‘We only get what we give’

A critical interpretation of sustainability in HCI

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Abstract

This Master's thesis is a critical reflection on design and sustainability. Inspired by autoethnography, a considerable amount of my reflections during the thesis is based on my own position as a design student. In addition to this, through theoretical elaborations, I will establish that technology is value-laden and consider what this might entail for designers as contributors to a viable future. Influenced by Daniel Fällman, I will propose a "new good" of Human-Computer Interaction (HCI), where designers acquire a mindset that questions what technology and design may have of influence on the environment through its mediational potential. Building on some of Tony Fry's work, I will further suggest that the education of designers is a potential place to provide such a mindset.

Based on two field studies, including participant observations and interviews, I will consider how personas and transdisciplinary teams can be valuable tools for a more sustainable design development. By utilizing personas on natural things, for instance, a bee, I suggest that there is an opportunity to give the silent actor nature a voice, as well as a kind of participation in the design process. Furthermore, I propose that transdisciplinary teams can provide beneficial value in several ways, such as perspectives and experience.

Keywords: *HCI, sustainability, personas, transdisciplinarity*

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First, I would like to thank my supervisor, Hanne Cecilie Geirbo, for her patience, enthusiasm, and for guiding me through this process. Her willingness and ability to help me connect my thoughts have been very much appreciated.

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Thank you, Ida, for countless discussions and priceless support, I'm the luckiest little brother in the world.

I would also like to thank friends and family for your support and patience.

Finally, this one is dedicated to you.

Andreas Løland Truchs
University of Oslo
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List of Acronyms

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UNWED The United Nations World commission on Environment and Development 5

NILU Norwegian Institute for Air Research 2

HCI Human-Computer Interaction i

UCD User Centered Design 2

SID Sustainable Interaction Design 10

TD Transition Design 11

RtD Research through Design 21

ICT Information and Communications Technology 42

NSD Norwegian Centre for Research Data 31

Chapter 1

Introduction

> *So it is that 40 years after the first global conference on humanity and the environment (Stockholm in 1972) and 20 years after the first world summit on the environment and development (Rio in 1992), the policy focus remains on economic growth — while ecological decline accelerates and social disparity worsens.*
>
> – Jennie Moore & William E. Rees, 2013 [26]

As probably one of the luckiest people in the world, I have been raised in, and able to appreciate, the beautiful nature that Norway has to offer. That said, I have — as I assume a lot of my fellow Norwegians also have — taken for granted what nature is providing us and neglected how reliant we are of it. While nature does not have a voice in the same way human beings have, it seems quite apparent that we are being served with a lot of reaction from "Mother Gaia" on how we live our lives. While scientists, almost unified, agree upon the reason for most of these reactions and furthermore are implying human beings are treating planet earth in an unhealthy way, it still seems to be a lot of work to be done before we may call ourselves sustainable. This call for sustainability has fascinated me quite a lot and will be an essential part of the following thesis.

This assumed negligence and reaction is in many ways what has encouraged me to write this thesis, and is part of the reason for the title as well. Back in 1998 the American rock band New Radicals released a song titled "You get what you give". At first, I wanted to name this thesis similarly, as I assumed a notion of sustainability to first and foremost being something each and everyone should maintain a personal devotion and obligation to act on. While I still believe that we all have a personal accountability for our actions, I figured that a lot of my work would incorporate a variety of both personal and mutual responsibility. Hence,

I borrowed New Radical's end line on their refrain as a way of telling us that we are inevitably answerable for our actions and that we only get what we are willing to give.

Initially, my idea for my master's thesis was in regards to general information and awareness of the air quality that we expose our selves to on a daily basis. I wanted to create a mobile micro-sensor that could give instant feedback to the user on the air quality at that given place — hoping that greater common knowledge and awareness could change our habits and attitudes towards a less pollutant lifestyle. As a start, I attended an abundance of public seminars mainly related to air quality and sustainability. During this phase I was happy to get in touch with Norwegian Institute for Air Research (NILU), whom at that time were engaged in a European collaboration project called HackAir (www.hackair.eu), working towards a similar idea of habit change through awareness. They offered me an opportunity to borrow one of their micro-sensors as a participant in their project. Though this micro-sensor was not mobile, it was still aiming at reducing the gap between citizens knowledge and insight regarding air quality by adding real-time data to a public website and their mobile application. While gaining a lot of exciting insight through both the seminars and NILU's work on HackAir, I got hold of an article written by one of the researches at NILU. Her research concluded, in short, that micro-sensors are too unreliable and might misguide someone uneducated in the field [3]. Furthermore, as I attended additional seminars, I got a feeling that most people in Norway are well aware of the air quality "situation" already.

During my education, I have been introduced to the field of HCI and particularly the values within User Centered Design (UCD) that is — as the titles indicate — educating user (or use) centered design of technology. We have been taught about the mediation between humans and technology, and as I will elaborate later on, values of technology and design. Inspired by the mentioned values, as well as, several contributors to both ethical, political, philosophical and educational views of design, I will in this thesis discuss the responsibility of designers, design education and design practices in light of sustainability. Furthermore, I will consider personas, and it's applicability in sustainable development as a tool to alter our focus and awareness of nature. In addition, I will contemplate on the utilisation of transdisciplinarity in a similar manner, to appropriate various expertise in an effort to meet a sought for sustainable, viable future.

1.1 Motivation

Every year the Global Footprint Network announces a report regarding the gap between Ecological Footprint and biocapacity of our planet. The human way of life is according to this report demanding resources and exceeded the biocapacity of planet earth equivalent to 1.75 earths in 2019. Named Earth Overshoot Day, this report informers us of the day we have used the equivalent of one planet's capability. The report highlights that this overshoot has been occurring earlier every year and during about the past 20 years it has gone from the end of October to the 29th of July in 2019 [32].

As mentioned briefly in my introduction, during the initial phase of my work, I participated in several seminars proclaiming their interest and call for sustainable actions. Though, my general impression was quite similar to what Robert Engelman describes as corporate *greenwashing* [8, p. 3], which I will elaborate further in my 5. Furthermore, as I engaged in several projects both at the University of Oslo and outside — in particular — a project with Folk Oslo regarding sustainable business opportunities in the corporate world, I became curious to what role nature has in regards of the human notion of sustainability.

1.2 Context

My work consists of observations during two particular ethnographic inspired studies at The University of Oslo and an Oslo based private organisation. These observations have no direct connection or affiliation to each other, though I utilise the observations in an effort to shed light on various actors in relation to sustainability and nature. Furthermore, a considerable amount of my work is based on my years as a design student at the University of Oslo's Department of Informatics, as well as my attendance at a great number of seminars and workshops. Inspired by autoethnography I will build on my personal experience, through my years as a student at the University as well as my participation in mentioned seminars, as one of my methods to comprehend and consider my research questions.

1.3 Research questions

By examining disciplines within HCI and particularly in close relation to user-centeredness, I will elaborate on a need to transition from user-centered design towards nature-centered design. The following research questions have been the focus of my research. Each question is followed by a brief explanation.

> *What is the role and responsibility of the designer in designing technology for a sustainable future?*

Captivated by Robert Engelman's *greenwashing* [8, p. 3] and the abundance of publications regarding sustainability, I wish to create a better understanding of some of HCI's contributions and responsibility towards a viable future.

> *How can personas and transdisciplinary teams be valuable tools for a more sustainable design development?*

Based on my first research question and my observations, I will consider the applicability of personas and transdisciplinary teams for a sustainable design development.

1.4 Thesis structure

The structure of the thesis is divided into the following chapters:

Chapter 2 – Theory presents prior research and theory in regards to sustainability, particularly within HCI

Chapter 3 – Field Studies includes a description of the field studies I have conducted

Chapter 4 – Methods includes a description of my paradigmatic philosophical background as well as what techniques, how they were conducted, analysed, and methodological and ethical considerations during my work

Chapter 5 – Discussion is a deduction of my observations during my field studies and theoretical considerations. Furthermore, I put forward implications based on the discussion.

Chapter 6 – Conclusion summarises the thesis and suggests future work.

Chapter 2

Theory

> *"Theory should not be treated as a rule to which we find people to tightly conform, it is a guide to help us understand why humans do and think the things they do"*
>
> – Raymond Madden, [25]

2.1 Sustainability

In 1987 The United Nations World commission on Environment and Development (UNWED) released a report known as the Brundtland report. The commission characterises sustainability (sustainable development) as a way of ensuring that present needs are met with a focus on a viable future [9]. The relatively basic characterisation, introduced by UNWED, is what will be the fundamental idea of sustainability during this thesis. According to the report, the concept of sustainable development does imply limitations, not only the environment's ability to absorb human activities, but also limits in the present state of technological and social organisation on environmental resources. One particular approach in regards of the limitations as mentioned above and environmental abilities is Johan Rockström et al.'s estimation of a safe operating space for humanity with respect to the functioning of the Earth System, introduced in 2009 as the *planetary boundaries* [36, p.2]. The report suggests a set of 9 specific planetary boundaries that mankind can operate within, reducing the risk of catastrophic environmental change. These boundaries are interdependent, as such, failing to live within just one of the boundaries may cause unforeseen effects in other parts of the Earth System as well. According to their report, three of the nine boundaries have already been exceeded, namely:

- *climate change* Due to increased temperatures, ice is melting, increasing the sea-level, reducing access to glacial freshwater as well as diminishing biodiversity.
- *rate of biodiversity loss* various species play varied, but important, roles in the ecosystem, such as corals which play a vital role in the last remaining transgressed boundary.
- *changes to the global nitrogen cycle* due to enhanced food production; for instance, nitrogen is causing unanticipated changes in lakes and marine ecosystems.

As stated in the Brundtland report, to meet human rights, we have to ensure that necessary resources are provided to those in need of it, be it energy, food, water, education, health care etc. But, as Rockström et al. highlights, we have already transgressed several of their proposed planetary boundaries, and as such, we have to make sure provided resources, consumption and lifestyles does not exceed the environmental abilities of our planet. This interdependence and dynamics between humanity and the environment are what Kate Raworth has visualised through her proposed *doughnut*, see figure2.1 [33].

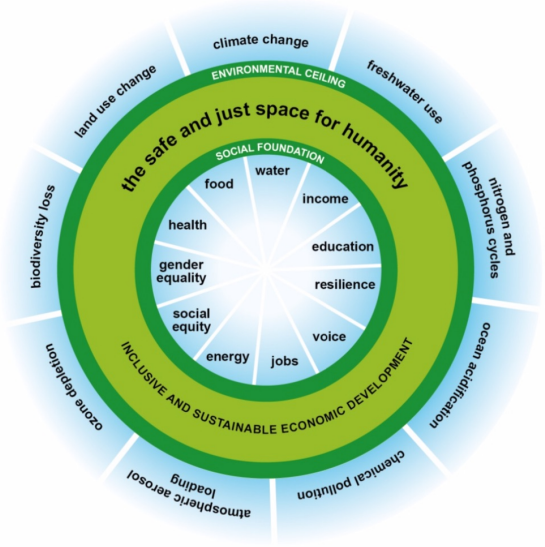

Figure 2.1: Kate Raworth's visualization of the 11 dimensions of the social foundation based on government's priorities for Rio+20. The nine planetary boundaries are based on Rockström et al. visualized as the Environmental ceiling. Combined, envisioning a safe and just space for humanity, titled the Doughnut [33]

By combining Rockström et al's planetary boundaries with social boundaries, Raworth visualises and discuss how there might be a socially

just space for humanity to thrive, where the planetary boundaries are not exceeded. This space, where no planetary boundaries are transgressed and social boundaries are met, is what Raworth has titled the *doughnut* — the safe and just space for humanity. Where Rockström et al. evaluate the current state of planet earth, Kate Raworth utilises this quantification in an effort to suggest that there are opportunities of a future where humans can develop without making a greater toll on the planetary boundaries. Though, as Raworth points out, there is an interdependence between environmental and human needs. For instance, humans fundamental need for food where according to Raworth, 2.7 billion people have no access to clean cooking facilities, may lead to deforestation, biodiversity loss, increased CO_2 emission etc. On the other hand, rising temperatures, sea-level rise, floods and droughts as a few of potentially many effects of transgressing planetary boundaries, undermine human development, particularly amongst the poorest. As Rockström et al's visualisation in figure 2.2 shows, loss of biodiversity and changes to the global nitrogen cycle are amongst the three boundaries which are assumed transgressed already.

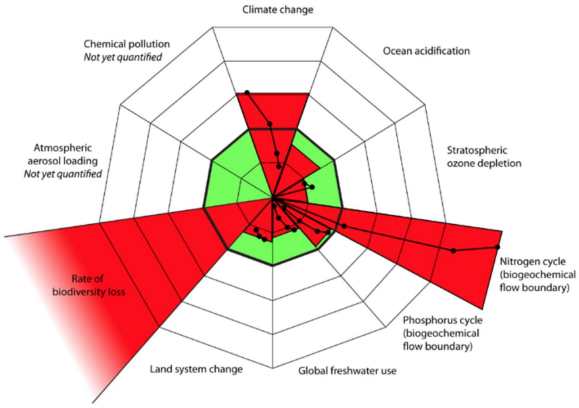

Figure 2.2: Rockström et al.'s visualization of current (2009) state of their proposed planetary boundaries. The inner green area represents the safe operating space and the red area represent the current quantification [36]

Though, according to Raworth, providing sufficient amount of calories to the 13 per cent of the world's population facing hunger would be met with 1 per cent of the current food supply. Furthermore, around 50 per cent of global carbon emission is generated by 11 per cent of the human population. As well as about one-third of the world's nitrogen budget is used to produce food to just seven per cent of the world's population. Based on data similar to this, Raworth suggests there is a possibility of humanity living within the *doughnut*.

Several suggestions and a lot of effort within HCI have been made in relation to sustainability, some of which will be further explained and discussed during this thesis. Similarly, as with the above-introduced theories of Raworth and Rockström et al., there is an abundance of contributions within other disciplines. Due to the scope of this thesis, I will only introduce and discuss a few, in particular, relating to my field studies.

2.2 Politics

When thinking of technology, I assume we, in general, have a perception of some sort of tool, such as our laptop, cellular phones or maybe even software like an email client. Consciously or not, we might look at these tools as neutral and without any ability to create or produce any values other than supporting some kind of work. However, when technology leads a user to a certain behaviour or choice, one can argue that technology is more than just a tool. In his article "Do Artifacts Have Politics?", Langdon Winner defines technology as "smaller or larger pieces or systems of hardware of a specific kind" [52, p. 123]. By bringing forward two approaches that he claims technology can contain political properties; "Technical arrangements as forms of order" and "Inherently political technologies" [52]. Winner argues that technology is not neutral. In the former approach, Winner utilises several examples where one of these is the effect of Robert Moses' overpasses on Long Island. These bridges, as technologies, are first and foremost means to move cars. But the obvious political relation reveals itself when one look at how buses are unable to pass underneath, deliberately designed to hinder and discourage the presence of buses on parkways in the area. This type of technological arrangement, he suggest, is forming order by either preventing a certain action by the user or guide the user to act in a specific way. Hence, Winner claims technology contains political properties[52].

2.3 Moral and culture

Based on Langdon Winner (amongst others), Peter-Paul Verbeek examines technologies ability to mediate intentionality and has its own freedom to act, thus having moral [49]. In his conclusion, Verbeek highlights the importance of understanding intentionality and freedom in a technological manner. He calls for new perspectives where technology plays an important role to realise our (human) intentionality and freedom, as

such, our intentionality and freedom is not a "purely human affair" [49, p. 99]. By doing so, Verbeek suggests that technology co-shapes our actions and interpretations, claiming human action quite often depend on technology. One important aspect of Verbeek's discussion relates to designers responsibility. He claims that designers by adding ethics into their design are co-responsible. As Winner and Verbeek claim technology has politics and moral. Maja Van Der Velden asks, "Do artifacts have culture?" [47]. While the questions of technology having politics, moral or culture might not have any obvious relation to sustainability or the environment. Several proposals have been made to utilise these concepts to make humans act in a preferred way through technology, both in theory and in practice. Van Der Velden for instance, examines the potential of "slowing down" the designers and their design process [47], in what may bring association to life cycle design and Eli Blevis' linking invention & disposal [1] as well as Tony Fry's Elimination design [18] and James Pierce's Undesigning Technology [31] — which I will elaborate further in my Discussion-chapter.

As a practical example of the potential non-neutrality of technology and design (further discussed in my Discussion-chapter), you will find the Carl Berners Plass not far from the University of Oslo. In 2010 the original cross-section guided by traffic lights and its four car lanes was converted into a green area with trees, wide lanes for pedestrians and cyclists. The four original care lanes were reduced into two lanes, in addition to a removal of most of the traffic lights, as a rectangular-shaped roundabout was supposed to manage some of the flow of cars passing through. Similarly to the increased space for pedestrians and cyclists, buses and trams were granted separate space from the cars, as well as the tram's own lane was directed straight through the roundabout. The effect seemingly being a reduction in private cars passing through the area and the number of accidents between pedestrians and cars has been reduced [42]. The shape and arrangement of the roundabout, in addition to granting pedestrians, cyclists and public transport greater space and assumed power, due to their right of way, draw resemblance to Winner's description of Moses' overpasses as a technical arrangement as forms of order [52].

2.4 Sustainability and Human-Computer Interaction

There are several suggestions and attempts on how to gain awareness around sustainable living. As an alternative mindset within HCI, Eli Blevis propose sustainability to be a central focus within interaction design (Sustainable Interaction Design (SID)) [1, 2]. Assuming there is a greater connection between interaction design, environment and sustainable behaviours, Blevis propose adding more of responsibility in the hands of the designers and their work. As a part of his assertion, five principles and a rubric consisting of ten points are introduced to encourage sustainable behaviours, as well as being utilised as a critical lens for designing and evaluating design. In doing so, Blevis suggest affiliating established design values, methods and reasoning with the perspective of sustainability [1, 2]. For instance, adding more value in the design of technology, by claiming that a technology is incomplete unless there is a clear plan for what will happen to the technology when it is reckoned obsolete (linking invention & disposal) [2, p. 508]. Similarly, James Pierce introduces what he calls *undesign*, which is building upon Tony Fry's elimination design [31, p. 958]. The general idea is what Pierce quotes from Fry as " Creating anything always requires the destruction of something else, so make sure what you create is worth what you destroy" [31, p. 959]. Their idea suits well within the concept of *script* that Verbeek elaborates upon through Bruno Latour [48]. He claims by using a speed bump as an example that designers may inscribe specific behaviour (drive slowly in this case) [48, p. 362].

Verbeek goes a bit further and challenges the suggestion by claiming that an interpretation by the user is needed. The technology in itself only gets an identity when in the user context — what Verbeek points to as Don Ihde's *multistability* [49, p. 367].

2.4.1 Affective Interaction Design

Claiming we are moving towards — and living at — the "end of the world" Fritsch refer to Benedictus de Spinoza's definition of affect as an "ability to affect and be affected". Furthermore, dividing it into a positive and negative "pre-personal intensity, that influences our bodily, vital forces directly" [14]. "Positive affects are those that make us feel alive and act in the world, negative affects have the opposite effect,..." [14]. Characterising the "end-of-world"-context as a negative affect, Fritsch suggest Affective Interaction Design "must be established as a

form of research-through design, where the theoretical mobilisation should continuously be informed through a practice-based engagement with building affective design prototypes", with intention to acquire further knowledge and potential guidelines on how to design for positive affect [14].

2.5 Research through Design

In his article Research in Art and Design, Christopher Frayling suggests that there is a lot of resemblance between science and design.

> Doing science — as opposed to post-rationalising about science — just doesn't seem to be like that, if recent researchers into the philosophy and sociology of science are any guide. Doing science is much more like doing design [13, p. 4].

Frayling discusses what research, art and design is, what it involves, what it delivers, and its connection to; and resemblance with each other. Suggesting it is plausible to ascribe similar values of the experience gained from doing art or designing as by the values of research done by a critical rationalistic scientist [13]. By viewing the knowledge production as more of a proposal rather than a prediction, Zimmerman and Forlizzi describes RtD as a " type of research practice focused on improving the world by making new things that disrupt, complicate or transform the current state of the world."[53]

2.6 Transition Design

Terry Irwine suggests that "*Design for service*" and "*social impact design*" , are two established (mature and developing) areas of design research, practice, and education. However, she claims they are lacking values of a long-term vision and potentially neglecting some groups of people [20, p. 230]. She, amongst others e.g.: [37, 45], propose a shift towards the so-called *Transition Design*. Transition Design (TD) addresses the need for societal transitions to more sustainable futures, by, e.g. adopting a stance from where a lifestyle " is place-based and regional, yet global in its awareness and exchange of information and technology." Also known as "cosmopolitan localism") [20, p. 229].

Claiming natural, social, economic and political systems all are interconnected and interdependent, Transition Design utilises concepts from an

abundance of, and far-reaching, theories in various fields, disciplines and movements. Transition Design encourages identification of potential areas for change within complex systems through exploring phenomenons "in terms of dynamic patterns of the relationships between organisms and their environments" (Living Systems Theory)[21, p. 3]. Proposing the primary context for understanding society and its patterns should be based on values such as the relationship between part and whole, pre-industrial, place-based 'slow knowledge' — what TD points to as Everyday Life Discourse. Aiming at transitioning humans towards a holistic/ecological worldview, by establishing connections, awareness and identifying needs on a community-based — though globally connected (cosmopolitan localism) — level, by utilising social psychology research, social practice theory and alternative economics to meet desired futures. All of which are suggested formed through and inspired by futuring, addressing long-term issues, which are addressed by ambiguous facts and indisputing values [21].

Similarly to Blevis' assumption of designers playing a key role in a desired sustainable future [2], Transition Designers are expected to produce solutions for the future generations based on past knowledge and transdisciplinary teams, as well as being able to adapt both intellectually and mentally to advancements in the future. Through multiple, iterative interventions, TD suggest four key mutually reinforcing and co-evolving areas of knowledge, action and self-reflection to aid and design future solutions [21]:

2.6.1 Vision (for transition or transition vision)

As mentioned above, TD is future-oriented which require us to detach ourselves from the present everyday life, creating grassroot based futures that emerge from local conditions. To inspire for discussion and debate as well as potentially working as a tool for evaluation, visions are proposed to be modifiable and dynamic. There are suggested various approaches to imagine futures that may influence both short-, mid- and long-term solutions, such as development of scenarios, backcasting, critical and speculative design to mention a few [20, 21].

2.6.2 Theories of change

A key stand within TD is the need for change. Claiming that our conventional ideas about change lie at the root of many complex, interconnected global, ecological and humanitarian problems (know as *wicked problems*).

Furthermore, that a sustainable future will require major change at every level of our society. To inform new approaches, and to manifest and catalyse this requirement for change, TD claim designers must obtain a transdisciplinary mindset to meet the diverse societal changes. By utilising ideas, theories, methodologies and disciplines from diverse fields, as well as maintaining an open-mindedness towards control and outcomes of change, one is expected to unmask counter-intuitive ways of changing open and complex systems towards more sustainable futures [20, 21].

2.6.3 Mindset/posture

Claiming designers values indeed affect the framing and interpretation of problems within a given context, TD suggest pushing designers towards a more holistic worldview where collaboration and responsible postures for interaction is part of their mindset [20, 21].

2.6.4 New ways of designing

With visions of a future — or the 'long now' as TD calls it — based on understandings of local ecosystems, culture and yet being globally aware, transition designers will see and solve for wicked problems with a different approach towards problem-solving in the present. Looking for emerging possibilities, solutions may have a short or long life-span depending on the intentional goal of the design and idea of change. TD suggest three areas of work. First, designers are expected to work in transdisciplinary teams to design new, innovative and place-based solutions rooted in and guided by transition vision. Second, amplify and connect grassroots efforts undertaken by local communities and organisations. Third, service design or social innovation solutions can be steps within long-term transition vision, as well as developing powerful narratives and visions of the future or the 'not yet' [20, 21].

2.7 Personas

According to Alan Cooper [4], humans seem to have a tendency of focusing on the specific problem and the obstacles regarding a certain challenge. This focus, Cooper claims, clutter our ability to see potential solutions and perhaps alternative ways of acting. In this regard, Cooper assumes designers are in a similar way blindfolding themselves when trying to understand users and their behaviour when interacting with technology. As simply asking an actual user about a particular problem does not

necessarily bring forward any solution. In a similar manner, designers run a risk of excluding unforeseen alternatives.

Instead of focusing merely on what problems a user experiences, Cooper suggest adjusting the designers perspective towards what the users wish to accomplish. By providing a detailed description of the user's skills, attitudes, settings etc. the designers are able to depict different users with contrasting backgrounds and as such potentially generalising and revealing similarities to a complex challenge. This way of direct attention towards people and goals, instead of, for instance, particular tasks and obstacles, is what Cooper describes as Personas.

Personas are supposed to be detailed and precise, as such Cooper emphasises a necessity of being aware of the difference between precision and accuracy. Where personas are supposed to depict a user, a persona is not expected to reproduce a literally identical person on paper. In other words, Cooper differs between precision as rich on details, and accuracy as in correctness. As such, a persona becomes more of a hypothetical archetype of users. Though, as Cooper points out, this might sound more like a made-up person and in some perspectives could argue containing deficiencies and flaws. Nevertheless, he claims that based on thorough research prior to the assembly of any persona, as well as a subsequent precise and credible description, produces a pretended user that designers can design for. Through designers research and analysis of users, personas are revealed, and as such, different goals can be identified, thus, goals also identify the persona according to Cooper. By producing rich specific details, goals will be more evident, and it will become more visible what the technological requirements needs to be, as well as what is less important. In this regard, personas produces a scope and characteristics of the design problem.

According to Cooper, personas not only produces insight and focus towards users. It is also a great tool for communication to explain design decisions, as personas produces a spotlight for the designers. In addition, Cooper highlights the power of being rich in the description of personas, as this will produce an even more relatable and "real", as in human-like persona, bringing the designers closer to the users. Cooper refers to several observations of colleagues discussions changing focus from "what a user might want" to "Patricia wants to do this, so we don't need that". This change, Cooper claims, is both an adjustment of focus in favour of the user, and producing a potential emotional-like relation between the designers and the personas. Moreover, this richness will bring forward the abilities

and skills of the users, and as such, needs of adaptation is moved from the user to the technology. Hence, needs of adaptation are moved from the user to the technology.

Personas should contain sensible characteristics, and to give it as much of a human-like notion, Cooper advocates the need for a name when creating a persona. Without a name, he claims the persona will never be an actual individual in anyone's mind. In addition, where there are several personas, based on a larger user group, there might be necessary to choose (or create) a persona that represents the similarities between the personas [40]. These specific personas are called primary personas, though according to Cooper, the primary persona should be identified by its specific needs. If there is a persona that will not be satisfied by other personas needs, this persona should become the primary persona. If there are several competing personas that will not be satisfied by each other's needs, there is a need to design separate solutions for each of the personas.

2.8 Theory of collaboration (Multi-, Inter- and Transdisciplinarity)

A recurring mechanism or tool in the field of Human-computer interaction is collaboration, across different areas of studies, with potential users, as well as scientists and researchers utilising concepts and values from various disciplines in their own work.

Marilyn Stember introduced in 1991 a classification visualised in figure 2.3 , where she suggests there are several levels of collaboration and bridging between disciplines [43]. Due to the scope of this thesis, I will only elaborate further on Multi-, Inter- and Transdisciplinarity. Their respective prefixes might give some notion of their values, though according to Stember, the difference of each of these modes of collaboration is seen through the approach and combination of knowledge, methods and people.

The "lowest" form of disciplinary collaboration is what Stember calls Multidisciplinarity, where a group of people from different disciplines work together by utilising their individual disciplinary knowledge within the group. Interdisciplinarity builds on multidisciplinarity though requiring conscious choices of common strategies and goals.

Transdisciplinarity is what Stember refers to as the highest level of collaboration, building on the values of lower forms of collaboration. It is characterised by the inclusion of "non-disciplinary problems" — what

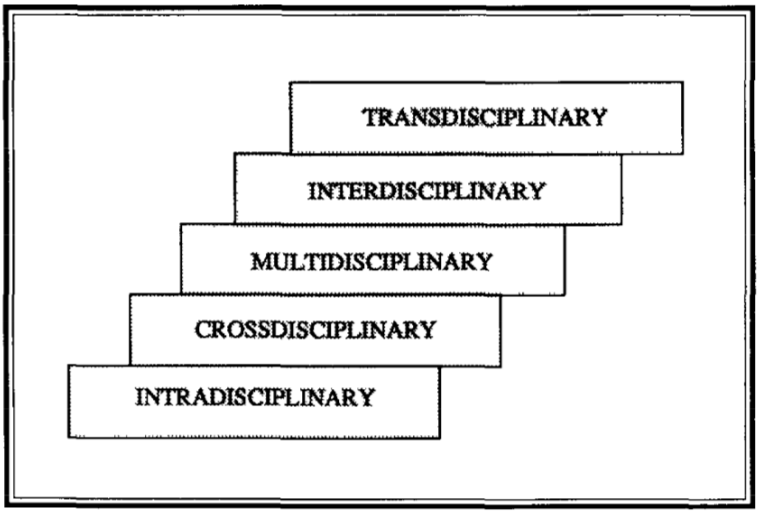

Figure 2.3: Marilyn Stember's typology of collaboration within and across disciplines [43]

Bergmann et al. describes as "everyday life problems"[38, p. 16] — as well as, non-disciplinary actors concerned with the unity of intellectual frameworks beyond the disciplinary perspectives [43, p. 4]. As already mentioned, each of the "higher" forms of collaboration builds on lower forms of collaborative work, which may give some potential misconception of what differentiates transdisciplinarity from any other form of collaboration. Rather similar to Stember and Bergmann et al., Lang et al. defines transdisciplinarity as:

> A reflexive, integrative, method-driven scientific principle aiming at the solution or transition of societal problems and concurrently of related scientific problems by differentiating and integrating knowledge from various scientific and societal bodies of knowledge. [24, p. 26]

As a closing remark, Bergmann et al. have proposed a "working definition" that is displayed in figure 2.4. While there are some aspects that distinguish transdisciplinarity from other forms of collaboration, the rather wide definition made by Bergmann et al. is what I will be utilising in this thesis. Furthermore, as some may have noticed, the mentioned theories of collaboration seem to be in relation to research and science. During this thesis, I will utilise the above-mentioned theories regardless of possible differences between collaboration during research and science, as opposed to any other type of work.

Evalunet's Working Definition

Transdisciplinary Research ...

... takes up problems or questions from everyday life,

... in describing the resulting research questions and their treatment, draws on scientific fields and disciplines in a manner that is adequate to the problem (differentiation) and, in addressing the questions, steps across disciplinary and field boundaries,

... draws on knowledge from practice that is necessary for the suitable treatment of the questions and establishes a relationship to practice that serves the development and implementation of actor-oriented strategies in a manner adequate to the problem,

... in the course of the project, ensures the compatibility of parts of the project and parts of the task, carries out the transdisciplinary integration of scientific knowledge, and thus connects the latter to knowledge from practice in a suitable manner (transdisciplinary Integration 1),

... in order to formulate, from this, new scientific knowledge or questions and/or practice-relevant strategies for action or solutions (transdisciplinary Integration 2) and to bring them into the discourses in the realm of practice and in science (Intervention).

Figure 2.4: Bergmann et al.'s suggested definition of transdisciplinary research [38, p. 15]

Chapter 3

Methods

"Doing science is much more like doing design"

– Christopher Frayling [13]

In this chapter, I will describe and consider my paradigmatic positioning within this thesis as well as what this entails for both methodology and particular methods of inquiry for my research. Furthermore, I will explain my implementation of the mentioned methods and work during my research. Finally, I present the methodological challenges I encountered and my ethical considerations.

3.1 Philosophical paradigm

Meyers suggest that, based on some underlying epistemological assumptions of research, one can position qualitative research within three paradigms *positivist*, *interpretive* and *critical* [27]. I recognise reality as non-objectively given, and that my observations and interpretations are influenced by my personal and theoretical background. Based on this, I consider my research as not within the *positivist* paradigm [27, 30, 34]. I consider my research to be inspired by and within both the *interpretive* and the *critical* paradigm. Though, as I will try to elaborate further, I deem my positioning to be a bit more *critical*. As I seek to understand both the interpretation, the meaning as well as the context where potential realities are socially constructed. Furthermore, that this reality might influence and be influenced by the context where my research is conducted [27], hence, one could assume my research as within the *interpretive* paradigm. However, the purpose of the research was to explore several aspects (in particular sustainability) and their interpretation and utilisation, both within the research field of HCI, as well as in other contexts. My research focuses on

the oppositions, conflicts and contradictions in contemporary society questioning the role of nature both in the theoretical field of HCI, in practice and in my research. Furthermore, I assume that social reality is historically constituted and that it is (re-)produced by people through social, cultural and political mediation. As a part of my interpretation of nature's role, as described above, I have produced some suggestions on how to potentially bring nature to our awareness. By doing so, I claim I am seeking to, as well as, encouraging a transformation of assumed restrictive social conditions [28, 30]. Thus, I consider my research as somewhat more within the critical paradigm.

3.2 Methodology

My endeavour throughout my work has been to understand the role of sustainability in the academic and practice of Human-Computer Interaction (HCI). To get a notion of this, I have worked with both theory and conducted fieldwork. One of the field works has been done within the frame of design education at the University. Whereas, the other fieldwork was conducted with HCI considered as represented through myself as only one part of a group of peoples knowledge and experience.

There is some resemblance between case study and ethnography in my work, as I have been inspired by both methodologies. As I have sought an understanding of the phenomenon "sustainability" through various contexts and several cases, I consider my work as somewhat in accordance with instrumental case studies [27, 41].

Though as most of my fieldwork has been conducted by utilising myself as a tool for researching sustainability in a social, cultural, academic and to some extent economical setting, I claim my work is first and foremost ethnographic [5, 12, 25].

3.2.1 Ethnography

According to Raymond Madden, ethnography is not only a research practice of fieldwork with human groups through participant observations and for instance, interviews. It is also, and very much building on, writing about observed human conditions to establish theories of these real-world social processes and settings [25]. By immersing oneself in localised settings, or cultures as Crang & Cook describes it [5], some of ethnography's strength is found in between people's point of view as well as the researcher's acknowledgement of her "impossibly

distanced objectivity" [5, p. 13]. With a goal of understanding, through observations of people's world view and experience through their way of life, ethnographers are both a researcher and through their interpretation a research tool in them self [5, 25, 39].

3.2.2 Insider and outsider

In addition to the particular fieldwork, a great amount of my work has been in relation to myself, as a design student and practitioner of design. Not only have I through my ethnographic work represented what often is described as an insider and outsider of my observations. That in short can be described as my interpretation of the insiders, what I have observed of others point of view, and the opposite, me as a researcher and outsider's point of view [5, 25]. I have also represented the insider through my position as a design student at a University where I interpret my own insider role and experience of the academic field. By drawing inspiration from autoethnography, I claim that I have conducted a third case of research through myself, my point of view as a student within the academic field of HCI.

3.3 Methods of inquiry

In the coming subchapters, I will elaborate on what methods I have used and how I have applied them.

3.3.1 Participant Observation

According to Crang & Cook [5], participant observation is the core means of ethnographer's endeavour to understand world-views and ways of life of actual people. It relies on a researcher's ability to submerge herself into other people's lives and practices as a participant of doing what others do and living with them. But, still being able to reflexively, with "all our senses" observe the culture [5, 25, 39]. As mentioned above, Madden highlights the importance of ethnography and in many ways participant observations, as not only a pure recap of observations, but a combination of participation, observation, interpretation and theorising through several iterations of writing and working with the data and oneself. During my work, I have conducted participant observations in two settings. One at the University as a student in a course of Research through Design (RtD) studying Transition Design (TD). The other participant observation was conducted at Folk Oslo as a member of a group trying to

produce sustainable solutions for a company. Further description of each participant observation will be done in section 3.5 later on.

3.3.2 Interview

During my work, I claim I have utilised interviews both consciously and somewhat unintentionally through conversations during my participant observations. Though in this subchapter, I will talk about interviews done in a more controlled and informed manner. As a disclaimer, I have noticed that Crang & Cook suggest interviews, in ethnography, should not be considered as a separate method from participant observation [5, p. 82]. That said, I regard some of my interviews as somewhat separated from my ethnographic work. Hence, I do believe it is in its place to separate them in this thesis.

In structure, interviews vary from the unstructured form, as mentioned above, with potentially no prepared questions or intentional goal of what is to come out of the conversation. At the other end, structure, themes and key questions might be utilised to seek potential comparison and analysis [5, 25].

All my interviews have been conducted as semi-structured, with some predetermined open-ended questions, first and foremost as a way of exploring what the interviewee mentions during our conversation. Though it serves well as a safeguard if the conversation derails out of a sought for theme. Or, to be embarrassingly honest, if there in some way should be a holdup in our conversation and I need somewhere to get it going again.

3.3.3 Autoethnography

As mentioned in my introduction of this chapter, I have drawn inspiration from autoethnography. A research method that takes inspiration from ethnography and autobiography in an effort to acknowledge the complex link between the personal and the cultural [35, 50]. By writing personalised accounts from their own experience as a researcher in the field, the researcher extends the potential understanding of social and cultural observations [6]. Drawing on the recent description of ethnography, as an outsider representing it's observations of the insiders, some argue that the utilisation of oneself might be more true, or what I would like to call authentic, than the "objective" "unbiased" outsider [50].

During my work, I have been working in several iterations of observations, analysis and interpretation. As a part of this, I claim a lot of my work has been both inspired and affected by my years as a design student at the

University. In addition to the influence on particular parts of my work, I have, as will be described later on, utilised myself as a data source as well.

3.4 Methods for data analysis

During my work, I have drawn inspiration from various methods for analysis. As 3.1 shows, I have, for instance, utilised a grounded theory approach to analyse and as a way of interpreting my observations. Influenced by White & Weatherall [51] as well as Johannessen et al. [22], I have read through my field notes, transcriptions and observations in several iterations, noting points of interest and trying to label them for further thematic grouping.

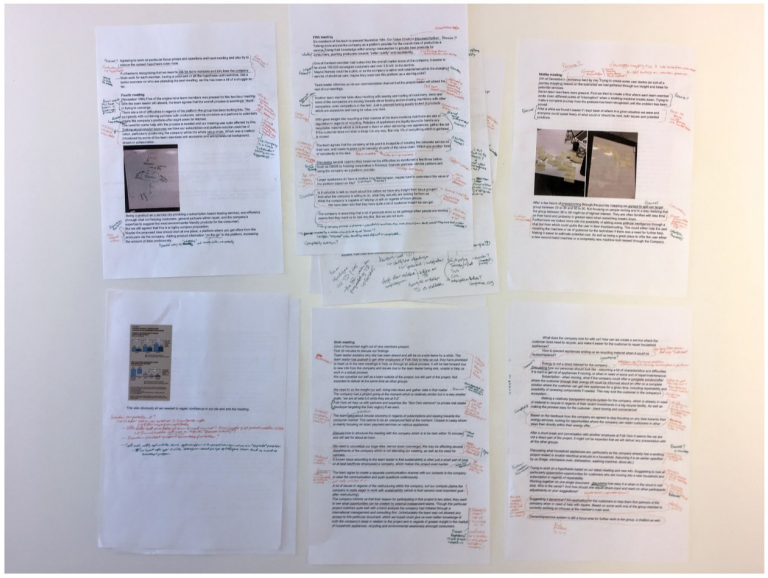

Figure 3.1: Some of the coding of my observations from the FOLK Oslo-project

My analytical work has consisted of identification and development of concepts, themes and issues, through great amounts of discussion and reflection on various forms of field notes I produced during the past two years. Though, my coding and potential concepts and themes have been utilised as inspiration and way of thinking through my observations. In particular, I would argue that a significant element of my work has been through combining research and writing, what Madden describes as writing down and writing up. In short, writing down is the process of documenting and working through your observations during your fieldwork. Though Madden calls it writing down, it is not to be understood as a purely written procedure, as for instance photographs and other means to enrich the observations are of great value. While writing down is

part of the recording and consolidation of an ethnographers observations, writing up is what Madden describes as the continuing process of data interpretation. As writing is a great mean to develop meaning, Madden encourages further writing after the actual fieldwork has ended as a part of a potential resolution or conclusion of a project [25]. During my work, I have, as stated above, drawn inspiration from grounded theory as a way of working through my data, that in many ways, resemble the way Madden describes writing out. As analysis and interpretation consist of working through data, some of the initial steps of writing out are to organise the materials systematically [25]. I have as 3.2 shows, written some field notes during my observations. Though, the notebooks do not only consist of "raw" observational data, as a sort of facilitation towards my writing out. During my fieldwork (and particularly after), a lot of writing based on the field notes has been done. In combination with my effort of coding, I have revisited and considered various theoretical landscapes in relation to my field notes as part of my writing out.

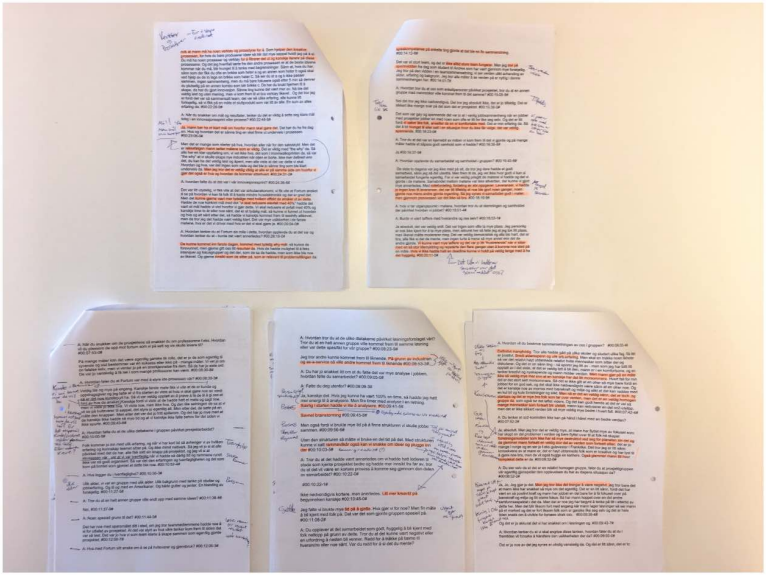

Figure 3.2: Some of the coding of my interviews from the FOLK Oslo-project

Even though I consider Madden's description of writing up as more of an interpretation of analysis, what he suggests as a move from "what" people do to "why" people do it [25]. I find it more fitting as part of describing my methods of analysis. Particularly as I have in many ways, been writing observations and interpretations rather interchangeably.

3.5 Data gathering activities

In this chapter, I will describe how I have conducted my data gathering and gained access to various sources of insight. The layout is somewhat linear, though as I will elaborate on, in the coming subchapter, a lot of my work has been revisited and utilised in alternative ways than what I initially planned.

3.5.1 Preliminary work

Crang & Cook [5, p. 134] describes preliminary work in relation to analysis of fieldwork, where you revisit primary material after a period of work that has been performed. I find it quite applicable as a description of both my initial work, and future iterations, which is in a more similar manner as described by Crang & Cook. Initially, I explored various themes and topics regarding sustainability and ethics within HCI. The introductory work, a combination of theoretical and practical exploration, got me in the direction of investigating nature's role in HCI. In addition to this, I was curious about how the topic of sustainability is handled in practice.

Despite not being an apparent part of my final work, I claim my final thesis started with me asking to be part of a Smart city-project at the University of Oslo. With Hanne Cecilie Geirbo as my supervisor, who got me a meeting with Norwegian Institute for Air Research (NILU) regarding a European collaboration called HackAir [19]. During the same timeframe, I attended several seminars related to sustainability, as an attempt to gather inspiration and hopefully form some ideas of future work.

The combination of seminars, the meeting with NILU, as well as a course regarding ethics in design and technology at the University, induced some ideas and created a foundation that I wanted to work further on. Based on this foundation, and particularly inspired by the ethics-course, I got in touch with one of the architects responsible for the work on Carl Berners-plass (described in my Theory chapter and Discussion chapter). In addition to an interview with the architect, I interviewed one of the founders of a service called HOLDBART. Both interviews will be elaborated further in coming subchapters.

Based on the initial foundation of inspiration, I figured that sustainability was an overall topic that I wanted to explore further. To gain a more practical notion of how the concept of sustainability was met outside the University, I participated in a project arranged by FOLK Oslo. In my Field Studies chapter, you will find a detailed description of both FOLK Oslo and

the project. I got in contact with FOLK Oslo via Email and was enrolled in the project soon after.

In addition to the FOLK-project, I participated in a course at the University. The course was supposed to explore a new direction within HCI, known as Transition Design. I became aware of the course during a few conversations with some of the professors and lecturers at the University. I got to be one of the participants of the course by applying through the University's internal systems and by talking to the supervisor of the course.

As will be elaborated further in the coming subchapters, some of the work was done with an initial set of values and focus that have been revisited and adjusted later on.

3.5.2 NILU and air quality

As an initial part of my work, a meeting with some of the researchers at NILU was arranged. The researchers were leading the Norwegian group of a European collaborative project named HackAir [19]. The project was related to measuring and raising awareness about air quality amongst European citizens. The meeting was planned as an introduction to NILU, their work, and what they could be interested in collaborating further on.

In addition to the above-mentioned meeting, I participated in one of their workshops related to their HackAir-project. I was curious about the potential of utilising microsensor to increase awareness about air quality amongst people in general. The workshop was an offer to anyone who was interested in building a microsensor for measuring air quality. I got access by emailing one of the previously introduced researchers at NILU. By participating and building the microsensor, the participants were asked to take the sensor home and share the measured data via the internet as part of the HackAir collaboration. Through the meeting and participation at the workshop, I got access to some of the research done by NILU regarding microsensors. It turned out that based on their research, the microsensors had some weaknesses due to inconsistent measurements between the microsensors. Thus, the microsensors were reckoned unreliable as a means to inform people without particular competence [3]. Based on this, I chose to readjust my focus and considered any work with air quality and microsensors to be unrealistic.

3.5.3 Seminars

During the timeframe of February and September 2018, I attended ten seminars concerning sustainability, design ethics or air quality in various forms and forums. The duration of each seminar varied, but in general, the presentations and talks lasted about 2 hours each. The seminars were open to anyone who wanted to participate and was held by various research corporations and some enterprises. Mainly, the seminars consisted of presentations regarding views and approaches related to sustainability. I wanted to form a notion of how different corporations assumed some sense of participation on an assumed need for sustainable action. In addition, I hoped for some inspiration and possible connection for further collaboration and work on my thesis. I gained access by actively looking for seminars proclaiming sustainability as a part of their seminar and attending successively. This lead to a wide variation of actors, like The Institute of Transport Economics and international enterprises such as IKEA, got to share their take on the topic of sustainability.

3.5.4 Interview with HOLDBART.no

As a part of my initial exploration of corporate initiatives for increased sustainable lifestyles, I got in touch with one of the executives of the firm HOLDBART.no. HOLBART is a webshop offering surplus goods that are near or already have exceeded their expiration date, hence are impossible to sell in regular grocery stores. The interview was, similarly to the seminars, part of my initial work. As it was rather early in my work, I found it suitable to have a semi-structured interview, to let the conversation between us be as free as possible. In addition, I was not quite sure what I actually wanted from the interview, I figured it could work as a sort of a pilot interview. By doing so, I hoped to get some experience about how various questions might be experienced by the interviewee. Several lessons were learned, in particular, how important it might be to take the lead in the beginning, just to inform and ask if it is OK to record the interview. As I failed to do so, I never got to start recording and had to rely on my note-taking.

3.5.5 Interview with landscape architecture firm Dronninga landskap

Inspired particularly by Langdon Winner [52], as well as my focus on air quality, I got in touch with one of the architects responsible for the

design of Carl-Berners Plass. I was curious about their intentionality when designing the area as they did (further elaboration regarding the design is done in Theory chapter and Discussion chapter). I assumed a semi-structured interview would work well as I had a few questions in mind, but wanted to have the opportunity to let the architect speak as freely as possible. My interview guide was mostly containing questions in regards of the architect's choice of design, and if there were any guidelines from for instance the road administration or municipality in relation to making the area less manageable for motorists. In addition to some questions related to air quality and how the design was put to life.

The interview lasted for about an hour, containing various information of mentioned topics as well as some related work the firm was involved in. The interview was recorded and transcribed later.

As mentioned at the beginning of this chapter, I have been working somewhat iteratively with my thesis. This interview is one of the examples where the layout and focus of the interview do not directly correspond with how I have utilised the interview during my later work. Initially, my focus prior and during the interviews were related to the potential of value-ladenness in technology and design, in addition to air quality. Some of which have been utilized in my Theory chapter and discussion regarding theory (see section 5.1.1). After a few revisions of the interview and prior theory related to transdisciplinarity, I realised that there were some interesting features in the interview I wanted to look further into. Hence, parts of my discussion regarding transdisciplinarity are based on this interview.

3.5.6 Participant observation in a course at the University

During the fall of 2018, I participated in a lab-based course at the University. The goal of the course was to utilise RtD to get a notion of what TD is and potentially can offer. The course lasted for five weeks, with daily work from nine to five. I wanted to get a closer look at how contemporary HCI and design was approaching the assumed need for sustainable action. Furthermore, I hoped to get both inspirations for future work as well as a notion of what TD is. In addition, I wanted to see how design students in collaboration could work with such a tremendous task as transitions towards sustainability. Inspired by various ethnographic techniques, I planned to photograph and take notes consecutively throughout our work. Further elaboration and description of the course, as well as discussion of the course, is done in my Field Studies chapter and Discussion chapters.

3.5.7 Participant observation during a FOLK Oslo-project

My preliminary work with theory, interviews and seminars got me curious about how the notion of sustainability is accommodated in less theoretical situations and more practical manners. I wanted to see how one or several corporations utilised the concept of sustainability in their businesses. In addition, to get a notion of how people with other disciplinary backgrounds integrated sustainability in their work. As briefly described in the subchapter of Preliminary work, I contacted the project executive via email and informed of both my work with a master's thesis and my interest in participating in their project. I was enrolled as one of nine members of our group and everyone in the group was informed that I was interested in combining my participation with observations of our work. I wanted to be an active actor on the same level as the other members in an effort to "fit in the field" [25, p. 19].

I assumed that a creative project such as this could produce quite a lot of situations where I would be unable to observe every aspect of our work. As an effort to try and reduce this potential loss of insight, I recorded every meeting. I asked for everyone's consent and hoped the recorder would be forgotten as soon as possible, as I assumed some could find it a bit unpleasant. In addition to the recorder, I did my best to take notes during our work as well as taking a few photographs. As our work was in a rather large group, in addition to everyone else taking various notes, I found my note-taking less intrusive than I feared.

The project lasted about six weeks, with twelve meetings lasting from three to six hours. As briefly described above, I was interested in some practical experience, as well as to get a notion of how disciplines outside the design sphere accommodated sustainability. I figured my focus during our work should be related to the member's interpretation and approaches towards facilitating an enterprise's business opportunities and interests, in relation to nature's interests and needs. Like my interview with the architect mentioned above, my focus during this participant observation varies from the way I have utilised the observations later on. While I originally focused on a kind of divide between interest and needs between nature and enterprises, I realised that our work as a rather transdisciplinary team appeared to be an interesting take on sustainability. Further description of the actual observation is found in my Field Studies chapter.

Interview with participants from the FOLK Oslo-project

At the end of our project, I asked for an interview with each of the members of our group. Though as described in my Field Studies chapter, one participant was on sick leave, and unfortunately, three others were preoccupied in other work. As a positive ending, the five remaining participants were the ones who had been participating the most during our work.

I asked each member during our last meeting as I hoped a personal face-to-face inquiry could make it harder to decline. Each interview lasted about an hour and was semi-structured as I wanted each interviewee to be able to speak freely and open up for follow up questions during the interview. I created an interview guide with various questions related to our work, as well as a few questions regarding their personal notion of sustainability and how they assumed this theme could be managed. The interviews were recorded and later transcribed, in addition to some note-taking.

In an effort to avoid any notion of discomfort, I figured the interviews was best arranged in the same place as our work had been conducted. This was common ground for both of us as well as being accessible due to its central location.

In the same way, as already described in the project, my focus during these interviews was mostly related to sustainability. Though, during my revision of my transcription, I realised that our collaborative efforts and combination of various backgrounds was quite appealing.

3.5.8 Autoethnographic perspective

As already mentioned, I have drawn inspiration from autoethnography as a research method. A particular reason for this is my ethnographic work at the University in combination with my theoretical considerations of HCI and sustainability. As a student at the University and within design, I am not only an observer, and thus an outsider, through my ethnographically inspired work. I am as much an insider, or maybe even more of an insider considering a subjective versus objective me in my work. In ethnographic theory, the discussion of "going native" as in the risk of identifying oneself too strongly with the observed group and thus obtaining an inadequate analytic distance to what one observe, is a well-known concern [25]. In my case, one could assume my position as rather native, though my effort during this thesis has been to reflect particularly on exactly this part of my work. By utilising field notes and writing out my considerations during

and after my data gathering (see 3.3 for some of my work), I claim I have managed to reflect on my interpretation and analysis as an outsider and thus maintained a partial immersion. Through my discussion and reflection, I have appropriated a lot of my knowledge and experience from my five years as a student at the University. This use of myself as not only a research tool, but also a particular set of data in my own work, is in many ways inspired by autoethnography as a means to tell my story within the elaboration and understanding of sustainability in HCI.

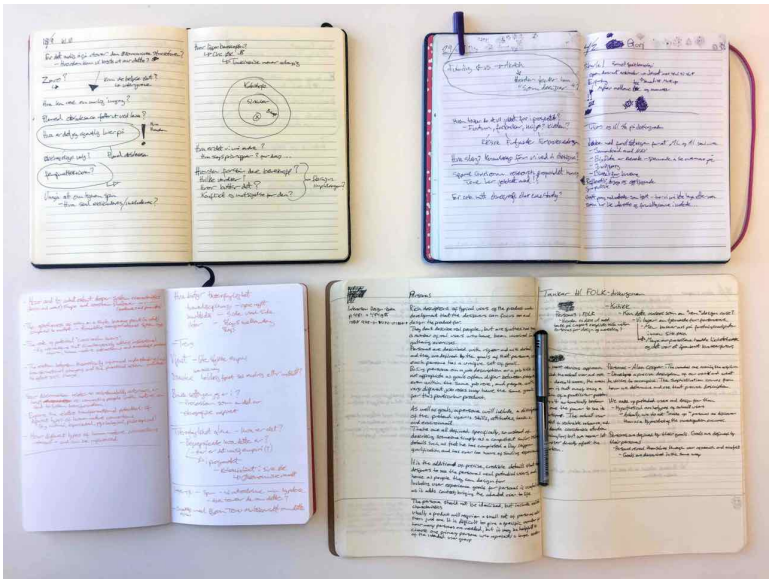

Figure 3.3: Some of my writing during the work on my thesis

3.6 Ethical considerations

Researching people through participant observations and interviews may potentially bring forward sensitive information. In addition, interpretation of observed behaviour may be considered unpleasant and even inaccurate in the eyes of the observed. Bringing forward observations and interpretations in a matter of ethnographic work thus needs to be considered in an ethical manner. Throughout my work, I have been conscious in my use of informants, I have either utilised aliases or simply avoided any description of people who can identify them. In addition to this, I have done my best to highlight the importance of this being my interpretation as one of many possible "truths". As well as, my work in no particular way is sought to be a critique of anyone, be it personal or corporate. In a more legal manner I have gotten informed consent from my informants and participants (see appendix A), based on an approved consent form from Norwegian Cen-

tre for Research Data (NSD) (see appendix B). As most of my interviews and some of my observation was recorded, I made sure to have the recordings safely stored on a password-protected external hard drive, which at all times have been stored in a locked cabinet at the University. I have regarded any sensitive information as without value for my work. Thus, I was attentive to remove any potentially sensitive information if it should occur. In addition to my recordings, I have documented some of my work through photographs. During my work, I was conscious to not photograph any situation that could be considered unpleasant as well as avoiding any pictures where people can be identified.

Chapter 4

Field Studies

> *"If there is one process that creates mystique, ritual and anxiety more than any other in ethnography, then it is writing"*
>
> – Raymond Madden, [25]

During the past two years, I have attended an abundance of seminars that pointed me in the direction of my final work. Based on the overall idea I got from the seminars, I was curious about what value and to what extent some directions of Human-Computer Interaction (HCI) focused on sustainability and to some degree design ethics. Furthermore, I sought a better understanding of transdisciplinarity and how this may or may not facilitate sustainability. To get a better notion of the former, I attended a course given at the Department of Informatics at the University of Oslo within Research through Design (RtD), as well as an innovation project initiated by Folk Oslo and Emergence School of leadership. Both events were announced as motivated by sustainability in some way, though as will be further elaborated, each differs in purpose and to some extent viewpoint. In the RtD-course I will be focusing particularly on some of the methods and mediums we utilized, while I in the innovation project will look further into the group's composition of disciplines and how our various backgrounds and knowledge was utilized when designing potential solutions.

4.1 Research through Design

In the fall of 2018, I attended a five weeks course within RtD, aiming at "exploring different research and application areas" through the methodology of RtD. This particular year we were expected to delve into the quite new and rather unexplored discipline of Transition Design (TD) [46].

4.1.1 The thing from the future

As a gentle introduction towards RtD and TD, each student was asked to make a set of transition design cards, that could be suitable for working towards change within a given context. Particularly interested in environmental challenges I sought inspiration from the imagination game "The Thing From The Future", by The Situation Lab [23]. The game is challenging players to imagine objects from different futures based on a combination of four cards that will create a given scenario and frame for the players. For example, what kind of future, what context the thing might be found, what form or shape; and emotion it might evoke [23]. As the cards only consist of text-based influence, I sought a potential of adding images and pushing the boundaries of "joyful play" towards a mind-opening reality. By doing so, I hoped to equalize an assumed gap between humans and nature. This could problematize how we have treated and possibly neglected the environment so far, and potentially "humanizing" nature through emotions.

I did this by combining the overall idea from "The Thing From The Future" with images of for instance children playing in a "broken world", cute animals and environmental situations. Furthermore, I added another set of cards asking the players to do particular things, such as ask the players to role-play a character from the cards or create a story based on the cards they have been given. In addition, I created a card asking the player to create personas of different natural objects like an animal or an insect. As an example, I illustrated a persona consisting of the Latin name of a bee, its age, origin, as well as a drawing of a bee. This way of utilizing personas on something else than humans, was later on in our group work, used as a concept to generate design implications as well as an endeavour to create a connection between human and nature. Some examples of the cards can be viewed in figure 4.1, where card number three from the left on the upper column is a card from The Situation Lab's "The Thing From The Future".

4.1.2 Transitions towards the "End of a Human"

The next day each participant was randomly assigned to one of two groups consisting of three and four students. The group I was part of chose to work with the following task:

> Use affective interaction design as a theory of change to discuss transitions towards the "End of a Human" (see Jonas Fritsch's

Figure 4.1: Some of my suggested cards in my expansion of the original "The Thing From The Future"-cards

> "Affective Interaction Design at the End of the World" [14] and Sophie de Oliveira Barata's The alternative Limb Project [44]). Furthermore, make a piece of technology that would either stimulate serious discussion and promote awareness leading to action, or prototype a service that could help with the problem.

The course was set to a lab-room that both groups shared as a working space. As will be elaborated further in the coming chapter, we utilized various tools and methods during our work, such as paper canvases, post-its, mood boards, futuring and backcasting. In addition to the physical tools in the lab, we utilized Google Drive for documentation and collaborative writing. Even though we worked together every day for five weeks in the lab, there were occasions where we wanted to communicate various ideas and inspiration. To meet this demand, we used Slack as both a chat for planning and to share documents and thoughts.

The course was supposed to utilize RtD to gain further perceptions of TD, and based on what Fritsch advocates; *"the theoretical mobilization should continuously be informed through a practice-based engagement with building affective design prototypes"* [14]. We, therefore, initiated our work by brainstorming our interpretation of several concepts and terms, such as affect, end of humans, mediation, conformity, existentialism, position of humans in the world, and tools to stimulate affect in some sense. Most of the introductory work was done by creating mind maps where we agreed upon some overall themes to converge into and discuss further — see figure 4.2.

While working simultaneously on several concepts, we observed a

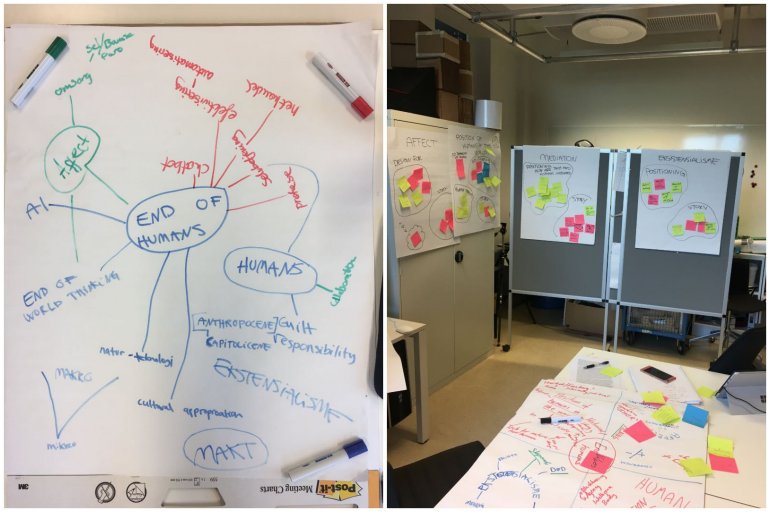

Figure 4.2: Initial ideation

resemblance between some of our mind maps, particularly in the direction of mediation. This, our group recognized as incorporating meaning of both position of humans, technology and nature, as well as shedding light on existentialism. During the initial phase of research, we agreed upon the notion that the relation between human beings and nature was a point of interest. In an effort to move from a rather abstract process, and to push our creativity in more practical manners, we experimented with "The Thing From The Future" [23], briefly described earlier. Seeing that we already had been working on similar cards a few days earlier as well as working within the fields of RtD, we found it convenient and in the spirit of RtD as well as TD, to apply some of the supplementary interpretations of the card game. As the game requires us to attain some notion of given futures combined with other additional influences, for instance personas, it made us particularly aware of the interconnectedness of humans, nature and technology. Assuming we, in general, are obtaining an anthropocentric mindset, in an effort to reduce this assumed gap between humans and particularly nature, we recognized a common aspiration to utilize personas and futuring as what TD characterize as *new ways of designing*. Futuring in this case is a concept taken from TD , as a science fiction inspired way of envisioning long-term visions of sustainable futures [21, p. 3]. As an example of how we utilized futuring as part of our work, see figure 4.3. Further explanation of the drawing will be done in the coming subchapter. With the intention of establishing a precise plan for the coming weeks, we specified our design brief as follows:

"Use affective interaction design as a theory of change, use personas and

futuring as ways of designing, for telling new stories about what it means to be human to inspire real political change on a global level."

4.1.3 Future personas and mediation

In several iterations, working with various materials, from mood boards and post-its, to more natural things such as stones and moss, we sought to create different kinds of affects. Amongst some of the ideas we discussed during the card game, we found inspiration from the Pixar animated movie *Inside out*, that depicts the emotional travel a young girl is experiencing when moving from her familiar life and surroundings to a new and strange place. As the protagonist of the story is influenced by the characters Joy, Fear, Anger, Disgust and Sadness representing her emotions, we sought a similar approach. By representing human emotions through five clay models, where each were sitting on a bench, looking at the night sky, talking to each other about what they see as the night sky changes due to pollution. The representation of Joy, for instance, sees new beautiful colours. Sadness, on the other hand, misses the magnificent starry night sky, thinking there is no hope for our future due to these changes. As we represent all emotions, that are both positive and negative, giving different perspectives and values to a common discussion, acting on the inside from the outside, we sought to evoke further contemplation as both the story in itself and the five clay models represent something personal and yet mutual.

	NOW	SOMEWHERE IN BETWEEN	FUTURE
CONSEPT/VALUE	Man is nature But tends to place herself outside and above nature	Man is nature Moving towards a different position within nature	Man is nature and places herself within nature
"PRACTICE"	Beekeeper club at ifi	Part of ifi design education	Part of professions and educations in general
TECHNOLOGY	WEARABLES	PROTHESIS	IMPLANTS

Figure 4.3: Our proposed steps to meet a visioned future

By combining Fritsch's theory as well as TD's concepts of *futuring* we moved on to another approach, trying to look into the future by travelling 100 years ahead our time, see figure 4.3. We visioned that *man is nature and places herself within nature*, mankind's *practice with nature* is part of both our profession and education. In this particular iteration, we used

a clay model to visualize this future, presented in figure 4.4. Planning that the human species within 100 years would evolve into a nature-cyborg — known as *homo agricult*. This advanced person is part human, part nature (by growing, e.g. trees from the body that can collect pollution) and part technology through implants. The implants are tools to fulfil the homo agricult's meaning in life, namely working with nature as a farmer.

To reach this phase in the future, the group realized that we could utilize another concept from TD called *backcasting* [37, p. 11]. By travelling back in time to somewhere in between now and the future of 100 years, see figure 4.3. To attain the goal of the future we claim that the movements or values, at this time, should be *Man is nature, moving towards a different position within nature*. The *practice with nature* might not yet be part of our profession, but it is part of the education. While the long future will contain humans with implants we claim that this *in between*-time will contain humans with prosthetics that may aid humans in their daily work, fulfil their goals of moving towards a greater contact and collaboration with nature.

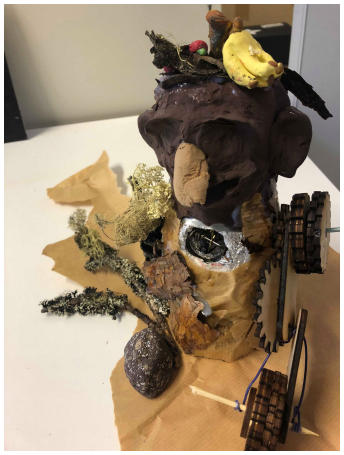

Figure 4.4: Homo Agricult

Following the proposed steps of TD's *backcasting* we now had to get back to present time to suggest a potential way of meeting the *somewhere in between*. As mentioned earlier, the group assume man today is of a rather anthropocentric stand. In other words, man might be part of nature, but tends to place herself outside and above nature. To establish a closer connection with nature today, we thus organized a community for beekeeping. Our general thought was to form a center where people would get a notion of conformity — being part of a community — while assisting bees in doing their work. As a part of this community, we created several prototypes of technologically inspired devices, such as micro-drones that could support the bees in seeking out honey. Furthermore, we created

smart-lenses for us humans, the lenses could, for instance, identify harmful fungus. In addition, we made smart-rings that would notify humans if any action was needed with a beehive. The suggested glasses and rings were part of our idea as technological wearables, that hopefully could work as a stepping-stone towards a greater acceptance of potentially adopting prosthetics in the future of *somewhere in between* and implants in the *future*.

A great amount of our work was based on the notion of mankind being something outside or even greater than nature, in what has already been mentioned as anthropocentrism. This assumption was a significant part of my initial work in the course and my main inspiration when utilizing personas in the outset of the course. In an effort to provoke this assumed anthropocentric notion, I wanted to combine something human with nature. By asking people to position nature within a rather humanly perceived technique, like personas, I hoped to generate a connection and awareness of nature. This utilization of personas was further applied during our group work, though in various ways and in combination with other techniques as well. As mentioned earlier, we started our group work by utilizing my card game as one way of evoking our creativity. Furthermore, we combined our use of mood boards with aspects from a persona, see figure 4.5.

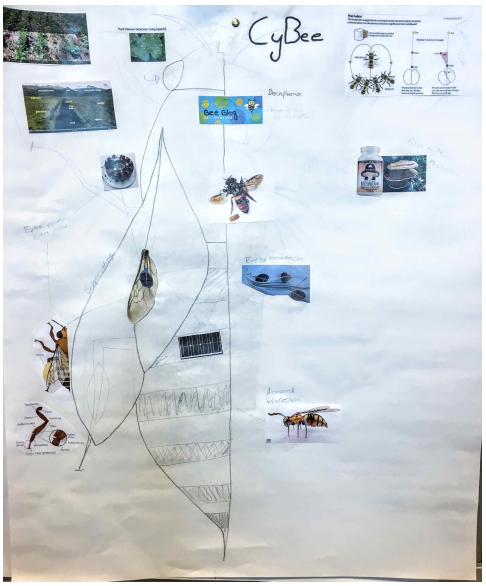

Figure 4.5: Our drawing of Cybee, with some ideas based on our data gathering

Instead of writing various information regarding a given "person", we drew a large model of half a bee, named it *Cybee* and added different kinds of information, inspirations and ideas on the drawing. The inspiration and ideas were based on data we gathered from our research of bees,

in particular, what work they do and challenges bees might experience in fulfilling their tasks. Some of the ideas were to offer technologically supported equipment, such as artificial intelligence to help the bees identify secure sources of nectar or detect danger. What we realized during this work was the rather instinctively utilization of technology as a solution to some of the problems we had identified. Some of these problems were in relation to deforestation and pollution, which we assumed are effects caused by human behaviour. We figured it would be wrong to alter bees anatomy in the same way as we had portrayed humans in our process of *futuring* and *backcasting*. Instead of utilizing technology to help bees adapt to human behaviour we assumed humans are the ones who need help to change. We saw it as a potential necessity for humans to be aware of nature, how it is a fundamental part of humans being, and that our exploitation of natural resources seems to alter a balance where nature needs to be sustained for humans to exist. Instead of changing nature's way of being, we therefore found it more appropriate to change humans to support nature. By utilizing technology and natural resources on humans, to support nature as one of those fundamental parts of what human life depends on. By doing so, we wanted to change humans idea of natural resources from something we take from nature and make use of, towards something we maintain, co-exist in and may borrow from.

In addition to the idea of utilizing wearable technology to move humans towards acceptance of technology being a part of our body, as well as hopefully making us more aware of nature, we created a social media account that was supposed to represent the bees in the community. The media account should speak for the bees by portraying a bee in a human setting. For instance, we created an Instagram-account (username: instabeeornot2be). By utilizing social media, we hoped for an easy way of encouraging others to join the movement. In addition to work as a promoter to gather more members and create awareness, we figured that the social media-accounts potentially could be a tool for support. We suggested that the social media-accounts could be connected directly to the beehives and provide updates and status to followers and community members, that they could, for instance, utilize in their maintenance of the beehives.

Inspired by *Homo Agricult* and working with personas of natural things, striving to balance the gap between humans and nature, we created a physical representation of a queen-bee — also named *Cybee* — made of plaster, see figure 4.6.

Figure 4.6: Our queen-bee named Cybee

Cybee was supposed to be a board member of the beekeeper community. The queen-bee would be based on artificial intelligence and be connected to the beehives in similar manners as the social media connection. By proclaiming interests and needs for the bees in the community, *Cybee* would provide a voice for the bees that humans can act on, thus minimizing part of the divide between nature and humans.

4.2 The Folk-project

During a six week period (25th of October until 11th of December), I attended an innovation sprint initiated by Emergence School of Leadership and Folk Oslo. Emergence is a school offering a one-year educational program *"focus[ing] on educating next generation project leaders, quite often to the creative industry."* [7]. FOLK Oslo is a co-work space aiming at connecting organizations and individuals that together may create innovative solutions towards a sustainable future [11]. Our task was to come up with business opportunities, based on circular economy for a given company. An important element for my later discussion is the group composition, how individual backgrounds and education etc. might affect the outcome of our work. In the following presentation of my field study, I will therefore start by elaborating upon the group and how it was put together, before presenting the study in more detail.

4.2.1 The Group

Each member of the group was handpicked by the team leader based on either their application through various channels or due to personal connections with the team leader. Neither of the group members had any relation to each other beforehand. The group was set to work with one of Norway's largest energy providers (from now on named The Company).

At our introductory meeting, all nine group members (including myself) was present, except The Company, which was introduced by our team leader together with the overall goal for the innovation project. The project was seeking to produce ideas and business opportunities for The Company by utilizing circular economy and hence sustainability.

The age span of our group was about 15 years, consisting of six male and three female participants, representing higher education within business and administration, economics, engineering, interaction design and marketing. Though some of the members had considerable working experience within specific fields such as waste handling, blockchain-technology, sustainable business-modelling, entrepreneurship (both founding and mentoring) and managing larger businesses within Information and Communications Technology (ICT), reuse and air quality. Except from the team leader's role, the group was without any form of hierarchy, leaning on each member's knowledge and experience.

4.2.2 The Challenge

The sprint was based on a methodological model provided by Emergence School of Leadership. The group was made aware of this model through an introductory information-email, where the model had been added as an image. The model was never explained to the group, nor did we have any participants from, or dialogue with, Emergence to help us comprehend the model, hence probably part of the reason why the model was never consciously utilized during our meetings.

The overall goal of the project was for several groups to produce ideas and potential solutions for various companies in relation to shifting focus towards sustainability. In particular, all groups were supposed to utilize circular economy as an inspiration to bring forward new possibilities. As briefly mentioned above, the Company is one of Norway's largest energy providers. Our group was introduced to some of the Company's challenges, that had been produced by the Company in collaboration with the team leader prior to our first meeting. These issues were based on

their present market situation and insight, and was made accessible to the group through a closed Google Drive-folder a few meetings later. As the document was a combination of both comments, challenges and some internal considerations on possible opportunities, the group agreed to use the rest of our meeting to abbreviate the document and hopefully create some overall themes that we could investigate further. As none of the team members had direct access to the given document at the time, the whole team worked together, successively through the document on a large screen.

During the approximately three hour long meeting, we managed to curtail the document into three main topics. First, **retention of customers**, which was dropping due to increased competition and lack of customer loyalty due to prizing. Second, **customers awareness towards energy consumption**. Third, **how to meet the assumed "littering" of larger household appliances**, in particular when moving from one household to a new one, we assumed there is some replacement of various appliances. The group agreed that it could be interesting to look into how the Company could be part of addressing this particular behaviour. While working on this abbreviation, a lot of ideas were discussed based on the interpretation of the given information. Based on this discussion, we agreed to work on our own on whatever topic we found interesting, prior to our next meeting.

Our next meeting was thirteen days later, without our team leader, who eventually had to withdraw from the position due to sick leave. The group agreed to keep working on what had been produced earlier without a specific team leader. As some of the members still lacked access to both our Google Drive and communication channel, we decided to work in a similar manner as the previous meeting. During the past thirteen days, some of the team members had gathered both insight and comments to our previous work, which was the main basis of our discussion during the second meeting.

A few meetings passed where the group kept discussing and ideating on various ideas. In short, trying to:

- Increase the overall knowledge and commitment within a household towards energy consumption.
- Charity by adding some sort of sponsoring on the electrical bill.
- Big data gathering about household appliances (life expectancy, materials, service etc.)

- Increased insight on peoples moving process, can the Company offer some sort of services within recycling and/or moving etc. when customers are moving?

- Leasing of larger household appliances, utilizing both sharing economy and subscriptions to hopefully increase the Company's ecosystem and preserve customers.

However, some of our ideas and mentioned challenges did not conform directly with the overall project goal of utilizing circular economy and address sustainability. This made the group rather insecure in regards to what direction we were heading. Without a team leader and the rest of the project leaders preoccupied with other teams, we struggled with the overall project plan. We also had some issues with the communication with the Company and struggled to gain further insight in regards to the Company's goals. However, we agreed that there was nothing wrong with our ability to generate ideas, and that we now needed to converge into something more tangible and mutual within the group.

4.2.3 Towards a solution

Based on personal experiences within the group, such as moving from a household to a new one, or breakdowns of appliances. In addition to some external discussion with various family members, friends and colleagues, the team realized that there was a potential in combining several of the above-mentioned ideas. As we had noticed during some of our research, The Company had invested considerable amounts of money in recycling facilities the past years. As visualized in 4.7, recycling is an obvious part of circular economy. Though, according to some of the team members, recycling is supposed to be the last resort, after trying to reuse and remake a given product.

The group discussed how the Company could take advantage of creating a platform that facilitate several of the phases within circular economy. Part of this discussion delved into some frustration in regards of both how hard it can be to recycle, as well as how fascinatingly lazy some people are when capable of dumping their washing machine in the ocean, when it probably cost you less to drive it to a recycling facility. We figured this kind of laziness and frustration regarding recycling could be a point of advantage for us to work with.

During this sharing of insight and resentment, some of the team members suggested to try and hide these potential frustrations within

Figure 4.7: Visualization of the phases within a circular economy [29]

the platform service. We assumed the Company could establish a platform solution where potential customers would lease larger household appliances. Within the leasing-service, the Company is expected to offer service, if breakdowns occur, and potentially new ones if not fixable, in addition to, dealing with transportation and recycling. The group agreed that this could have the potential of concealing any frustrating aspects of both moving from and to households, and potential breakdown scenarios, particularly in households with children where available time could be limited.

As additional meetings went by, we eventually managed to get a hold of both the Company and some of the project leaders. At this meeting, it turned out that the Company actually had some data that could be of assistance in regards to our overall idea. Though this data turned out to include sensitive personal information and due to the General Data Protection Regulation, the Company was forced to withhold it.

4.2.4 Value chain and journey mapping

In our final meeting, the team discussed data gathered from different areas that we had easy access to, such as students, colleagues and acquaintances. Furthermore, the group utilized knowledge within the group by creating a value chain and journey mapping (as visualized in fig.4.8 and 4.9).

Even though subscriptions that offered both transportation and service was quite appealing, it turned out that people, in general, are sceptical when it comes to leasing. Furthermore, the team was quite insecure in regards to how the Company could manage the financial aspects of such a

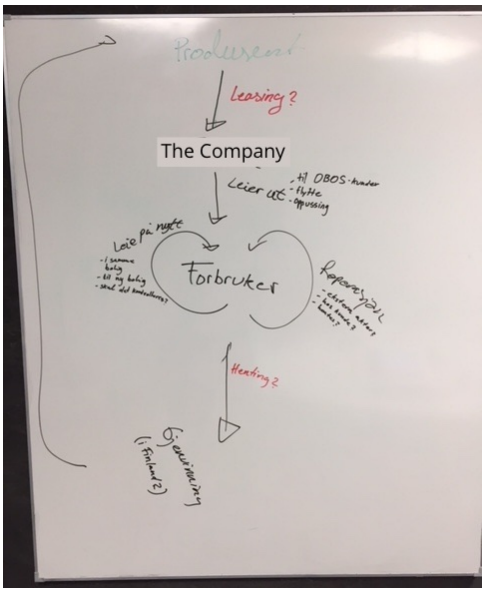

Figure 4.8: Our suggested Value Chain

solution. During some of the data gathering, it turned out one of the team member's father knew a guy who had been working with leasing for over 20 years. We managed to get a meeting with him, that turned out to be quite a revelation for the team and our idea. This acquaintance assured us that the financial part of such an idea would be rather lucrative for creditors and would be a minor struggle. We had regained some faith in our idea, with assurance from businesses within recycling and reconstruction, who were interested in such a collaboration. As well as, the financial aspect turned out to be manageable. With our deadline just a few days later, the complexity of our suggestion was still quite troublesome, the team was pleased with the overall idea. Still, we knew it could demand a great amount of effort for the Company to manage such an immense platform.

Figure 4.9: One of our suggested scenarios from our journey mapping

Chapter 5

Discussion

"Weniger, aber besser"

– Dieter Rams

In an effort to answer my research questions, I will in this chapter start by establishing that technology is value-laden. Building on this premise, I will highlight the role and responsibility that the designer play in designing technology for a sustainable future. Inspired by some theoretical contribution in the Human-Computer Interaction (HCI)-community I will consider design education as a viable point for mediating further sustainable design actions. Through my participant observation at the University, I will then discuss the designer's role, and consider the potential of utilizing personas as a tool for a more sustainable design development. As I suggest that a viable future require more than design expertise, I will finish my discussion by considering my interpretation of the FOLK-project. During this last part, I will contemplate on the potential that transdisciplinarity may facilitate for a sustainable design development.

5.1 The role that the technology plays

5.1.1 Technology and politics

In my Theory chapter I presented, amongst others, the article "Do Artifacts Have Politics?". In his article, Langdon Winner defines technology in a relatively wide manner, where technology is set to be "smaller or larger pieces or systems of hardware of a specific kind" [52, p. 123]. Based on his elaboration of "Technical arrangements as forms of order" and "Inherently political technologies" [52], Winner argues that technology is not neutral.

In comparison to the overpass example by Winner, mentioned in my Theory chapter, one can see how technology mediates forms of order through, for instance, a revolving door. This technology which typically consists of a given amount of doors rotating around a vertical mount, in either a clockwise or counterclockwise direction, demands particular behaviour as well as in some situations denying some users the opportunity to pass through. Moving impaired or people with any disadvantage in any way, may have trouble passing through a revolving door due to, for instance, lack of space for a wheelchair or the particular speed of the rotating door (or even the absence of speed as some revolving doors demand physical force to be rotated). Whether or not such a technology has been designed with the deliberate notion of excluding certain groups of people, one can see that the technology creates forms of order by demanding visitors to enter and exit a given building on different sides of the vertical mount of the doors, creating a particular flow. Furthermore, one can argue that this technology is inherently political in the case of excluding particular human groups who are unable to enter.

As another example of "technical arrangements of forms of order", briefly introduced in my Theory chapter, Carl Berners Plass in Oslo, draw some resemblance to Robert Moses' overpasses. The Norwegian Public Roads Administration sought a change in what was known to be a rather dangerous crossroad. The chosen solution was to remove all traffic lights and two of the originally four lanes, giving more space for the tram, busses and pedestrians in addition to a larger rectangle-shaped roundabout. Through several computations, the planners found that this particular solution would reduce the capacity of cars passing through with close to 40%. This matched the municipality's wish of shifting their focus from cars towards the pedestrians and public transport, as well as bringing back some of the original natural environment. By designing the roundabout as a rectangle and let the tram (which has the right of way) pass straight through the roundabout, the rectangle-shaped roundabout discouraged unnecessary passing of the area with a car. It is both cluttered in the way that all cars passing through have to obtain continuous knowledge of potential passing trams, busses and pedestrians. Which during the past years seems to have reduced the amount of accidents between pedestrians and cars as well as the number of cars passing through in general [42].

The design of the roundabout and its surroundings creates forms of order by reducing navigability for cars. Thus, one may characterize the technology as what Langdon Winner describes as a technical arrangement

as forms of order [52].

Furthermore, looking at toll gates could be an example of what Langdon Winner characterise as inherently political. Toll gates are not particularly flexible in its nature as there are few alternatives to driving through it, accepting the economical cost. In addition, it is quite obvious a means of control for the road administration by discouraging specific means of transport as well as provoking particular choices of routes for those unwilling to pass through the toll gate. This implies a great means of political power to the authorities through the technology of toll gates, which both gain financial support, and it creates forms of order [52, p. 128].

Another example that can be discussed in a similar manner, is the use of access cards and gates in, e.g. fitness centres. To gain access to these types of centres it is expected of the users to pay a certain amount of money, this payment is represented through an access card that will let you through the gates and into the actual training facility. By designing the entrance inaccessible without a card and without paying, the entrance serves as a validation of your mutual agreement — if you have paid, you are allowed to enter. The gate serves as a great means of control, as well as discourage — even denying — people from not paying for utilizing the facilities. Additionally, similarly as with the revolving door, the gates are often creating a certain flow with people leaving through one particular gate and people entering using another. Hence, the gates seem to produce some sort of order as well as being rather political in its ability to prevent unwanted guests.

Intentional or not, several proposals have been made to utilize the notion of value-laden technology to make humans act in a preferred way.

5.1.2 Technology and moral

While Winner discusses values of politics embodied in and produced by technological artefacts, Verbeek asks if technology can mediate intentionality and has its own freedom to act, thus having moral [48]. In ethical theory, Verbeek says there is a requirement of both intention and some degree of freedom to qualify as a moral agent [49, p. 93]. Though Verbeek highlights the importance of understanding intentionality and freedom in a technological manner. He calls for new perspectives where also our (human) intentionality and freedom should be perceived as not a "purely human affair", where technology often is key to achieve these aspects [49, p. 99]. By questioning human moral as not a purely human affair, Verbeek claims technology has some sense of influence on humans and hence should be

regarded as having moral values as well.

Trying to exemplify this statement — inspired by Verbeek's discussion of speed limiters in cars [49, p. 97] — the speedometer gives the driver an idea of moral decision in what is constituted as acceptable speeds on the road. We know what risk is entailed in driving faster than the speed limit; some of us might also have a notion of what speed is reckoned as the threshold between life and death. When I was getting my drivers license, this threshold was told to be above 60 kilometres an hour, anything above this limit was considered fatal, if one should be unlucky to hit a wall for instance. Though what speed we are driving in is a fairly complicated notion to comprehend without the speedometer. For a driver to get a sense of how fast he is driving, he looks at the speedometer that informs the actual speed of the car. Hence, the interaction between the technology of the speedometer and the driver constitute and mediate some sense of moral value; are you willing to take the risk of driving faster than what is advocated on that given road? As will be further elaborated upon in the subchapter "interpretation of design", all mediations and interpretations are not necessarily a "purely human affair", and furthermore not necessarily what was intended by the designer. In the example of a speedometer informing a given speed, it is still the driver's responsibility to interpret and evaluate the consequences of their actions to either maintain a given speed or adjust in a particular manner. Hence, the technology can be described as rather neutral in just informing the given speed, but it still works as a moral agent, shaping or mediating human action through our moral judgments based on the informed speed [49].

This implies that designers embed her intent and values in the technology through the design of it. As well as the technology acting back on us through our interpretation of the given technology and its mediation. This leads us towards the important aspect of the designer's responsibility, as also argued by Verbeek, who claims that designers are co-responsible for the technology developed [48, 49]. To better understand the values that designers base their design decisions on, I will in the coming subchapter explore the developments within the Human-Computer Interaction discipline based on Daniel Fällman's elaboration of the past 30 years of Human-Computer Interaction (HCI).

5.2 The values in Human-Computer Interaction

In his article "The new good," Fällman suggests HCI, during the past thirty years, has shifted its focus through several waves. The first wave was about information processing or metrics of usability through, e.g. "interactive systems [that] should be designed to be effective, efficient, engaging, error-tolerant and easy to learn" [10, p. 1052]. Fällman describes this as "rather disembodied emphasis on a single user operating a single application." Then, HCI moved towards a second wave of comparatively contextually aware and collaborative design practices, hence a strengthening of the user's influence on the design. Arriving at the third wave of HCI, Fällman suggests that the HCI movement responded to a need to design for an ever-increasing amount of contexts and multiple groups of various backgrounds.

Through his historical review and discussion, Fällman's concern relates to the tendency of usability seemingly constituting too much of designers focus. When asking what good design is, the general notion seems to be in relation to how well the technology is supporting humans in doing some kind of action or how effortlessly the user can utilize the technology. Which in itself is not a bad thing, producing useless technology is obviously not what one wants.

Nevertheless, by assuming this notion of technology being simply a tool for some particular part of a given task, the designers obtain a notion of technology being a completely neutral tool. Hence, diminishing technology to what Fällman describes as 'mere dead matter´. Doing so, Fällman argues that designers neglect the potential of technology having any values in relation to what I have described earlier regarding technology mediating politics and moral. This, according to Fällman, disavows any ethical accountability in regards of the designer and the technology, assuming all responsibility of the given interpretations of technology is in the hands of the user [10, p. 1058]. An explicit perception of this statement, would in my point of view, mean that for instance, the speedometer mentioned earlier actually has no effect on any drivers. Hence, one could argue that the speedometer could have been removed and the driver would still be able to interpret what is an acceptable and rational speed.

In some extent comparable with Fällman's concern, Eli Blevis through his "Sustainable Interaction Design" claims that:

> [...], the sense of human-centeredness in the HCI context is oftentimes construed as a notion of method in which

> engineering "needs and requirements" follow from cognitive models of "users" rather than a concern for human conditions, particular or global.[2, p. 504]

Where Blevis suggest HCI has embedded problematic meanings, Fällman describes the development HCI has undergone through the past thirty years. In the ongoing, third wave of HCI, Fällmann claims that the increasing complexity has led to a loss of focus (shared notion and common goal). Arguing there is a lack of critical perspective in regards to what is designed, Fällmann suggested a need for increased discussion around ethical and philosophical values of design within HCI.

Inspired by Fällman's shared notion and common goals, as well as Blevis's sustainable interaction design, I will in the coming subchapters, discuss the potential of sustainability being a part of the focus of technology development and hence design. To create a shared notion of sustainability within design, I will begin by discussing how technology and design might be interpreted in unforeseen ways by its users and what this may imply for a sustainable perspective within the field.

5.2.1 Interpretation of design

By looking at technology such as the internet in all its variations of use, one can see how technology might be interpreted in various ways. While in the very beginning of its development was designed as a concept of wide-area networking and collaboration between certain laboratories, the use and interpretation of contemporary internet is almost as vast as the number of people utilizing it. While the early developers of what we today look at as internet, probably did not foresee the abundance of effects this technology would have, it is a great example of how intentions and interpretations do not necessarily correlate. Designers may have only good intentions with any particular introduction of technology, such as the idea of swift collaboration over great distances. Though as recent events have shown, the interpretation of internet may also be seen as an underlying effect on recent political elections (and wars for that matter). Hence, users interpretation of a given technology may not be equivalent to the intentions of the designer.

As I suggest sustainability to be a greater part of Fällman's proposed focus for HCI, the above-mentioned conflict between intention and interpretation present an even greater challenge of complexity within design. In what seems to be a paradox; if there is no guarantee for

the introduced technology of being interpreted and used in a sustainable manner, one could assume that any intention of sustainable technology is futile. Though, this paradox would in any case of design be relevant. There is no absolute guarantee of a given design of technology not being used and interpreted by its user in other ways. Looking back at the speedometer, there are several examples of people interpreting the speedometer as a mean to go even faster, experiencing a kick by the informed speed. Furthermore, a cellular phone, for instance, may have been designed and intended as a communication device, though it is also capable of doing other sorts of tasks, such as removing the cap of a bottle. I am rather certain that designers of cellular phones did not intend for this technology to be utilized in such a manner, which may be the case of keys or cutlery for that matter, which often are used in a similar way, despite their original intentions.

This is where I interpret Fällman's article and proposed focus to point a rather important aspect of analysis within HCI. Fällman seems to argue that contemporary design view on philosophical values in most cases are utilized in a retrospective manner, as a tool to evaluate the effects of the introduced technology. Whereas Fällman seeks to move this evaluation into part of the actual design process and designers awareness. By being conscious of what a given technology might overshadow, as in what was needed to fulfil this task before the technology was introduced [10]. Or what Fällman relates to Albert Borgmann in the sense of hiding means through technology to meet ends, which I will elaborate further later on in this chapter.

As discussed earlier in this chapter, technology is non-neutral, and as such technology can be designed to impose certain behaviours and use. In some cinemas in Oslo, assuming visitors have both various sweets and beverages with them while watching a movie, the garbage cans as 5.1 shows, have been divided into two different purposes. Where one garbage can is meant for empty bottles and the other for garbage in general. To increase the possibility of visitors interpreting the various garbage cans as intended, the garbage can meant for bottles have been shaped like a bottle. Furthermore, to prevent any misinterpretation and unwanted garbage being misplaced, the opening of this particular garbage can is as small as possible, only suitable for bottles. Thus, creating forms of order [52] for the visitors as well as making the recycling of bottles easier. Hence, there are possibilities for sustainable design by, for instance guiding or simply provoke certain behaviours in a similar manner as the speed bump

presented by Bruno Latour (via Verbeek [49]).

Figure 5.1: Garbage cans at a cinema in Oslo

There are, however discussions in regards to this type of influence, as Verbeek points to a potential loss of human autonomy, for instance [49]. Which could suggest that, e.g. some may experience this as a violation of their human rights to freedom. Furthermore, as swiftly introduced earlier, Borgmann argues, there might also be a risk of detachment between the user and the ends of certain actions. Where in this example, the garbage cans represent our effort to manage our trash to meet an end where there is less tall on the environment due to garbage. By forcing certain behaviours such as the garbage can only allowing bottles, one could argue that the process of recycling and understand the need to separate different kinds of garbage, is concealed in an effortlessly demand to put bottles in one can and the rest in another. The means, in this case, by making recycling easy and convenient, might detach the user from the environment. Hence, the users might not understand what the means of doing this type of interaction to meet the end, that is to make sure we treat the environment in a sustainable manner. One could argue that this design is hiding a problem that the user should be aware of before throwing away her garbage mindlessly in a can, hence detaching the user

from the environment. Though, in this particular example, a lot of effort has been made to educate citizens in regards to why we recycle. Thus, I claim that this particular example is one of which could both encourage environmental-friendly behaviour as well as having educational values for those interacting with the cans.

Following up on the above argument, I suggest that these examples are showing how technology can be utilized to create forms of order by reducing the potential of misinterpretations of where to put what kind of garbage. As well as being of educational value for further environmental awareness. Though as my example of the Internet indicates, foreseeing all future potential interpretations of a given technology are almost certainly impossible, and by no means what I strive for designers to accomplish. The complexity that the unknown future creates for design, however, does not in any way have to be an excuse not to take nature and the environment into account when designing. Being aware of the values one inscribes in design as well as what the interaction between technology and humans might entail, is of particular use for future design, notably the implications on and apprehension of what a given technology and its use can have on and for the environment.

As I am aiming for sustainable design, and as the designers intent and values take form in and through the technology they develop, one can argue that the designer should incorporate the values of designing sustainable technology in their practice. To embody such a stand and build a value-set for future design, designers are dependent on being aware of their potential influence on both technology, humans and in my view, particularly nature and its environments.

5.2.2 Sustainability as the new good?

The endeavour thus far has been to highlight the assumed values technology can mediate and that I (amongst others) claims suggest a greater responsibility in regards to the designer. In the previous subchapters, I presented Fällman's article, where he separates HCI's changing focus during the past thirty years into three distinctive waves. Fällman points to a lack of precise characterizations of what contemporary HCI strives for as a discipline. Asking what "the new good" of HCI might be, Fällman suggests a greater, collective, focus towards ethical assessment, proposing philosophies of technology to be this new good of HCI.

Part of his assertion emphasizes a need and understanding of a shared notion and common goal of what it is HCI strives for [10]. Where

Fällman suggests, or call for, an extended discussion in regards of guiding visions within HCI, suggesting the "new good" of HCI to be in regards of philosophy of technology [10, p. 1059]. I claim that there is a distinct need for a common goal of a viable future and thus, a shared notion of sustainability within the fields of HCI. Suggesting a potential "new good" where design, and in particular designers, acquire a mindset of — and recognizes — what technology and design may have of influence on the environment through its mediational potential.

Shared Notion

Through Fällman's elaboration of HCI's different waves of focus during the past 30 years, he suggests earlier HCI movements have had an apparent focus — or shared notion — of what HCI strives for. In Fällman's opinion in the first wave, this shared notion was in particular towards usability, in regards to singular users operating singular technologies, hence a rather narrow task-orientation from the designers perspective. This focus expanded further in the second wave where designers recognized a need to move its shared notion of usability from a particular user and her work case, towards teams collaborating and using several technologies. As we move nearer contemporary HCI practices, Fällman claims the shared notion diminishes. By expanding the idea of usability to include activities, exploratory and playful user experience (to name a few) — not only in — well-defined work situations, Fällman argues that theHCI movement seems to be without any clear set of core values. Based on this characterization, Fällman seeks a coherent, shared notion, of what HCI strives for in today's design practices [10].

Fällman claims contemporary use of philosophy, and it's values have been utilized more in regards of retrospective evaluation of technology. In other words, looking back and evaluate how "good" the technology is in doing what it was intended to do. Fällman suggests a clearer shared notion could be within the discussion of ethical values, especially within the philosophy of technology [10]. Based on this, I suggest that a particular shared notion of what sustainability is and entails for design is of great importance for future work within HCI.

During my work, I have attended an abundance of workshops and seminars that proclaim some kind of sustainable value for our future. Though, I noticed a recurring personal perception, after most of the seminars, that the word sustainable/sustainability was in regards of how the given company could sustain itself, through the trending movement

of environmental sustainability. Hence, more in the direction of some marketing value and less in any ethical, philosophical manner. As an example from one of the seminars I attended, a global manufacturer talked about their immense financial investments in wind-powered energy, as an effect of this investment, the company would become self-sufficient on green energy. Thus, claiming to be sustainable by providing all their factories with renewable energy, disregarding any other view where they demand extensive material needs in both production and the products they offer to the consumer.

As mentioned in the Introduction chapter of this thesis, over the past 40 years, there have been research calling for sustainable actions [26]. In relation to this, and the above suggestion of sustainability as part of "the new good", Engelman argues that we live in an age of "sustainababble" [8]. Where he claims the term sustainability is more typically exploited by the corporate world — better known as greenwashing, where products and services are described as sustainable without any consideration of what that actually implies or as Engelman puts it: "a little better for the environment than the alternative"[8, p. 5]. In a similar manner to my perception, Engelman claims there are too many interpretations of what sustainability is and entails. To constrain this tendency of sustainababble, HCI as one of many fields, needs to create a focus and shared notion of what sustainability is, means and entails for design and technology.

Means and ends, suggesting a "new good"

As mentioned earlier, Fällman discusses the possibility of philosophy of technology and its values as a "new good" for HCI. Fällman claims the focus of HCI seems to be in relation to utilize technology to meet some discovered need, or achieve a certain objective. Claiming too much of the focus have been on what Borgmann describes as "ends", where technology is utilized in particular as a tool for humans to meet any certain goal or desire, hiding what is actually going on in the background. Thus, ignoring, for instance, what a given technology and design might demand of natural resources, this demand is what Borgmann describes as "means". I suggest a focus for HCI and design to ensuring values of "means" being as obvious as the "end" within design. In this way, we can better understand what materialistic demands we put on the environment when introducing technology.

Given that sustainability becomes part of the designer's values in design development, one could assume that designers incorporate sustain-

able values. Future technology might be designed (or maybe not designed at all) with the environment in mind and thus be able to "sustain the sustainable" as a response to how Tony Fry describes contemporary design practice of sustaining the unsustainable [18, p. 24]. Designers might acknowledge both their responsibility as well as what values that can be mediated through technology and use. Though, How are designers supposed to commence a shared notion of sustainability in their design? From where should a world view of such values come from?

5.2.3 Design Education

My endeavour in recent chapters has been to highlight that design and technology is non-neutral, as well as what responsibility this may entail of the designer. Furthermore, I have suggested sustainability to be a distinct focus for designers, as it seems contemporary HCI may be particularly fixated on the notion of usability [10]. Arguably disavowing the power and responsibility of technology and design, particularly in regards to the environment. Assuming such an established focus of usability within HCI must have been incorporated from somewhere, I will argue that our education could be a potential place to start.

In the coming subchapters, I will discuss how the education of designers may be one particular channel where responsibility and viable futures are sought. Suggesting that an even greater focus on the environment in the education of designers might play a vital role to reach a more sustainable future. To get a perception of what it seems designers are taught, I will elaborate upon a selection of Tony Fry's work in relation to design education. I will first, look at a potential void between design education and academic design research. Before I discuss how the design student can be an important element to reach a viable future of sustainable design.

Instrumentalized education

In my thesis, I have presented several academic design researchers, highlighting a need for a greater focus on sustainability within design. Assuming that the design education is based on findings in academic design research, one would expect a similar focus being present within the education of design. However, there seems to be a noteworthy gap between design education and academic design research. The educated is notably instructed in regards to being prepared for the labour market through uncritical adoption of design processes, methods and empirical

studies of design in use [15, 16, 18]. Claiming that design education (and education in general) is totally instrumentalized [16, p. 3], without any particular understanding of what design is and does in a global sense, Fry says:

" [put] Bluntly, designers are not adequately educated about the nature of design, its presence in the world and its futural consequences. [16, p. 4]"

In my point of view, Fry's statement draws resemblance towards earlier discussion of responsibility being put in the hands of the users. If Fry's description of contemporary design education is inadequately educating students of the complexity that design possess, one can question design students chance of, and ability to, acquire any sought for comprehension of their common notion of designs impact on the world and ourselves. Hence, any education disregarding the power that design seems to have, leave the responsibility to fathom these implications in the hands of the student.

Based on earlier mentioned intention and mediation of technology, what does it imply not having a conscious idea of what sustainability entails within design education? As students of design, we bring with us a toolset based on what we have been taught, and what Fry, in short, describes as "design as a service industry"[18, p. 20]. Where Fry claims universities, in general, are too focused on the idea of producing graduates for the labour market, serving industry needs and desires, educating for the past and not the future [15, 16, 18]. If we as designers inscribe values to technology without any obvious relation and idea of what technology entails in relation to means and ends, any form of sustainable action and reaction based on the adoption of a given technology would just be mere luck. Hence, a holistic world view that acknowledges the potential effects of design is required to at least make the design, in itself, sustainable.

Given that contemporary design, education is as constituted by usability and hence, as instrumentalised as described and discussed so far, or what Blevis describes as a potential ontological blindness [1, p. 504]. How are educated designers supposed to both comprehend the potential effect of their design, as well as get a notion of what this may imply for our understanding of and toll on the environment? As I will elaborate further in the coming subchapter, one can not simply assume that any change or addition of views will occur from nowhere.

The designer in education

Given the above-described design education, there is a need to emphasize that my endeavour is not to criticize the education, nor is this part of the

scope of this thesis. Though, an important aspect of recent discussion is a necessity to comprehend and acknowledge what design entails and what the non-neutrality of it implicates. Furthermore, as I thus far have been trying to elaborate on some relations between design, designer and the values within the designed. The characterization of design education presented above seems to disregard a great part of the potential impact of design. Without any notion of what the effects of design might have, how are design students expected to comprehend their position and responsibility?

Design education seems to be concentrated on particular use cases and the understanding of what a given user needs and wants. Any educated designer appears to be facilitating a notion of technology being a neutral tool for humans to overcome or in some sense, conquer the world. In what might be described as designers visioning design as a human-to-human relation. Disregarding that we, as human beings, and everything we create and use is inevitably part of something bigger than our self. There is a need to establish a sense of ontological understanding of humans "being-in-the-world", where design is not only a mean to meet ends, but also a mediator between humans and our lifeworlds. This view needs to be understood as a circle where the world is both designed upon by us and designing us as beings in the world. The complexity that such a view creates is immense, and I do not expect students of design to obtain every possible aspect of it. Though, as it seems, these values are not, in particular, being taught in contemporary design education, any notion of this view is better than nothing. Being able to articulate what is designed, why it is designed, and in particular what the consequences of the design is, could be a great means to take us from where we are to where we need to be [17, 18].

The venture throughout this theoretical discussion has been to highlight that technology and design is value-laden, in addition to what one could expect of design practitioners in regards to values being inscribed in what is designed. There seems to be some sort of conflict or at least distance between the researched design theory and the education of future design practitioners. Though, as I am potentially one of these soon-to-be practitioners of design, I am — in a way — contradicting myself. By discussing what I do understand of design theory through this thesis, I am to some degree presenting observations of what Fry and Fällman (amongst others) suggest is lacking in design and it's education. Hence, one could to some extent, argue that the education is producing a notion of critical and ethical values in this regard.

In the coming subchapters, I will based on the discussion thus far, examine the two particular field studies that have been introduced in the chapter 'Field Studies'. In an effort to discuss parts of the established design education in light of sustainability, as well as discuss how my role as a designer and the values of designing may or may not have influenced these particular studies. The coming chapters will be structured in a similar manner as recent discussion, in an effort to compare contemporary design theory with what I comprehend of some design practices through the given field studies.

5.3 The role that the designer play

As described in subchapter 4.1 Research through Design, my fellow students and I initiated our school project on the basis of Jonas Fritsch's article "Affective Interaction Design at the End of the World" [14]. Additionally, as mentioned in the Research through Design section, our design brief was:

" Use affective interaction design as a theory of change, use personas and futuring as ways of designing, for telling new stories about what it means to be human to inspire real political change on a global level."

Our ideas and suggestions were all based on collaboration within the group. Both earlier studies, design knowledge, as well as what we have been shaped of through our different lives, played a part in our work. Through the five weeks of work, the group created several design proposals and prototypes, that was aimed at creating some kind of affect on the humans interacting with it. These prototypes were all mainly based on our perception of Fritsch's theory of affect, as well as our worldviews and ideas of potential futures.

5.3.1 Imposing design

In our group work, we were supposed to obtain a notion of being transition designers. Transition Design (TD), as described in my Theory chapter, aims at transitioning humans towards a holistic worldview. Transition designers are expected to have an understanding of the interconnectedness of social, economic, and natural systems [20]. This might be seen as a potential response to Fry's apprehension of contemporary design, which he claims is sustaining the unsustainable [18, p. 24]. As our work was supposed to be done in five weeks, there is of course limitations in regards to how much we were able to comprehend. Nevertheless, we managed to create a rather

extensive suggestion of both prototypes and ideas of potential futures.

By utilizing the potential of design and technology as described earlier, one can assume we as designers have an opportunity to force changes upon anyone. As in the example of trash cans in cinemas, design has the capability of forcing certain behaviours. This ability to potentially dictate desired behaviours through what is designed raises a question in regards to an authoritarian manner. Are designers and design supposed to govern, or just facilitate for desired futures? As our goal was to provoke and — in a way — facilitate for change, I come to question how we as four designers, are in any particular position to claim the responsibility to make any sought for changes.

Based on earlier discussion, technology can hold powerful values. As students of design, we learn to utilize these values to meet certain user needs. Given that contemporary human lifestyles are unsustainable and that we must change our habits — and if design education is as service-oriented as described by Fry [18, p. 22] — on what basis are designers supposed to recognize which design that is not sustaining the unsustainable?

5.3.2 Nature as an actor

Assuming we are living in an ecological pressured world and utilizing affective interaction design as TD's *Theories of change* (see chapter 2.6.2), we figured that a practical approach towards human affect could be within the notion of conformity. Conformity, in this sense, is to be understood as social influence, where humans interacting in the community might feel part of belonging, and possibly an attachment to something bigger than oneself.

Based on our *futuring* of humans, some time in the coming 100 years, acknowledges and wish to be a greater part of nature (and to some degree technology), we thought of appropriating the perception of being part of a community. We assumed that being part of a community could bring about some sense of conformity. The community was supposed to be a combination of both humans as well as bees and technology. We figured that the concept of beekeepers and a community in this regard was not a new idea. However, to bring the bees within the community in a more literal sense could possibly generate new perspectives and attitudes towards nature. We assumed most of the reason for beekeeping was in relation to a form of self-interest, as a hobby for honey production in some sense. By forcing a greater attention towards the bees themselves, we

figured there could be a possibility of preserving the *means* to an *end* in several ways. The *end* in this case being the production of honey and, to some extent, leisure activities. Furthermore, *means* generating a notion of what the production of honey is actually depending on, as well as, potentially enlightening the notion of human reliance on bees in a broader sense than only as a provider of honey.

Part of the mentioned assumption of humans lacking a perception of dependency of nature is in a way comparable to *means* and ends, through humans use of technology, helping us meeting an *end*. The group obtained a general stand of humans positioning themselves above, or at least apart from nature. By utilizing technology, we as humans have to some extent, reinforced this conception and enabled ourselves to "conquer" or become a master over nature. As well as technology in itself has demanded a toll on nature through the resources needed to create the technologies. As a tool, technology has, to some degree, blurred our understanding and the *means* of nature as a provider of human life. With nature being neutral in the sense of its inability to directly communicate and act on human behaviour, our way of living in the world can be viewed as rather politically unbalanced. This power structure where humans and our technology in a short-term perspective have almost limitless capabilities, are in the long-term inevitably reliant on a functioning planet. Without any obvious and immediate way of communicating any toll on itself, nature can be considered a silent actor, that humans have a tendency to neglect our dependency of. This notion of nature, not necessarily being a neutral actor, but an actor lacking an ability to speak for itself in the short-term perspective, was part of my essential inspiration to utilizing personas on natural objects. I was curious about the ability of personas providing a voice and in that way potentially equalize what I considered an uneven power structure between humans and nature.

5.3.3 Personas

The idea of personas on non-human actors was adopted by the group I was part of as we saw it as a potential tool for further ideation. During our work with personas, we gathered a lot of information and insight in regards to challenges and needs that bees have and must endure throughout their lives. This information, such as theories about bees dancing to communicate in what direction other bees can find nectar, was utilized in our personas. Other research was, for instance, viruses that deform bees when in their larval stage, causing deformation of their wings in particular.

This exact challenge demonstrated needs of access to a particular fungus that can help the bees fight the virus. Both examples provided us with behaviors, needs and frustrations that the bees experience, thus, providing us with design implications to work with.

This application of personas on something non-human, was a new concept for us, and seemed to be a rather unexplored idea in regards to what we could find of others work on similar ideas. As stated in my Theory chapter, personas are descriptions of a user's characteristics and what this user wants to accomplish. There are some difficulties to precisely address what nature, or bees in this particular case, wants. Especially as our group had no prior experience or knowledge within these fields of study. As well as the rather obvious lack of a verbal way of expressing needs and wants in a humanly direct manner. That said, personas can provide a context of observed behaviours which research within fields of melittology and biology provided us. These behaviours I suggest have some similarity to humans, they are based on certain goals that can be assumed to be the drive behind observed behaviours. As such, we were able to identify certain areas of potential focus — for instance, the above-mentioned virus and dancing.

5.3.4 Giving nature a voice

In addition to producing particular behavioural patterns, needs and goals, I realized that the idea of utilizing personas in this manner also created a common reference point, or *shared notion*, of something rather obscure. Personas, in this sense, is more like a cooperative mechanism within the group, providing a specific focus. Through a *shared notion* we provided a voice for nature. By giving this "silent" actor a place within the design process, I claim we were able to both create a tool for cooperation within the group, as well as equalize the assumed unbalanced power structure between humans and nature. This democratization also seemed to have its impact on other parts of our work, as we realized that we could bring the bee into human spheres of the board room of the beekeeper community as well. By giving the bees a voice through personas, we figured we could utilize this notion of a voice even further through a modelled bee. Based on artificial intelligence, communicating with sensors within the beehive and manufactured drones, we sought to bring status updates from the bees to the board of the beekeeper community.

However, by providing nature — and bees in this case — with a voice, there is still no guarantee of a precise representation of their particular

needs. Not only are we, as design students, lacking competence within the fields of biology, but the personas are based on assumptions of non-humans needs and goals. Even though I describe the personas as a way of providing a voice, the bees are still unable to give any immediate response to our work. This way of "collaboration" between human and non-human, in this case through personas, can be described as producing a sort of pseudo-human. This pseudo-human is representing more of a human, being another species, and reducing the notion and understanding of the silent actor it is supposed to represent. The bees, in this case, are inevitably non-human, unable to express themselves and are in this view neutral. We, as designers, might identify design implications based on these given personas, and any design based on these personas can potentially aid and guide bees.

However, as personas on bees can be seen as a way of humanizing non-humans, there is a potential of disregarding the already discussed notion of *means* and *ends*. If the personas are utilized as a tool to provide potential design implications, one could argue that we as humans, and designers, to some degree, will disregard the *means* behind what is designed to meet an *end*. By providing support for the bees, we could potentially forget our human reliance of bees. Hence, a design implication could also be as damaging as any other assumed negligence of bees and nature. For instance, lack of sources to nectar might be one reason for the decline of bees. One of our suggested ideas was to utilize technology to guide bees in the direction of nectar. As such, we use technology as a tool to help the bees. Though, one could probably assume that some of the reason to bees' shortage on nectar is human's lifestyle, pollution and construction on places previously filled with sources of nectar for instance. In this sense, we provide a tool to help the bees, but in the same way, we neglect that it is our lifestyle that might need to be changed to prevent further decline in the bee population.

In addition, some of the suggested prototypes we produced, require extensive use of technology. To produce these types of technologies, there is an obvious need for materials, and as such, we are in many ways sustaining the unsustainable [18, p. 24].

I suggest that personas in this matter not only provided the group with possibilities of ideation by providing a context and possible sets of inquiries for particular needs. It also functioned as a shared notion of what we were designing for, as a tool for collaboration and focus. While bees by themselves might be unable to participate in any direct manner

of a design process, the application of personas on bees, show that we are able to create both a common objective as well as producing design implications based on our secondary research. By doing so, we were able to give the bees a sense of participation and voice in our design process. As a response to some of the critique I have mentioned, I suggest personas first and foremost as a tool to alter our focus and raise awareness towards the silent actor of nature. By doing so, I suggest there might be a potential of acknowledging nature as an actor that we undeniably rely on and need to take considerations for when designing.

5.3.5 Lack of Transdisciplinarity

Even though we gathered quite a lot of insight related to bees and beekeeping, we had no prior experience with either of the above-mentioned approaches. Our research was only based on internet searches and information we could gather from studies of bees we found during this process. As we had no background or particular expertise, we had to assume the information we found was valid. By utilizing other fields of study, as well as attempting to include bees in the design process, the process can, in some sense, be characterized as a type of multidisciplinarity. Though, as there was no actual participation from neither bees nor experts on the fields, our work can at best be characterized as crossdisciplinary. A weakness by working in this manner is the possibility of misinterpretation and potential of neglecting important signs and values. Through our work, it became obvious to me that a conscious notion of how we utilized other's research and assumed particular implications in regards of the bees is crucial. Assuming we as four designers were able to interpret the research correctly, there was still no way of assuring the quality of our suggested design.

To avoid the above-mentioned difficulties, as well as to provide other values and viewpoints, I suggest a conscious utilization of several fields of expertise is a particularly powerful tool for future work. In the coming chapter, I will in greater detail discuss a proposed awareness of transdisciplinarity.

5.4 Folk-project

Within a time frame of six weeks, as described in my Field Studies chapter, I attended an innovation project aiming at producing business opportunities within circular economy. The team consisted of nine participants with

various backgrounds, education and experience. Compared to the previously discussed Transition Design-project, that consisted entirely of design-students, we were able to combine several disciplines in this particular project. With a diverse set of competence, one can argue that this particular project was more in the range of transdisciplinarity, as described in my Theory chapter.

Rather similar to the formerly discussed project, the premise of the work was in relation to sustainability. The objective was to produce alternative angels of business towards the consumer marked with circular economy as a source of inspiration. Our work was expected to be based on consumer insights as opposed to the work done at the university that was predominantly theoretical and lab-based. The main goal of the FOLK-project was to utilize circular economy to look at business opportunities for a company, thus possibly giving an impression of being more of an economically fixated task. Though, as described in my Field Studies chapter, both our process, methods and focus, bear similarities to design-work. In particular, our end product and proposal was directed at the consumers of washing machines and how to provide services for these potential users. The notion of circularity is not an unknown focus within HCI (e.g. [2, 17, 21]). Though, the scope of this thesis is not in relation to discuss whether a project is within the lanes of HCI, I will in the coming subchapters be looking at particular parts of our work in light of collaboration between several disciplines, its potential and how this may have any influence on future work. I will utilize the previous discussion as part of the frame of my considerations of transdisciplinarity as a potential tool within HCI.

5.4.1 Transdisciplinarity

One of the notable differences between my two field studies was the combination of participants, where the FOLK-project consisted of both designers, economists, technologists, engineers and entrepreneurs. As such, the project was far more diverse in the perspective of disciplinary knowledge and experience, thus position our work well within the terms of multidisciplinarity. Furthermore, the group collectively defined both focus areas, challenges, goals and strategies, as well as utilizing knowledge from our varied areas of education. In addition, we gathered actors with specialized insight from different fields from our extended network and interviewed users in relation to both issues and potential solutions to our defined focus area. Hence, I claim we were working by the

notion of transdisciplinarity. That said, the scope of this thesis is not to decide whether or not a group of people are precisely within the borders of transdisciplinarity. Though, a clear understanding of what transdisciplinarity entails seems to be of great importance. Based on my interviews of five of the group members, as well as my interview with one of the architects of the Carl Bernes Plass, there seems to be a gap between implementation and the general idea of transdisciplinarity. In particular, this revealed itself when the architect tried to describe their initial work on Carl Berners Plass. The architect positioned their work as obviously transdisciplinary, with several actors from various disciplines working together on a joint mission. Though as the architect elaborated further on the specifics of their work, it seemed to me that the collaboration was only in their implementation-phase. The architects produced an idea, delivered their sketches to various engineers, who then had to formalize the specifics of how to implement and construct the idea. As such, the process was more of a traditional linear production line, where the different fields of expertise had little to say on the overall idea as it seemed they where only a part of the actual execution of the planned work.

A particularly fascinating comment the architect had, was the discovery of how the benches in the area were of little to no use for some people. After the project was completed, the architect had been on an inspection of the Carl Berns Plass, where the architect got in touch with a man using crutches due to an injury. He was frustrated as it turned out the benches were too low for him, making it impossible to rise from a seated position. The benches that had been ordered were several centimetres lower than what is recommended in general, as such, regarded useless for disabled people. One could assume this specific example might have been avoided if several actors, both people living in the area and experts on particular fields had been included throughout the greater part of the process.

I will in the coming discussion elaborate on the potential of what the group in the FOLK-project formulated. As I claim a considerable amount of our ideas originated from the diverse knowledge within the group, I assume our suggestions might not have been realized if we were to work in a similar manner as described in the Carl Berner example.

As described in my Field Studies chapter, during the FOLK-project, the group discovered that the Company had invested a substantial amount of money in a recycling facility. Based on this discovery, the group realized that the Company could utilize their investment as part of an almost complete circular service. Except for the actual production of a device, the

Company could provide users with a complete service of some products. In this particular case, we chose to focus on washing machines. As one of the group members had specific insight into recycling, we knew that a considerable amount of technological waste could easily be fixed and reintroduced as secondhand products. By utilizing leasing, we figured that the Company could control the better part of the value chain of a washing machine. As a result, the Company would also be able to control the lifespan of a given washing machine. Furthermore, by utilizing leasing, the Company was enabled to keep a closer relation to their customers. As we had gathered insight from experts both within and externally, we knew that the financial model of leasing would not be a problem to handle for the Company either. The customers, on the other hand, would never have to worry about breakdowns as the Company was expected to handle the repair or recycling of the machine if this was needed. All the users needed to do was to subscribe to the service and contact the Company if any problems occurred.

This idea was a combination of several actors knowledge and expertise within the group. Combined with insight gathered from various potential users, as well as, external professionals within finance and recycling. A discussion in relation to whether or not this idea could have been conceptualised in isolation by, for instance, a group representing just one of the disciplines is rather hypothetical. Though I suggest that the potential accuracy and assurance our solution is based on would be difficult to match. Thus, the strength of working as transdisciplinary as I claim we were, shows great potential of transdisciplinarity being a valuable tool for a more sustainable design development.

The challenge of hiding responsibility and care

However, at the outset of my discussion, I considered Albert Borgmann's notion of *means* and *ends*. Borgmann highlights the potential risks one might impose by "hiding" certain steps to meet an end. In this specific case, we addressed the frustration and inconvenience of breakdowns of washing machines. With our solution, this frustration would be removed as the Company would replacing the broken machine with either a new or a second-hand washing machine. In light of Borgmann's theory, the service could quite possibly weaken our understanding of care for things. This detachment may be further intensified as the washing machine is leased and not of a particular relation to the user, as one might assume of a self bought machine. As I have no insight to back up these possible scenarios,

I do not intend to make any allegation. Though, as my endeavour thus far has been to show the potential of transdisciplinarity in future work, I come to question the group's capabilities and understanding of sustainability and the potential effects of our solution.

5.4.2 Sustainability as the new good

The FOLK-project was a combination of several independent groups working with different companies, with a goal of providing business opportunities within circular economy. As such, our work can be viewed as producing sustainable suggestions for the Company. To some degree, we as a group did facilitate for sustainable actions. We utilized our various expertise in a collective manner to offer a potential transformation for the Company. The Company would be able to maintain a steady connection to their customers through their lease plans, and they would secure a steady source of material for recycling, as well as, preventing premature recycling through their repair and secondhand service.

In many ways this draw resemblance to a modern way of offering cellular phones. Where any subscriber to the cellular service are leasing their phone as part of the cellular service. If your phone breaks, or a year passes by, you are able to exchange it in a new phone. This idea of a product "as-a-service" is not necessarily unique in any way, but there are some potential pitfalls, as I mentioned briefly in the previous chapter. It may pave a road to increased consumption as the service in itself provide convenient ways of managing the frustration of breakdowns. Thus, the service could be viewed as blurring the notion of care for our belongings. In this particular example, it is further amplified by the opportunity to exchange your phone after a year as well.

Shared notion

In the previous discussion of sustainability and the shared notion of its interpretation, I referred to Robert Engelman's description of sustainability being used as a mechanism for corporate greenwashing [8]. It is tempting to assume the above-mentioned services are of such examples, though, as it is not within the scope of this thesis, I will leave the judgment in the hands of the reader. Nevertheless, in a similar way as the above-mentioned example of cellular phones, it may seem that the notion of sustainability vary, both within the group I worked with, as well as, within the project managed by FOLK and the participating corporations. Viewing sustainability as a pure marketing strategy, as Engelman suggests, is one

way of assuming complications within the notion of sustainability. As this suggests, we are interpreting sustainability in regards to a corporation — how can we make sure the corporation will sustain?

Another perspective, rather similar to the above, is the quest of sustaining a service and customers. Which I suggest is a more fitting description of the service that our group advocated, as we attempted to create an ecosystem that the users would be fairly reliant on (or even locked into). Obviously, a corporation would do its best to maintain its income, or else it would cease to exist. As such, the term sustainability, is quite applicable in many situations, but it raises questions of what is sustained, and for whom something is sustainable?

Even though this particular part of the discussion is an endeavour to assess and suggest a conscious accepted perception of sustainability, I think it is worth mentioning some difficulties with the term in itself. To begin with, there are a plethora of ways to interpret the word. There is no clear content of the word that can tell us what is supposed to be sustained. As mentioned above, it may also differ by the perspective and self-interests one holde. Introduced in my Theory chapter as my foundation and understanding of sustainability, the Brundtland-commission's characterization of sustainable development as "ensuring present needs are met with a focus on a viable future", does not give any explicit notion either. Whose needs are we talking about, and whose viable future? Based on my interviews with the other participants in my group, this vagueness of what was to be sustained became even clearer. The majority of participants were first and foremost, focusing on the Company's ability to sustain itself and to utilize consumer's needs to make this possible. Only one participant seemed to be questioning our choice of action in relation to nature and its ability to sustain and prosper, as a requirement for humans to do the same.

Assuming this diversity of potential approaches and perspectives, as mentioned in previous discussion of shared notions, there is an obvious need to make sure there is as little room for misconceptions as possible. A transparent, shared notion of sustainability, as in whose needs are at stake when talking about overconsumption and pollution, is certainly required when working in transdisciplinary teams.

Common goal

Despite my recent endeavour to highlight the potential misinterpretations — and even more dangerous — exploitation of sustainability. As well

as, discussion in regards to what extent our group had a shared notion of the term, I claim that our goal was rather collectively agreed upon. The common goal of our work was expected to produce new business opportunities for a company, based on an alternative economic perspective. This common goal, seemed to have its effects on our shared notion of sustainability, as the group in general, perceived the final suggestion as less materially demanding and could keep products in use potentially longer. Furthermore, it was of convenience to the users as they no longer would have to bother with transportation and breakdowns. That said, my attempt in this subchapter is not to assess the potentials or the quality of the group's idea. My endeavour is to suggest the possibilities that arise through transdisciplinary work and the importance of a conscious shared notion, towards a common goal.

Previously I have discussed Borgmann's theory of *means* and *ends*, that I consider having a relation to, in particular, common goal. As a goal and an *end* in many ways do have a resemblance — reaching a goal is to some extent reaching an *end*. In this discussion, I claim the resemblance is of particular importance as we need to understand what the actual *end* through our solution may entail. Looking at the groups suggested idea as positive as possible, it may form a platform where less material harm is put on the environment. As such, the idea's *end* and our common goal could be assumed to be similar. Though, as I have tried to point out earlier as my understanding of Borgmann, reaching an *end* without any understanding of the *means* might also distance our understanding and connection to what we are inherently reliant on. In this regard, our common goal — to produce a solution for a company — obscure the perception of nature as not only a source to support our needs, but something much greater, something we as humans are not above and free to use. By producing a solution of convenience for a given user, as we did, the distance between user and nature might be increased. Our common goal of assisting a company towards a potential, less environmentally demanding solution in this point of view can potentially reduce users connection and understanding of dependency on nature. In this perspective, our common goal was entirely based on the interests of a company, we gathered some potential needs of a user that we could utilize to produce business opportunities. Though, in similarity to the discussion of the term sustainability, I believe there is a need to view our common goal in nature's perspective as well, maybe more than in the interests of sustaining a company. Is the common goal to sustain a company or to sustain nature? And if one agrees on the latter,

what may the needs and interests of nature be?

As a closing remark on the discussion of transdisciplinarity, I suggest there is a huge potential in utilizing a diverse set of experience, knowledge and perspectives. Though, just as with the term sustainability, there is a great need to be aligned in regards to what the group is actually seeking to produce. As I do think, my example of a transdisciplinary group's suggestion is showing, it is limited help in just putting together a diverse team, telling them to produce something sustainable for a company. As some of my endeavour through the discussion of sustainability was to show how the term can be viewed in various ways, there is a great need within a diverse group of people to be collectively aware of what sustainability entails and demands, as such, a shared notion of sustainability is needed. Furthermore, by even assuming something ought to be sustainable, I suggest a greater part of the common goal should be based on nature's demands, with a conscious awareness of what we are preserving — nature — and whom we are hired to produce solutions for.

Chapter 6

Conclusion

"Erst kommt das Fressen, dann kommt die Moral."

– Bertolt Brecht

During my work, what has been reoccurring to me is how reliant we as humans, are of nature. How we treat nature consequently affects us, hence, as I described in my 1 and have utilized as my thesis title "We get what we give". As will be elaborated further in the next subchapters, if designers can acquire a certain mindset that questions what technology and design may have of influence on the environment through its mediational potential, I suggest part of this mindset — as a way of "giving" — may "get" us a sustainable future. Two potential ways of both acquiring and maintaining such a mindset, I propose is by utilizing personas and transdisciplinary teams.

In the coming subchapters, i will summarize my discussion and contributions followed by some critical reflections and propositions for future work.

6.1 Contribution

Through my empirical work of studying literature, conducting field studies and utilizing my own position as a design student, I claim I have first and foremost contributed with insight to the Human-Computer Interaction (HCI)-community. Though, as I have both conducted a study of collaboration with various professions and discussed the potential of transdisciplinarity, I will be as bold as to say I have also brought some insight to several other areas of practice. I have sought to establish a support of technology being value-laden, based on this, I suggest there are some responsibility and considerations expected from and of the

designer's inscription of values in her design. Through various theoretical considerations, in particular, through Tony Fry's and Daniel Fällman's work, I have proposed to utilize design education as a valuable starting point to provide designers with a shared notion of and common goal towards a sustainable future. When examining the notion of sustainability within HCI, the various perspectives are manifold. In my work, I have been particularly interested in viewing nature's role. As I have considered nature as a potential actor, I have been curious about how this silent actor might be included in work towards a sustainable future. Through my field studies I have identified and considered two specific approaches to incorporate nature in designers, and through transdisciplinary work, other profession's work with sustainability in mind.
As presented in my Introduction, my research questions are as follows:

> *What is the role and responsibility of the designer in designing technology for a sustainable future?*
>
> *How can personas and transdisciplinary teams be valuable tools for a more sustainable design development?*

In the coming subchapter, I will begin by presenting what I consider my contribution based on my first research questions. Before I, in the next two subchapters, elaborate further on my contributions based on the second research question.

6.2 The designer and the designed

As briefly mentioned above, I have established that technology is value-laden and furthermore that designers may embed their intention and values through their design. Thus, one can argue that designers are co-responsible for what is developed. Through a historical review of HCI's past 30 years, Daniel Fällman claims that contemporary designers focus on usability to some extent shows that designers seem to be considering technology as neutral and 'dead matter' [10]. Furthermore, that in most cases, ethical and moral values are utilized as a tool to evaluate, in a more retrospective manner, potential effects of the design and technology. Building on Fällman's proposition of a collective focus within HCI [10], I suggest that HCI needs a shared notion of sustainability and a common goal towards a viable future. This suggestion, I claim, to some extent, shows the importance of an ontological understanding of humans "being-in-the-world". As well as being able to articulate what is designed, why it is designed, and in

particular what the consequences of the design is, could be a great means to take us from where we are to where we need to be. Based in particular on some of Tony Fry's work regarding design education, I get an impression of some distance between design education and design research [15–18]. Hence, as both an effort to answer my first research question, as well as providing a proposition to bring sustainability even further in HCI. I, therefore, suggest the potential influence of education as an important and powerful place to initiate and produce an ontological mindset where nature and sustainability is part of a designer's work.

One of my propositions in light of this suggestion is to utilize personas as a tool to increase the potential awareness of nature for a more sustainable design development.

6.3 Personas

During my participatory observations at the University, my group and I appropriated personas on non-human natural things, in particular, bees. By utilizing information in relation to bees characteristics and goals, we were able to identify potential areas of focus and interest to support bees in certain ways. In addition, I suggest that this utilization of personas created a cooperative mechanism within the group as both a common goal and shared notion of something vague and ambiguous. By utilizing personas in this manner I suggest that not only do the personas provide a collective focus, the focus in itself is also in a way altered as the participants are forced to think of nature's behavioural patterns, needs and goals. Furthermore, I suggest this focus might produce an awareness and particularly a voice for the silent actor nature. Hence, I consider personas as a promising tool for a more sustainable design development.

As a part of my discussion of personas and the group work at the University, I identified some challenges. For instance, our group was consisting entirely of design students. To produce personas without any particular knowledge of bees, or other natural things for that matter, could be potentially damaging. One possible way of accommodating this challenge I suggest, is to utilize transdisciplinary teams. In the coming subchapter, I will bring forward what I have gathered of insight when utilizing transdisciplinarity as a tool for a more sustainable design development.

6.4 Transdisciplinarity

Through my data gathering during the FOLK-project, I experienced how a transdisciplinary-team was able to provide a diverse set of perspectives, practices and knowledge. Based on the group's proposed solution, I suggest that transdisciplinary teams may offer significant influence in regards to sustainable development. As a student of design, I find it evident that I have inadequate knowledge of, for instance, economy or biology. By bringing various practices together, I suggest nature may have a better chance of being a greater part of human's and designer's awareness in sustainable development.

As with my discussion and proposition of a shared notion and common goal within HCI, I believe it is probably of even greater significance in transdisciplinary teams to be unified in regards of a shared notion and common goal. If a group can manage to agree upon what it is they seek to develop, as a common goal, hopefully — in my point of view — nature's needs and interests. Furthermore, if they can produce a joint understanding of what for instance, sustainability should entail, I claim this collaborative tool can have valuable potential.

6.5 Critical reflections

A great deal of my work and discussion has been in relation to the silent actor nature. I have, in various ways, suggested to bring nature into the design sphere as an equal actant as any other human or technology. Though, as with various critique of, for instance, designers designing for situations they can not relate to, such as visually impaired, when the designer has a 20/20 vision. The notion of nature is, to some extent, in a similar manner. How is a designer expected to develop any understanding of a bee's needs and wants as well as recognizing which design is not sustaining the unsustainable? In addition to our human ability to understand natural things, the idea of bringing nature to the table as an equal actor may bear some difficulties as well. In particular, as I have discussed already, the potential of humanizing something non-human, might clutter our vision and cause a disconnection between human and nature.

As a thought experiment and example, the work on capturing and storing carbon dioxide (CO_2) to prevent global warming for instance. It has long been known that carbon dioxide in the atmosphere is contributing to

global warming, to prevent CO_2 from reaching the atmosphere, capturing and storing CO_2 has become an important solution. To some extent, one can argue that by managing our pollution by capturing and storing it, we help nature (and our self) to sustain. Though, it seems to me that we are consciously neglecting the cause to a great amount of the CO_2 emissions. In a way, this particular example can be viewed as if nature is sick, and needs some kind of antidote to function as we humans want it to. Despite being a clever and potentially helpful solution, we add technology to prevent CO_2-emissions that in many ways are caused by us humans, instead of acknowledging that human beings might be the ones who need to change. Looking back at personas, in particular, I do consider this as a potential risk. That is, trying to bring forward nature as an equal actor might produce solutions, but maybe not the best for nature. Personas, by and from itself, may not bring forward any realization that humans might be the ones who need to change. That said, as a final comment, I wish to highlight the importance of understanding personas as, first and foremost, a tool to collaborate and alter an assumed powerstructure and focus.

6.6 Future work

During my work, I have considered the notion of sustainability within HCI as well as the potential of utilizing personas and transdisciplinary teams in an effort for sustainable design development. Building on Tony Fry and Daniel Fällman I have suggested sustainability to be part of a "new good", as well as proposed a shared notion and common goal within HCI. I believe there is a need for future work in relation to a unified HCI-community in this regard, in particular, to align design practice and design theory towards a sustainable development.

While most of my work has been rather hypothetical, I suggest future work on personas with actual natural actors, could strengthen our understanding of personas potential. As there seem to be limited amounts of former work regarding utilization of personas on natural things, I suggest further research on the application of such a perspective is needed. A combination of other tools might be of interest as well, for instance scenarios. While personas bring focus towards a given actor, scenarios may complement this as a description of particular tasks executions, activities etc. of the given actor in a given use case.

When it comes to transdisciplinarity, I claim there is, a bit ironically, a need for future collaboration to utilize its full potential. I assume that if

only one group of any given profession is aware of the potential and needs to appropriate transdisciplinarity, there will not only be a lack of utilization, there will potentially be further misinterpretations of conduction. In addition, I propose future work might be of interest, in trying to add nature as an actor within the transdisciplinary team through conscious utilization of for instance personas, scenarios, shared notion and a common goal.

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Appendices

Appendix A

Consent form

The following document is my information about what my interviews with is in relation to and in what way any participant's privacy will be maintained during and after the data gathering.

Vil du delta i forskningsprosjektet

"Transition Design, etikk og bærekraftig utvikling"?

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å danne forståelse rundt holdning og atferd i og rundt en bærekraftig fremtid. Informasjon om målene for prosjektet og hva deltakelse vil innebære for deg følger i dokumentet.

Formål
Som en del av en masteroppgave innen interaksjonsdesign ønsker jeg å danne en forståelse av atferd og holdning til miljø, samt endringsvilje og eventuelle design implikasjoner dette vil medføre. Hvordan design kan påvirke og potensielt endre vår hverdag på en slik måte at blant annet miljøet forhåpentligvis blir mindre utsatt for skade.

Hvem er ansvarlig for forskningsprosjektet?

Hanne Cecilie Geirbo, forsker ved Institutt for informatikk, Universitetet i Oslo
Andreas L. Truchs, mastergradsstudent ved Institutt for informatikk, Universitetet i Oslo

Hvorfor får du spørsmål om å delta?
Som en del av datainnsamlingen håper jeg at din erfaring gjennom ditt engasjement kan bidra til innsyn i prosesser, fremgangsmåter, holdninger og atferd rundt et bærekraftig samfunn og en bærekraftig fremtid.

Hva innebærer det for deg å delta?
Hvis du velger å delta i prosjektet, innebærer det i første omgang ett eller flere semi-strukturerte intervju som vil bli lagret ved bruk av lydopptaker og videre transkribert. Eventuelle observasjoner vil bli dokumentert med lydopptaker og bilder av aktiviteten. Motivet og fokus vil være på selve aktiviteten, ansikt og identifiserende elementer vil ikke bli benyttet. Ingen personopplysninger vil bli forespurt eller benyttet om dette skulle bli annonsert i løpet av intervjuet eller observasjoner.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Opplysningene samt opptak og transkripsjon vil kun være tilgjengelig på mastergradsstudenten sin private brukerkonto på Universitetet i Oslo sine servere. Navn og kontaktopplysninger vil erstattes med en kode som lagres på egen navneliste adskilt fra øvrige data.

Deltakere vil potensielt kunne bli gjenkjent i publikasjonen om prosjektet og/eller arbeidet som beskrives er av kjennskap for utenforstående.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Prosjektet skal etter planen avsluttes 2. mai 2019, eventuelle opptak og personopplysninger vil etter dette termineres.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra *Institutt for informatikk, Universitetet i Oslo* har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Andreas L. Truchs, andrelt@ifi.uio.no / 977 18 182.
- Hanne Cecilie Geirbo, hannege@ifi.uio.no / 915 86 648.
- Vårt personvernombud: *(sett inn navn på personvernombudet hos behandlingsansvarlig institusjon)*
- NSD – Norsk senter for forskningsdata AS, på epost (personverntjenester@nsd.no) eller telefon: 55 58 21 17.

Med vennlig hilsen

Prosjektansvarlig (Forsker/veileder) student

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet *Transition Design, etikk og bærekraftig utvikling*, og har fått anledning til å stille spørsmål. Jeg samtykker til:

- □ å delta i intervju

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. 1. mai 2019

(Signert av prosjektdeltaker, dato)

Appendix B

NSD approval letter

The following document is the receipt from Norwegian Centre for Research Data (NSD) in regards of my inquiry to conduct my data gathering.

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD sin vurdering

Prosjekttittel

Transition Design, etikk og bærekraftig utvikling

Referansenummer

260678

Registrert

11.09.2018 av Andreas Løland Truchs - andrelt@ifi.uio.no

Behandlingsansvarlig institusjon

Universitetet i Oslo / Det matematisk-naturvitenskapelige fakultet / Institutt for informatikk

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Hanne Cecilie Geirbo, hannege@ifi.uio.no, tlf: 91586648

Type prosjekt

Studentprosjekt, masterstudium

Kontaktinformasjon, student

Andreas Løland Truchs, andrelt@ifi.uio.no, tlf: 97718182

Prosjektperiode

01.09.2018 - 01.05.2019

Status

29.07.2019 - Avsluttet

Vurdering (1)

13.11.2018 - Vurdert

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 13.11.2018, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan

starte.

MELD ENDRINGER
Dersom behandlingen av personopplysninger endrer seg, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. På våre nettsider informerer vi om hvilke endringer som må meldes. Vent på svar før endringer gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 02.05.2019.

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).
For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!

Kontaktperson hos NSD: Siri Tenden Myklebust
Tlf. Personverntjenester: 55 58 21 17 (tast 1)