Social Implication Design (SID) – A design method to exploit the unique value of the artefact to counteract social problems

Nynke Tromp, Delft University of Technology
Paul Hekkert, Delft University of Technology

Abstract

The role of design in changing people's behaviour and causing social implications has been referred to as an inherent aspect of design. In taking responsibility for this influence of design, emphasis is often placed on the prevention of undesired consequences rather than the realization of desired ones. Little research exists on how to exploit this implicit yet inevitable role of design in the social realm.

This paper presents the development of a method to help designers in exploiting this influence of design to realize social benefit. We explain how design is part of the 'choice architecture' in social dilemmas and discuss methodological steps we derived from this. We show how the integration of these steps in an existing design method has led to the method Social Implication Design (SID).

The SID method has been applied in a project to improve the social situation in a deprived neighbourhood. We discuss the process and the outcome of this and illuminate strengths and weaknesses of the method. We conclude by reflecting on this type of design practice in relation to other practices of social design, and discuss the unique contribution of the artefact when it comes down to solving issues of social kind.

Keywords

social design, behavioural change, design methodology, social dilemma, choice architecture

Introduction

Products and services affect what we do, how we live together, and thereby shape culture and society. Several sociologists and philosophers have shown and discussed how the entrance of, sometimes revolutionary, products has changed our behaviour and social structures often without us noticing it (Akrich, 1992; Latour, 1992; McLuhan, 1964; Meyrowitz, 1985; Shove, Watson, Hand, & Ingram, 2007; Verbeek, 2005). For instance, Verbeek (2005) reflects on the use of the microwave and discusses the consequential changes in the social structure of families. He explains that one of the reasons that families started to share fewer dinners together is because the microwave made it easy to heat up individual portions. The need to come together for a warm meal immediately after it was prepared disappeared with the entrance of the microwave. However, the evening meal appears to be crucial for a child's development (Fruh et al., 2011). This example illustrates how the interaction with a product shapes behaviours, and thereby contributes to social implications (Figure 1). Often, such behavioural and social consequences of design are unintended, only become salient over time, and are only being discussed when they are undesired. For this reason, they are regularly referred to as side effects (Dörner, 1996; Sterman, 2000), rebound effects (Hertwich, 2005), or indirect effects (Tromp & Hekkert, 2012) of design.

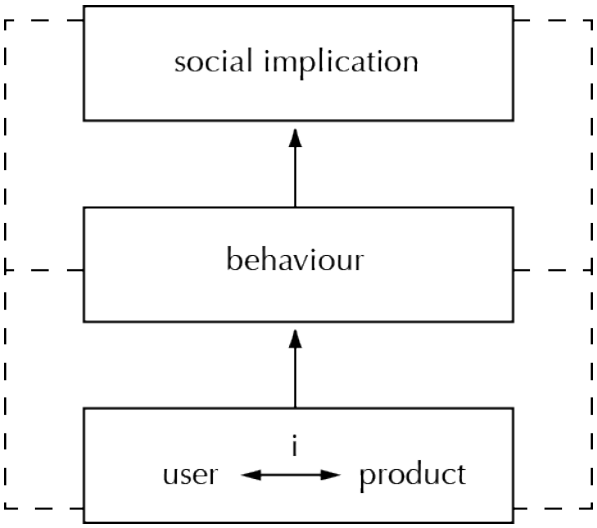

Figure 1: The behavioural side effects of design with consequential social implications.

Reflections on the side effects of design have logically stimulated knowledge development about how to prevent such implications in the future. Methods now exist to assess the possible consequences of new technologies or technologies under development (e.g. Delphi-method, e.g., Linstone & Turoff, 1975). For instance, when a technology such as automatic iris scanning for biometric identification is being developed, the use of the Delphi-method implies an involvement of experts to speculate on the risks of this technology. This type of method makes possible unforeseen consequences apparent, but does not yet provide support in how to develop responsible applications of such a technology. To this latter end, other methods exist (e.g., Constructive Technology Assessment, e.g., Schot, 1992; Value-Sensitive Design approach, Friedman, Kahn, & Borning, 2002; an approach to 'moralize' technology, Verbeek, 2011; Practice Based Design, Shove et al, 2007). These methods embed the product-to-be-designed in its social context, to discuss how the product may then conflict with particular value systems. The designer is offered an approach in which these insights are related to design decisions. Though supporting design activity, these methods equally originate from the desire to prevent negative consequences, which causes implications for the type of reasoning that is supported. Namely, such methods presuppose that the product-to-be-designed is defined beforehand, and help reasoning from the artefact to a desired social implication. Such methods are useful when one wishes to understand how to develop a security system that does not conflict with personal privacy. Or, how a bathroom can be designed so users will spoil less water. But these methods are little supportive when the product domain has not yet been defined and when we wish to understand what type of product can be best designed when aiming for a particular social implication.

We propose to change our habitual approach in studying and controlling the social implications of design. We are interested to explore whether it is possible to start with defining a 'desired side effect' and then reason back to what type of product could possibly cause this over time? Many designers are currently interested to realize social change through design (e.g., Burns, Cottam, Vanstons, & Winhall, 2006; Davey, Cooper, Press, Wootton, & Olson, 2002; Jegou & Manzini, 2008). When we are able to understand how to reason from a desired social implication to behaviour, and finally to the product itself (reversing the arrows in Figure 1), we are able to support a design practice that deliberately makes use of the inevitable influence of design to realize social benefit. In this type of design activity, the behavioural change facilitated by the design becomes 'just' the means to realize an intended social implication. In other words, the (long term) social implication becomes the raison-d'être of the design rather than an inescapable

consequence that should be dealt with. Next to the fact that such an approach stimulates the design of artefacts that are well thought through, it additionally offers a new and unique approach to counteracting social problems, possibly offering new benefits (and drawbacks, of course).

This paper explains how a method has been developed to support the designer in defining a desired social impact and reason to a design that contributes to this by causing a specific behavioural change. We first explain how we can conceptualise the role of the artefact in the social realm in such a manner that it helps to denote methodological steps to design this role deliberately to realize social benefit. By integrating these steps in the existing method called Vision in Product design (ViP) (Hekkert & Van Dijk, 2011), we developed a preliminary method to design on the basis of intended social implications. We present a design project in which this method has been applied. We discuss both the strengths and weakness of the approach and conclude with discussing the potential unique contribution of the artefact in realizing social change.

Artefacts as part of the choice architecture in social dilemmas

The way the often indirect and hidden influence of design is understood and conceptualised affects the way it can and will support the design of it. Hence, we need to realise a conceptualisation that explains this influence of design justly while at the same time provides the insights needed to reason from social problem to design. Social problems are complex phenomena that are often discussed in abstract terms. They are understood and explained by psychological, cultural, sociological, and political processes in which design plays no substantial role. How to grasp these complex processes as a designer and how to understand the role of the artefact in these?

Understanding social problems

To understand social problems as designer, it helps to frame a social problem as a social dilemma (e.g., Dawes, 1975, 1980; Liebrand, Messick, & Wilke, 1992). Social dilemmas are situations in which personal concerns are in conflict with what concerns us as society. In these situations, a person is confronted with a choice: do I act in my own interest, or in favour of society? Van Lange and Joireman (2008) explain that conflicting interests in social dilemmas can contain both a social and a temporal dimension. Behaviour may have consequences for the self and/or others, and in the short and/or over the long term. To illustrate some of the possible conflicts a social dilemma can contain, consider the dilemma of smoking (Figure 2). From an individual perspective smoking can be desirable because one enjoys a short moment of relief. However, smoking contributes to long-term individual implications by causing health problems, it impacts others in the short-term by causing annoyance from the cigarette ash and smoke, and over the long term by increasing shared healthcare costs.

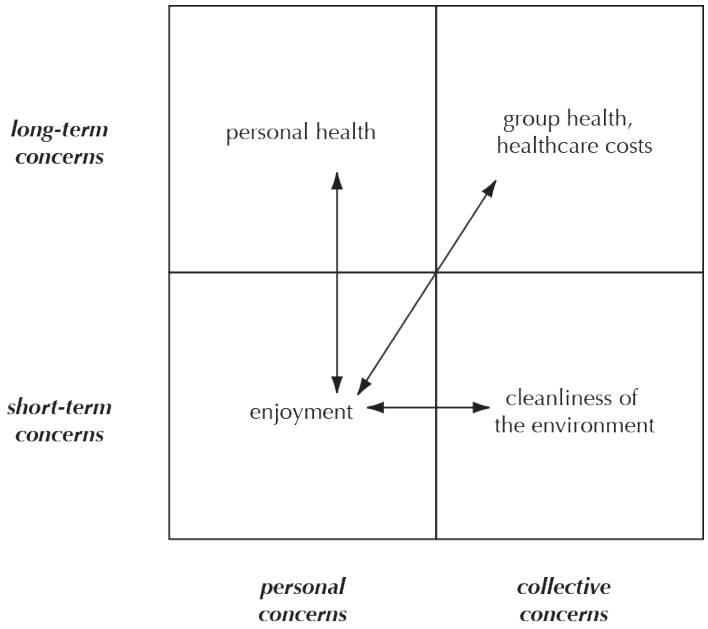

Figure 2: A social dilemma refers to a situation in which social and/or temporal concerns are conflicting, like in this case of smoking.

One of the things that make social dilemmas complex is that people gain more when they act on the basis of personal concerns rather than collective concerns, but that all are better off when acting in favour of the group (Dawes & Messick, 2000). In other words, what we gain (or lose) as result of a particular choice or action depends on the choice of others. This explains why a situation in which personal and collective concerns conflict only leads to a social problem when too many people decide to act in favour of themselves. For instance, only when a lot of people take their car do traffic jams occur and fuel emissions become a serious threat to our environment. And only when too many people smoke, it becomes a too heavy load on our communal health care system. Hence, social dilemma theory helps to frame social problems as situations in which personal concerns conflict with those of society, and in which too many people act in line with personal concerns too often.

The role of design in social problems

Although it may not seem as such, we are daily confronted with social dilemmas. Do I cook tonight, or get some fast-food? Do I take a warm sweater to wear, or shall I put on the heating? Do I greet my new neighbour in the street, or shall I keep looking at my smart phone? Do I order my groceries on the Internet, or take a walk to the local shop? We all make such choices throughout the day, yet mostly without consciously considering personal or collective concerns. We simply act. But even simple actions may contribute to a greater or lesser extent to particular social implications when too many people perform these too often. Fast-food consumption contributes to obesity, energy consumption causes environmental implications, avoiding contact with newcomers may discourage integration of immigrants or contribute to loneliness, and ordering groceries on the Internet makes accidental encounters between neighbours in the supermarket impossible while this strengthens neighbourhood cohesion. Hence, particular choices may become unfavourable when we consider them from a social perspective. Yet, from an individual perspective these choices are quite understandable, right? Eating fast-food is easy and tasty, heating our house is comfortable, avoiding contact with strangers is safe, and ordering our groceries on the internet increases flexibility in planning our day. This shows that these conflicts between personal and collective concerns are clearly present in much

of what we do. In fact, social dilemmas are omnipresent, but mostly unobtrusive in daily life.

For every ‘choice’ we make, design is built-in in the ‘choice architecture’, i.e., the context in which people make choices (Thaler & Sunstein, 2008). The convenient drive-thru, the neutral heating system, the absorbing smartphone, and the website of the supermarket that can be visited from any location, are all artefacts created by a designer. But as we started off with in our introduction, design is not neutral. In fact, design prompts for particular choices by making particular behavioural options more attractive or easier than others. Although our examples do not exactly refer to desirable behaviours from a social perspective, it shows that designers have –unintendedly- realized powerful means to promote behavioural changes. Understanding the artefact as part of the choice architecture in all these situations in which people consciously or unconsciously have to ‘decide’ how to act, we come to understand that by addressing personal concerns so successfully designers motivate people for particular behavioural options. Systematically put: through our interaction with products and services that address our personal concerns successfully, we behave in ways that lead to social implications that are either desirable or undesirable, depending on our collective concerns (Figure 3). The fact that we come to understand this role of design by studying undesirable consequences of design should not refrain us from studying it more closely and exploring how to exploit it to prompt socially responsible behaviours.

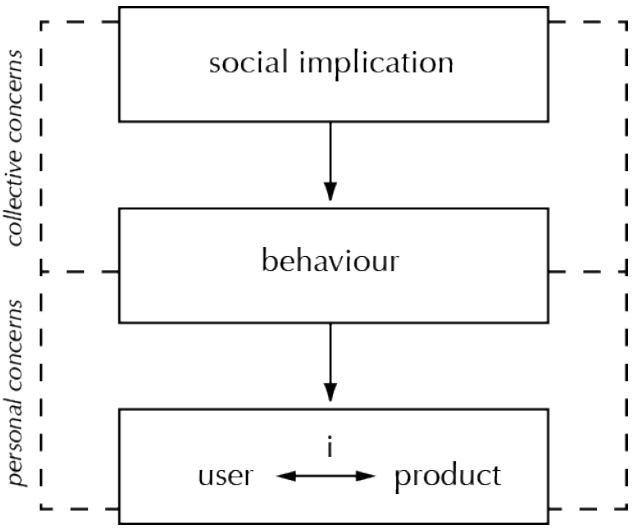

Figure 3: In how to act, we can consider both personal and collective concerns. Being part of the choice architecture, design prompts for particular choices by addressing powerful personal concerns.

Methodological steps

Understanding the role of design as part of the choice architecture in social dilemmas helps to define methodological steps in getting from social problem to design. The first task of a designer in this particular process is to consider collective concerns and to define what social implication would be desired given the problematic situation at hand. This means that insight needs to be gathered which concerns are shared by the collective and are at stake or important given the scope of the project. Next, the designer needs to understand what behaviour could be stimulated in order to contribute to the desired social implication. In defining this behaviour, the designer should be confident that this behaviour effectively contributes to the social aim on the one hand, while at the same feel confident that it is behaviour he or she can ‘design for’. Not every type of behaviour is easy to affect

through an artefact. For instance, ‘sharing intimate thoughts with neighbours’ may be more difficult to affect by means of design than ‘handling one’s garbage in a socially correct manner.’ In the first case, a product domain is not yet defined, while in the second case, opportunities to redesign garbage bins or the garbage collecting system become apparent. When both behaviours are expected to contribute to the same social implication, e.g., ‘increasing tolerance between neighbours’, both behaviours may be considered effective, though to a greater or lesser extent. Hence, deciding upon the behaviour to design for becomes a trade-off between *effectiveness* and, what we call, *designability.* The final step becomes to understand what personal concerns may conflict with this desired behaviour, and to consider what personal concerns can be addressed by means of the design in order to motivate people for this behaviour.

Social Implication Design

Usually the starting point of a design process is the artefact, the technology or the practice for which one needs to design. But in reasoning from a desired social implication to design, the design remains a ‘black box’ for quite a while. This means that the designer needs to understand the relational qualities of the design (that lead to specific behaviour) before the factual design as such. A method that supports exactly this thinking is the method called Vision in Product design (Hekkert & Van Dijk, 2011). The origin of the Vision in Product design approach dates back to 1996, and the method has been part of Industrial Design Engineering curriculum at the Delft University of Technology since it was first conceived.

Vision in Product design (ViP) acknowledges the fact that design mediates experiences and behaviours on top or their mere function (in line with mediation theory as developed by Verbeek, 2005). The method is deliberately developed to support the design of an artefact on the basis of this mediation. Before considering the artefact at all, designers are stimulated to define how this ‘black box’ should enable people to relate to their world, i.e., what it should offer or enable people to experience or do. This relation should be specified explicitly in what they call ‘a statement’, e.g., ‘We want to enable people to experience pride in saying “no” to requests.’ Or, ‘We want to assist people in managing their schedule in a meaningful way, by augmenting the significance of things.’ Although ViP is not specifically focusing on behaviour, a statement can possibly refer to it. In order to reason from this statement to an artefact, the designer should define the relational qualities of the artefact first, which is captured by what they call ‘an interaction vision’. This interaction vision explains the interaction and product qualities the artefact should embody, in such a manner that it makes sure that interacting with the artefact leads to the statement defined beforehand on the one hand, while at the same time guiding the design of the artefact. By assisting the design of a behavioural effect *through* the interaction with a product rather than *in* interaction, the ViP method may successfully help in designing the influential role of design deliberately to induce desired social implications.

The Social Implication Design Method

The main aim of the Social Implication Design method is to support the designer in reasoning from a social problem to a design proposal. In this, focus is on the consequential social implications of the design to counteract the social problem at hand.

In Figure 4, the Social Implication Design method is presented. This method is an integration of our understanding of design as part of the choice architecture in social dilemmas and the ViP method. The method consists of three layers and five design steps. The three layers, i.e., the social realm, behaviour, and interaction, illustrate the three main perspectives the designer should consider in relation to the design. ‘Behaviour’ is the middle layer as it connects the personal life-world of the user, what he considers

meaningful, to our social world and our group wellbeing and viability of society. An artefact is used in interaction, and through shaping consequential behaviours the artefact causes social implications. What these behaviours mean to others may be different than what it means to ourselves, in the light of our collective and personal concerns respectively.

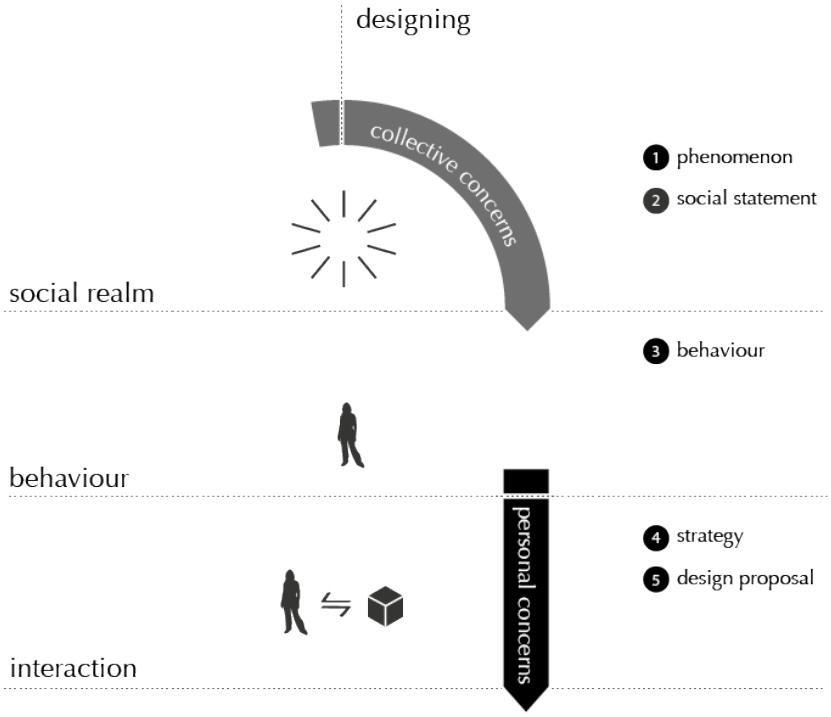

Figure 3: The Social Implication Design (SID) method; an integration of a theory of the hidden influence of design in the method Vision in Product design (ViP).

The five steps should help the designer to frame the project (step 1), to define a desired social effect (step 2), to focus on a particular behaviour to reach this effect (step 3), to define what user concerns to address, i.e., the strategy (step 4), that leads to a particular concept (step 5). Some steps are accompanied by a set of questions the designer can ask him- or herself. In getting from step 1 to 3, the designer is encouraged to take a holistic and social perspective and argue for decisions on the basis of collective concerns. In getting from step 3 to 5, the designer is stimulated to take a user perspective and consider personal concerns. Next, the five steps are described in detail.

1. Phenomenon
Similar to how many design projects often start with a problem, so social design projects often start with a social problem. In line with the ViP method, the Social Implication Design method holds the premise that taking a problem as a starting point for design limits the designer's possibilities. Therefore, the designer is asked to reframe the scope of the project in terms of a neutral phenomenon that encapsulates the social problem, rather than focusing on the problem as such.

2. Social Statement
Based on a holistic and coherent view of the phenomenon, the designer is asked to explicitly define what he/she wants to contribute to the collective or society, i.e., the desired social implication he or she wishes to foster. A social statement is the desired implication regarding the phenomenon, which is a statement how it should change. Similar to the ViP method, the act of defining a social statement requires reflection, discussion, sound argumentation, and explanation of the goals behind the project.

3. Behaviour
Behaviour can refer to actions or activities on different levels of specificity. The designer is asked to define the behaviour as specifically as possible, without losing the faith that it will induce the intended social implication.

4. Strategy
A strategy is a conscious attempt to inscribe product influence in a design proposal. After garnering an understanding of why people do not exhibit the desired behaviour (and thus framing the situation as a social dilemma), what objectives or concerns they have that prompt them to behave differently, the designer may understand what personal concerns should be addressed, or try different options to understand this better (to this end, pre-defined strategies may be used, for which we refer to Tromp, Hekkert, & Verbeek, 2011*).* Part of the strategy is to define what interaction is needed between the user and the artefact so that the desired behaviour follows.

5. Design Proposal
A design proposal refers to a preliminary idea for an artefact, i.e., a product or a service, that should still be further developed into a mature concept and detailed design, potentially supported by different methods. The final step in this process is for the designer to 'check' whether the design leads to the predefined behaviour and social implication. This check can be done through logical reasoning, discussing the proposal with experts, or by low-fi testing of essential components of the design.

Design Case

Three students applied the Social Implication Design (SID) method for their graduate projects at Industrial Design Engineering, Delft University of Technology. Their projects were carried out for Estrade, a real-estate developer for housing corporation Vestia. At the time, Estrade was developing urban plans for the Afrikaanderwijk, a neighbourhood in Rotterdam that is confronted with a number of social problems like high unemployment, crime and intercultural tensions. As it owns a large amount of the houses in the Afrikaanderwijk, Estrade is interested in learning how the physical environment can positively affect the social processes within the area. The students were free to set a more specific focus for their project individually, i.e., what social phenomenon to focus on.

The main purpose of the study is to evaluate the SID method and to understand how it can be developed further to better support this type of social design. To evaluate the method, data is collected on both the design process and the object, i.e., the objective and its relation to the object as outcome (Dorst, 2008). Multiple sources have been consulted, like email conversations, reported observations, four recorded group interviews during the process, two recorded individual interviews (one in the middle of project development and one at the end of project development), design reports, and the final designs. In this paper, we present one of the cases to illustrate particular benefits and drawbacks of the method that became apparent through this multiple-case study. Reflection on the design outcome of this case helps to discuss the value of this type of design practice and helps to denote possible fruitful directions for further research.

Contributing to weak social ties; the design of the 'Birthday slide'

One of the students (who we will call Alex from now on) decided to work on the intercultural relationships in the neighbourhood. As the Afrikaanderwijk is home to people from a wide range of cultural backgrounds, he was interested to see how social bonds were shaped and how they affect the liveability of a neighbourhood.

Social Implication:
Alex conducted a literature study, visited the area, and talked to experts and inhabitants. One of the key findings in his context research was the theory of 'the strength of weak ties' (Granovetter, 1973; 1983). This theory shows the value of weak ties: by increasing diversity in information flow, opportunities rise for social mobility and public familiarity and neighbourhood cohesion are strengthened. Given the high unemployment and isolation of particular groups in the area, Alex gained confidence that establishing weak ties between people with various cultural backgrounds could make an important contribution to the area.

Behaviour:
To establish weak ties, people logically need to meet each other in the first place and exchange information. So the behavioural goal to establish moments of contact is easily defined, and easily evaluated as effective regarding the intended social implication. The 'designability' of a moment of contact however, may be more questionable, especially between people who are in principle avoiding each other. Alex therefore had a hard time in finding a point of reference for design. He finally considered at what moments or locations people from various backgrounds are already physically close to each other, of which he could then make use. In the end, he decided to interfere at the schoolyard with his design. First of all, because people from all cultures are already physically close to each other when waiting for their children to get out of school. Secondly, this location allowed him to address people's universal concern for being a good parent. Whatever their background or culture, parents want the best for their children. Alex used an analogy to express more precisely how to address this personal concern that is shared by all (see Figure 5) and defined it as: creating a moment of recognition between unexpected equals.

Figure 5: Using an analogy to define the behaviour more specifically: 'creating a moment of mutual recognition between unexpected equals.' Sarkozy is amused by his colleague Obama and probably realizes they have similar thoughts (retrieved from www.thesun.co.uk, 2013).

Interaction:
To understand how this meaningful experience could be established, Alex had to define through what type of relationship with an artefact this could be achieved. How to create a moment of mutual recognition, while prejudices may be present? He analysed various situations in which this occurs. For instance, when we are all stuck on a train station

because of a snowstorm. Or when we are struggling with our groceries while holding a child. Or when we are in an unfamiliar place as a tourist and do not know where to go. In all these situations, vulnerability is present; in some there is an unexpected element or something that move people out of their comfort zone or daily routine. And in all, social interactions (discussing delay, helping with the groceries, or giving directions where to go) are based on (mutual) recognition and empathy for the situation.

Hence, Alex defined his interactions as follows:
'Within a daily routine I want to design an excuse for a positive interaction that presents itself through an unexpected situation and the need for a helping hand.'
This means that the design should establish a positive, unexpected, and vulnerable interaction with the user, and the design itself should be delightful, out-of-ordinary, and overpowering.

Figure 6: The Birthday slide

Design:
Based on these considerations, Alex designed the 'Birthday Slide' (Figure 6). This slide for primary schools serves as part of a ritual when children leave kindergarten and move to higher grades. For children who are in their final year of kindergarten, the slide is used to celebrate their transitional year whenever it is someone's birthday. At the end of a birthday, the slide is moved against the school building, and all children are allowed to slide downwards by stepping out of a window on the first floor. The parents are asked to help with this activity during the year.

Figure 7: By sharing the enjoyment of the children, parental concerns are recognized and a moment of mutual recognition between equals is established.

The idea is that the enjoyment of the children of this unusual event becomes a persuasive power for parents to cross their intercultural boundaries. The parent whose child has his/her birthday (and the child who is allowed to go first!) is assigned the responsibility for the positioning of the slide. The fact that the slide can only be moved when three or four adults collaborate, places this parent in a vulnerable position. But because every parent is responsible for this situation once, and because of the communal excitement of the children jumping in front of the window, the situation evokes helpfulness. When sliding off one by one, and by sharing this parent-child enjoyment, a moment of mutual recognition between unexpected equals is shared.

Discussion

Although our study provided several valuable insights in both the usability and the effectiveness of the SID method, for the purpose of this paper, we wish to illuminate a few interesting findings. We conclude the paper with a short reflection on this particular type of social design practice and its potential value in relation to other forms of social design.

Sequential or integrative thinking?

On the one hand, Alex considered the method successful in teaching him to look at products in a different manner than he was used to. The convergent process, i.e., starting with a sociological theme as ‘social ties’ and getting to the point of designing a slide so heavy that it creates opportunities for help, had been a difficult and lengthy process. Yet, by considering design at a social, behavioural, and interaction level before thinking of a concrete design, helped him to understand the role of design in all these levels. Additionally, the steps prevented Alex from jumping to ‘direct’ solutions. Generally, if you would give a designer the task to establish contact between people from various cultural backgrounds through an artefact, we expect that he or she immediately thinks of ways to facilitate this contact, e.g. by realizing social gatherings or develop communication tools.

However, such solutions do not exploit the hidden and indirect influence of design, but offer a direct means for the behaviour.

‘The method made me more conscious [of the social implications of design]...and it taught me to look at products differently.’

On the other hand, it is exactly this ‘forced’ way of thinking that also caused problems. The explicit shift from a social to a user perspective indeed stimulates the designer to prioritize social benefit over user benefit, considering the (long-term) social implication as the raison-d’etre of the design. However, it also led to the fact that more time was spent on defining and understanding the social benefit of the design than how it could benefit the user. But this social benefit, i.e., the behavioural and social consequences of the design, becomes only apparent over time. So the question rises, what is the short-term value of the design? The method stresses too little that time should equally be devoted to define this immediate value of the design. Alex therefore considered his design too imbalanced:

‘I feel my design is way out of balance, it is too far from reality.’

In general, it is said that designers apply integrative thinking to integrate various perspectives within design (Dorst, 2007; Tromp & Hekkert, 2010). In other words, designers are skilled in taking various perspectives into account simultaneously and balance conflicting ones, e.g., ergonomic aspects versus aesthetic aspects of the design. Therefore we argue that adaptations of the method need to be made so that it encourages the designer to take a social and individual perspective simultaneously throughout the process, without losing the hierarchy in importance during decision-making.

Bypassing the social dilemma: a unique value of the artefact

Many movements exist in which (service) design thinking and skills are applied to realize social change. Designers and design scholars alike often argue that the unique value of the designer is to lead a human-centred design process, and involve stakeholders of all kind (Sangiorgi, 2011). For instance, if we wish to counteract the economic problems some families face, such approaches would lead to involvement of these families in the project and realize interventions together. Although such approaches are of immense value, they should not be confused with the type of design we discuss here. These projects often lead to designs with immediate benefit for people who need to cope with problematic situations. Although the type of goal is defined similarly, i.e., aiming for social benefit rather than commercial benefit, the approach and outcome are different. The means to realize social change does not need to be an artefact, but may as well be the process itself. In these cases, the designer moves into the direction of group facilitator or facilitator of social change, rather than a product engineer.

What we aimed for through the study presented partly in this paper, was to explore whether the power of the material, the artefact, can be exploited to counteract social problems, and whether this would be a valuable design practice. Although the SID method allows for much improvement, we argue that designing an artefact for its social implications brings a unique strategy to the table. The strategy of connecting *other* personal concerns to the behavioural change by means of an artefact is rather unique. Talking to people from a different social group, *out of concern for being a good parent*, becomes possible thanks to the ‘Birthday slide’. In this case, the design links a different concern to the desired behaviour, and therefore one that would not be related to the behaviour without the design. In other words, we are *bypassing* the social dilemma by involving a different concern to act upon. Designers can therefore invite behaviours that

are meaningful to users for other reasons than why we consider them meaningful as a collective.

Hence, we consider interventions that address a concern that users feel they have to act upon, whether this happens consciously or unconsciously, to be most powerful in changing behaviour. In the case of the Birthday slide, this concern was our universal concern for being a good parent. The fact that this concern is so close to our nature may explain why we are often unaware of these concerns and the role they play in our behaviour. Fundamental human concerns may in fact be quite a successful source of inspiration when one wishes to stimulate people to change their behaviours: every single person shares these concerns, but remains mostly unaware of the role they play in behaviour.

References

Akrich, M. (1992). The De-scription of Technical Objects. In W. E. Bijker and J. Law. (Eds.) *Shaping Technology/Building Society: Studies in Sociotechnical Change.* Cambridge, Mass.: MIT Press.

Burns, C., Cottam, H., Vanstone, C., & Winhall, J. (2006). *Transformation Design.* RED Paper Design Council.

Davey, C. L., Cooper, R., Press, M., Wootton, A. B., & Olson, E. (2002). *Design against crime.* Design Management Institute Conference. Boston, USA.

Dawes, R. M. (1980). Social Dilemmas. *Annual Review Psychology* 31,169-193.

Dawes, R. M. & Messick, D.M. (2000). Social Dilemmas. *International Journal of Psychology,* 35(2), 111-116.

Dörner, D. (1996). *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations.* New York: Metropolitan Books.

Dorst, K. (2007). Design Problems and Design Paradoxes. *Design Issues,* 22(3), 4-17.

Dorst, K. (2008). Design research: a revolution-waiting-to-happen. *Design Studies* 29(1), 4-11.

Friedman, B., Kahn, P. H., & Borning, A. (2002). *Value Sensitive Design: Theory and Methods.* Seattle, Computer Science and Engineering, University of Washington. Technical Report 02–12–01.

Fruh, S., Fulkerson, J.A., Mulekar, M.S., Kendrick, L.A.J., & Clanton, C. (2011). The Surprising Benefits of the Family Meal. *The Journal for Nurse Practitioners* 7(1), 18-22.

Granovetter, M. (1973). The Strength of Weak Ties. *The American Journal of Sociology* 78(6), 1360-1380.

Granovetter, M. (1983). The Strength of Weak Ties: A Network Theory Revisited. *Sociological Theory* 1(1), 201-233.

Hekkert, P., & Van Dijk, M. (2011). *Vision in Design: A Guidebook for Innovators.* Amsterdam: BIS Publishers.

Hertwich, E. G. (2005). Consumption and the Rebound Effect - An Industrial Ecology Perpsective. *Journal of Industrial Ecology* 9(1-2), 85-98.

Jégou, F. and E. Manzini (2008). *Collaborative Services - Social Innovation and Design for Sustainability.* Milano, Edizioni POLI.design.

Latour, B. (1992). Where are the missing masses? The sociology of a few mundane artifacts. In W. E. Bijker and J. Law. (Eds.) *Shaping Technology/Building Society: Studies in Sociotechnical Change.* Cambridge, Mass.: MIT Press, 225-258.

Liebrand, W. B. G., Messick, D.M., & Wilke, H.A.M. (1992) (Eds.) *Social Dilemmas: Theoretical Issues and Research Findings.* Oxford, UK: Pergamon Press.

Linstone, H. A. & M. Turoff (1975). *The Delphi Method.* Reading, MA: Addison-Wesley.

McLuhan, M. (1964). *Understanding Media: The Extensions of Man.* New York: McGraw-Hill.

Meyrowitz, J. (1985). *No Sense of Place: The Impact of Electronic Media on Social Behavior.* New york: Oxford University Press.

Sangiorgi, D. (2011). Transformative Services and Transformation Design. *International Journal of Design* 5(2), 29-40.

Schot, J. W. (1992). Constructive technology assessment and technology dynamics: The case of clean technologies. *Science, Technology & Human Values* 17(1), 36-56.

Shove, E., Watson, M., Hand, M., & Ingram, J. (2007). *The Design of Everyday Life.* Oxford: Berg.

Sterman, J. D. (2000). *Business Dynamics: Systems Thinking and Modeling for a Complex World.* New York: Irwin/McGraw-Hill.

Thaler, R. H. & C. R. Sunstein (2008). *Nudge: Improving Decisions about Health, Wealth and Happiness.* New Haven & London: Yale University Press.

Tromp, N., & Hekkert, P. (2010). A Clash of Concerns: Applying Design Thinking to Social Dilemmas. *Proceedings of DTRS8, Sydney, Australia.*

Tromp, N., & Hekkert, P. (2012). Designing Behaviour. In J. Donovan & W. Gunn (Eds.), *Design Anthropology:* Ashgate.

Tromp, N., Hekkert, P., & Verbeek, P.-P. (2011). Design for Socially Responsible Behaviour: A Classification of Influence Based on Intended User Experience. *Design Issues, 27*(3).

Van Lange, P. A. M. & J. A. Joireman (2008). How We Can Promote Behavior That Serves All of Us in the Future. *Social Issues and Policy Review* 2(1), 127-157.

Verbeek, P.-P. (2005). *What Things Do: Philosophical Reflections on Technology, Agency, and Design.* University Park, PA: The Pennsylvania State University Press.

Verbeek, P.-P. (2011). *Moralizing Technology: Understanding and Designing the Morality of Things.* Chicago: University of Chicago Press.