Design for People & Society: Turning the Product Impact Tool into a Design Tool
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Designers have a key role in the creation of the products and technologies that shape people and society. The Product Impact Tool (PIT) is a tool that originated in philosophy of technology and elaborates how technologies have a social impact. The tool has the potential to be of use to designers to design more socially acceptable products. In this paper the PIT is further developed into a tool for designers. The question answered is how designers can make better use of the PIT to create designs for people and society. Through a literature study, interviews, ideation and a testing-phase, the Product Impact Tool For Designers was developed. This tool contains four booklets and a worksheet to be used in a brainstorm session and it is designed to be more practical in use for designers, to leave room for creativity and to be flexible in use. Using the Product Impact Tool For Designers, designers can create products that better fit the user and have a more acceptable impact on society.

Product Impact Tool; Design Methodology; Design for Usability; Philosophy of Technology

Introduction
Our everyday lives are shaped by the products and technologies that we use. How we interact with each other, how we work, sleep, relax, communicate and even how we arrange our taxes are all different from just a couple of decades ago. The temperature in our homes is, for example, controlled with just one click or even automatically behind our back. It is clear that technologies have affected people and society, but particularly how that has happened is not as clear at first glance. The Product Impact Tool is a tool that originated in philosophy of technology and aims to solve this by elaborating how technologies can have an effect on people and society. It shows the different forms of influence a product or technology can have and gives a short explanation and some examples. The goal of the tool is to structure multiple philosophical theories on product impact so that not only philosophers, but also practitioners in the field can benefit from the existing knowledge on this topic (Dorrestijn, 2012).

An important example of practitioners is product designers. They have a key role in the creation of the products and technologies that will have an impact on people and society. Designers should, therefore, be aware of the different ways they can affect people and society to be able to design a better impact. Better, in this case, means that the products should be designed to have a more socially acceptable effect in different aspects, like usability, sustainability, acceptation, or ethical
impact. Dorrestijn and Eggink (2014) have used the Product Impact Tool in a session in which the use of the tool shows opportunities to raise awareness of the possibilities designers have for influencing peoples’ behaviour through product design. Designers have, during these workshop sessions, showed their interest in using such a tool. However, the use of the tool within the design process is not as clear yet. In this research, therefore, the Product Impact Tool is further developed into a dedicated tool for designers by designing an extension to the tool. The question that will be answered is how designers can make better use of the Product Impact Tool to create designs for people and society. In this paper, it will, first of all, be elaborated based on insights of philosophy of technology why designers should create better designs for human and society and why the Product Impact Tool has potential to bring this topic into the practice of design. Then, it is elaborated how the Product Impact Tool For Designers has been developed and evaluated.

Research approach
First, it is explored why and how the Product Impact Tool could be of use for designers by doing a literature review into philosophy of technology, the design process and design tools. In addition, previous users of the tool have been interviewed to find the main problems in use. Based on the results of this research, a concept for the Product Impact Tool For Designers has been developed, which is then validated in two workshop sessions with both professional and design students. Finally, a final concept for the tool has been developed.

Designers and product impact
In philosophy of technology, the relation between human and technology has already been studied for years. Within contemporary philosophy of technology the consensus has been reached that human and technology are intertwined (Dorrestijn, 2012). The distinction between subject and object has been overcome. With the notion of technical mediation, it is explained how technology is not neutral, but an important factor in the shaping of our lives (Verbeek, 2005). The rise of the mobile phone and chat services, for example, have drastically changed what it means to be social. Because you are able to take your phone everywhere, you are also expected to be socially available at any point. How fast you answer texts, and how you use emoticons are all part of how people perceive you. The phone has also changed how you are present in the world: on the train station, during your break or basically anywhere else, you are on your phone. It means that often you are in multiple places at the same time: your physical place and somewhere else, with another person, literally mediated through your phone. It changes how you act in your day to day life. The mobile phone with all its features is, therefore, not a neutral tool, but a factor in shaping lives and society.

Like the mobile phone, there are many examples of technologies that we use that have changed our way of living. This is not necessarily a negative consequence, but understanding how it affects us can help to design better products (Verbeek, 2005). Technology can be seen as inherently human, because it is created and used by humans. Designers should, therefore, be concerned with the impact their designs have on humanity. They need to have an understanding of humanity in order to create designs that will have an acceptable impact. Since the technologies they design will make a change, be it gradual or radical, they have the responsibility to look ahead and prevent as much as possible foreseeable disasters (Dorrestijn, 2012; Dorrestijn & Verbeek, 2013).

To structure all the different theories and ideas from philosophy, design and psychology on this topic, Dorrestijn has developed the Product Impact Tool: a tool that shows the different ways products can have an impact on people and society. It consists of a model (figure 1) containing four quadrants. Each quadrant represents a different way an influence reaches the human: via the conscious decision-making process (before-the-eye), physically (before-the-hand), via the environment (behind-the-back) and by changing ideas and thought-structures (above-the-head).
In each of the quadrants there are three different concepts explained that show how these influences work (Dorrestijn, 2012). In the ‘to-the-hand’ quadrant, for example, there is the concept of coercion in which it is explained how products and technologies can physically force users into a certain kind of behaviour. An example is the speed bump that makes sure car drivers have to slow down in order to not break their neck or their car (Dorrestijn, 2012).

Next to that, the model can be used in a session, a Product Impact Session so to speak, in which a product can be analysed for its societal impact (Dorrestijn, 2010). The tool has potential to be suitable for designers, because it gives a practical overview of complicated ideas. In the interviews, however, it became clear that the tool is not yet able to give the needed support for designers to use the provided knowledge in their specific design processes. The existing session mostly looks at product designs in retrospect instead of looking how they can be designed better before entering the market (van Belle, 2016).

**Product Impact in the design process**

To better fit the design process, the Product Impact Tool needs to be adapted and extended, so that designers will be able to use the model effectively. Design is a complex process, because it has a lot of unknown variables. Methods and tools can support the designer in dealing with the complexity of design (Daalhuizen, 2014). Designers need to solve problems that are usually not clearly defined in
the first place. They often start with only a goal or a value and it is up to them to find a fitting combination of how it looks (design) and what it does (technology) (Dorst, 2011). Following from the literature review, the Product Impact Tool can be a tool for designers to find and define problems in the conceptual phase (Eger et al., 2010) of the design process. This enables the designers to implement improved solutions in the design of the eventual product (van Belle, 2016).

According to Dorst (2008), most design tools are created to improve the design process, but forget to address the type of designer, the context of use and the specific problem for which the tool is supposed to be helpful. All these factors change what the design tool should look like. For student-designers, the tool needs to have more rules and regulations, whereas experienced designers require more flexibility to fit the tool into their personal method of designing (Dorst, 2008). Will the tool be used by an individual designer or by a team of multiple designers? This distinction also changes what the tool should look like and how it will be used. The Product Impact Tool offers potential to improve the communication and consensus about the design within a design team, because it helps to make the different perspectives on the design explicit. Van der Bijl-Brouwer (2012) calls this frame of reference that exists within a team the ‘design frame’ and explains the importance of a strong frame for the development of good products. Lastly, the specific type of problem for which the tool is used also defines the design of the tool: measuring the forces on the product asks for a different medium and use than a tool to explore human-product interaction (Dorst, 2008). The topic of product impact needs to enable creativity, social imagination and preferably even co-design with users (van Belle, 2016). The extension of the Product Impact Tool needs, therefore, not only be designed to fit the design process, but also the different types of designers that work with it, the context and the specific problem it addresses.

**Concept Product Impact Tool For Designers**

Based on the research of product impact and the design process, multiple requirements for the Product Impact Tool For Designers have been set up. These requirements have formed the basis for the ideation- and conceptual phase. Using a morphological scheme, four tool concepts have been developed of which one has been chosen and elaborated (figure 2).
The concept Product Impact Tool For Designers is developed as a brainstorm session consisting of two parts. In the first part of the session, the design team will analyse the problems and societal impact of their product idea. In the second part, they will use the tool to come up with specific design solutions and ideas to create a better impact of their product idea. They finalize the session by making a plan on how to implement these ideas into the next design (figure 3). The whole session is supported by a worksheet with a lot of empty space for ideation, small harmonica booklets that give pointers and examples of the theory behind the tool, and a turning table and dice to prevent patterned sessions, and stimulate creativity and a positive atmosphere in the team (see figure 2). The tool is on purpose not digital because, as found in the interviews, designers prefer brainstorming on paper. In addition, a physical model is better able to support designing in teams (van Belle, 2016).

**Figure 3: Course of the session**

**Testing the Product Impact Tool For Designers**

In two sessions the Product Impact Tool For Designers was tested (see figure 4). The goal of the study was to find out if the extended Product Impact Tool helps designers in practice to design for people and society. Important aspects to test with this respect are the usability of the tool, in how far the tool offers a new perspective on human-product interaction and if the designers themselves see added value in the tool. The used methods of testing were observing, interviewing the participants and analysing the results of the sessions. The first session was held with a team of four professional designers from a digital strategy company. The second session was done in a class with sixteen third year design students. The students were asked to read a text about the Product Impact Tool before class, so, contrary to the professionals, they were already a bit familiar with the topic and tool at the start of the session.

In both sessions a case-study was used about a surveillance camera system in an elderly residential home that was meant to detect falling and wandering patients. Cameras would be installed in the rooms of the elderly to create more safety for the clients and a more efficient work environment for the nurses. For privacy reasons, the camera’s didn’t show faces, but people were shown by a red dot
and an ‘action-line’ that followed the movements. However, the pilot of this system in a Dutch elderly home was declined by patients and family members. Important issues that were at stake in this case and can be analysed using the Product Impact Tool are the issues of safety and risks, freedom and autonomy, and privacy (van Belle, 2016).

Figure 4: Workshop sessions with professionals (left) and design students (right)

The course of the sessions offered enough possibilities to test the use of the tool and find points of improvements. The participants were motivated and interested in learning a new perspective and it led to interesting discussions and results. The professionals especially, were having a lot of discussions, triggered by the different influences presented by the tool. The consequence was, however, that the results for the case were only vague and poorly elaborated. The students, on the other hand, were supported sufficiently by the structure of the session and the parts of the tool and were able to pitch their results in terms of product impact at the end of the session. One group, for example, designed a bird-box in which the camera was implemented to improve the image of the system. To improve the privacy and control of the elderly with regard to the system, the box had a light showing if the camera was on or off.

From the observations and interviews, it was found that in both sessions the participants were interested in this way of looking at technology and design. The participants stated that the tool could be a helpful tool when designers get stuck, need inspiration or have no clue where to start. Next to that, the participants saw a need for concerns about product impact in the design process. The Product Impact Tool offered a good way to find these concerns and find options to address them. The session, however, has quite a learning curve, since a lot of new concepts are introduced in a short period of time. The participants acknowledged, on the other hand, that after the introduction they had enough understanding to work with the tool. The reading of a text beforehand, as the students had done, was an improvement in understanding the tool quicker and better. In both cases, the overall concepts and quadrants were clear, but the details were still perceived as vague. The participants thought the right quadrants of the model, the ‘before-the-eye’ and the ‘to-the-hand’ quadrants, were easier to understand than the left side. This is in line with expectations since the right side fits the expertise of designers better, because it is more practical (van Belle, 2016).

The usability of the different parts of the tool was differing. The worksheets and harmonica booklets turned out to be helpful, especially the pointers and examples that were provided in the booklets. The turning table gave a joyful interaction between the students, but not so much for the professionals. The turning table and dice didn’t prove to be of added value to the session, other than a small laugh at the beginning, which the participants expected would work only one time (van Belle, 2016). The idea behind the division of analysis and ideation was appreciated by the participants, but didn’t work out in the session with the professionals, because it forced them too much into a pattern that didn’t fit their own way of working. In both sessions it proved to be difficult to switch from an analytic mindset to an ideation mindset, because the first needs to look at the problem from a wide perspective whereas the second asks for a more detailed and in-depth look. It can be concluded that the designers need more support to make this switch (van Belle, 2016).
During the session, especially with the professionals, there was a lot of difficulty to apply the tool during the ideation phase resulting in a disordered course of the session. The participants acknowledged, however, that as long as the overall and general ideas are clear, this should not be a problem, since already improved results and inspiring discussions were achieved. In other words, the goal of the tool was not for designers to follow theory precisely, but to gain a new perspective and achieve better results. The disordered course of the session should, therefore, not be problematic (van Belle, 2016).

**Improvements**

In the next phase of the development of the Product Impact Tool For Designers, the results of the test were implemented (see figure 5). The turning table and dice were discarded and the structure of the brainstorm session was changed. In the booklets, support was added for both thinking widely as well as thinking in-depth. This was done by providing different kind of questions for both analysing and ideation. The analysing questions are designed to make the designers think about the product impact of their concept by, for example asking how the product guides the user. The ideation questions have been set up to inspire and stimulate specific design solutions, for example how to guide users according to the different senses (van Belle, 2016).

With the improved version, designers are able to follow their own way of working using the booklets, but at the same time, a teacher in front of a classroom of design students is still able to apply the structured version of the session. It is also, due to the design of the booklets still possible to randomize the order in which the designers use the quadrants by putting them faced down and randomly picking one (van Belle, 2016).

![Figure 5: the Product Impact Tool for Designers, final version](image)

**Discussion**

In this research the Product Impact Tool For Designers is validated in two workshop sessions with a total of twenty participants, which is hardly enough to retrieve objective results. In addition, the research couldn’t objectively compare, as is the case in many design research projects, the results of the session with and without the tool, since it is not controllable what conditions play a role in the result of a design process. It is, therefore, not validated if it was in fact the tool that resulted to indeed deliver better design solutions to the case. However, this preliminary research has shown that there is definitely an interest and need for designers to use a tool that supports improving the impact of products on people and society. The results also show an improvement in the usability of the tool, compared to previous sessions and a better implementation of the Product Impact Tool in the design process.

In further development it is advised to look into the graphical elements of the tool, so the booklets and worksheet can be designed in such a way that the information is the clearest. Opportunities lay mostly in visualizing more of the information to reduce the amount of text. Another possibility that arose during the workshop sessions is to use the Product Impact Tool as a kind of benchmarking
system to measure if the product concept meets the requirements set at the beginning of the process. To enable the tool to be used in this way, some adaptations are probably needed: the session would be less of a brainstorm session and more an analysis session, which needs a different set-up of the booklets and worksheet, and possibly some additional support like a checklist (van Belle, 2016).

Conclusion

In conclusion, to answer the question how can designers make better use of the Product Impact Tool to create designs for people and society, the Product Impact Tool For Designers was developed. The tool was depicted to be used in the conceptual phase of the design process. The extended tool was based on testing the concept in two workshop sessions, to be more practical in use for designer, to leave room for creativity and to be flexible in use to fit the different ways of working of designers. In this way, the Product Impact Tool For Designers offers a versatile solution to think about the different impacts a product concept could have on people and society. The tool contains four booklets and a worksheet to be used in a brainstorm session with the design team and works to the creation of a plan to implement new insights in the design of the product. Using the Product Impact Tool For Designers, designers can create products that better fit the user and have a more acceptable impact on society.

References

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