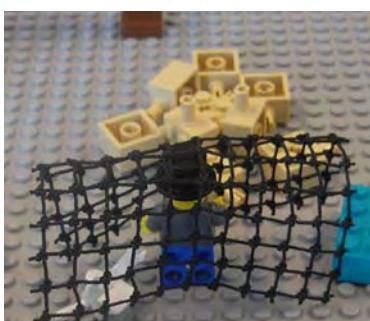


**Figure 4.23:** (...) I may well say this Gate – it is a bit difficult to enter. You have to acknowledge that you are old and that there are many things you cannot do. Some of the obstacles are higher than others. That is what I think - being old - is like. You feel the limitations in many ways. (...) You also think differently. You are more easily (...) confused.

[Workshop 6\_video 1\_ 0:07:21]

Eva also expressed a need for help to handle this situation both from relatives and from the nursing assistants. She also said that for the moment, there seems to be no one who addresses this issue. During one of the workshop-breaks, she further elaborated on the importance of the gate by saying that if you do not enter that gate, it does not matter how well the meals are prepared, because if you have not accepted that you are not able to cook your own meals, everything will taste bad. Similarly, if you do not accept that you need help, all help will be inadequate.

Another individual model from workshop 6 was the ‘The brown mass’. It was built by the ethnologist Josefine on the basis of her first and preliminary studies of the nursing home context. She explained the model like this:



**Figure 4.24:** (...) the problematic part about [being old] may well be the emergence of (...) an overall societal opinion (...) You are easily detached from society. You are seen as some kind of brown mass(...) you are trapped in your own world (...) maybe because you forget who you used to be (...) And being in a nursing home (...) it is just storage on your way to death – you are not getting home again. It is the last place (...)

[Workshop 6\_video 1\_ 0:31:32]

Josefine's model contains a number of things, from the importance of life stories in dialogue with elderly people, to the acknowledgement that phrases like the 'the burden of the elderly' might be harder for 'the burden' than for the ones carrying it, and finally that the confrontation with death can be rather depressing.

A third important individual model from the workshop was called: 'To give help and to get help'. This model acknowledged that getting help without being able to give something back may feel degrading or even humiliating.



**Figure 4.25:** *I have a partner over here, who does not help me because he is supposed to, but because we are in the same situation, and because he wants to (...) we have some agreements on giving help and not so much about getting help. (...)*

[workshop 6\_video 2\_ 0:12:01]

The 'To give help and to get help' model also rethinks the nursing home situation into a place, in which everyone plays an active role, even if it means peeling one carrot a day or reading a small section in the newspaper to someone.

The last example, which will be provided here, is the 'human rights' model. It is concerned with the rights, which elderly people have or should have, for instance being treated with respect and being accepted for one's individual needs, wants and habits. The 'human rights' model was built by the nursing assistant Pia, who explains:



**Figure 4.26:** *I somehow had human rights in the back of my mind. (...) [It is about] being able to go to the toilet, when needed and not at a certain time. (...) If you prefer a shower in the evening – yes, why not? – Why does it have to take place in the morning?*

*I hope that it will be further acknowledged that we are different and that we have different habits and needs and that resources will be distributed differently than they are today.*

[workshop 6\_video 2\_ 0:01:20]

### The shared model

The shared model in workshop 6 was actually a collection of the most significant individual models – models which everyone agreed were important. The models included insights on both functional, personal and social needs and experiences. In the figure below, there is a picture of the final outcome.



**Figure 4.27:** The final outcome of workshop 6

In the evaluation of workshop 6, Thomas Hammer-Jakobsen called the Lego models a first step towards ‘design principles’ or ‘design dogmas’, which could be used in the development of the design briefs. The idea was that all briefs in the project should include or consider: ‘to give help and to get help’, ‘human rights’, ‘the gate to the elderly life’ and so forth.

He also saw the outcome of the workshop as a form of evaluation scheme, which could be used when evaluating future concepts in the project.

The creation of the Lego models also proved to have a further impact on The Good Elderly Life project. In the ethnological fieldwork following workshop 6, the ethnologist was able to identify and underpin

the outcome of the workshop, and find evidence of for instance problems like The Gate to the Elderly life and the need To Give and To Get Help. Furthermore, she chose to use these “one-liners” in the presentation of her analysis, because, as she argued, they each held several senses and experiences, which otherwise would be hard to combine into meanings.

When the ethnologist presented the fieldwork and analysis to a panel, which included employees both from Copenhagen’s Health and Care administration and from several care facilities, it was concluded that many insights on elderly people were recognizable to the group. However, as one of the participants noted, because the insights were gathered in this particular way, they created a whole new understanding of the insights and new perspectives on how to handle them.

### **Summary**

In this chapter the research material has been presented. First of all, the workshop-portfolio was presented. In this section there was a brief introduction to the four single workshops and to the two workshops in the longitudinal study. Furthermore, the characteristics of the workshop-portfolio were presented in order to underline the broad variety of projects and organizational contexts, and the quality of the data, in terms of being real-time and real projects.

And secondly, each workshop was presented in terms of context, type, assignment, participants and the process from individual to shared model.



# 5.0 | Analysis and Findings I

## IDENTIFYING GENERAL PATTERNS

## **This chapter**

In this part of the dissertation, the analysis of the research material and main findings of this study will be presented. In chapter four, the workshops were examined and presented individually to provide an overview of the research material. In the following chapters, the aim is to identify patterns across the six workshops and to show the main findings of this dissertation.

The analyses and findings will be divided into three chapters. In this chapter, there will be a presentation of the general patterns across the six workshops. This will narrow down the unit of analysis to a set of significant models, which had an important influence on the workshops.

Chapter 6 holds a detailed analysis of the significant models and provides examples of their influences in the workshop. Furthermore, it identifies the reasons behind these influences, based on the insights from the theoretical framework.

In chapter 7, the significant models will be compared to existing definitions. It will be qualified why these significant models are to be seen as ‘new’ and not previously described, and their names and definitions will be presented.

## **General Patterns**

When analysing the video-material from the workshops and the additional documents from the longitudinal study, it was evident that some of the Lego Models played a more significant role in the workshops compared to the other models. These models were often created by some of the participants with direct experiences from the context of use, and they enabled the stakeholders to make some of their sticky knowledge explicit. Another characteristic of these models was that they provided a second-order-understanding of their creators’ meaning making and thereby supported the communication in the group.

The significant Lego models were also an important part of the shared models, which were created in the workshops. In relation to the shared models, the significant models enabled the participants to create a shared frame in relation to the project.

When analyzing the significant Lego models more closely, it was also evident that their structure was different from the other Lego models created in the workshops. Whereas the ordinary models either represented a concept or an experience/reflection, the significant models

had both a ‘concept component’ and an ‘experience component’. An example of this can be found in workshop 6 and the Good Elderly Life project. In this workshop, there were 5 significant Lego models, including the model called: To Give and To Get Help.



**Figure 5.1:** *I have a partner over here, who does not help me because he is supposed to, but because we are in the same situation, and because he wants to (...)*  
*We have some agreements on giving help and not so much about getting help. (...)*

[workshop 6\_video 2\_0:12:01]

The ‘concept component’ in this significant model is ‘to give and to get help’ and the ‘experience component’ is the creator’s personal story about how humiliating and maybe even dehumanizing it is, if you are in a situation, where you cannot give anything back. The concept ‘to give and to get help’ can be seen as the head-line or perspective in which all creators’ experiences can be linked and interpreted. The ‘experience component’ is the personal experience, which links the significant model to its creator and to a concrete set of situations. Another way of explaining the difference between a regular model in the workshop and the significant models is by comparing the significant model called: To Give and To Get Help to one of the regular models from workshop 6. The regular model expressed a concept and was explained like this:



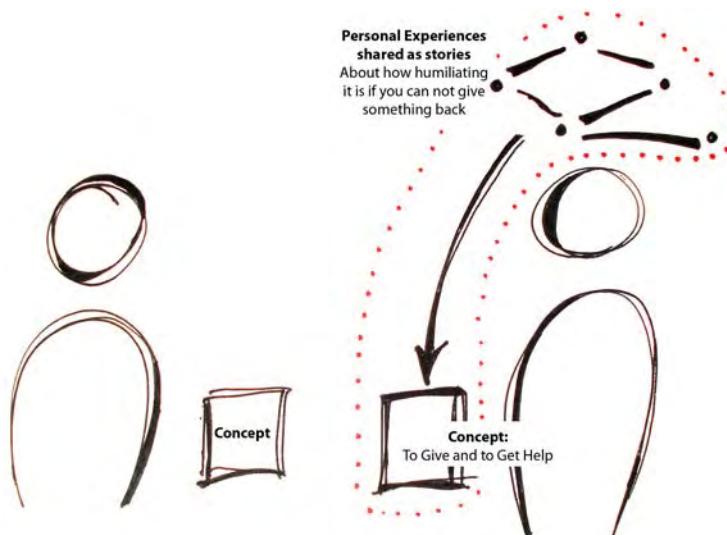
**Figure 5.2:** *I have chosen to look at it from a technological perspective – and I hope we will be able to reach this within 10 years.*

*I have tried to illustrate it with some kind of station (...) combined with a private robot, which can help me [the elderly person] with the things I want and need. (...)*  
*If it was inside a nursing home, every room would have its own robot to wait on [the elderly person] hand and foot – and anywhere else it is wanted (...)*

[workshop 6\_video 2\_00:09:49]

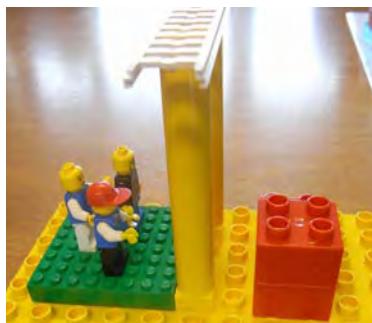
When comparing the regular model to the significant model ‘To Give and to Get Help’ it becomes clear that the ‘experience component’ is missing in the regular model; there are no insights on whether the creator would like a robot or not – or what kind of experiences or motivators are behind these suggestions or ideas about a robot. The concept in the regular model represents an idea, where as ‘To Give and to get Help’ represents a concept of how its creator makes meaning of the nursing home situation.

In figure 5.3, there is an illustration of the difference between the regular model (on the left) and the significant Lego model (on the right). As the figure illustrates, the significant Lego model is not detached from the person, who creates it. Instead, it holds both the ‘concept component’, which represents how this person makes meaning, and the personal experiences, which are the background for this meaning making - shared in terms of a storytelling.



**Figure 5.3:** The difference between a regular model and a significant model

Another difference between regular models in the workshops and the significant models was that the significant models represented a way of understanding all the experiences each stakeholder or team member had been gathering. In the example of the ‘The Gate to The Elderly Life’ (also from workshop 6), 76- year- old Eva combined a number of experiences and emotions from her own life and transformed these into the significant model of the ‘Gate’.

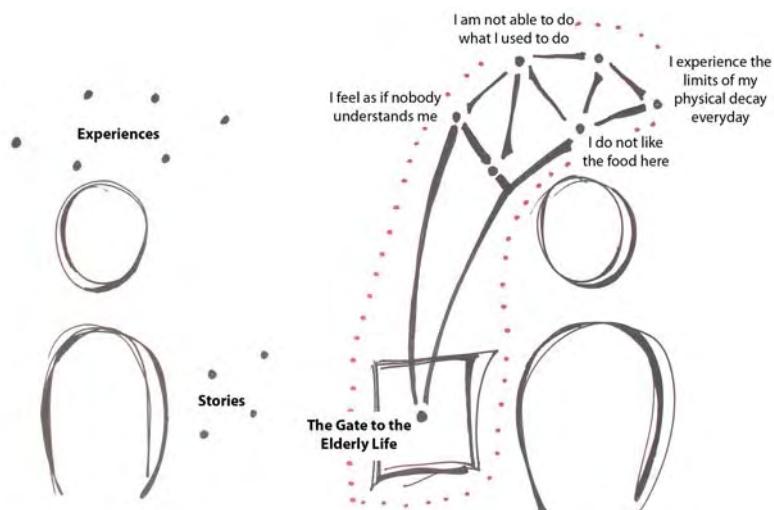


**Figure 5.4:** (...) I may well say this Gate – it is a bit difficult to enter. You have to acknowledge that you are old and that there are many things you cannot do. Some of the obstacles are higher than others. That is what I think - being old - is like. You feel the limitations in many ways. (...) You also think differently. You are more easily (...) confused.

[Workshop 6\_video 1\_ 0:07:21]

This ‘Gate’ made it possible for her to overcome the boundary of not being able to express her opinions and values to the project team. This was possible due to the fact that the model contained a lot of experiences, which otherwise would be hard to connect into something meaningful for somebody, who had not had those personal experiences.

The experiences in relation to The Gate might have been: “*I am not able to do, what I used to do – and it makes me sad*”, “*I experience the limits of my physical decay everyday*”, “*I do not like the food here*”, “*I feel as if nobody understands me*” etc. Expressions like these might have been difficult to connect to for the other participants in the workshop, but with The Gate to the Elderly Life, they make sense. And just as important, the other stakeholders or members of the team can also add similar experiences to the ‘concept’ in their personal meaning making process. In figure 5.5 there is a simple illustration of this.



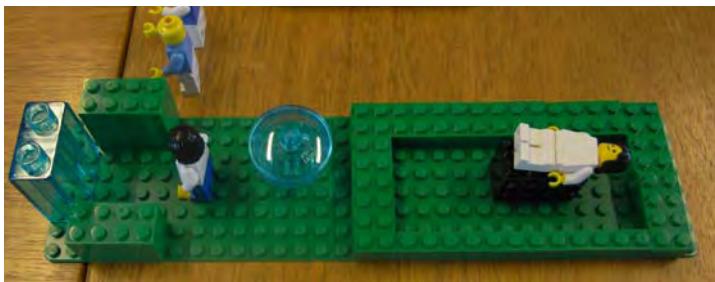
**Figure 5.5:** The difference between sharing experiences and a significant model

In the figure, all the little black dots represent experiences. If the experiences are shared via a story or in a model (as viewed on the left), it can be hard to interpret how these different experiences are connected, and thereby also what is meaningful to the person, who is sharing it. However, the significant Lego model (reviewed on the right) reveals how these connections are made via the ‘concept component’.

Other stakeholders or members of the design team can also add similar feelings and experiences to ‘The Gate’ in their personal meaning making process. For instance: if you have an older relative, who is complaining about the food in the nursing home, or who is depressed about not being able to clean his or her house properly, these experiences can perhaps be better understood in the light of The Gate to the Elderly Life.

Another way to illuminate this is by showing one of the regular models from workshop 6, which only included an experience/reflection (or the ‘experience component’).

The regular model was created by a relative to one of the elderly people living in the nursing home, and she explained the model as follows:



**Figure 5.6:** (...) Well... I can of course only talk about my mother, who is 90 years old and lives at Sølund [the nursing home], where I am really happy she is. And she is happy as well – however sometimes is it a little bit difficult (...) because even though she can hardly do anything, she does not like to be of any inconvenience to the staff. But then of course she has me. (...) I often come around, and we eat together and spend time together. I also wash for her and she likes that (...) she still likes to be neat (...) [She is not that social anymore] She often just sits and stares into space, because she does not like to listen to tapes anymore and she cannot watch television anymore, and then life becomes a little bit sad.  
There are many depressions.

**[workshop 6\_video 1\_ 00:10:48]**

As it appears, the relative shared a lot of personal stories and insights in relation to her mother. However, it can be rather hard to combine these experiences and understand how she makes sense of these.

## The significant models

A large part of the significant Lego models have already been shown in the presentation of the workshops in chapter three, due to their influence on the workshops and the workshop projects.

The significant models are for instance: The Artistic Guitarist from the workshop at TC Electronic, The Modular Structure from the Red Cross workshop, Running Away From the Task from the workshop at Daimler, The Community Mill in the workshop about Medical Treatment Houses as well as The Good Life and The Gate to the Elderly life, from the Good Elderly Life workshops.

However, it was far from all the models created in the workshops, which turned out to be significant models. Typically, the significant models:

- Enabled the stakeholders to make some of their sticky knowledge explicit.
- Provided a second-order-understanding of their creators' meaning making.
- Supported the communication in the group.

And, as opposed to all the other regular models (concepts, experiences/reflections), the significant models had both a 'concept component' and an 'experience component'.

In figure 5.7 all the Lego Models from the workshops are categorized in terms of concepts, experiences/reflections or significant models.

Workshop	1 <sup>6</sup>	2	3	4	5	6
Concepts	*	4	6	5	6	5
Experiences/ Reflections	*	10	2	7	5	8
Significant Lego Models	2	1	4	2	4	7

**Figure 5.7:** The Lego Models from the six workshops divided into Reflections, Concepts and Significant Lego Models

As the figure shows, the significant models are only a small part of the complete number of models. In the six workshops, a total of 78 models were created, out of which 20 were significant models.

<sup>6</sup> Since the TC- Electronic workshop was not video-documented, these are no exact count of the reflections, concepts and significant models. However, due to the pictures and notes from the workshop, it is certain that there are two significant models.

However, even if the significant models were small in number, they had an important influence on the workshop and are therefore also the units of analysis or research objects of the dissertation.

### From Personal to Shared Significant Models

Most of the significant models were created by an individual and then taken into the shared model. However, there were also alternative ways for the significant Lego Models to be created and accepted into the shared model. In the section below, a review follows related to the movements of the significant Lego models into the shared Model, including:

- Adopting the significant personal models into a shared model.
- Combining two individual personal models into a shared model.
- Combining a ‘concept component’ and an ‘experience component’ into a shared model.

#### *Adopting the personal significant models into the shared model*

In the workshops, there were several examples of significant personal models being taken directly into the shared model. This happened when the other participants started to invest ownership in these models, either by stating their personal acceptance of the model or by adding similar or related experiences to the model - and thereby making it shared.

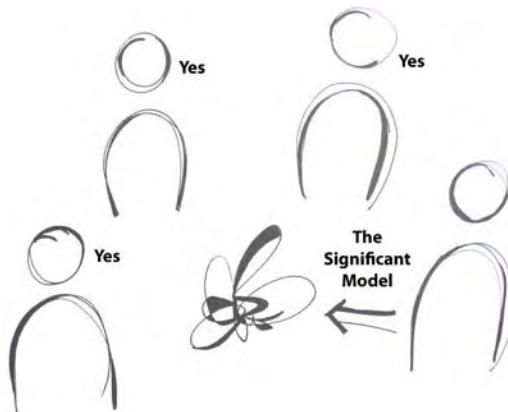
An example of this can be found in workshop 5, where a number of the participants stated their liking of a personal significant model, created by one of the workshop participants and thereby made it part of the shared model.

**Frida:** I really like Thomas' model

**Lise:** yeah, yeah....

**Lene:** Yes, that one, that is really important. I think it has to be part of it [shared model].

[Workshop 5\_video 3\_00:00:00]

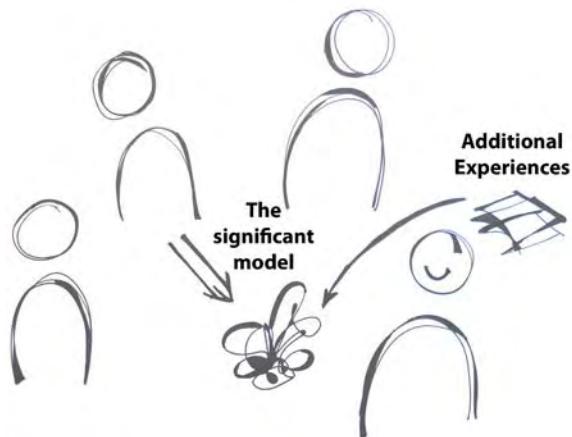


**Figure 5.8:** Ownership via acceptance

In workshop 6, one of the participants showed her ownership in relation to The Gate to the Elderly Life by adding her personal experiences to it:

**Lene:** (...) But it could also symbolize other things (...) Are you afraid to go through [the gate] because you think it means that someone will start controlling your life? (...) I have experienced that [fear] many times - Especially when we had the protected residences [at the nursing home].  
Their greatest fear was to lose their independence. (...)

[Workshop 6\_video 1\_00:12:25]



**Figure 5.9:** Ownership by sharing additional experiences

A similar example to this can be found in workshop 1 at TC Electronic. After the guitarist / sound-tester's presentation of The Artistic Guitarist some of the engineers started to share some of their insights and experiences on digital sound by sharing examples of, how The Artistic Guitarist would be able to customize and create new sounds via the digital sound technology, and then share it with his colleagues via the Internet.

#### ***Combining two individual significant models into a shared model***

Sometimes the process of creating the shared model was not just a matter of accepting and showing ownership in relation to the other participants' significant models. In some of the workshops, two significant individual models were combined into a new one.

One of the most obvious examples of this can be found in workshop 3 at Daimler. In the beginning of the workshop, there were two significant models: The Linear Approach and Running Away from the Task (reviewed on page 73 and 74)

In the process of building the models together, The Linear Approach and Running Away from the Task were combined into a circular approach, where the idea was to constantly diagnose, make interventions and evaluate. The Circular Approach combined both the experiences of the many ‘behavioural drivers’, which constantly challenge the collaboration in the engineering teams, as well as the approach and experiences linked to industrial psychology.



**Figure 5.10:** The Circular Approach from workshop 3 at Daimler

***Combining a ‘concept component’ and an ‘experience component’ into a shared model***

Still, the shared models were not always based on personal significant models only. Sometimes, the process of creating a shared model also involved the combination of a new concept, along with some of the previous experiences/reflections presented in the models, in other words combining a ‘concept component’ with an ‘experience component’. An example of this can be found in workshop 5. In the first part of the workshop, the ethnologist Josefine shared some of her experiences and reflections from her nursing home research:



**Figure 5.11:** Model of the ethnologist’s experiences / reflections

**Josefine:** (...) My point of departure is: What is the good elderly life for the elderly person? And I have tried to illustrate this as a pictogram. (...) Well it is about being physically active [points to the man on the skateboard]. (...) To have all one's physical faculties [points to the magnifying glass]. (...) To be able to go out and explore. [points to the backpack, camera and flippers] (...) And if you need it, to have the necessary assistive tools [points to the man with the sack trolley as a symbol of a walker] (...) and not to be afraid of new things (...) and to be able to communicate with one's relatives as communication is done today [points to the computer]. (...) To be mobile and to be somewhat financially independent (...) [Workshop 5\_video 1\_00:36:09]

Later in the process, one of the other participants initiated the creation of a concept or perspective, around which Josefine's observations and experiences could be connected and understood:

**Thomas:** Well... the way I understand Josefine's model – is that it is almost inside the elderly person. That we are almost down to what is important for the individual. [Workshop 5\_video 3\_00:00:16]

And after further discussions, Josefine ended up creating the concept herself by stating:

**Josefine:** Maybe it is 'The expectations towards the elderly life'  
[Workshop 5\_video 3\_00:01:16]

By doing so, Josefine added an overall concept or perspective that linked together her experiences/reflections. In relation to the workshop she also transformed her initial regular model into one of the significant models.

Another example of this can be found in workshop 2 at Red Cross. In the process of creating a shared model of the Base Camp, the participants used a number of LEGO building-bases to collect the different experiences/reflections in relation to the different parts of the camp.



**Figure 5.12:** The green and grey building bases are used to collect the different experiences/reflections in relation to the different parts of the Red Cross Base Camp.

At some point in the process, the facilitator interrupts this building process, and asks the participants some questions in relation to what they have created.

**Poul (facilitator):** (...) Well... some of the things I find interesting here is the modular-structure, which you have created now. Is that a way of thinking, which you usually use? (...)

**Birgitte:** I don't know – H.C. – maybe you can answer this?

**H.C:** Well ..... it is probably the way I look at it. If you isolate every part here (...) then you are able to see what is essential for each module. And then afterwards you can see what will be essential in order to link this one and that one. (...) In this way you get a quick overview of the critical issues, and it also gives you a much better understanding of how [the base camp] can be set up.

[Workshop 2\_video\_2\_00:23:34]

As the discussion from the workshop above reveals, the participants have created a concept ('The Modular Structure'), in which all their experiences/reflections can be understood and combined. However, the value or influence of this significant model was being created without anyone being fully conscious of it.

## **Summary**

In this chapter the general patterns across the six workshops have been presented. It was found that some of the Lego Models played a more significant role in the workshops compared to other models. And that these models influenced both the communication of meaning and the creation of shared frames in the workshops.

When analyzing the significant Lego models more closely, it was further found that their structure was different from the other Lego models, because they had both a ‘concept component’ and an ‘experience component’.

The number of significant models across the workshops was also presented along with several examples from the workshops.

In the last part of the chapter, the significant models’ transformation from individual models to shared models was in focus. It was found that not all the models were individual significant models, before they became shared significant models. Instead, it was found that a shared significant model could be created in three ways, either by:

- Adopting the significant individual models into a shared model.
- Combining two individual significant models into a shared model.
- Combining a ‘concept component’ and an ‘experience component’ into a shared model.



# 6.0 | Analysis and Findings II

## THE SIGNIFICANT MODELS

## This chapter

In the beginning of chapter 5, a number of findings in relation to the significant models were presented.

It was reviewed that the significant models:

- Enabled the stakeholders to make some of their sticky knowledge explicit.
- Provided a second-order-understanding of their creators' meaning making, and thereby supported the communication in the group.

And that the shared significant models:

- Enabled the participants to create a shared frame in relation to the project.

In this chapter, a number of examples to unfold these statements will be reviewed as well as an explanation why the significant models were able to accomplish this.

### Making sticky knowledge explicit

One of the best models to exemplify that the significant models enabled the participants to make some of their sticky knowledge explicit, is The Artistic Guitarist created in workshop 1 at TC Electronic. The Artistic Guitarist was created by a part time guitarist and sound tester working at TC Electronic. When presenting The Artistic Guitarist, the guitarist and sound tester was referring to himself, and he shared some of his personal experiences from the music industry. In his explanation of the artistic guitarist he was referring to himself. He explained for instance that he was more interested in the customization and creation of new sounds, rather than being a star. He is not the stage person but the kind of guitarist, who is experimenting with his band in the basement - a person who lives by selling his music to frontline stage-performers via the Internet.



**Figure 6.1:** The Artistic Guitarist is shown with his 'yellow stick'-guitar. The guitar is connected to the white guitar pedal as well as to the computer from which different sounds can be created/adjusted or downloaded from the Internet.

By creating and presenting the model shown in figure 6.1 the guitarist / sound tester made some of his sticky knowledge about guitarists explicit to the other participants in the workshop. The Artistic Guitarist created a concept of meaning in which he structured all his experiences. Until the workshop, he had never shared any of these insights with anyone at TC Electronic, nor tried to make them explicit. However, the insights about The Artistic Guitarist had an important influence on the workshop and on the other participants' understanding of TC's market (as viewed in the presentation of the workshop on page 69).

Another example, which shows how the significant models enabled participants to make some of their sticky knowledge explicit is the model called Running Away From the Task from the workshop at Daimler (reviewed on page 72). It was created by one of the industrial psychologists as a picture of the many different 'behaviour steering mechanisms' – like money, department policies and personal interests, which influence engineers working in development teams. The main message was that all these mechanisms in the end may ruin team collaboration and make the engineers run in all different directions, instead of focusing on the task and the collaboration.

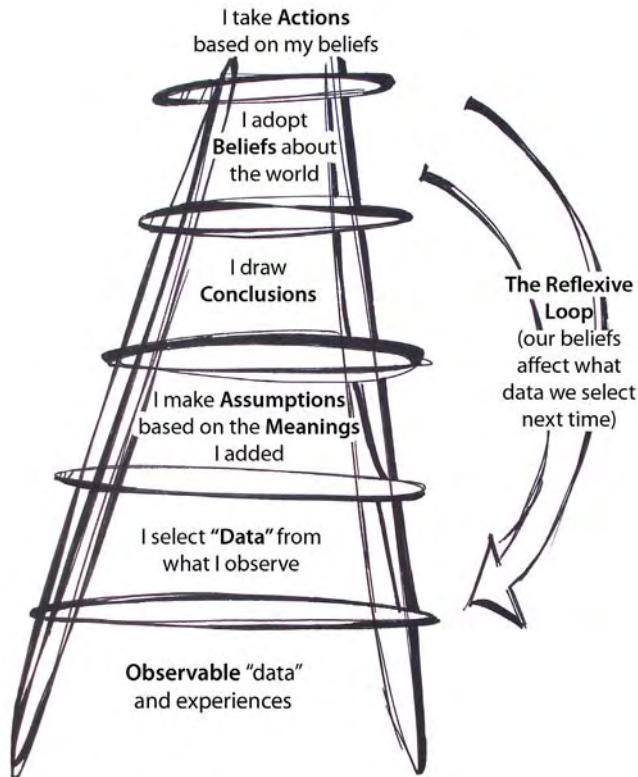


**Figure 6.2:** The model called: Running Away From the Task - from workshop 3

By presenting this model in the workshop, the industrial psychologist made some of his sticky knowledge about the organization explicit to his colleagues and, as it was reviewed in chapter 3, it had a significant influence on the workshop and the shared model called 'The Circular Approach'.

In order to understand the reason behind the finding that the significant models enabled participants to make some of their sticky knowledge explicit, it can be helpful to compare the structure of the significant models with the ladder of inference reviewed in the theoretical

framework. The ladder of inference (Argyris, 1990) showed that our present beliefs influence the data we select next time – and accordingly, the senses that we allow to influence our personal meaning making are bound by our previous meaning making.



**Figure 6.3:** Ladder of inference (Illustration from Senge et al, 2001: 243)

However, in the creation of the significant Lego models, the creator structures all his experiences into a concept or reconnects his senses into a meaning making.

In doing so, the reflexive loop may be stopped, because he is so focused on the process of creating the physical artifact, and therefore he has undivided attention on his experiences. This means that when he creates the significant model, he starts on the first step of the ladder instead of on its fifth step, which is probably the step he would have started at in a conversation.

Some of the arguments for this line of events, where the reflexive loop is stopped and the focus is on creating a physical artifact, can be found in Schön's description of the designer's interactions with models and

prototypes (Schön, 1983). When creating the model or prototype, the designer engages in a process of trial and error in which he uses his tacit knowledge-in-action (which is based on previous experiences). Another argument is that the reflective loop actually seemed to be stopped in the workshop at Red Cross, when they were creating the shared model. As explained earlier, in the process of building their different models of experiences and reflections together, they created The Modular Structure without anyone being fully conscious of it.

In the example of the sound tester/guitarist from TC Electronic, the situation might have been that he did not find it purposeful or appropriate to talk about his passion in his work as a sound tester, and that he had accepted the Jimi Hendrix Guitarist (see page 67) as the main user of TC's products; so he was standing on the fifth step of the ladder of inference, and his actions were based on these beliefs.

Nevertheless, when he created The Artistic Guitarist, he connected all his experiences – including those from outside TC - into this personal model, which means he was starting on the first step of the ladder of inference.

In the example at Daimler, the situation might have been that the industrial psychologist was so used to his colleagues' professional practice in terms of diagnostics, intervention and evaluation as well as his own that he had not even considered the fact that all this fitted very poorly with his own sticky knowledge about the organization. Still, when he was creating the model to explain the context of the Social System Engineering Program, he was reconnecting and recombining all his experiences from the organization, despite his understanding of the psychological approach.

### **Second-order-understanding of the creators' meaning making**

The second finding, which needs to be unfolded, is that the significant models provided a second-order-understanding of their creators' meaning making, and thereby supported the communication in the group.

An example of this can be found in workshop 4 and the Medical Treatment House project – in terms of the model called: Pulling Together (or directly translated from Danish: 'Lifting in a Crowd'). The model represented the concept of meaning based on the director's experiences: that in order to make a specific Medical Treatment House a reality, it was necessary that the different stakeholders were pull-

ing together. Therefore the region, the municipality and a number of practitioners (doctors) would have to pull together their interests and invest together, in order to build the Medical Treatment House.



**Figure 6.4:** The Model called: 'Lifting in a Crowd' (Pulling Together) from workshop 4

After presenting the model, he further shared some of his experiences from other shared investments between the municipality and the Region Northern Jutland, including insights he had from current cases in Denmark, where Medical Treatment Houses had been created.

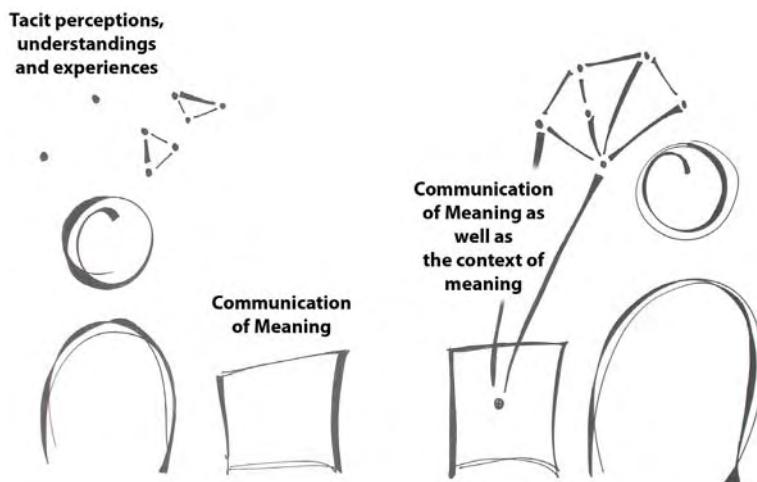
The presentation of the model 'Pulling Together' revealed to the other participants how the director was making meaning in relation to the project – and thereby, the model made it possible for the other participants to understand his understanding (second-order-understanding).

The reason why the significant models provided a second-order-understanding of their creators' meaning making and thereby supported the communication in the group can also be revealed by looking more closely at the structure of the significant models. The significant models have a 'concept component' as well as an 'experience component'. This means that they are better at providing an understanding of how their creator understands the situation, because both the meaning and the context for this meaning making are presented.

As explained in the previous chapter, when meaning alone is communicated it can be hard to understand, as there is no context to understand it in; similarly, experiences alone can be hard to connect and link together into something meaningful. However, the significant models hold both meaning (in terms of a concept) and the perceptions and experiences (in terms of the personal storytelling), and thereby they support the communication, because the other participants are

able to see or reconstruct the whole meaning making process (or intellectual molding) made by the person presenting.

In figure 6.5, an illustration is made in relation to communicating respectively meaning and the communication made through the significant Lego models.



**Figure 6.5:** Communication of meaning alone versus the significant model

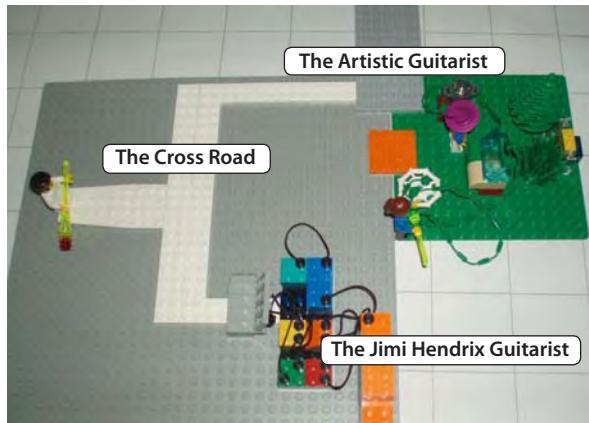
On the left side in the illustration, the participant is only communicating meaning. This meaning derives from previous experiences (senses and perceptions), yet, there is no longer a link between the meaning and senses/perceptions, which it derived from. On the right side however, meaning as well as experiences are communicated.

#### **Creating a shared frame in relation to the project**

When analyzing the six workshops, it was also found that a number of shared significant models enabled the participants to create shared frames in relation to the project. In the theoretical framework, a shared project frame was defined as the basis upon which the team matches problems with solutions (Schön 1983; Valkenberg & Dorst, 1998). The shared frame was described as either a selection of a desired end state or goal, which implicitly includes the problem, need or opportunity. Or an identification of the problem, need or opportunity, which implicitly includes the desired end state or goal. To exemplify that the shared significant models enabled participants to create shared frames in relation to the project, all six workshops will be reviewed.

## **Workshop 1**

In workshop 1 at TC Electronic the shared model was based on three shared significant models. 1) The Jimi Hendrix Guitarist, 2) The Artistic Guitarist and 3) The Cross Road, which symbolized the choice between the two types of guitarists.



**Figure 6.6:** The Shared Model from workshop 1

The shared model created shared framing of the project in terms of the choice between two different frames along with a shared understanding of these two frames. On the one hand, there was the Artistic Guitarist and his needs in relation to digital sound (and the opportunity to explore and use the qualities of digital sound technology), and on the other hand there is the Jimi Hendrix guitarist, who preferred the analogue sound. When the shared model was presented to TC's management after the workshops, it was implied that there was actually only one right choice in terms of the Artistic Guitarist.

## **Workshop 2**

In workshop 2 at Red Cross, the shared model was based on one shared significant model called The Modular Structure. This divided the base-camp into different modules, which could be developed and shipped independently.

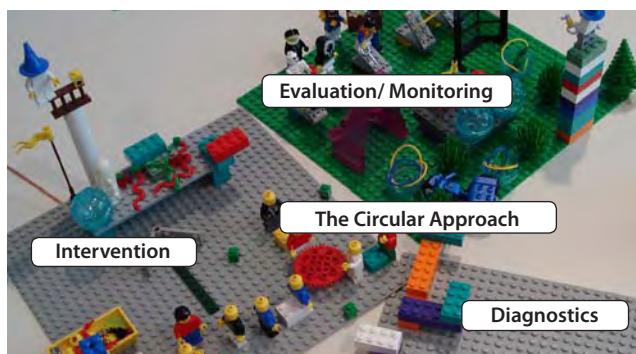
This significant model created a shared frame of the project in that it presented a desired end state of the base-camp, in terms of the modular structure, and it implicitly reveals the understanding of the problems, which had to be solved in the base-camp, such as different types of needs, when it comes to heating in the sleeping areas and in the working areas, and the issues in relation to setting up the camp.



**Figure 6.7:** The Shared Model from workshop 2

### **Workshop 3**

In workshop 3 at Daimler, the shared model was a combination of the two significant models called The Linear Approach and Running Away from the Task into the model called The Circular Approach. The Circular Approach represents the Social System Engineering Program and presents the idea to constantly diagnose, make interventions and evaluate the development teams. The Circular Approach combined both the experiences of the many ‘behavioural drivers’, which constantly challenge the collaboration in the engineering teams, as well as the approach and experiences linked to industrial psychology.



**Figure 6.8:** The Shared Model from workshop 3

The Circular Approach created a shared frame of the project in that it shows the desired end state of the Social System Engineering Program. It also implicitly expresses the understanding of the problem in the engineering teams, which has to be approached by this program, in terms of the understandings deriving from the model called Running Away from the Task.

### **Workshop 4**

In workshop 4 and the project Medical Treatment Houses, the shared model was first and foremost represented in the shared significant model called Pulling Together. The model expressed that in order to make a specific Medical Treatment House a reality, it was necessary that the different stakeholders were pulling together.

In the discussion after the workshop, this model was somehow merged together with the other significant model from the workshop called The Community Mill. This fusion of the two models extended the idea of Pulling Together to all levels and all times - from a specific medical treatment house, where the region, the municipality and a number of practitioners have to pull together their interests, and invest together – to the everyday operation of a medical treatment house, in which different people working have to pull together to make the place function for the citizens and themselves.

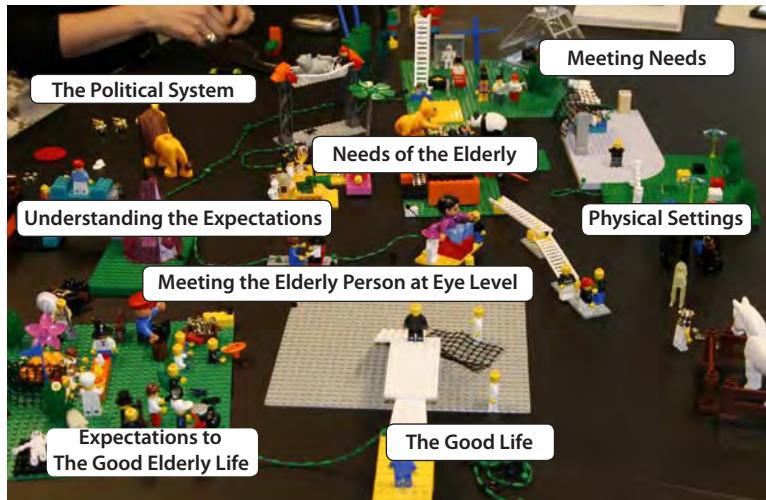


**Figure 6.9:** The Shared Model from workshop 4

The model called Pulling Together created a shared frame of the project in that it represented the desired way to create the medical treatment houses and implicitly the largest potential problems, if the different parties chose not to collaborate and pull the project in different directions.

### **Workshop 5**

In workshop 5 the final model was especially characterized by the four shared significant models: The good Life, Needs of the Elderly, To be Meet at Eye Level and Expectations to the Elderly Life. What characterized these shared significant models was that they all had the elderly person as point of departure and not the nursing home setting.



**Figure 6.10:** The Shared Model from workshop 5

These significant models created a shared frame of the project in that they represented the desired goal of the project, in terms of putting the elderly person in focus. It also highlighted implicit problems in focusing on the nursing home situation only, in that the solutions (product and services) therefore would be limited by the structure of these.

## Workshop 6

In workshop 6 the final model included shared significant models such as: The Prison of Loneliness and Boredom, To Give and to get Help, The Gate to the Elderly life, The Brown Mass, Human Rights, The Crocodile in the Glass Cage and Structures that can be broken.

These significant models created a shared frame of the project in that they identified some of the key problems to be approached in the project, such as loneliness, getting through the gate, being able to give something back and being in systems, where structures can support one's life, but also be broken. The significant models also implicitly showed what kinds of solutions were needed in the project. After the workshop, it was even suggested that they would be used as design dogmas or design principles. (The model is reviewed on the following page).



**Figure 6.11:** The Shared Model from workshop 6

### ***The Background***

In order to understand why the significant models enabled participants to create shared frames in relation to the project, it can once again be helpful to investigate their structure.

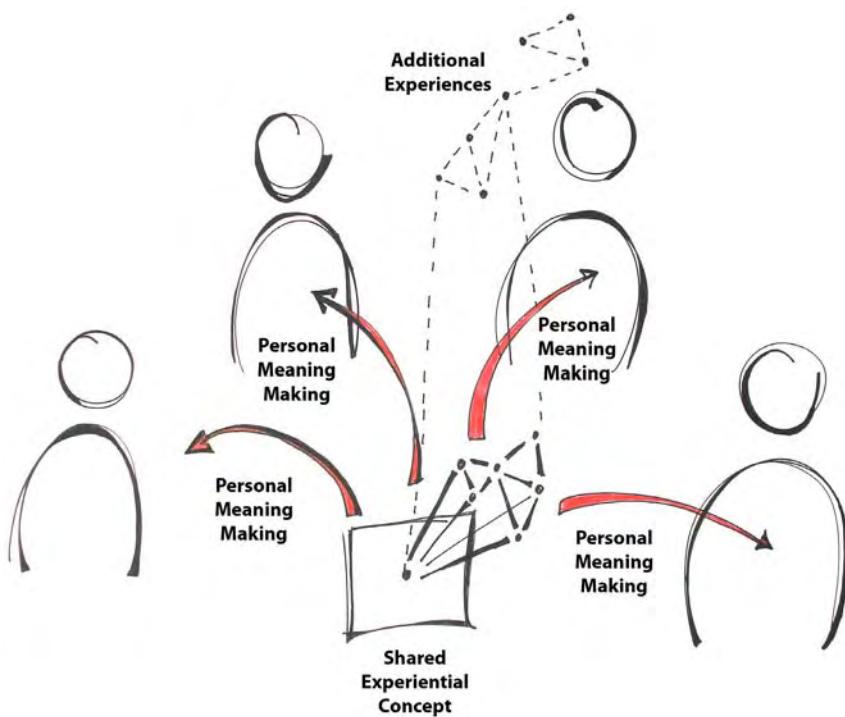
Common for all the shared significant models – no matter how they emerge – is that they reflect what happens in a personal meaning making process: they show how the individual combines and links perceptions and experiences into meaning, due to the ‘concept component’ and the ‘experience component’.

In the example of adoption, the other participants chose to invest ‘ownership’ in this reflection of the participant’s personal meaning making, and thereby they initiate the creation of a shared frame.

The understanding of how the creator of the significant model is making meaning influences the other participants’ personal meaning making, because they are able to see their own experiences in the light of the significant model. Furthermore, they also come to understand and to some extent to share the experiences of the creator, and thereby his experiences become part of the other participants’ personal meaning making processes, as well.

This can also be illustrated via the example of The Gate to the Elderly Life. As mentioned earlier, the other participants are able to see their own experiences with elderly relatives in the light of ‘The Gate’ and thereby understand complaints about the food or physical limits as a lack of acceptance and acknowledgement in relation to being old.

In workshop 5, the participants also experienced Eva’s personal storytelling. The stories and experiences, which she shared, also impact the other participants’ personal meaning making (at least to some extent). This is also illustrated in figure 6.12.

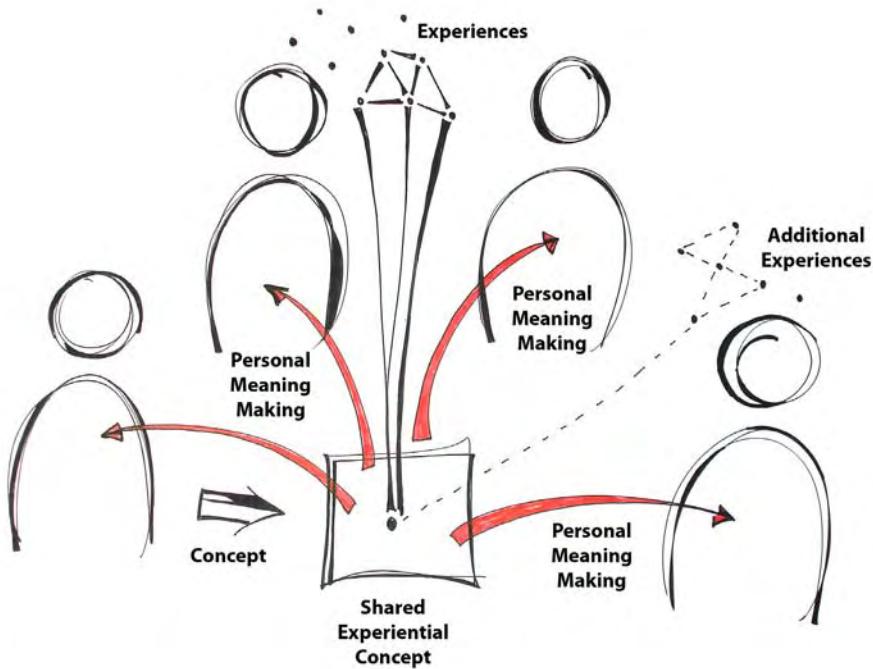


**Figure 6.12:** Adopting a Shared Experiential Concept influences the personal meaning making.

In the examples where two individual significant models are combined, or where a number of experiences is combined and linked together via a new ‘concept component’, the participants are playing an active part in managing and reorganizing the different experiences and linking the various senses and perceptions into meaning.

This is another way of creating a shared frame within the team, because all the participants are simulating a personal meaning making process, in that they are combining and linking senses and experiences

into meaning. As above, this influences the participants' personal meaning making process too, because this process equips them with a concept (or a perspective) in which their personal senses, perceptions and experiences can be combined and also with an extended set of experiences (because they now 'share' some of the other participants' experiences through their personal storytelling). This is also illustrated in figure 6.13.



**Figure 6.13:** Creating a Shared Experiential Concept and its influence on personal meaning making

### Summary

In this chapter the general findings in relation to the significant models have been unfolded in terms of examples. It has also been reviewed why the significant models influenced the communication of sticky knowledge and meaning making the way they did, and how they supported the creation of shared frames in the teams.

In relation to this, the structure of the significant models – in terms of a 'concept component' and an 'experience component' - has been identified as very influential.

# 7.0 | Analysis and Findings III

## EXPLORING DEFINITIONS

## This Chapter

In the previous chapter the identification and characteristics of the significant models have been unfolded and exemplified. This chapter will go one step further in terms of qualifying the significant models definition-wise.

A large part of this study has actually evolved around the puzzling question: What are these significant models?

Initially, both boundary objects and metaphors seemed to be plausible definitions. However, as it already has been revealed, none of these definitions fully covered the characteristics of the significant models, and it was therefore found necessary to present and identify the significant models as something new and not previously defined.

In this chapter, there will firstly be a review of the comparison between the significant models and boundary objects and metaphors respectively. This will be done to show why these definitions were disqualified as explanations for the significant models.

This review will be followed by a naming of the significant models. And to underline this, the characteristic elements of the significant models, which have been found in the last two chapters, will be summarized.

## Exploring definitions

### *Boundary Objects*

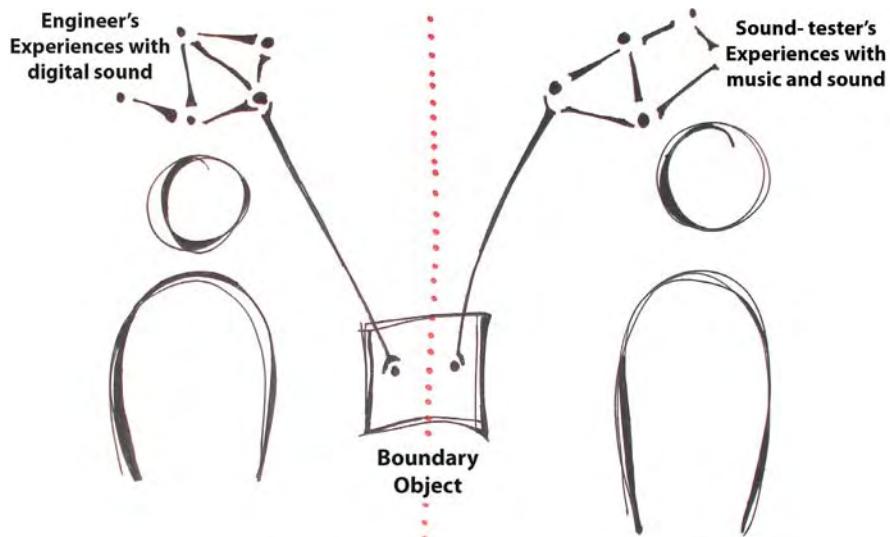
The first definition, which initially seemed plausible to characterize the significant models, was boundary objects.

As reviewed in the theoretical chapter, boundary objects are understood as objects, which enable different groups to see and give meaning to different aspects of the same object, even though they have different backgrounds, competences, practices or professional languages (Star, 1989).

The Boundary Object definition fits very well in terms of creating an object for interaction between people with different backgrounds, competences, practices and professional knowledge; but Boundary Objects do not necessarily require that participants create a shared framing. As Henderson (1991:450) argues:

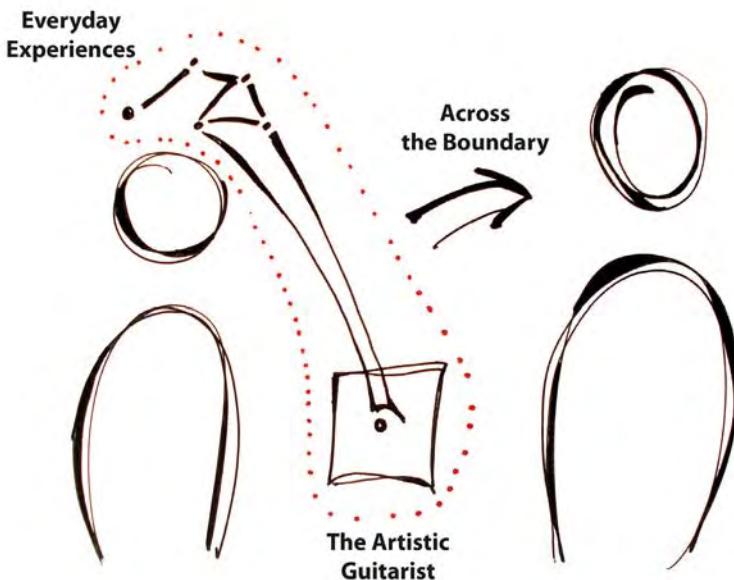
**(...) Boundary Objects allow members of different groups to read different meanings particular to their needs from the same material. This is possible, because the material remains flexible in group use and more focused in individual site use.**

The significant models, on the other hand, were not characterized by allowing different people to read different meanings from the same object; on the contrary, they enabled stakeholders to make their sticky knowledge explicit, provide a second-order-understanding of their creators' meaning making and supported the creation of shared frames. Workshop 1 actually has a fine example of the difference between the characteristics of the boundary object and the significant models in the workshop. As described earlier, the part time guitarist worked at TC Electronic as a sound tester, which means that he tested the prototypes of the guitar-pedals created by the engineers. In their interaction, the prototypes of the guitar-pedals became boundary objects. The guitarist was testing the sound of the prototypes and so was mainly interested in the prototypes from a musician's perspective, whereas the engineers creating the prototypes were mainly interested in the prototypes from a technological perspective. In other words, they read different meanings into the prototypes. This is further illustrated in figure 7.1.



**Figure 7.1:** The guitar-pedal as a boundary object

However, the significant model from the workshop called The Artistic Guitarist was not a boundary object. It was a way for the guitarist/sound-tester to communicate some of his sticky knowledge about his work as a musician, and the aim of creating it was to enable the other participants in the workshop to understand his understandings. In other words, the significant model is not a boundary object, but a way of getting across such boundaries.



**Figure 7.2:** 'The Artistic Guitarist' – a way of getting across the Boundary

### ***Metaphors***

Another attempt to position the significant models into an already existing definition was based on the idea that perhaps the significant models were metaphors. One of the main similarities between metaphors and the significant models is that the significant models often were expressed through metaphors or phrases, like for example The Prison of Loneliness and Boredom.

As described in the theoretical framework, Lakoff & Johnson argue that:

**(...) most of our ordinary conceptual system is metaphorical in nature.**

(Lakoff & Johnson, 1980, p. 4)

This means that metaphors are used to map experiences into cognition and thereby make meaning of them. Initially, this description of metaphors also seemed to fit the characteristics of the significant models. However, when investigating the video-material it was clear that the metaphors only underlined part of the characteristics in the significant models. In other words, the metaphors only represented the 'concept component' of the significant models, whereas the definition of a metaphor does not include an 'experience component'.

The fact that the 'concept component' often is metaphoric may be

part of the reason, why the significant models made the impact on the individuals' meaning making, which they did.

Still, it does not mean that the definition of a metaphor covers the characteristics of the significant models. In the significant model the 'experience component' is what links it to its creator. Therefore, the personal storytelling is an important part of the significant models, because it shows not only their meaning, but also the context based on which this meaning is created.

### **Naming and characterizing the significant models**

After examining boundary objects and metaphors it is evident that none of these definitions fully cover the characteristics of the significant models. It is therefore found necessary to understand the significant models as something new and not previously defined.

Based on the analysis in the previous chapters, it is however possible to characterize the significant Lego models as well as to give them names that can be used in a wider context.

The name 'Personal Experiential Concepts' and 'Shared Experiential Concepts' emerged after a thorough analysis of the workshop-videos and from several discussions in relation to the initial writing process. The names were mainly chosen to underline the 'experience component' and the 'concept component', which were found so particular to these entities. It was further found necessary to show the division between the personal and shared models – and subsequently adding these to the names, as well.

On the following page, the characteristic elements in the Personal Experiential Concepts and Shared Experiential Concepts are summarized.

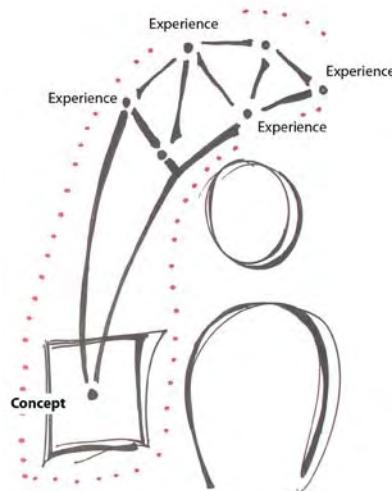
### **Personal Experiential Concepts:**

A Personal Experiential Concept is a way of communicating a personal meaning making in relation to a project, activity or context – in terms of how different experiences (senses and perceptions) are combined into personal meaning making.

A Personal Experiential Concept holds both a ‘concept component’ - in terms of a concept of meaning (that can be generalized across different people’s experiences) and an ‘experience component’ – in terms of personal experiences.

A Personal Experiential Concept enables stakeholders to make sticky knowledge explicit, because both the unconscious senses and perceptions, as well as the conscious reflections and interpretations (in the form of meaning) are communicated.

A Personal Experiential Concept is not a defined boundary between different sets of knowledge, perspectives, assumptions or values, but a way of communicating across such boundaries, due to its two component structure, which supports and enables the receiver to understand the sender’s construction of meaning.



**Figure 7.3: ‘Concept Component’ and ‘Experience Component’**

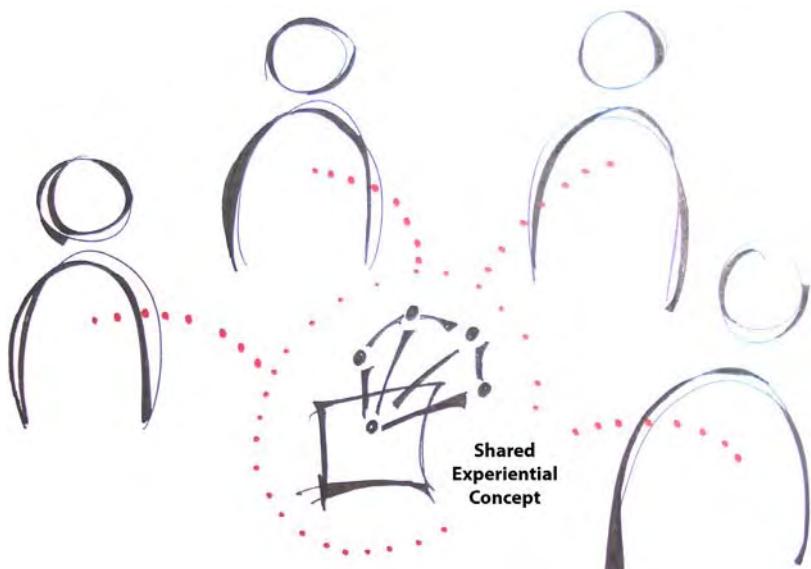
## Shared Experiential Concepts

A Shared Experiential Concept is constructed by a ‘concept component’ (which can be generalized across different people’s experiences) and an ‘experience component’, in the form of at least one personal storytelling.

A Shared Experiential Concept is created, when a design team either adopts a Personal Experiential Concept, or combines two different Personal Experiential Concepts into one, or provides a number of experiences/reflections with a concept, which links them together.

The creation of a Shared Experiential Concept is a reflection or simulation of a personal meaning making process, and therefore it influences its owner’s personal meaning making

A Shared Experiential Concept or a group of Shared Experiential Concepts support and enable the owner’s creation of a shared framing.



**Figure 7.4:** Illustration of a Shared Experiential Concept



## 8.0 | Conclusion AND FURTHER INDICATIONS

## **This Chapter**

The objective of this chapter is to create a conclusion of the dissertation as well as to synthesize the different theoretical and empirical parts of the research project. In doing so, the aim is to connect the different perspectives and insights shared throughout the dissertation. The aim of this chapter is more specifically:

- 1) To finish the research circle by answering the research questions presented in the introduction.
- 2) To unfold the reliability of the research project and discuss the conclusions with respect to the research design.
- 3) To re-unite the theoretical foundation with the outcome of this research project, and thereby position the present conclusions within existing knowledge.
- 4) And finally to discuss the perspectives and further implications from this study.

The chapter is divided into smaller sections, in which these different aims will be discussed and wrapped up.

## **Answering the Research Questions**

In this section the aim is to finish the research cycle by answering the research questions presented in the introduction of the dissertation. The answers to the research questions have, to some extent, already been reviewed in the empirical chapters. However, in this chapter the questions will be directly connected with the answers.

This study has evolved around a very specific research setting – in terms of the facilitated workshops, in which the creation of physical artifacts is a central element. As it has been reviewed, all the workshops took place in projects positioned in the early phase of innovation and included both members of the interdisciplinary team as well as users and stakeholders with the relevant contextual knowledge.

The aim of the workshops was to create a shared framing of the project and find the right problem, need or opportunity to approach. In this dissertation, the research questions are also framed within this specific workshop setting, and their answers are to be understood in this context as well.

The Research Questions are:

1. How can the creation of physical artifacts enable and stimulate the communication between team members, users and stakeholders in interdisciplinary teams working in the early phases of innovation?
2. How can the creation of physical artifacts enable and support the creation of shared frames within interdisciplinary teams working in the early phases of innovation?

In the sections below, the answers to the respective research questions will be reviewed one by one.

***Research Question no.1***

Based on the research presented in this dissertation it is found that: **One of the ways in which physical artifacts can enable and stimulate the communication between team members, users and stakeholders in interdisciplinary teams working in the early phases of innovation, is in the form of Personal Experiential Concepts.**

The main reason for this is that Personal Experiential Concepts enable team members, users and stakeholders to communicate how they make meaning in relation to a project or their everyday life, and thereby enable them to make some of their sticky knowledge explicit. Secondly, Personal Experiential Concepts enable the interdisciplinary team to create second-order-understandings of each others' perspectives, values and assumptions. These second-order-understandings illuminate any differences in the participants' understandings in relation to the project, and make it possible for the participants to discuss or negotiate these.

The reason why Personal Experiential Concepts enable these things are their two component structure. As reviewed in the analysis and findings chapter, a Personal Experiential Concept holds both a 'concept component' and an 'experience component'. The 'concept component' contains a concept of meaning, which can be generalized across different people's experiences. The 'experience component' holds a number of personal experiences, which is shared in terms of storytelling.

Together, these two components become a way to communicate personal meaning making in relation to a project, activity or context,

because they show how different experiences (senses and perceptions) are combined into personal meaning making. Or in other words, they are important drivers for the communication of personal meaning making, because they reveal both meaning and the context of this meaning.

### ***Research Question no. 2***

Based on the research presented in this dissertation it is found that: **One of the ways in which physical artifacts can enable and support the creation of shared frames within interdisciplinary teams working in the early phases of innovation, is in the form of Shared Experiential Concepts.**

In the early phases of innovation, Shared Experiential Concepts enable teams to create a shared frame in relation to the project, because the creation of a Shared Experiential Concept resembles or simulates a personal meaning making process, and thereby influences the team members' individual meaning making, in that it provides a model of how to structure different people's experiences into meaning.

Like in a Personal Experiential Concept, the two characteristic elements of a Shared Experiential Concept are the 'concept component' and the 'experience component'. However, in a Shared Experiential Concept both components are shared among a group of people within a team. This means that the 'concept component' is shared in terms of a shared concept of meaning, and the 'experience component' is shared through personal storytelling.

The team either 1) adopts a Personal Experiential Concept, 2) combines two different Personal Experiential Concepts into one or 3) provides a number of experiences/reflections with a concept, which links them together – in order to make them shared.

Furthermore, the creation of a Shared Experiential Concept is a shared process of experiencing in itself, because the team members are sharing the experiences in the workshop and the experience of building their Personal Experiential Concepts together into one.

By creating a Shared Experiential Concept and thereby a shared frame, 'the sharedness' in the team, which is highly recommended in previous research, is also created. This limits the possibility that the team ends up pursuing different goals, as well.

In relation to answering the research questions, it has to be noted that the research questions are all closely linked to the more thorough review of Personal- and Shared Experiential Concepts, which can be found in the analysis and finding chapters, and that the answers in this chapter must be seen as distilled versions of these.

In the following section, the reliability of the research project, and thereby the reliability of the answers to the research questions, will be discussed.

### **Reliability of the research project and its conclusions with respect to the research design**

In chapter four, it was reviewed that this research project is characterized by three things:

- 1) The data is collected in real project situations
- 2) The data is collected in real time, and
- 3) The data is collected across a diverse set of organizational contexts

This assures that research findings are applicable to actual situations, and that conclusions are not limited by certain simulation settings. On the other hand, there are also some unintended impacts on the research material, which need to be reviewed and discussed, mainly because these may have limited the realism of the data.

The unintended impacts are related to the role of the researcher and the influence from the video camera.

#### ***The role of the researcher***

As reviewed in the methodological chapter, part of the research was conducted as Action Research, which means that the role of the researcher in the workshops was extended to a facilitator. This may have influenced the workshops both in terms of the facilitation itself, as well as by the way the questions and assignments were framed.

In favour of the research project it can be argued that the questions in relation to the assignments were fairly open, generative and inspired by the understandings of wicked problems; however the possibility that the researcher influenced the workshops is present.

Another influence, which needs to be considered in relation to the workshops, is the mere presence of the researcher; this may have created a feeling of ‘being observed’ and thereby changed the participants’ actions and reactions towards each other. In favour of the study,

it can be argued that in the introduction to every workshop an effort was made to underline the fact that the research did not involve any judgement of individual behaviour, and that the attention was on the models. However, the researcher's potential influence on the participants' behaviour cannot be ignored.

One of the ways in which the researcher's potential influence could be avoided in future research, is by hiring different professional facilitators for each workshop. This assures that there is not any specific influence on the workshop from the researcher's side. However this does not necessarily solve the problems in relation to the participants' feeling of being observed, because the facilitator will most likely be from outside the team.

Furthermore the idea of different professional facilitators may also cause other issues in terms of how to plan and focus the workshops, so that they can be part of the same study, without influencing the facilitation.

However, in relation to the discussion on the role of the researcher, it has to be noted that the identification of Personal- and Shared Experiential Concepts did not appear until after the first five workshops were conducted (that is all workshops except workshop 4). This means that the researcher could not have intentionally pushed the development of Personal- and Shared Experiential Concepts in regard to the largest part of the research material.

### ***The video documentation***

Another thing, which has to be discussed in relation to the reliability of the research project, is the presence of the video camera. Even though people adjust to a video camera rather quickly (Jordan & Henderson, 1995), its presence may have had an effect on the participants' actions and reactions and thereby limited the realism of the data.

When looking at the data from the workshops, it is evident that people focus on the interactions in the group, and not on the camera. However, there is a possibility that they may have been holding themselves back or somehow limited their behavior due to the presence of the camera.

In relation to the video documentation of the data, it also has to be noted that what is observable in the analysis is limited by both the video technology and the operator.

First of all it is given that the video documentation can by no means reconstruct the complexity of the situation and the context, in which the interactions happen. Everything that happens outside the lens of the camera is not part of the analysis, and this may limit the understanding of the situation.

Secondly, the operator controls what is documented and what is not, as well as what is in focus and visible in the videos. Accordingly the operator plays an important role in terms of selecting the data from the workshop, which can be analyzed. Interactions outside the focus, or for instance in breaks may be just as important as what is in focus in the video; however it is not present in the data, which is analyzable. One of the ways in which this could be solved in future research, is by having multiple video cameras running at the same time - operated by different operators. This could assure that all facial expressions of the participants are documented, as well as all minor interactions. However, increasing the number of cameras and operators increases also the risk of making the participants feel observed, due to the fact that there will be so many people present in the room, who do not participate in the workshop. Perhaps a video-observation-lab is the only way to increase the number of cameras without too many operators being in the actual room of the workshops; however this also means that the workshops are taken out of their natural contexts.

### ***Analysis and structuring of the material***

Besides the things which may have influenced the realism of the study, there are also some critique points in relation to the analysis and structuring of the material, which need to be discussed.

As described in the methodology chapter, social constructivism is used as an epistemology in this research.

The typical critique of social constructivism is that since it is socially constructed, it may be false in another social formation. This research project has been approaching this critique point by collecting data from different projects set in different organizational contexts. This assures to some extent that Personal- and Shared Experiential Concepts are not just constructs based on a certain project or context.

However it can be argued that the limitations from political issues as well as the fact that all the workshops take place in Northern European Countries (mainly Denmark) may limit the study's conclusions, and the extent to which it can be generalized.

The critique that social constructions may be false in another social formation has also been approached in terms of the span of the collective analysis. As reviewed in chapter three, the collective analysis has taken place both in the department of Architecture and Design at Aalborg University as well as at Stanford Center for Design Research. This means that the analysis and construction of the Personal- and Shared Experiential Concepts happened in two research groups. However, it can be argued that even if this effort is made, the extensive analysis created by the main researcher may have pointed the attention of the other researchers in a certain direction and influenced the collective analysis more than intended.

One way to approach this issue in relation to the data from this study is to employ a number of researchers/coders to independently code all the research material to see if they are able to reach the same conclusions.

However, in a future research project, it is recommended to conduct the collective analysis as described by Jordan & Henderson (1995). A second typical criticism, which is often discussed in relation to social constructivism, is that it cannot be judged, because the creators of the knowledge and the receivers of the knowledge may have different worldviews. In order to minimize this difference, this study only includes workshops, which are free of issues such as confidentiality or language, which is very specific to a single group of professionals. Furthermore, it has been an objective to document and share as much of the data as possible and to unfold the theoretical background as widely as possible. Even so, it can always be argued that the documentation could have been more extensive or detailed.

In future research, it could probably be useful to document the research process on multiple levels besides the dissertation – for instance, by making small video-documentaries on 1) the researcher's planning and execution of the workshops, 2) the environment and contexts in which the workshops take place, 3) the workshop participants – in the form of interviews before and after the workshop as well as on 4) the cultural background of the region/country, where the workshops take place.

This could perhaps explain part of the implicit culture, in which the research takes place, and thereby show more detailed insights in relation to the 'world view' applied.

All the issues discussed above in relation to the reliability of the

research project are very important, especially when evaluating the contribution of this research project as well as the extent of the conclusions. In retrospective, the appropriate things to do are always much clearer than in the actual situation, but hopefully there will be multiple opportunities to apply the learning from this research project – into new projects.

In the next section, the focus will be to re-unite the outcome of this project with the theoretical foundation.

### **Re-uniting the theoretical foundation with the findings**

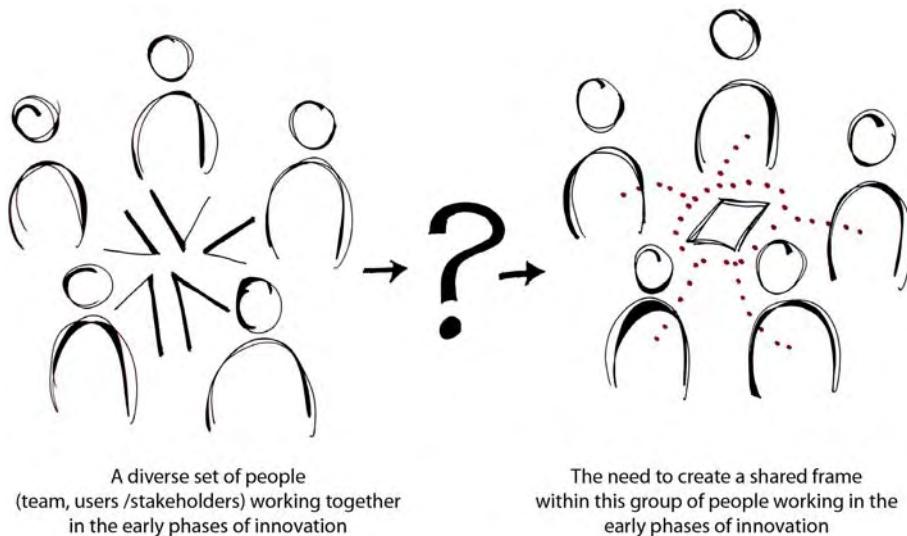
Throughout this dissertation, an effort has been made to connect the design perspective with the development of the workshop set-up and to connect the insights from the theoretical framework with the empirical findings. However, the connection between the outcome of this dissertation and the previous research in the early phases of innovation has not been unfolded yet.

Therefore, the objective in this section is to position the Personal – and Shared Experiential Concepts within the research on interdisciplinary teams working in the early phases of innovation.

In the introduction it was clarified that this dissertation builds on the a priori assumption that all interdisciplinary project teams working in the early phases of innovation will benefit from a shared frame as early as possible, even though this framing may be changed to another shared frame later in the process.

This assumption is linked to previous research in teams, which shows that ‘sharing’ is one of the keywords, when it comes to handling diversity, complexity and ambiguity in teams. But in this dissertation’s research set-up, it is also linked to the research on how to handle the asymmetry or stickiness of knowledge in the early phases of innovation, in the sense that if the interdisciplinary team works with users and stakeholders to create a shared framing of the project, it is assumed that this project framing includes the most important problem, need or opportunity from the context of use.

This dissertation can therefore be seen as an effort to approach the gap between a diverse set of people (team, users and stakeholders) working together in the early phases of innovation, and the need for these people to create a shared frame. This is also illustrated on the next page.



**Figure 8.1:** Positioning the findings

This study is important because it reveals some of the underlying drivers for enabling and stimulating communication within this group of people, as well as some of the drivers for enabling and supporting the creation of a shared frame. In other words: Personal – and Shared Experiential Concepts are the link between ‘the diverse set of people’ and ‘the need to create a shared frame’ or an answer to the question: How can these people create a shared frame together?

Accordingly, the main contribution of this dissertation is the identification of Personal- and Shared Experiential Concepts and their influence on meaning making and on the creation of shared frames in interdisciplinary teams working in the early phases of innovation. The notion of Personal- and Shared Experiential Concepts and their structure has not been unfolded before, and it is therefore considered the ‘breakthrough’ of this dissertation.

On a broader scale, the aim of this dissertation was to approach the gap between the internal challenges and the external challenges in the early phases of innovation. As reviewed in the introduction chapter, previous research on the early phases of innovation either focuses on how to handle the diversity, complexity or ambiguity within the team, or on the interaction between users and stakeholders and how to manage the asymmetry or stickiness of knowledge.

It was found that this division did not exist in practice, and that both sets of challenges are present at all times in interdisciplinary teams working in the early phases of innovation.

Accordingly, the aim of this dissertation became to approach the gap in the present knowledge in terms of the intersection between the internal – and external challenges (see page 11-12).

When evaluating the outcome of this dissertation it is clear that it brings forward knowledge on how to handle both the internal- and the external challenges. As explained above, Personal- and Shared Experiential Concepts are a way to approach the diversity, complexity, ambiguity and stickiness of knowledge, which the teams have to handle. However, this research represents only one way of approaching this intersection between the internal – and external challenges, as well as only one way of approaching the situation where a group of people needs to create a shared frame. In fact, there are a number of research potentials and new questions that this research project has opened up. These will be reviewed and discussed in the next and final section.

### **Perspectives and further research**

Like many other research projects, this study has opened more questions, than it has been able to answer, and provided more opportunities to unfold and investigate new ideas, than it has closed and narrowed.

First of all, the view on the early phases of innovation as a double challenge opens up a number of questions on how to handle different perspectives and methods, which may be applied to approach either diversity, complexity and ambiguity or the asymmetry/stickiness of knowledge.

Secondly, this research project can be seen as a first step within the field of Personal- and Shared Experiential Concepts. This means that there are a number of perspectives and questions, which can be further unfolded as well as indications from this study, which need to be further researched.

And finally, a number of questions in relation to the role as a facilitator has become increasingly apparent throughout this research project. In the following section, each set of questions will be reviewed and discussed. The review will start with the questions in relation to the role of the facilitator.

### ***Perspectives on the role of the facilitator***

One of the first questions, which occurs in relation to facilitating the workshops, is: How do you find the ‘right’ or most relevant users and stakeholders? This question is highly relevant because without key users and stakeholders, you are not able to get the relevant information or insights in relation to the project. In the workshops from this research project, this question has been solved quite pragmatically either by asking everyone in the interdisciplinary team to decide who they think is relevant, or by thinking through the context of use, and trying to figure out all the important stakeholders. But in the end it was always defined by who was available. However, even if the question may be handled quite pragmatically, it would provide a great support for the facilitator as well as for the team, if guidelines in relation to selecting key users and stakeholders existed.

The second question, which faces the facilitator, is: How do you motivate the participants to share their insights if it means that they have to share quite personal stories? Or in other words: How do you create a ‘safe place’ in which vulnerability can be handled? This question became especially apparent after the workshops in the Good Elderly Life project, because it was clear that the insights shared were so important to the project, but at the same time very personal to the elderly people sharing them. Another question, which is also related to this, is: How do you manage the balance between the intentions of the workshop and the ‘slowness’ embedded in letting the participants get to know and trust each other?

A third set of questions, which came up during the process of facilitating the workshop, was actually a consequence of the democratic structure of the workshop. In more than one case, it was experienced that the power structure in the team collapsed. Not many of the participants noticed it, but the project managers did. How do you prepare the managers for this? and: Is it possible to control if and when it happens?

The final set of questions opened up in relation to the workshops is: How do you document the workshops? and: How do you transcribe the values of openness and democracy from the workshops into its documentation? In this research project, this was only tested in some of the workshops - in terms of creating power-point documents with pictures and transcripts from the workshop. However the interactive intentions with this documentation was never unfolded.

### ***Perspectives on the Personal- and Shared Experiential Concepts***

The second group of questions, which emerged during this research project, was in relation to Personal- and Shared Experiential Concepts. The first and perhaps most interesting questions are: to which extent are the bricks needed? and to which extent is the physical artifact needed?

Based on the experiences from this research project, the best guess is that other physical artifacts could be used instead of the bricks, perhaps wooden toys or clay, but that it would demand a larger skills-building competence in the beginning of the workshop; as well as some kind of intervention in relation to how the different models are put together.

In relation to the question whether the physical artifacts are needed, the experiences from this project indicated that they are needed; partly because they assure that perspectives and insights are not forgotten even if the discussion shifts to something else (since the physical artifacts remain on the table). But also because the knowledge-in-action, which was often applied when creating or building the models together, may not be triggered in a discussion.

Another set of questions with respect to Personal- and Shared Experiential Concepts is related to whether they created more than a shared framing within the teams? Did they also create trust and commitment? The main indication behind this question emerged in The Good Elderly Life project. In the evaluation meeting after the two workshops, head of Copenhagen Living Lab, Thomas Hammer-Jakobsen, described the positive effects of the workshops by stating that in contrast to many of their other early phase projects, this project had not had any ‘refluxes’, where the team members, due to different understandings of the projects, would start pursuing different goals, which means that the process at some point had to be stopped and started all over again.

**‘The fact that the project did not have all these ‘refluxes’ has created calmness, security and focus on the project, which again has made the following process [after the workshops] more effective. There are lots of things in this project that we do not know, but we agree on the focus of the project’.**

(Copenhagen Living Lab, 2008)

He further argued that the workshops had not only created a shared frame, but also a commitment to the shared frame, and that the team in the process afterwards seemed to understand each others’ actions.

Based on the data from this research project, it was not possible to conclude whether this experience was present in all the workshops or only in this single case, since The Good Elderly Life project was the only longitudinal study. It was also not possible to identify, why the workshop turned out to have that effect. One guess is that the creation of the Shared Experiential Contexts - in terms of the physical artifacts - may have touched a greater variety of intelligences (as described by Howard Gardner), than a typical conversation and thereby made it possible for the different team members to connect and commit to each other. However, this is not observable on the basis of this data collection, and therefore needs further research.

Another set of questions in relation to Personal- and Shared Experiential Concepts, is related to the conditions for their creation. That is: Are there conditions in the workshops, which are key to the creation of Personal- and Shared Experiential Concepts? And can the natural occurrence of Personal- and Shared Experiential Concepts be boosted? Based on the experiences from the workshops, the guess is: Yes. However, it is trickier to answer: how this can be done.

The main experience behind this guess is actually a workshop, which was not selected as part of the research material. The reason for deselecting it was that this workshop did not have any Personal- and Shared Experiential Concepts, and it was therefore found very difficult and confusing to communicate as part of this study.

It also did not conclude with a shared frame, which means that it did not contradict any of the conclusions of the dissertation.

However, in relation to the questions above, it provides an initial opportunity to compare the interactions and conditions for creating Personal - and Shared Experiential Concepts with the interactions and conditions, when that is not happening.

One of the things, which seemed to differentiate the ‘deselected’ workshop from the other workshops, was a tendency in the workshop to leave the concrete matter (the bricks) on the table in favor of a more typical meeting-style discussion. This also induced longer dialogues and argumentations, with fewer participants involved in the discussion.

In the workshops presented in the dissertation, there was a more rapid dialogue, which included all the participants at all times. Sometimes, it was even as if the critical decisions were formalized by a consensus assurance in the group, and subsequently the shared model was not

altered, until all participants around the table had given their acceptance of the change.

However, the indication presented above is by no means sufficiently conclusive or elaborate. - But just indications.

Yet the understanding of the interactions and conditions for creating Personal- and Shared Experiential Concepts is definitely interesting in relation to future research.

#### ***Perspectives in general***

As it has been reviewed in this chapter, Personal – and Shared Experiential Concepts open a number of questions and perspectives in relation to the early phases of innovation. It touches upon several specific issues regarding team dynamics in general and points towards new potentials for improving interactions in interdisciplinary teams.

It approaches some of the key challenges in relation to interaction with users and stakeholders, and points to new ways of collaborating and co-developing.

Furthermore, ability of Personal - and Shared Experiential Concepts to augment communication and establish shared frames also makes it relevant to areas, where either framing, meaning making or communication in groups occur – in general.

In other word, there are potentials for refinement within present methods and definition, as well as potential in relation to developing the methods and specifications for other contexts of use i.e. in other project forms or in other group formations.

In fact, Personal and Shared Experiential concepts can be seen as a potential point of departure wherever it is important to align and create a collaborative platform for a group of people – and to establish a common objective and shared understanding.



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