

HOW DEEP IS DEEP? A FOUR-LAYER MODEL OF INSIGHTS INTO HUMAN NEEDS FOR DESIGN INNOVATION

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ABSTRACT

It is generally acknowledged that knowledge about the people that are affected by a design proposal, supports successful design and innovation processes. In this paper we explore the question: what needs to be known about involved people to be able to innovate through design? Based on a literature analysis of human-centred design we propose a model with four levels of human insights: 1) the desired solutions; 2) the desired scenarios; 3) which goal drives this need; and 4) which human value or theme underlies these goals. We argue that radical innovation — which involves a reframe of the problem — can be supported by an investigation of the deepest level of this human insights framework: the thematic level. We show how themes are explored through a hermeneutic phenomenological exercise. This approach is illustrated with a design case in the context of social housing.

KEYWORDS: *human values, themes, design method, frame creation, social design*

INTRODUCTION

Ever since the publication of Henry Dreyfuss' 'Designing for people' (1955) there has been a general consensus in the design field that it is important that products meet the needs of the people that buy and use them. Insights into these needs are therefore an essential ingredient in designing products with a competitive advantage. Whilst Dreyfuss just focussed on gathering insights into ergonomic needs of people, later designers and design researchers have argued that products and services need to be accommodated as well to needs related to emotion and pleasure (P.M.A. Desmet & Hekkert, 2007; Jordan, 1999; Norman, 2002), and social needs (Forlizzi, 2008; Papanek, 1984).

To apply 'design thinking' in the broader field of innovation, Brown argued that in order to be able to innovate 'we need to put human beings to the center of the story. We need to learn to put people first' (Brown, 2009, p.39). Similarly, Bucolo et al. (2012) showed how design-led innovation is based on gathering 'deep customer insights'.

The inability of consumers, customers, and users to express what their true needs are makes designing for people a challenging activity. How to innovate through design, and how to find the 'latent needs' of consumers, are therefore ever-

popular topics for research in the design and innovation field. Norman and Verganti (2014) recently argued that human-centred or user-centred design could never lead to radical innovations. Contrary to this argument, Hekkert and van Dijk (2011) stated in their book 'Vision in design – a guidebook for innovators', that understanding people, their goals and concerns, their aspirations and motives, and the world surrounding them, indeed supports innovation. Similarly Sanders and Stappers (2012) argued that it is possible to innovate in human-centred ways, in their case through generative design, which allows people to express their needs and values.

In this paper we will contribute to this field of 'human-centred innovation' through proposing a model of levels of insights into human needs for innovation. Based on previous studies on design expertise (Dorst, 2013) we will show how an analysis of the deepest level of this model — the thematic level — supports design innovation. Thematic analysis questions the nature of certain human experiences through interrogating it from the 'heart of our existence' (van Manen, 1990), and is thus an in-depth approach to analysing human needs for design and innovation purposes. We will illustrate how thematic analysis works by applying it to a design case related to social housing.

HUMAN NEEDS AND DESIGN INNOVATION

Our research question is: ‘what do designers need to know about people’s needs to be able to innovate through design?’ According to Verganti (2008) design innovation is about the creation of new product meaning: the emotional and symbolic content of products. One of the more interesting practices of design that can be adopted in innovation processes for this purpose, is (re)framing the design problem (Dorst, 2011). In this paper we will focus on how insights into people’s needs support this framing process.

To explore this research question we will compare two models of design based on insights into human needs. From the business field we consider Sinek’s ‘what to why’ model (2009), and from the design field we consider Hekkert and van Dijk’s ViP model (2011).

Although Sinek’s immensely popular Ted talk ‘How great leaders inspire action’ (2009) is not directly about how customer insights can steer innovation, it does provide a simple model of different ways to look at customer needs. His mantra is ‘people don’t buy *what* you do, they buy *why* you do it’, which he explains in a three-layer circular model, with ‘what’ on the outside, ‘how’ in the middle, and ‘why’ at the inside. To be successful, he argues, you need to communicate from the inside out. As an example of a company who did not succeed in communicating from the inside out he refers to TiVo. Their ‘what’ was the product they provided: the TV set-top-box TiVo. The ‘how’ of this product was: pauses TV, skips commercials, rewinds live TV, and memorizes your viewing habit. According to Sinek TiVo failed commercially because they did not communicate the ‘why’ of this product: ‘to have total control over every aspect of your life’. Although Sinek remains ambivalent about how to arrive at the customer’s why — in other words how to innovate —, he shows in a simple way that it is important to focus on the ‘why’ or ‘raison d’être’ of a product.

This corresponds to Hekkert and van Dijk’s (2011) vision that design and innovation include ‘a shift away from thinking about “what” to thinking about “why” instead. With their Vision in Design (ViP) model and related design method they provide sound support for designers and innovators to create new product meaning. The ViP model consists of a ‘product level’, an ‘interaction level’ and a ‘context level’, which loosely corresponds respectively to Sinek’s what, how, and why level. The product level contains ‘the world of things’: products and their static characteristics such as colour, material, and dimensions. The interaction level is about the interaction between people and the product. Hekkert and van Dijk particularly advise designers to look at how the interaction *quality* can be characterised. The context level is about the worldview of the designer and includes people’s needs and motives.

The main idea of the ViP methodology is that in order to innovate, a designer first needs to design a set of views and considerations upon which the desired interaction and con-

sequently the product can be designed. This *vision* can be created by first ‘deconstructing’ existing products and trying to understand their reason of existence, and subsequently re-designing this vision by analysing trends and developments that are changing peoples needs and motives. They illustrate this with an analysis of the context of ‘parenting’ for the design of a baby stroller. In the 1990s, considerations underlying the design of baby strollers were that ‘people want things to be cheap’, ‘people want to move their kids’, and ‘people want ease of use’. The designer of the Bugaboo, Max Barenburg, saw how this context had changed with both parents working and having less and less time to spend with their kids. The new context was ‘they want the best for their kids’ and ‘flexibility in moving in the urban jungle’, which resulted in the design of Bugaboo: a stroller that creates a comfortable space for the child, protects the child to the utmost, and provides the parents with a luxurious mobility aid (Hekkert & van Dijk, 2011, p.136). By reframing the problem as seeing it as a problem of ‘efficient transportation’ to a problem of ‘wanting the best for the kids’ this designer managed to design a very successful product.

The ViP model and Sinek’s model lead us to the conclusion that insights into human needs can be gathered on a product or what level — what do people need; an interaction or how level — how do people want to interact with what they need; and a why level — why do people want to interact in that way. For the remainder of this paper we will focus on the why level.

To build a model of human needs insights for innovation we look a bit closer at the ‘context level’ of the ViP model. This level is the complete set of starting points — and their mutual relationships — selected by the designer for a given design task (Hekkert & van Dijk, 2011, p.231). Human needs can be found within the ‘principles’ and ‘trends’ on this context level. Principles are factors that are by their unvarying nature, constant over longer periods of time. The term refers to immutable laws or general patterns that can be found in human beings or nature. Trends are more dynamic factors, concerning tendencies in behaviour, values, or preferences of (groups of) people (ibid., p.233). Trends can be based on principles, e.g. the trend ‘to send hundreds of text messages per week’ is based on the principle that ‘youngsters want to belong to a group’. They are both needs, but on different levels. The trend in this case is how the principle plays out in a certain context.

To further refine this model we refer to the recent work of the second author of this paper (Dorst, 2013) on how the reframing of problems or ‘frame creation’ can be supported by an analysis of *themes*. Frame creation is the ability of expert designers to create new approaches to problems. A combination of empirical studies into expert designer’s practices, fundamental analysis into reasoning patterns, and different forms of rationality, and experimental practice, have led to the development of a frame creation process model (Dorst, 2011). An in-depth explanation of this model is outside the scope of this paper. We focus on those parts of the model that connect insights into human needs to the creation of frames and thus support innovation. This part roughly consists of

three steps: In the 'context' and 'field' steps, the needs of the direct and more broader stakeholders in the original design problem are investigated. This step is about analysing what is important to those people and organisations. The next step includes the identification of the common themes that can be found within this context and field. This is similar to identifying the 'whys'. Then the model proposes to go even deeper by a thorough analysis of these themes through hermeneutic phenomenology (van Manen, 1990). The patterns that can be found in the themes through this analysis can then be used to create frames.

Before explaining how such a thematic analysis works we first explain what is meant by 'themes' and how it relates to the ViP model. Phenomenological themes may be understood as the structures of experience. So when we analyse a phenomenon, we are trying to determine what the themes are, the experiential structures that make up that experience (van Manen, 1990, p.79). We could thus first look at (desired) experiences of stakeholders on the 'how level' and then try to find the 'structures' that underlie these experiences on the 'why' level. Themes described in phenomenology are typically both deeply personal and universal among humanity (Dorst, 2013). There is a similarity between the themes described by van Manen and the principles in the context level described for the ViP model. Since both authors take the phenomenon 'parenting' as an example it is possible to compare the two.

For example, when van Manen (1990) explores the phenomenon 'parenting', he identifies themes such as 'preparing the child's world as a place to be and to become' and 'exercising parental responsibility' (ibid., p.168). Hekkert and van Dijk (2011, p.146) mention as relevant principles in the future con-

text of parenting amongst others 'the notion of being responsible all of the time', and 'parenthood puts strong pressure on the ability to regulate emotions'. These principles are clearly on a comparable level of human needs as themes. The themes/principles can be analysed independently of the context, the baby stroller. The other type of context factors as described by Hekkert & van Dijk contrarily are context dependent needs and indicate how these principles play out; e.g., the trend 'baby strollers are more and more an expression of identity' is grounded in the theme 'identity'. Since trends and themes both would be part of the 'why' level, but have different influences on the design innovation process, we propose to split up the why level in a level of 'goals' (trends) and 'themes'.

A model of insights into human needs for design innovation

Based on the above analysis we distinguish four levels when trying to understand human needs for innovation. These levels are illustrated in Figure 1, and are shortly explained by means of a design case in which a student design team designed a carrier bike: a bicycle with a box in the front which in the Netherlands is mostly used to transport children (van der Bijl-Brouwer & van der Voort, 2013a). Although the students did not use our proposed model in their design process, the resulting design illustrates how human needs on the different levels explain the design.

We refer to the top-level as the 'solutions' level, including solutions and their characteristics, be it physical product solutions, services, policies etc. For the carrier bike the team found that parents wanted a detachable rain hood.

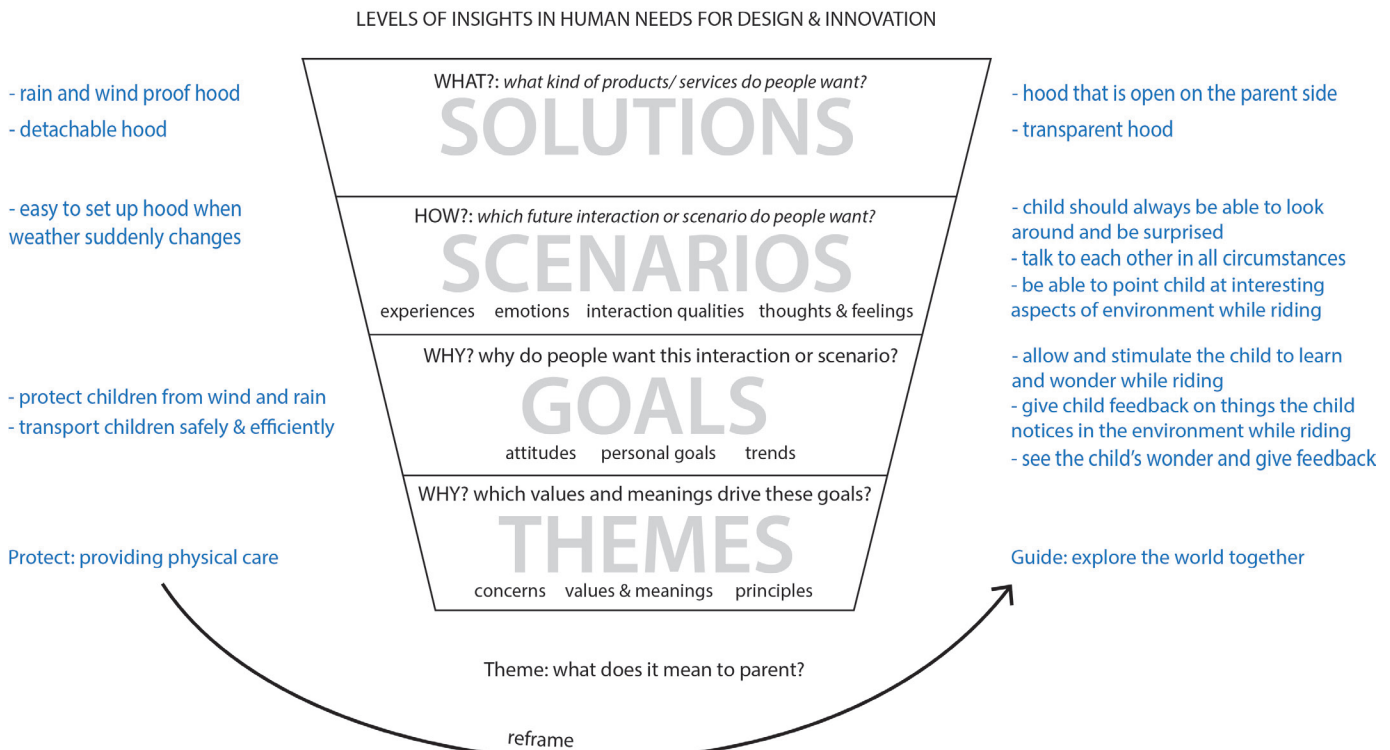
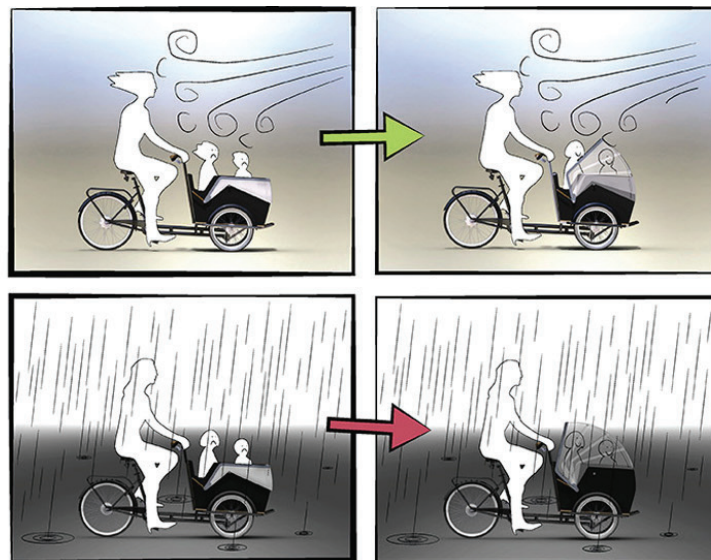


Figure 1: a model of insights into human needs for design & Innovation



Figure 2: a carrier bike to 'explore the world together'



The level below is the 'scenarios' level. It includes all needs that are related to how people want to interact and experience certain solutions in specific situations. Parents wanted the hood to be easy to set up in case of sudden weather changes during cycling.

The goal level describes why people want certain scenarios to occur in the context of the solution space. In the carrier bike case parents wanted to always protect their children from wind and rain while being seated in the box.

At the base of the model the 'themes' level explains what the origin is of certain goals. In this case the underlying phenomenon again is 'parenting'. The theme that underlies the goal 'protecting children from wind and rain' is grounded in the theme 'protection'. This student team managed to reframe their design problem by further investigating parent needs. Parents had indicated that they enjoyed the carrier bike because they could see their children in front of them, and it was nice to be able to talk to them. The team furthermore found in literature about the emotional development of children that it was important for them to 'explore the world' around them. They then reframed their problem from a 'transport and protect' problem to a problem of 'exploring the world together'. This frame can be explained through the theme of guidance as a parent. Guidance is part of 'pedagogic competence', an essential theme of parenting. Parents need to be able to help the child grow up and give shape to life (van Manen, 1990). Guidance means that an interaction between the guide (parent) and the guided person (the child) takes place while the guided person interacts with the world. The interaction in the case of the carrier bike means that it should always be possible for the parents to talk to and see the child, in order to be able to point the child at interesting elements of the environment, to give feedback on the child's observations, and to see the child's reaction. The interaction of the child with the world means that the child should always be able to look around and observe the world whilst seated in the box. The solution the student team created was a transparent hood

that is open on the parent's side, so it always allows this guidance to take place, even in different weather conditions (Figure 2). This example shows how the themes related to 'parenting' form the basis of a reframe of the problem.

HUMAN-CENTRED DESIGN METHODOLOGY

The above example shows how it is retrospectively possible to rationalize how insights into deeper levels of human needs can support an innovative design process. Of course post-rationalization is easier than actually going through this design process. Likewise it is easy to see how a good vision as proposed by Hekkert and van Dijk (2011) can steer successful design, but creating this vision is not an easy task. It is a design skill that needs practice and experience to be developed.

We contribute to this work by providing additional tools for innovation through the reframing of problems in design situations of social design, which involve decision-makers that are often not designers themselves. In the next session we first give a short overview of different available methods to gather insights into human needs before presenting a hermeneutic phenomenological method to analyse the needs on the deepest level.

Methods for gathering insights into human needs for design

For every level of human needs, different methods are available to gather insights into these needs. Insights on the 'what' level are mostly gathered by market research techniques. In design these types of insights are mostly useful for benchmarking purposes and not for design innovation. To get insight into *how* people experience or want to experience a certain solution, various techniques are available that measure different aspects of experiences such as: (self-) reports of experiences and emotions (for example PrEmo, Desmet, 2005); scenario analysis (for example (van der Bijl - Brouwer & van

der Voort, 2013b); interaction qualities (Hekkert & van Dijk, 2011); user testing (for example, Sharp et al., 2007) etc. To gather insights into people's goals one can use techniques such as interviews, as in persona investigation techniques (Pruitt & Grudin, 2003). To identify human values and meanings comparable to themes one can use techniques such as generative tools (Sanders & Stappers, 2012), to glean them from users themselves, or techniques such as ViP (Hekkert & van Dijk, 2011), to define them as a designer. In this paper we don't want to focus on how one gathers insights on the thematic level, but more on what is done with these insights to make them useful in a design innovation or reframing process.

As mentioned above, the work of the second author (Dorst, 2013) has shown how an analysis of themes through hermeneutic phenomenology can support reframing of a problem and consequently innovation. The frame creation process of which this thematic analysis is part has been successfully applied in numerous social design projects in the area of crime prevention (for example, Lulham et al., 2012). In this paper we will show how such a thematic analysis can be executed with involved decision-makers in a practical example.

Using hermeneutic phenomenology to analyse the deepest level of human needs

Hermeneutic phenomenology is a method to identify and analyse themes (van Manen, 1990). It is a means to research the meaning of 'lived experience'. The phenomenological orientation of this method means that it fundamentally differs from positivistic orientations towards experiences and emotions. Phenomenology does not allow for empirical generalizations, the production of law-like statements, or the establishment of functional relationships. Instead phenomenological research finds its point of departure in the *situation*, which for purpose of analysis, description, and interpretation functions as an exemplary nodal point of meanings that are embedded in the situation (van Manen, 1990, p.18).

The way we have experimented with hermeneutic phenomenology is by applying it in workshop sessions of social design teams, based on previous case studies (Dorst, 2013), and inspired by the guidelines for thematic analysis provided by Rijken (2013). First, themes are identified by searching for common patterns in analysed needs on the how and goal level of involved stakeholders. These needs are gathered through various research methods prior to the workshop (see for a comparable example, Tomkin & Watson, 2013). We then proceed to further analyse these themes by investigating their meaning and relationships. A core element of the method is to explore the relations by sharing personal experiences related to a theme. For example, Rijken (2013) explains how to investigate the theme 'fear' through asking people: have you ever experienced fear? What triggered it? What did it feel like? What were you thinking? What changed it? What did you do? Did others play a role? By having different team members share these experiences in an iterative process a pattern can emerge that shows the structure of a theme. For example, fear is related in a structured way to insecurity, risks, con-

fidence, uncertainty etc. Other ways to explore themes are consulting scientific literature and philosophy on specific themes; and gathering artworks that express a theme (Rijken, 2013). The universality of the themes makes it possible to analyse them independently of customers or end-users, and independent of the problem context. To move from the themes to reframe the problem, it is useful to look at how the elements of the theme are dealt with in domains outside the problem context (Dorst, 2013). Through using metaphors, a frame can then be created which forms a bridge between problems and solutions. Different frames should then be analysed on their 'fruitfulness' i.e. the extent to which they open up the solution space. In the next section we will illustrate this process with a social design case study.

A CASE STUDY OF THEMATIC ANALYSIS IN SOCIAL DESIGN

Slowly but surely it is becoming clear that design is an essential element of dealing with complex social problems (Brown, 2009; Dorst, 2013). Applying human-centred innovation to social problems is difficult, with solutions that do not just include products and services but also new policies and programs. The fact that social problems consist of multiple related and interacting stakeholders makes them complex to deal with (Forlizzi, 2008). Moreover, the team that takes decisions for social design will most likely consist of people who might not be used to working in a designerly way, such as public servants, NGO's, and in some cases members of the community. Innovating for such problems is therefore an even more challenging activity. We will show how such social problems can be approached through aforementioned analysis of themes, by showing its application in the redesign of a social housing service.

Context of the case

The case we will describe here is a workshop session with a group of senior public servants from different Australian state government departments. The workshop was organized as part of a training program in innovation. In different sessions the public servants learned about innovation methods through applying each method briefly to a case related to problems in social housing. We offered a workshop in 'frame creation', which included a thematic analysis. Since the workshop was a training session, and not an actual design session, the group had gathered fewer insights into human needs on the scenario and goal level than we would generally recommend. However, our own expertise and wide experience in working with public housing organisations provided enough input for the workshop to go through a thematic analysis session. Consequently we found this case appropriate to study the process of thematic analysis in the context of a social design problem. The group consisted of sixteen participants who were subdivided into four teams. Each team went through a frame creation process facilitated by an expert, including the authors of this paper.

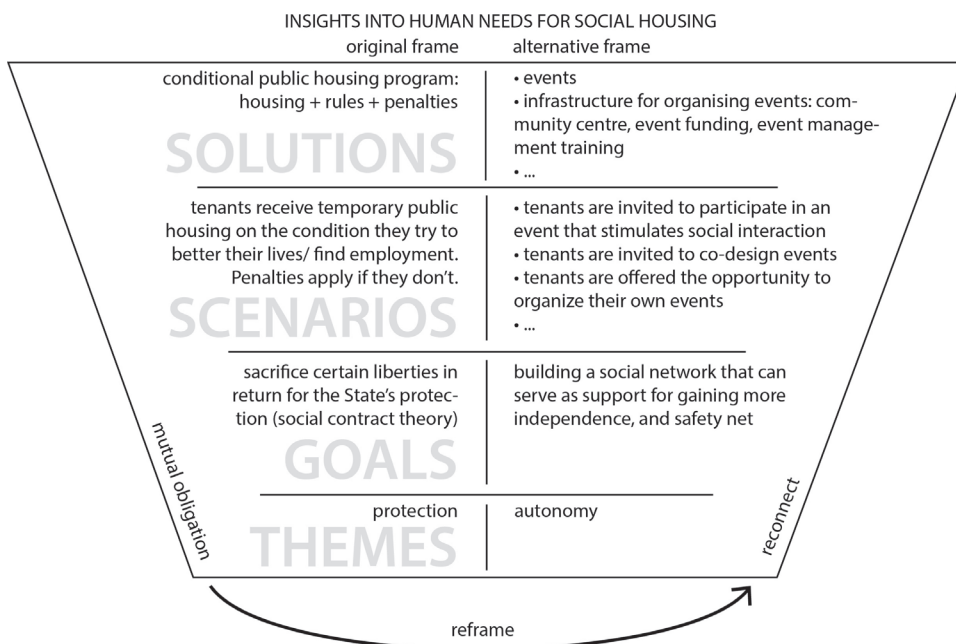


Figure 3: insights into human needs for the social housing case study on the four levels for the original frame and one alternative frame

Preparation of the thematic analysis

The original brief for the problem drew on an historical framing of ‘mutual obligation’ between the provider of social housing and the tenants (see for example, Kinnear, 2002). The aim of social housing is to provide temporary housing for tenants until they can move on to more independent types of living. The obligation of tenants is to improve their own life circumstances through, for example, education and employment, so that they will be able to ‘move on’. Since there are too many tenants that do not fulfil this obligation, social housing is currently reaching its capacity. Mutual obligation is based on social contract theory, the presumption that individuals consciously decide to enter into political society, agreeing to sacrifice certain liberties in return for the State’s protection (ibid., goal level in figure 3). When we discussed this frame with the group there was a consensus that it did not help them come up with ideas on how to address the issue. It did not help them in finding a ‘path to action’ (Dorst, 2013, p.7.).

To situate this problem we first showed three short online movies about communities in areas where a large proportion of the population lives in social housing. The movies show how families, single parents, teenagers and volunteers try to better their living circumstances, particularly those of children, and provide a glimpse of how people live in social housing. This is a simple form of research on the scenario level of our framework.

We then investigated which stakeholders are involved in the sketched problem (the context) and which stakeholders could potentially be involved in future solutions (the field). They include housing and residents (families, pensioners, long term, short term, people with disabilities, youth, single parents), NGO’s, ethnic groups, schools, churches, police,

transport services, job network providers, vocational educational institutions, health services etc. We then looked at what was important to them (the goal level) to try and find shared themes.

Thematic analysis

Common themes that were found in the context and field included (across the different teams): self-determination and autonomy, control, belonging, trust, shelter and stability.



Figure 4: thematic analysis of control and autonomy (blue sticky notes)

Through a hermeneutic phenomenological exercise as explained above, some of the themes were unpacked. As an example, we summarize the analysis for ‘control’ here.

Control and autonomy are themes that apply to all the involved stakeholders. We shared personal experiences of when you feel (or do not feel) in control of your own decisions and what it feels like, and when you relinquish control to someone else. To be in control (autonomy) means having options available and knowing what the options are, and to be authorized to make the decisions. Feeling that you are in control leads to a sense of calm and self-respect. However, taking control can also mean that you need to step outside your comfort zone and it therefore requires confidence in one’s capacities. People are willing to give control away to someone they trust and when they have the freedom to choose who to trust, for example in the case of giving control to the pilot of a plane, or to a doctor when having to go into surgery. When you are empowered to be in control of decisions that affect others, it leads to a sense of being respected. Figure 4 shows the results of the thematic analysis as explored during the workshop on a flip chart.

Reframing

The thematic analysis showed how control and autonomy are related to other themes such as trust, empowerment, safety and confidence. We then looked for metaphors that embody similar patterns of relationships to explore frames. Here we show two examples related to the theme ‘control’ that illustrate how the thematic analysis can change the perspective on the problem.

Scaffolding: this frame uses the metaphor ‘scaffolding in education’ as a perspective on the problem. Scaffolding consists essentially of the adult ‘controlling’ those elements of the task that are initially beyond the learner’s capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence (Wood et al., 1976). Once a student masters a task, the scaffolding can be removed and the student will then be able to complete the task again on his own. This frame made participants realize that what social housing does now is to take over control by imposing rules (mutual obligation). They do not remove the scaffold, so it’s a step back.

Reconnect/ (family) reunion (Figure 3): this frame is based on allowing people to give control to people they have chosen to trust. The frame is about bringing people together and having them find a common background that connects them. This in turn supports building a social network. The social housing organisation in this frame does not provide the assistance itself, but organizes events in the community that brings people together so they can help each other. A common background could be a shared cultural history, shared interests (sports, crafts), or common circumstances (single parent). A similar frame found in another team was that of community sports clubs to help build a sense of community.

Next steps

The frames of ‘reunion’ and ‘scaffolding’ are completely different perspectives on the problem than the original frame of ‘mutual obligation’. The scaffolding frame has an individual focus while the reunion frame has a clear communal focus. The frames could therefore potentially be complementary in providing paths to action. The next step in frame creation would be to further explore the fruitfulness of the frames with regard to creating solution directions (futures) and to investigate their feasibility (Dorst, 2013). For a complex case like this more research and workshop sessions would be needed to explore a broader variety of themes, frames, and futures. However, the case shows well how an analysis of the deepest level of human needs can support reframing the problem in a case of social design.

CONCLUSION

In this paper we explored the research question: ‘what do designers need to know about people’s needs to be able to innovate through design?’ We have formulated a preliminary answer to this question by proposing a fledgling model of levels of insights into human needs for innovation. We have shown in a case study how an analysis of the deepest level of this model, the thematic level, can support design innovation processes in a social design context. However, more case studies are needed to investigate which depth of insight is needed for which type of innovation, and which type of design problem and design context. This will be the focus of our future research.

As we mentioned in the introduction, Norman and Verganti (2014) argued that human-centred design could never lead to radical innovation. This is clearly true for traditional forms of human or user-centred design, which focus on iteratively designing products that fit user’s needs as expressed by these users themselves. However, if radical innovation is about the creation of new meaning, exploring this level of meaning on its deepest human level can indeed support such radical innovations. Users need not be involved directly in the design process in order to innovate, but human needs should be at the centre of the design process, in order to create new meaning.

ACKNOWLEDGEMENT

We would like to express our gratitude to the public servants who participated in the workshop. We thank the NSW Government Architect’s Office for their support in organizing and facilitating the frame creation workshop. We thank Rodger Watson and Olga Camacho-Duarte for co-facilitating the workshop and their feedback on this paper.

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