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THE OFFJECT.

A DESIGN THEORY OF FICTION

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PhD

2018

THE OFFJECT.
A DESIGN THEORY OF FICTION

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A thesis submitted in partial fulfilment of the requirements of the University of Northumbria at Newcastle for the degree of Doctor of Philosophy

Research undertaken in the Faculty of Arts, Design & Social Sciences

October 2018

Abstract

More and more design researchers and practitioners are expected to design objects that deal not only with the actual but with the imaginary too. Many of them see their practice developing in a reality where alternative facts and fake news complicate any attempts at rationalization. This dissertation attempts to provide a new way of making sense of the real and fictional character of the objects that designers make.

My research question is "What makes design objects real or fictional?" and the research contribution is a design theory of fiction. This research contribution focuses on design researchers and design practitioners. People entangled with the practice of designing. It is structured in three parts:

Part I is called Methodology. It is composed of two chapters. Chapter 1, Path, first develops the ethos that grounds this research endeavor. A description of the rationale and research questions of this research program follows. Then, I proceed to review the methods that have informed my research process and give an account on what a design theory is as opposed to a theory of design. Finally, I argue for the need to deploy a metaphysical workshop where ideas can be built and tested before venturing into theorizing. I call the metaphysical workshop Milieu and, in Chapter 2, I proceed to give a comprehensive description of it

Part II is called Insight. There is only one chapter in this part and it is called Object. In this chapter I explore and critically analyze all the design objects that I have produced or been part of producing for the last three years. It is structured according to what I have called 'metaphysical probes': research efforts trying to understand what makes design objects real or fictional. Each metaphysical probe is structured by a design event that lead to a final design object. After explaining what each metaphysical probe examines, the design event that served as its vehicle and the final design object that resulted, I reflect on the insights gained.

Part III is called Theory. This is where I develop a design theory of fiction by applying the conceptual tools from Part I to the insights from Part II. There are two chapters in this part. Transitional is the name of Chapter 4 and it is where I develop a set of intermediary concepts that will help me in making a number of arguments in Chapter 5. They are three design theoretical concepts: a principle (Ontoference), an operation (Deswing) and a design object (Offject). In Chapter 5, Induction, I mobilize these transitionals to give an account on real and fictional objects, their interactions, their effects and their influence on each other. Also, I provide a genealogy of the design object of speculation as it has been commonly understood in design. Finally, I rely on my design theory to position myself within three debates that designers dealing with speculative objects normally face: on design objects as props, on make-believe and on fictional worlds.

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Acknowledgements

This research project is an object that has comprehended me for the last three years. I have been incredibly fortunate to be in this object and never be the only one. To all of you who kindly comprehended and were comprehended too, I want to thank you for your time. It is the most precious thing and without it, there would be no words to write, no objects to design or ideas to share. Each moment is a treasured object that will be in me for many presents to come.

Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the Faculty Ethics Committee on 23rd September 2017.

I declare that the Word Count of this Thesis is 86394 words

Name: Enrique Encinas
Signature: Enrique Encinas
Date: 26th of October of 2018

Publication List

Encinas, Enrique, Mark Blythe, Shaun Lawson, John Vines, Jayne Wallace, and Pam Briggs. "Making Problems in Design Research: The Case of Teen Shoplifters on Tumblr." In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, p. 72. ACM, 2018. Honorary mention awarded.

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Preamble

In the present. About the future.

This thesis is an attempt to make theory through design. It is not an attempt to answer the question, if designers make all sorts of objects, can theory be one of the objects they make? Or even the more fundamental, can we know things by making and designing them? These questions have already been answered with a yes by others in compelling ways so my research contribution would be redundant if I attempted to address them as the main subject of my study. Of course, I will consider these questions in the methodology section of this thesis, but only to build upon the work of other design researchers and further develop their ideas through a design object: a design theory of fiction.

My research contribution focuses on design researchers and design practitioners. People entangled with the practice of designing. It has been my intention all along to locate this thesis in the present moment of its context: it is a PhD dissertation that addresses a research question that is investigated through design in order to provide an original contribution to the knowledge in the field where it is located. The research question is "What makes design objects real or fictional?" and the research contribution is a design theory of fiction. However, its anchoring in the present moment has been, at times, compromised by the nature of the content I am trying to deliver. For example, the Literature Review does not have the form of an individual chapter, but is entangled with the content of every chapter. Also, the text is sometimes quite metaphorical, poetic and even philosophical. This is intentional and, in my opinion necessary, for it seems to me

that if one tries to address the philosophical or the poetic through design, design might need to become slightly philosophical or poetic in turn.

The line that separates the actual and the possible is a thin one. In presenting this dissertation in this form I understand that I am facing a great risk. The risk that my research effort is not considered a design research or research through design effort albeit my struggle to make it so. As a design researcher, I have chosen to embrace this risk as an attempt to experience the epistemic boundaries of design knowledge. It seems to me that the present in which this thesis exists needs to know more than clear facts and objective truths. A way to such knowledge might involve finding ways to legitimize forms of knowing that embrace and thrive in the ambiguous, the artificial, the contradictory and the disputed. I believe design is such a form of knowledge capable of producing not products or methods but also theories. Design theories that are made through designing.

In this dissertation I present a design theory of fiction.

Introduction

Science fiction is often described and even defined, as extrapolative. The science fiction writer is supposed to take a trend or phenomenon of the here-and-now, purify and intensify it for dramatic effect, and extend it into the future. "If this goes on, this is what will happen." A prediction is made. Method and results much resemble those of a scientist who feeds large doses of a purified and concentrated food additive to mice, in order to predict what may happen to people who eat it in small quantities for a long time. The outcome seems almost inevitably to be cancer. So does the outcome of extrapolation. Strictly extrapolative works of science fiction generally arrive about where the Club of Rome arrives: somewhere between the gradual extinction of human liberty and the total extinction of terrestrial life. This may explain why many people who do not read science fiction describe it as "escapist," but when questioned further, admit they do not read it because "it's so depressing." Almost anything carried to its logical extreme becomes depressing, if not carcinogenic. Fortunately, though extrapolation is an element in science fiction, it isn't the name of the game by any means. It is far too rationalist and simplistic to satisfy the imaginative mind, whether the writer's or the readers'. Variables are the spice of life. This book is not extrapolative. If you like you can read it, and a lot of other science fiction, as a thought-experiment.

Ursula K. le Guin

First paragraph of the introduction to The Left Hand of Darkness (Le Guin 2012)

Over the last three years I've been involved in the ideation and design of thought experiments. Of course, not everyone would define them as such, just as not everyone would read science fiction as a thought experiment. The present manuscript is a record and an argument. A record of design objects made or found and an argument for how they could be considered or thought about. In turn, it is also a theory: a set of conceptual tools meant to make it easier to deal with elusive, complex or taken for granted design ideas or simply to generate new ones. Depending on how this thesis is considered, that is, as an object, it can be seen as real or fictional. Undoubtedly, it is a material assemblage of paper (when printed) that affects other objects independently of the consciousness of an observer. A real thing. But it is also a narrative with an assortment of characters acting towards each other, a thought experiment that only comes to live once one is able to thread its meaning. A fictional thing. The fictional as consequence of the imaginary and the real as independent of it is the experimental conceptualization of reality that will be present in the first part of this dissertation.

However, this theory would be a failure right from the start if it only informed those pursuing abstract endeavours. The theory I will present is intended to serve first and foremost design researchers and designers doing design. Those people dealing with complexity through some sort of material to bring about the new[1]. Those trying to conceptualize the possible in terms of the used, the interacted with. This is why, the theory I bring forward is not primarily a theory of design[2] but a design theory. Its main purpose is not to explain how design happens or what design is, that is, if at all, secondary. Instead it is a theory meant to problematize and ask questions. As a result, a designer engaging with it has to generate some of it in order to design with it. It is also not a design theory of everything but a design theory of something. That something is fiction. This design theory is then, by extension, a design theory of the real too, for how can one talk about the fictional without making the real part of the conversation?

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[1] "Designers put things together and bring new things into being, dealing in the process with many variables and constraints, some initially known and some discovered through designing." In Donald Schon's Reflective Practitioner (Schön 1987)

[2] Well known examples of theories of design are (Pye 1978) and (Cross 2001) and a more recent one is (Hara 2007)

It is not only science fiction that suffers a severe case of "extrapolitis". In my opinion, design suffers from it too. Design deals some of the cards that are used to play the game of the future. Sometimes it even designs the cards with uncanny accuracy (Sterling 2005). It is no surprise that this is the case, for it is design's job to deal with the actual and the potential, with what is and what could be (Latour 2008). However, is the future really a matter of extrapolation? What is to come is an extension and purification of the known present? What works today is what will work tomorrow with a twist? Many designers think so and their activities rest on comforting notions of success (Morozov 2013b). This is the case, for example, of those practicing a radical optimism towards the possibilities of technology. The problem, seems to me, might be not only one of understanding the possibilities of the future, or the possibilities of technology but crucially, one of conceptualizing possibility and the fundamental objects that inform it: real and fictional objects. The main aim of this research effort is to provide design researchers and designers that place design practice as fundamental for knowledge generation with one more handle to grasp what makes a design object real or fictional. My contribution is two-folded. First, I bring forward a design theory of fiction: A set of concepts, ideas and arguments that designers and design researchers working in a project of their own can mobilize to get an alternative grasp on the fictional or real character of a design object. In doing so, I intend to provide two secondary contributions: a way of appropriating the philosophical thought of a particular thinker through the creation of what I have called a Milieu and a designerly way of learning about metaphysical matters through "metaphysical probes". Second, the contribution of this dissertation can be seen as an effort to stretch the epistemic boundaries of research through design. If we take for granted that things can be thoroughly known by designing and making them, how far can we go? A doubt that will possibly arise: doesn't this enquiry belong to the realm of the philosophical? Certainly, the question of what is real must be accessed from a philosophical perspective but, what is the reason for it not be approached through design too? This would mean that I am not doing philosophy but research through design. Research through design as an affirmation that things can be genuinely known by making and designing them is, then, the ethos of this investigation and the question of the real, of how real and fictional design objects are understood, its subject matter.

Every PhD student at Northumbria University must complete an annual progression report to reflect on how she has oriented her research and what she has accomplished so far. My progress report for the year 2017 reflects on my research question in these terms:

"What design fiction is, seems to be a matter of debate, whilst how design fiction accomplishes its feats lacks attention among the design research community. Hence, my research will go on to focus on how people engage with a fictional story world through design or in other words, how disbelief is suspended when design is employed as an ingredient that illustrates some aspects of a fictional narrative."

The early focus of my PhD was to move beyond understanding design fiction and instead know more about how design and fiction come together. In retrospect, I suspect I felt constrained by the design fiction space and resolved to move beyond its boundaries by investigating fiction itself through design. I was overwhelmed by the fluidity with which reality and fiction mingled and decided to attempt to separate them using design as a sort of metaphysical tool. Even if the result was failure, I believed that designers and design researchers might find something valuable in my attempts, just like an incomplete sketch opens the path to a better idea. In turn, the research question became 'What makes a design object real or fictional?'. The use of the verb "makes" is not accidental. It is an attempt to bring to the very frontline of my investigation the close link between design and the artificial.

Once my rationale and subject matter have been introduced I need to briefly account for the form that this dissertation has taken. In organizing the content of my research, I have not followed the common PhD thesis structure of background - methods - results - discussion. I have kept the introduction and the conclusion but in between I have tried to fit the form to the content I am trying to deliver. In thinking form I follow Johan Redström's definition "that expressive structure which emerges in the associated act of perception" (Redström 2017). As far as this dissertation is a linearly written account, the "associated act of perception" part of the definition leaves little room to interpretation: it is reading. As far as the expressive structure part goes, it is my intention that the thesis reflects that what I am trying to provide is a design theory of fiction.

Adapting the content of my thesis into the traditional PhD structure would have been possible but it was deeply problematic for two main reasons. The linearity imposed by the written word coupled with the chronologically intense structure of the background - methods - results - discussion would heavily distort the design research process that I am presenting. Also, it would obscure rather than illuminate the arguments I am trying to bring to the front. After all, this is not a philosophy or sociology thesis but a design research thesis and hence, I have proceeded to marry form and content accordingly. It is structured in three parts:

Part I is called Methodology. It is composed of two chapters. Chapter 1, Path, first develops the ethos that grounds this research endeavour. Research through design not as method but as methodology and importantly, as the floor on which I build my design theoretical edifice. This is followed by a description of the rationale and research questions. Then, I proceed to review the methods that have informed my research process and give an account on what a design theory is as opposed to a theory of design. This is because my main contribution is a design theory of fiction. Finally, I argue for the need to deploy a metaphysical workshop where ideas can be built and tested before venturing into theorizing. I call the metaphysical workshop Milieu and, in Chapter 2, I proceed to give a comprehensive description of it. In a nutshell, it is a sketch or a prototype of the philosophical work of Tristan Garcia, an adaptation and redesign of, mainly, the ideas of his book "Form and Object".

Part II is called Insight. There is only one chapter in this part and it is called Object. In this chapter I explore and critically analyze all the design objects that I have produced or been part of producing for the last three years. It is structured according to what I have called 'metaphysical probes': research efforts trying to understand what makes design objects real or fictional. Each metaphysical probe is structured by a design event that lead to a final design object. After explaining what each metaphysical probe examines, the design event that served as its vehicle and the final design object that resulted I reflect on the insights gained.

Part III is called Theory. This is where I develop a design theory of fiction by applying the conceptual tools from Part I to the insights from Part II. There are two chapters in this part. Transitional is the name of Chapter 4 and it is where I develop a set

of intermediary concepts that will help me in making a number of arguments in Chapter 5. They are three design theoretical concepts: a principle (Ontoference), an operation (Deswing) and a design object (Offject). In Chapter 5, Induction, I mobilize these transitionals to give an account on real and fictional objects, their interactions, their effects and their influence on each other. Also, I provide a genealogy of the design object of speculation as it has been commonly understood in design. Finally, I rely on my design theory to position myself within three well known matters of concern for designers dealing with speculative objects: design objects as props (Dunne and Raby 2013a), on make-believe (Sterling, Bruce 2013a) and on fictional worlds (Coulton et al. 2017).

Before I move on to Part I, I would like to quickly comment on the limitations of my research effort. I am well aware that the boundaries of design research and research through design are a matter of contention. What are the limits of what can be known through design? What are the thresholds? Or in other words, how does one know that what one is doing is precisely design research? Just like in other design endeavours, I have found possibility in ambiguity but had to make sacrifices. In order to retain clarity and focus on my research question without going over the word limit I placed especial emphasis on two books by two thinkers: Making Design Theory by Johan Redström (Redström 2017) and Form and Object by Tristan Garcia (Garcia 2014). This is an intentional methodological decision. Redström's book has been revealing in terms of structuring my research as a contribution in terms of design theory. By paying so much attention to it I want to describe and legitimize my research endeavour and, at the same time, also share a way of thinking about what design can do that the reader might find useful in her own work. Similarly, Tristan Garcia has been revealing in showing me where to go once I found the limitations of Redström's work in the context of my research question. Again, the reason behind it is to show a part of the design process I have followed in order to make design theory and, at the same time, provide the reader with a description substantial enough in the hopes that she can join me in the ways of thinking that have produced this work.

Part 1

Methodology

A biologist in a laboratory.

She peruses published papers while she waits for some samples to be ready for inspection. She is trying to connect the work of others to the topic of her interest in order to structure a plausible argument that explains some biological thing. Now she is writing. She does not know what will become of this text, possibly a scientific article or maybe a book if time and resources allow. She asks herself whether this text is the beginning or the end of a research effort and resolves that is neither and both. She smiles at this thought. She wonders how complicated the world is. She celebrates that people can know it through biology. She ponders whether she should include this idea in the .doc she is writing but quickly realizes that doing so would blur her contribution, dissolve her tiny idea into an ocean that deserves a text, or maybe many, of its own. Besides, she thinks, there are others writing excellent words about it anyway.

And so, her ethos, her knowing that the world can be known through biology lays beneath, silent and absent from what she really has to write about.

A design researcher in a studio.

She waits for the varnish to dry on a wooden chunk of wood that will structure a prototype. On her desk are images of objects similar to the one she is making and papers from other design researchers describing how objects like hers are formed and used. She is trying to connect the work of others to the topic of her interest and articulate a plausible argument that explains some design thing. Now she is writing. She does not know what will become of this text, possibly a research paper or maybe a book if time and resources allow. She asks herself whether this text is the beginning or the end of a research effort and resolves that it is neither and both. She smiles at this thought. She wonders how complicated the world is. She celebrates that people can know it through design. She ponders whether she should include this idea in the .doc she is writing but quickly realizes that doing so would blur her contribution, dissolve her tiny idea into an ocean that deserves not one text but many on its own. Besides, she thinks, there are others writing excellent words about it anyway.

In this part of the dissertation I will describe the methodology that has informed my research effort. I will set the grounds of my enquiry, the notions that I build upon. As

I noted in the introduction, I will make intensive use of the work of two thinkers: Making Design Theory by Johann Redström (Redström 2017) and Form and Object by Tristan Garcia (Garcia 2014). This is a methodological decision that I have made intentionally. Redström's contribution was essential in helping me understand how to structure my research in the form of a design theory and Garcia provided a way forward once I encountered the limitations of Redström's thought. It is my intention to provide a clear description of both thinkers' ideas in order to properly illustrate the design process that has led me to a design theory of fiction. Although I have tried to contextualize their work, this has been secondary for reasons of space and clarity. After all, what this thesis proposes is primarily a design theory of fiction.

Chapter 1

Path

Design is not biology but biology is becoming design[3]. Biology floats together with other disciplines in this current that leads to the ocean of the artificial[4]. Progressively, disciplines are becoming supplemented with a design overhead that is difficult to account for, critically examine, act upon and respond to from within these disciplines themselves. As a result, we see designers intrude and their impact expand beyond the boundaries of consumer culture (Ulrich et al. 2008).

If there ever was an object resembling a virus, it is design. Design has a virus-like aptitude to colonize the hosts that previously contained its activity: shops and websites display design objects and soon become design objects themselves. Political campaigns need slogans and posters and soon become designed in turn[5]. The same goes for the objects of education (Ideo 2008), objects of the economy (Design Council 2018) and more

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[3] The field of synthetic biology is a research field that investigates how biological entities can be artificially created or existing ones redesigned. Daisy Ginsberg elaborates the question of designing artificial life in (Ginsberg et al. 2014)

[4] I am alluding here to the well-known "Sciences of the Artificial" by (Simon 1996)

[5] During a visit to a BMW factory in 2006 the then prime minister Gordon Brown famously claimed "Success does not happen by accident, it happens by design" - (Madslien 2006)

recently, objects of biology and the ecosystem. Some are even trying to turn the Earth into a design object (Temple 2018). But design not only infects, it also reproduces with, as we have witnessed in this and the previous century, exponential strength: design objects seem to be constantly generating more design objects without older objects completely ceasing to exist. For example, BP has a new logo but the previous logos remain stubbornly anchored in reality, as images in books and websites or as ideas in our memory (FamousLogos 2018). The persistent character of design is certainly intriguing but not so much its generative attitude, after all, design is about engendering the new (Schön 1987). Although new things are or happen without design, there is no design without the new.

However, a virus might be design but design is not a virus. Although both infect, reproduce exponentially and sometimes cause diseases, over identifying both design and viruses might be quite problematic and, especially for design, too pessimistic. So, let's leave viruses to biology (for now).

Let us instead think of design as spring-like. A harbinger of change or a burst of opportunity. In fact, if we were to perform a complete reduction on what design is and took it only as spring-like design, we would be aligning ourselves with a big segment of the design establishment: the "prophets" of innovation[6]. As we will see through this thesis, I won't be reducing design to its virus-like or spring-like features but will be doing something different altogether.

In order to succeed in what I am trying to accomplish with this dissertation (a design theory of fiction) I will follow the way of the biologist in the Introduction and, after this section, let my ethos lie in the background of my arguments. This is because as a design researcher, I feel compelled to reassert that I consider design as an epistemic domain that is able to access knowledge about the world on its own terms[7]. On this basis, I will proceed under the assumption that things can be deeply understood through design

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[6] For an extreme case of such reduction see (Josh Epperson 2013)

[7] In my opinion, an excellent compilation of texts regarding the possibility and qualities of design research is (Grand and Jonas 2012)

and hence, that design research is possible and justified[8]. I do this for the same reason as the biologist, or any other researcher for that matter: if every step of epistemic gain had to involve the reassurance of all previous steps I would be stuck climbing a tower of Babel that others (design researchers in this case) have already worked very hard to build. I choose the opposite, to stand at the highest point and attempt, humbly and diligently, to crack the sky open[9].

1. Design Research

As in any other investigation, this research aims to shine light on a topic. In doing so, the spotlight is surrounded by a greyscale of more or less illuminated issues. This thesis places the divide, or the split, between reality and fiction under the spotlight. What I will investigate is not one or the other particularly but the elusive fringe that keeps reality and fiction apart. That which forces design researchers to differentiate between real design objects and fictional design objects. My research question can be formulated as follows:

What makes a design object real or fictional?

Of course, many other questions take the spotlight when I approach this research question. What does it mean that a design object is real? Do fictional design objects actually exist? What happens if we conflate real and fictional? What if we reduce one to the other? Are there other entities apart from real and fictional? What are the relations between them? And what about their effects? How do they affect people? And what about their culture? Is culture fictional? Is society fictional? Is a family real? A lover? Love

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[8] I take research through design as ethos and not as method. The following paper illustrates the inverse approach for the field of Human Computer Interaction. (Zimmerman, Forlizzi, and Evenson 2007)

[9] This is an allusion to Ted Chiang's 1991 Nebula award winner novelette "Tower of Babylon". In it, the main character, Hillalum, is summoned to climb to the top of the tower of Babel and dig through the Vault of Heaven. (Chiang 2010, 1)

itself? And what about this chair? And the idea I just had about this chair? Is my consciousness a fiction? Am I real at all?

Certainly, these questions pulled my attention and many times attempted to resolve uncertainty in order to move on with my work by settling down with a definition from the fields of philosophy (Brock and Everett 2015), critical theory (Freedman 2000) or literature (Currie 1985). I failed over and over again. What a particular static definition established would be useless the moment I tried to design with it[10]. Finally, I decided to delay my solutionist[11] attempts till I had a better grasp on the strange force that seems to keep the fictional and real apart.

1.1.1. The Chance of a Domain and its Research Price

A research project is within an epistemic domain, a field of knowledge. Supporting it, there is a body of material and social practices that informs how the research is conducted and the outcomes produced. The opposite, however, does not necessarily hold: a topic or subject of investigation does not completely determine the research approach that should be taken. It rather limits the validity of outcomes. For example, the question of life, of what life is, what counts as living, and so on, can be approached from natural science, philosophy or physics. Claims of truth, or any other value for that matter, need to be evaluated carefully, in many cases once there are outcomes that permit analysis and critique.

Similarly, with regards to my research question, one could ask, but isn´t the domain of what is real and what is not that of philosophy? To this, one could quickly reply, why philosophy and not psychology (Oatley 1999), neurology or sociology? Are real and fictional design objects metaphysical objects, physical objects, the result of

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[10] We will see examples of this failures later in this chapter when we talk about intermediaries.

[11] Solutionism is understood here following Evgeny's Morozov term, as the tendency, characteristic of the digital age, to reduce issues to problems that can be fixed by a straightforward solution. (Morozov 2013a)

physical objects (such as neurons) interacting or something else? One could also argue that real and fictional objects happen when people define them, through language for example, they could be emergent social events and mobilize sociology or linguistics to understand them. The possibility of knowing is too attractive for a discipline to disregard regions of inquiry a priori and, in my opinion, disciplines should be very careful when doing so. In a sense, the chance for a domain to gain knowledge about a particular subject is offset by the price that the researcher has to pay in terms of the validity of outcomes and the claims based upon them.

1.1.2 Why Design Research?

It is with an awareness that a research domain imposes a price on its research outcomes that I have chosen design as the epistemic domain to ground my effort. I predict, with no absolute confidence, few eyebrows raising expressing concerned doubt or even worse, plain disbelief. Although I am slightly jealous of the biologist and the implicit acceptance she enjoys, I feel that the question "why design research?" demands three answers:

The first answer is historical. One might doubt this research on the grounds of the maturity of design research as a discipline. Design research is relatively young when compared to research in other fields, especially if one considers its birth when the name became a token used in the academic or political world[12]. However, the tradition of designing or making things in order to learn about other things possibly extends beyond the limits of written human history. Perhaps even beyond the limits of humans as species, after all, couldn't the making of a tool be understood as an act of discovery? A search for knowledge? I am not implying, however, that what the New Caledonian crow is doing when fiddling with a stick is design research, or at least not in the present document. My point is that juvenescence does not discard design research as suitable. What is young

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[12] "Design historians have tended to regard processes of industrialization as significant for providing the conditions necessary for the emergence of a distinct practice of design" (Lees-Maffei and Houze 2010, 13)

might not be design research as event, as the act of designing, but design research as a linguistic object that we mobilize to, for example, debate, define or apply for grants.

The second answer is contextual. Isn't design too concerned with the material and the economic so as to be able to address such complicated topics as the nature of reality? My negative response is motivated by the severe rejection of reducing design to some sort of "patriarch of consumerism". Design goes beyond capitalist exchange and its modes of defining what counts as knowledge. In fact, design research is characterized by a multidisciplinary attitude that goes well beyond that of business or marketing involving sociology, psychology, philosophy, art and politics, for example[13]. It is this multidisciplinary attitude, this ease of involving expertise from other areas that might make design research so valuable in grasping abstract topics such as this one.

The third answer is methodological. Design research can be understood in multiple ways. It can be research about the practice and processes that inform designing or about the history of design artefacts, and so on[14]. The understanding of design research that I adhere to in this research project is this: design research as an activity that generates knowledge through design. It is by designing objects that a certain knowledge is apprehended. Obviously, there is a great deal of thinking, reading and writing involved, as in any other research discipline, but the flavour[15] of design research that I have practiced in this dissertation places the act of design as primary to other epistemic acts. I see this as an invaluable asset when considering my particular research topic. Not only am I able to observe, think, read, and write about the real and the fictional, but my research approach actually necessitates that I design real and/or fictional things in order to learn about them. This seemed only natural in the context of my investigation for in its early stages I was already entangled in the study and design of design fictions (Bleecker 2009a).

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[13] Although not strictly design research, this book by Buchanan and Margolin is a good example of the bidirectional relation between design and other disciplines. (Buchanan and Margolin 1995)

[14] This is based on Frayling's distinction between research through design, research for design, research about design (Frayling 1993)

[15] For an extensive review of how design and research come together we found useful (Joost et al. 2016)

The first steps of my investigation involved my engagement with an academic design community that did design as part of their research (Encinas, Dylan, and Mitchell 2017a). More specifically, this community is comprised of researchers working under the umbrella of various research methodologies that have important similarities such as constructive design research (Koskinen et al. 2011) or research through design (Stappers and Giaccardi 2017). Perhaps most significantly is how this community places design practice as a fundamental element of any research project. It is this practice-based design research community that most resonated with my work and where I found inspiration and guidance on how to explore the problem of the real from a design perspective. Naturally, I think of this community as the audience for my present research contribution because of the role that design practice performs in their research activity. The emergence of imaginary objects and the speculative activities associated with their manipulation are an inseparable consequence of practicing design (Tonkinwise 2015a) and hence I anticipate that my effort in understanding the fictional nature of design objects might be beneficial to some (if successful). In contributing to this community from a practical perspective I have tried to take advantage its heterogeneity in terms of academic and design interest. This is reflected in the multiplicity of venues where the work of practice-based researchers is published an exhibited: CHI (Marketa Dolejšová 2016a), DRS (Joseph and Ali 2018a), DIS (Pierce and DiSalvo 2017a), RTD(Koulidou, Wallace, and Dylan 2019) or Participatory Design (PD)(Rosenbak 2018) are just a few examples. Although I have had the opportunity to attend the Research Through Design conference in the year 2017, most of my work has been presented at CHI, a venue that is mostly focused in Human Computer Interaction. The reason for it is associated to the program to which my PhD belongs to. The program of my PhD is one of interaction design and Northumbria University considers CHI as the top venue for a PhD student to publish her interaction design work. In turn, as a PhD student I felt encouraged and supported (financially or otherwise) to do so.

1.2. Design Methods

I'd like to begin my review of the research methods that I have used in this investigation following a character from a science fiction book. Dr Louis Banks is a linguist. Not a real linguist but a fictional one. She is the main character in the excellent (and real) novella "Story of Your Life"[16] by American author Ted Chiang. The story is real, it won a Nebula Award in 2000 and was the subject of a feature film starring Amy Adams (Villeneuve 2016). The story is also a fiction because the events it relates could not be found in reality but only in the universe of the story. In the story, Dr Louis Banks is a real linguist and also a real narrator as it is through her voice that one experiences what happens. The story also has other real things, like aliens, the heptapods, and fictional things, like the imaginary ideas concerning the intentions of the alien's visit in the mind of US Army officials.

While for a literary critic (Gleick 2017) what the novel is doing is posing questions related to, for example, the future and free will, in my opinion the story is, first of all, the depiction of a fictional research exercise: after the heptapods arrive on earth and strategically place interaction devices, or "looking glasses", in various countries, the US Army hires Dr Louis Banks to find a way to communicate with them. Dr Banks is confronted with an utterly strange mess and she proceeds cautiously. She sets up experiments and cumulatively builds on what she learns after those experiments are completed. One could describe her approach as scientifically rigorous but designerly in principle: she constantly detours trying to find "the 'wickedness' of her 'wicked problem'" (Tonkinwise 2017). Furthermore, in order to move forward she didn´t restrict herself to using habitual research methods from linguistic practice. Aside from thoroughly analysing heptapod sounds and inspecting their calligraphy, she used theatre, games, props and whatever she considered necessary to find an entry point into the heptapod's language.

In my enquiry, the heptapod, the alien object of inquiry and research, is the relationship between real and fictional in design objects. The real and the fictional in their

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[16] The story can be found in Ted (Chiang 2010)

split or assemblage, in their nesting within each other or their sudden bifurcation. The real and the fictional as a characteristic of design objects that permits its differentiation. And similarly to Dr Louis Banks, I provided myself with as many design tools as time and resources allowed in order to know. If in the previous section I addressed the "why" of my research effort, I now turn to the "how". In what follows I briefly describe the tools I have used to move forward in my investigation. It is important to note at this point that in this thesis, I will talk about methods in two parts. First in this section and also later in Part II when I describe in detail each of the objects I have designed. In an attempt at the real, here I have clustered my methods in a fictional chronological order, not unlike Ted Chiang wrote the very real "Story of Your Life".

1.2.1. Make and Design

In this first class of methods I include everything that has to do with creating design artefacts. This is a primary class for me. First, it a question of legitimacy: I am doing practice-based design research and my goal is to contribute to those design research communities in which the research work speaks through words and also design objects. These are mainly the research through design and constructive design research communities. Second, the primacy of making and designing is primary due for more pragmatic reasons as it allows me to approach the real and the fictional from radically different angles. The making of a prototype, for example, allows us me reify an idea, test it and easily discard it. It also allows me to think through it and with it. They can be the materialization of a thought experiment or the end of a research path that suddenly raises questions compelling me to take a completely different research direction. They also allow me to perform other important research operations with them or through them aside from thinking: writing, publishing or presenting to peers. In the best-case scenario, they are also the beginning of a new design artefact.

Particular making and design methods I have constantly employed include:

1.2.1.1. Sketching

This method is present in a higher or lesser degree in every single project within this research effort. I have sketched, on paper and on a computer screen, ideas for real and fictional products, services, identities and stories. These sketches have become nearly

invisible in those objects that demanded a certain degree of completion but also sketches have taken the spotlight in those objects that draw their efficacy precisely from the fact of being unfinished.

1.2.1.2.   Prototyping

If sketching is in two dimensions, I understand prototyping as three-dimensional sketching. It is the creation of material artefacts that live in space and demand to be interacted with. I prototyped objects, such as products, in order to facilitate a bodily engagement of any kind.

1.2.1.3.   Speculative Design

Speculative Design followed the trail of what Anthony Dune and Fiona Raby called Critical Design (Dunne 2005). It was a design program developed in UK's Royal College of art that drew from the Italian Anti-Design and Radical Design movements from 1970's Italy. Critical Design proposals:

> *"…can really only exist outside the marketplace as a form of*
> *"conceptual design" – meaning not the conceptual stage of a design project,*
> *but a design proposal intended to challenge preconceptions about how*
> *electronics shape our lives." (Dunne and Raby 2001, 65)*

Although it began taking technological objects as primary it quickly assumed other cultural objects as cases. A few years later, in 2012, a then Royal College of Art doctoral student, James Auger, used the term speculative design in his PhD dissertation (Auger 2012) to define the design work he had been producing for a decade. He drew from the ideas about Speculative Biology from geologist Dougal Dixon (Dixon 1981a), Critical Design from Anthony Dunne, Discursive Design (Tharp and Tharp 2013) by Bruce and Stephanie Tharp and also from Bruce Sterling's and Julian Bleecker's Design Fiction (Bleecker 2009b). Auger took a semantic approach and decided speculative was the right word as it allowed the objects to remain anchored to the here and now, the real, while retaining the status of fiction:

> *"There is much overlap between the descriptions above- all remove*
> *the constraints of the commercial sector that define normative design*
> *processes to create a space for thinking, questioning and dreaming. The*
> *differences are subtle and based primarily on geographical or contextual*
> *usage. With all these options available (and of course new proposals), my*
> *choice was informed mostly by semantics and the subsequent loading of*
> *experience: the physical object presented as a 'design fiction' may be*

> *identical to a 'speculative design' object or a 'design probe,' and so on, but the meanings of these words give the cultural object a substantially different value. For example, the word 'fiction' after design immediately informs the viewer that the object is not real; 'probes' infer that the object is part of an investigation; and both 'discursive' and 'critical' directly reveal the intentions of the object as an instigator of debate or philosophical analysis. These terms act to dislocate the object from everyday life, exposing their fictional or academic status." (Auger 2012, 136)*

Speculative design objects seem to be able to address the tension that I consider central to my investigation (between real and fictional objects) so, naturally, I felt compelled to produce some artefacts within this category.

Another design method influenced by Critical Design (and also Tactical Media (Raley 2009) works and practices) is Adversarial Design (DiSalvo 2012). Although the scope of Adversarial Design goes well beyond that of a method, for the purposes of this project I have drastically reduced it to a "how", a design research method in the service of my enquiry. What Adversarial Design objects try to accomplish is a productive state of confrontation, a creative dissent where participants are able to elucidate and respond to complex political issues. It was coined in 2012 by Carl Disalvo in his book with the same name:

> *"Through designerly means and forms, adversarial design evokes and engages political issues. Adversarial design is a type of political design… to label works that express or enable a particular political perspective known as agonism."(DiSalvo 2012, 2)*

> *"Agonism, as a political theory, provides a productive starting point for exploring this question because theories of agonism assert that there are important differences between politics and the political and that democratic civic life and public discourse are grounded in the kind of contestation that characterizes adversarial design." (DiSalvo 2012, 4)*

The last method in this category is Design Fiction. Design Fiction is a design method that has received a lot of attention in recent years (J. Lindley and Coulton 2015). I have used it frequently and dedicated some of my work to study its history and relations to other design methods, particularly within the field of HCI. This passage from a paper I co-authored presents a brief description of the multiple competing definitions of Design Fiction:

"At the Next 13 conference keynote Sterling offered a more formal definition of design fiction as: "the deliberate use of diegetic prototypes to suspend disbelief about change." (Sterling, 2013a). Following Sterling's definition several others have been proposed. Josh Tanenbaum suggested this: "Design Fiction uses narrative elements to envision and explain possible futures for design" (Tanenbaum, 2014) Lindley and Coulton describe design fiction as: "(1) something that creates a story world, (2) has something being prototyped within that story world, (3) does so in order to create a discursive space", where 'something' may mean 'anything' (Lindley and Coulton, 2014)". Blythe and Encinas got in on the competing definitions game with this rather wordy effort: "Design fiction is a malleable concept: it can take the form of text, image, audio, video, model, working prototype or event; it can be conceived as a plausible idea for a technology developed with "designerly thinking", an eye for detail and practical concerns; it can be framed as a conceptual design placed within a broad cultural context focusing not just on product functionality but potential social consequences of use; it can be a tool for corporate propaganda or a means of expressing concern, dissent and critique." (Blythe and Encinas 2016a)

Although different in form and content, one can detect a common ground among all these definitions: they appeal to the fictional and the imaginary in its many flavours. They keep the actual at a certain distance in an effort to grasp the possible. This is precisely the reason why I felt compelled to use it many times: Design Fiction allowed me to gain a certain perspective once I was too enmeshed in the real or when I needed to challenge it. It is also a strong nexus with other disciplines, such as science fiction in literature[17], that have a strong tradition in questioning what one takes for granted regardless of its real or fictional status.

It is also important to notice that their boundaries are blurred by the very objects that define them as practices. Objects of Critical Design, Speculative Design, Adversarial Design or Design Fiction might be enclosed in different thematic or theoretical 'Russian dolls' depending on how the designer is approaching her issue of interest. The main proponents of these labels are themselves often quite liberal in defining the scope and character of their practices and the objects they comprise and hence, it comes as no surprise that lively discussions arise as to which one falls under another (Bardzell and Bardzell 2013) (Pierce et al. 2015). In the present work, I prefer not to contribute directly to this debate and instead describe these design approaches following the use I have ascribed to them within my investigation: as design research methods at the service of a higher goal. The choice of Speculative Design as a methodological

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[17]In fact, one of the main proponents of design fiction is Bruce Sterling, an accomplished science fiction author. See (Sterling 2009)

umbrella acknowledges the way I colloquially, in my every day, referred to those design objects that attempted to engage with the fictional rather than the more immediately actual. If a situation demanded to be more particular about my practice I would describe my method as Adversarial Design, when it was agonism what I was aiming for, or Design fiction, if my object was meant to function as a prop within a story accompanying it.

1.2.1.4.   Actual Design

The difference between actual and speculative design is also a contested one (Tonkinwise 2015b). For an analogous reason as that mentioned before, I recourse to the term actual design in order to refer to those design research methods that, from my perspective, gave primacy to the real by either heavily taxing attempts to bring fictional elements into them or by existing in the same plane as objects that would be troublesome to define as speculative. A piece of urban furniture, the brand identity of a social computing research group or a battery that accumulates energy by means of gravity fit into this category.

1.2.2.   Engage and Involve

Design research also favours a number of methods of inquiry that involve relation instead of production. These methods of inquiry are sometimes contemplated as part of a larger method, that of research through design (Zimmerman, Forlizzi, and Evenson 2007). What follows is a passage from a paper I presented at the Research Through Design conference in 2017:

> *"Research through design makes use of purposefully designed artefacts or prototypes to explore the boundaries of knowledge, frequently involving users in various ways during different stages of the research and/or design process. In contrast to purely scientific approaches, design is generative, it assumes not a single world to be discovered but a multiplicity of worlds awaiting to be created and the theory derived from it is, in Bill Gaver's words "provisional, contingent, and aspirational" (Gaver 2012). We have chosen the Digital Dreamcatcher as the vehicle for exploring how an audience creates, understands and navigates the story world made available by a design fiction." (Encinas, Dylan, and Mitchell 2017b)*

Research Through Design is not a method in the context of this dissertation. As explained in the previous section, it is the ethos, an essential part of my methodology. At

the same time, there is a dimension of a designed object that is lacking if an object cannot be interacted with, if it cannot or is not used. I will focus on this issue in depth in chapter 4. For now, I will account for my decision in terms of the research advantages derived from the generative power of design once an artefact leaves the studio, the art gallery or the pages of a book. Also, for the generative potential for a design object in terms of philosophical discovery by not only probing in the physical but also in the metaphysical realm will be discussed also in Metaphysical probes section of chapter 3 .

After an object was designed, or sometimes while designing it, I presented it in talks or conferences, organized workshops or interviewed participants during or after use. I will be more precise about the particular design methods for engagement I have used in Part II when I look closely at each design object that has played a role in this investigation. Along with interaction came a sizeable amount of precious insight generously provided by people external to the design team. Through the knowledge that others shared with me, I could approach my abstract topic from perspectives very different from my own and discard viewpoints that I considered unshakable or revisit some that I believed have lost all value.

1.2.3.   Publish and Review

If there is a place where fiction and reality mingle it is that of academic publishing and reviewing (Coulton, Lindley, and Akmal 2016; J. Lindley and Coulton 2016; Kirman et al. 2018). The universe of research production is an intense site of contestation. Reality defined as truth is malleable and changing, constantly affected by new theories and discoveries. The following is an excerpt from the same Research Through Design paper I referred to earlier:

> *"The science fiction author Cory Doctorow illustrates design fiction as follows: "An engineer might make a prototype to give you a sense of how something works; an architect will do a fly-through to give you a sense of its spatial properties; fiction writers produce design fiction to give you a sense of how a technology might feel." (Doctorow 2016). While we sympathise with this definition that focuses on realism and extend it to the design arena, we wanted to explore the boundaries of design fiction beyond the scientifically possible. Hence, we asked ourselves, "what would a magic realist design fiction look like?" The answer was published as a paper in a scientific conference (Encinas 2016)."*

In following papers, I would refer to the act of mobilizing imaginary elements for research purposes as research fiction and developed all sorts of research outputs, from imaginary abstracts to papers to fake Wikipedia pages. One of the arguments grounding my efforts was that the function of fiction lies beyond mere prediction. As this fragment from a paper I co-authored with Mark Blythe shows, I was together with other researchers in this endeavour:

> *"Imaginary abstracts like this question the value of potential technologies before any making takes place. Rather than beginning with a technological possibility it first considers whether that **possibility is worth realising or not**. Lindley and Coulton (Lindley and Coulton, 2016) have produced entire papers which imagine complete studies and findings. Taking this to its logical conclusion Kirman et al. (Kamin, 2008) organized a fictional conference and produced a list of fictional proceedings with some forty-paper titles."(Blythe and Encinas 2018a)*

The possibility of publication and the process it entails favoured constructive analysis and reflection. It allowed for a cumulative build-up of knowing and productive reasoning. At the same time, volunteering for reviewing papers in a number of conferences allowed me not only to monitor the evolution and status of my knowledge but also helped position my ideas in the context of others. It would be erroneous then, not to consider these practices as research methods in themselves.

1.2.4.   On Methods Found and Made

In this section, I have attempted to give a view of the methods that have informed my investigation. I have organized them according to the limitations of the format in which I am expressing myself: that of a linear text. A line is usually read from left to right (in the English language) and a text flows from top to bottom. But my research process and the methods it mobilized did not follow such strict rules. Structurally resolving how my research proceeded by identifying it with the structure of this text would recreate a false sense of continuity that in no way represents how the work presented here actually developed. This text can be seen as the culmination, as a finished puzzle in which many pieces are put together but that, if considered differently, might have yielded a different puzzle altogether. While I was carrying my investigation there never was a definite sense of plenitude or overall coherence but a faint sense of orientation. More like reading stars on a cloudy night than following a ship's certain compass.

Also, I have described methods without the artefacts affected by them for the purpose of clarity. Like describing an event without the objects that surround its occurrence, the description is poor and lacks intensity. This is a necessary evil that I will attempt to compensate for in chapter 3, where all design objects will be properly examined. The reasons informing the classification I have performed in this section also demand further clarification. In no way is my intention to set a normative standard or argue for it. Rather, I aim to display what I considered as methods while conducting my investigation and the reasons for doing so. Some of my prototypes might be considered "Cultural Probes" (B. Gaver, Dunne, and Pacenti 1999a) for example, if looked at from a certain, twisted, perspective. I could have labelled my entanglement with users "Experience Prototyping" (Buchenau and Suri 2000) or it could be said that at a certain moment what I was doing was "Participant Observation" (Atkinson and Hammersley 1994). Again, I think that doing so would have added a layer of complexity to this text that is not necessary or beneficial at this point and instead I will provide greater detail in chapter 3.

It is my hope that this section makes clear that my attempt to use methods reflected my aim and did justice to the complexity of my topic. In turn, my methods made clear that only designing, engaging and publishing was not enough because I was not only finding notions but also making them, a making of the theoretical kind. And I was not making a theory of design but rather a design theory.

1.3. Design Theory

In 1.1. Design Research, I explained my research question and why I believe practice-based design research is a valid method of enquiry. The research question is 'What makes a design object real or fictional?'. In 1.2. Design Methods I reviewed the methods that made the inquiry possible. Now I turn to explain the reason for and the form of the outcome of this thesis: a design theory of fiction is my answer to the research question that motivates this thesis.

Early in the pages of his book "Making Design Theory" (Redström 2017), Redström uses a pertinent parallel between the etymology of the words theory and tourism in order to introduce an argument on what design theory might be about:

> *"There is a relevant etymological relation between "theory" and "tourism": in its original meaning, the Greek word theoria meant to see something, to be a spectator, or "in its most literal sense, 'witnessing a spectacle'" (Nightingale 2001, 23). Perhaps the approach taken here can be seen in the light of this early history of philosophy: "theory" approached as something meant to take you places so as to witness a spectacle."(Redström 2017, 3)*

Redström is inviting us to conceive of theory not as something concrete and static, unaltered by the passing of time and externally given. His concept of theory is a fluid one that bangs heads with traditional scientific understandings of theory as independent and preceding practice:

> *"The basic idea is to create this shift in perspective by evoking the temporality of theory: by considering theory as something not always stable and constant, but in this case as something unfolding, something acted as much as articulated, performed as much as described."(Redström 2017, 2)*

1.3.1. Why Redström and Why a Design Theory

Redström's understanding of theory strongly resonates with the nature of my investigation for two reasons:

First, it rather intuitively provides a take on the idea of theory as a conceptual tool that aligns with the ethos of my inquiry. I am not doing research about design but research through design, mobilizing design outcomes in order to produce knowledge that is relevant for the creation of the new and the understanding of the possible in design. My practice precedes or better, coexists with theory production so the theory produced should be able to accommodate this. Both, siding with a theoretical stance a priori or trying to shoehorn the design objects I have produced into a theoretical framework after the fact would possibly add a certain legitimacy to this investigation in the eyes of particular audiences. However, in order to do this, I would have a to pay a high price in terms of fidelity. That is, to present a research effort quite different from the one I have actually undertaken.

Second, the very object of my inquiry is everything but static. The real, the fictional and their mingling are always in motion, defying all attempts at synthesizing all-encompassing definitions that allow for a fixed meaning. If I am to be able to think them and design for, with or through them, I need a set of theoretical constructs that provides me with handles that incorporate their dynamic nature rather than with anchors that keep my understanding fixed while everything around it changes.

The design theory in Part III is a set of conceptual tools that play the critical role of laying the foundation for an effective argumentation about how real and fictional objects are mobilized when designing. The elements that comprise the design theory of Part III, e.g. concepts, are crucial and must be carefully defined for with unsuitable ones, as we will see below, fictional and real objects might vanish from sight.

1.3.1.1.   Theory of Design VS Design Theory of Something

The difference between a theory of design and a design theory must be understood primarily in terms of their subject: a theory of design takes design as its subject while a design theory takes *something* as its subject. Redström develops this idea into a question:

> *"If we take theories to, in general, be things that in one way or another describe and explain something, that reveal and articulate the underlying structures, principles, or logic of something, then we also have to remember that we do not have just a theory but always a theory of something. Theories have a direction, an orientation, a purpose—and this purpose determines what needs to be accounted for and what can be considered the matter of something else. This means that there might be a significant difference between a theory of design and a design theory of something. If a theory of design would take design as its subject, with the aim of developing an account of its underlying structures and logic as seen from the outside, what would a design theory of something be like?"(Redström 2017, 4)*

The context where this question happens is design. Design, as object or event, as thing designed or act of designing, is especially prolific in the display of its own multiple and sometimes conflicting definitions. Rather than choosing one among the others and proceed to build notions regarding design theory, Redström intelligently focuses on the fact that *there are* multiple and conflicting definitions of design. It is this lack of

agreement, this possibility of reinterpreting what design is, that makes design a powerful ally when dealing with complex and contradictory issues:

> *"this absence of unified definitions is not a conceptual shortcoming of our thinking but in fact an effective strategy for coping with certain kinds of complexity"(Redström 2017, 6)*

The example that we are invited to follow is that of colour by Merleau Ponty, "A sea so blue only blood would be more red". If we were to extract the design value of this expression (or even try to understand it) by translating red and blue to their precise wavelength equivalent in nanometres, we wouldn´t be able to relate it to any matter of aesthetics. Instead, we can approach the elements in terms of their difference so they attain a sort of problematic precision that allows us to refer and apply them even in unstable contexts. For example, we can always talk about a house being white regardless of the kind of light it is bathed in. The house, in conversation for example, is still considered white even if the morning or the evening white have definitively different wavelengths. Basically, by approaching, understanding and defining concepts on the basis of difference rather than through static criteria, they are already prepared to cope with continuous change around them.

Moving away from conceptual precision when developing a design theory trades complexity, up to the extent of sometimes challenging strict common sense, with the ability to accommodate change. For Redström, Design theory is transitional theory: fluid, dynamic, unstable and able to articulate what design is while designing. The elements of design theory are transitional in the following senses:

> *These ideas, concepts, principles—theories—are transitional in a sense similar to the notion of transitional forms in evolutionary biology: traces of how a form has evolved into another, as in transitional forms showing how life evolved from living in water to living on land. They are transitional in a sense similar to the notion of transitional objects in psychoanalysis: objects such as the child's blanket providing comfort and support during the process of developing an understanding of the external world, as when grappling with the "not-me," of experiencing the parent as external to the self (cf. Winnicott 1953; Attfield 2000). They are transitional in a sense similar to Wittgenstein's ladder. Propositions that are used to obtain a different view but in retrospect are no longer necessary. And they are transitional in a sense related to Gilles Deleuze's "intellectually mobile concepts," to how "all the new sports—surfing, windsurfing, hang-gliding— take the form of entering into an existing wave. There's no longer an origin as starting point, but a sort of putting-into-orbit. The key thing is how to get taken up into the motion of a big wave".(Redström 2017, 135)*

The concepts in a theory of design aim at remaining static while defining things that move and change. On the other hand, the concepts of a design theory are malleable but resilient. As a consequence, and to avoid their falling back into a theory of design, the definitions that structure a design theory must include not only their form but also their *formation*. In order for concepts to remain part of a design theory *of*, their definition must not only account for what they are but also for how they come to be.

1.3.2.   Intermediaries

To say that definitions are made through design has implications on many epistemic levels. The first epistemic level belongs to the design object and includes what Redström refers to as "ostensive definitions":

> *"Consider how a chair defines the act of sitting, and how, therefore, designing a chair in a certain sense is a matter of defining what sitting is. When we make a chair, its form will define a certain intended bodily position, a certain act of sitting. If someone asks us, "What is sitting?" we can point to the chair, sit down in it, and say, "This is sitting." While the experience of sitting down in this chair is our own, it can also be shared, as when we invite the person asking us what sitting is to sit down in the chair. And we say: "That is sitting." In this way, we define a general term - "sitting" - through the concrete design of a given thing, that is, this particular chair"(Redström 2017, 31)*

Every new design object belonging to a certain class represents a new definition that does not necessarily disqualify previous definitions. When a new chair is made it provides a new definition of sitting without deeming false other definitions. It rather works as an extension and, in the case of a chair, represents a "this is also sitting". In my investigation, I have created a number of design objects with the purpose of confronting the ostensive character of propositions, for example, in order to test my understanding of the real I designed objects to face the statement "this is reality" or "this is fiction".

1.3.2.1.   Definition of "Intermediaries"

The second epistemic level that involves definitions made through design is that of concepts derived, informed or made with the objects designed. These concepts act as higher-level definitions than the artefacts that originated them but not as high level

as the design theory to which they contribute. They bridge the gap between theory and practice and aim at achieving a form of intermediate-level knowledge (Höök and Löwgren 2012), following Redström, I will refer to them as intermediaries in allusion to their capacity to directly address the tension between the particular and the universal. To put it in terms of this particular research project, intermediaries are the conceptual objects that were made while/through making design objects to go beyond materializations of the real or fictional but not so far as to venture in giving a coherent and complete picture of what the real and the fictional are.

As a result, the intermediaries I make must be unstable and, just like the design theory they aim to contribute to, transitional. They have to be definitions that feel like questions instead of answers, like "something calling for a response", to use Redström's words. Only in this way they will be able to integrate the fluidity and constant change of my design research process:

"whereas others look toward the universal for support and stability, design needs theories that support conceptualizing, articulating, making, communicating, collaboratively creating, and so on, something new and particular."(Redström 2017, 25)

As I will try to show in the next section, to make an intermediary is a challenging task that can quickly obscure rather than clarify what is been investigated. They are quite effective at drawing the conceptual strength of a particular design object to visualize a tension. However, whether visualizing this tension is productive or not to further elaborate a design theory of something is altogether a different matter.

1.3.2.2. Failed intermediaries

My process of developing a design theory could be easily be compared to many other instances of a design process. A series of questions leading to a prototyping effort that provides certain answers which inform the creation of various concepts that result in new prototypes that partially respond to previous questions and generate new ones informing new concepts in return and so on, and so on. In parallel to this non-linear thread of making, reflection and conceptual synthesis, ran an effort to incorporate the concepts within the larger coherent whole of a design theory of reality and fiction.

One such effort took place well into the second year of this investigation. Armed with the knowledge collected from the design of four research artefacts and after presenting some of the insights gained after attending various conferences, I felt ready to provide a set of intermediaries, of terms that were conceptually in between the design objects and the arguments about what makes them real or fictional. There were two threads that connected the intermediaries. First, I had been using fiction as a design material such as a veneer, that, more or less knowingly, I had spread over objects. Second, fiction could also be considered a tool, like a nutcracker, that could "crack open" reality.

My certainly Deleuze-overdosed attempt really felt like a breakthrough at the time. These four intermediaries seemed to open up interesting epistemic paths that might have led to valuable designerly insights. However, my enthusiasm quickly faded when I faced my next design brief: these intermediaries were too abstract and would not facilitate reasoning but rather confuse any attempt to draw a productive conclusion, let alone provide any clues on how to inform the design of an object. The resulting four intermediaries were the following:

Everyday - Reality is the place where the real objects dwell and for a designer, reality is the everyday. The material and cultural practices that people carry out as part of their life. It is an entanglement, a sort of fabric.

Knot - Real are the objects that make the everyday. The knotted threads that put the fabric together. They make it effective, they make it happen and appear as it is. Real objects are what give the everyday consistency. Primarily or ultimately, they are made of matter threaded in one way or another which imposes on designers the need to be materialists.

Gap - Fiction are the objects that are not real. They are not made of matter. They however are inseparable from Knots as there is no Knot without the gaps that define its arrangement. Gaps keep the entangle an entangle and not a point, or a ball and hence they also determine how they fold or unfold.

Neveryday - The fictional is the neveryday. It is from where the new emerges, new threads, new knots. It's the region of the formal or the pre-individual or the virtual with the ingredients for new knots or threads to happen.

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To this attempt many others would follow but the result would always be, to a higher or lesser degree, the same: failure. In some cases, the failure would consist in intermediaries that articulate a design theory so compact, so static and rigid that any new design object developed afterwards would sooner or later refute it. In other cases, the intermediaries would provide a design theory so diffused and all-encompassing that any design object would prove it right. The outcome would be the same, a useless design theory when attempting to gain an effective understanding of the real and the fictional.

1.3.3.   The Missing Thing

Constant failure can be many things, aside from a source of frustration and an invitation to further design and study, it can also signal that there is something missing. In reviewing failed intermediaries, I conceived of the possibility that there was an element that was absent from my theoretical edifice. If the design methods where the "how?" of my investigation and the intermediaries were a tool to respond to the "what?" (our research question) I realized I had been missing the very important "where?". It is as if I had been trying to make and use tools in an empty place, without support or structure. It seemed as if I required a space where I could conceptually work on my intermediaries and test them: I needed a workshop, or as I will show in the next section, I needed a milieu.

1.4. Design Milieu

In the previous section, I differentiated between a theory of design and a design theory of something by mobilizing the arguments that Redström employs in his book "Making Design Theory". I showed how I attempted to define intermediaries but failed because there was something missing. Redström's book also provides a suitable nexus to this section, in particular the part he reserves for the discussion of programs:

> *"The term "program" is used in a range of diverse settings, among them computer software, television shows, educational curricula, frameworks for scientific inquiry, and architectural planning of space. Such different programs may not share many similarities, but they have at least one common feature: they are about the intent and structure behind something about to unfold. A program can be a planned set of events or*

actions, as when we talk about the program of an art or a music festival; it can be the overall intention and planning governing the development of a new technology infrastructure, or sector, as in a nation's nuclear program…"(Redström 2017, 85)

The fluidity of the term "program" in everyday language to describe things that are evolving towards something not yet defined, allows for it to also be applied effectively in research, as when we talk about research programs. In this particular context, Redström reminds us of the philosopher of science Imre Lakatos and what he termed "research programmes" in the context of science:

"Lakatos's notion was partly a response to Thomas Kuhn's notion of "paradigm" and describes the overall framework that science operates within, something akin to a worldview, a set of theories held true as a foundation for further research." (Redström 2017, 86)

A design research program addresses the overarching or rather chronic presence of the tension between the universal and the particular that is endemic to any design object but it does so in a particular way: it allows for the use of transitional worldviews. Within a design research, program foundations need not be static and fixed, they can become provisional and act as a sort of "what if" that allows designers to explore possibility with a conceptual ground under their feet. The following is an example of what a simple design research program might be like:

"Design is the use of the basic geometrical shapes of the circle, the square, and the triangle to express the functionality of everyday things." Through design experiments, we would then explore what designing would be like according to this program through the (re)design of various everyday objects. To find out what the design space of this program is like, our experiments would probably initially explore issues such as how objects with more complex forms could be reduced to these elementary geometrical compositions. In a sense, we would look for what are typical, as in the notion of the "prototype" (Moholy-Nagy 1998), examples of what this kind of designing is like."(Redström 2017, 96)

The strength of a design research program when thought of in this way resides in its ability to become a sort of "play-ground" or a testing site where the implications of having a certain worldview for design can be explored and developed. At the same time, a program forces a worldview to become explicit.

Certainly, my research investigation starts to resemble a design research program as defined by Redström. I am using design to investigate a topic but rather than using well established foundations in theories of design, I will be creating a core that supports the

design experiments and gives them enough stability so as to articulate a design theory. Now, I will proceed to examine what programs and projects are built on, the "hard-core" that gives them consistency: their worldviews.

1.4.1.   Worldview

The concept of worldview, or Weltanschauung in German, is a fundamental notion in philosophy (Vidal 2008). It is used to refer to the set of beliefs and ideas that an individual mobilizes in order to compose a comprehensive image or conception of the world around her and her place in it. Unsurprisingly, Redström takes a similar standpoint in defining worldview but shifts the focus to that of design and places it within the context of a program:

> *"… "worldview" here is understood as a set of basic beliefs or assumptions that constitute the "world" for the design, in the sense that they are not really questioned or challenged but rather assumed as its basic condition. We are not speaking of worldview in the sense of a complete human experience; on the contrary, for this to work, it is central that we can find ourselves both inside and outside the program, although our design work is conditioned by it."(Redström 2017, 96)*

This definition happens after the example of a simple program I quoted above that posited design as the use of basic geometric shapes to express the functionality of everyday things. The intention is not only to illuminate what a worldview clarifies but what it obscures when taken for granted without a dose of critical thinking. The salient characteristic of any worldview is the fact that it is situated:

> *"Still, there are things we can say about its basic beliefs, such as that it brings forth a definition of form that is inherently visual and even geometrically reductive, that it understands purpose primarily as functionality, and that it believes the domain of design to be the expressions of everyday things. To understand its world, we can also look at what is clearly not present in its projection, such as for whom the design is made; for what reasons the functionality of the object is in focus, and not what people use it for; that it says nothing about how to prioritize use and management of resources in a global context; and so on. So while this is an extremely limited set of assumptions, the resulting worldview certainly has real implications, in a larger context potentially both productive and destructive ones. And though this worldview is limited and constrained, this makes it clear that it is situated: insisting that it must be understood as something particular, as something representing a position."(Redström 2017, 97)*

Understanding 'worldview' as a particular set of elements that determines a certain position to be taken, strongly resonates with what I described earlier as my ethos. The basic belief or notion that one can deeply know something by making it or, in other words, that research through design is possible. This is the object that sustains my research effort and provides the base to continue with my enquiry. However, my worldview does not only include that notion but also other objects derived from my particular cultural, social or epistemological grounding. Some of these "worldview components" are more obvious than others lending themselves to analysis with different degrees of ease. In fact, a critical look at the reasons why my intermediaries constantly failed revealed how my worldview was inefficient as a space where I could conceptually develop effective theoretical notions. It was as if I went into a metal workshop with a chunk of wood. What I came to realize however, was that not only my worldview was to blame but the notion of worldview itself needed to be revised.

1.4.1.1.   *Why 'Worldview' is not Enough*

In order to understand why I find the notion of worldview problematic at this stage, or why conceiving of my worldview as my workshop fails, I need to quickly remember the nature of my research endeavour: I am after effective design knowledge that facilitates thinking of what makes design objects real or fictional in order to contribute to the community of design researchers and practitioners that place design practice in the core of their research endevours. When I consider a worldview in the context of my particular research endeavour, I feel compelled to ask, is a worldview real? I am tempted to reply in the affirmative as a worldview has a structural efficacy as far as constituting reality goes that is hard to deny. At the same time, worldviews are mental constructs. Aside from effective, they are extensive insofar as they comprise many objects like social and cultural values. At the same time, worldviews are also abstract. Are worldviews fictional? I feel compelled to reply negatively but then, what about other objects of the mind like stories? I would run into trouble if negating their fictional status. Are worldviews then, both real and fictional? Worldviews are certainly effective objects that can serve as the foundation of many design research projects but their ambiguous character disqualifies them as a basis for this one. How could they be when I am not even able to think them clearly in the context of my enquiry!

1.4.2 The `Metaphysical workshop´ or `Milieu´

It is at this point that philosophy enters the scene. Philosophy, not understood as the love of knowledge[18] or as a method for gaining it but, in much simpler terms, philosophy as a way of thinking about things. In this investigation, I recourse to philosophical constructs just to be able to think more things. Not to claim that the things I think are true, right or better than the things that other people think. My hope is that after I am able to think things I can proceed to criticize or evaluate them, if that is what is appropriate. It is in this sense that a worldview is not suitable as my foundation for it is too rigid or rather, too constrained, so as to allow me to think enough things. The sense in which a worldview is constrained for my purpose lies in the fact that for worldviews to exist there has to be people (and their minds) putting them into practice. Although my concern might seem paradoxical (after all, what is design without people?) I believe that in order to think people's things I first need to be able to think only things, regardless of whether people are involved or not. This overly simple statement echoes with the one of the main tenets of a contemporary philosophical current known as Speculative Realism (Bryant, Srnicek, and Harman 2011): a critique of correlationism. Speculative Realist philosophers wildly diverge in their philosophical treatments but they have in common the rejection of what they refer to as the correlationist principle. Essentially, a rejection of the notion that it is only possible to gain access to knowledge about the world with a human mind mediating it. In other words, one cannot have access to things but only to the relation between mind and things. I will further explore what correlationism stands for in Chapter 2. At this point, I hope this very short description suffices to illustrate that worldviews are not the only candidate for acting as foundation of a design research effort. In addition, and as I will argue in the next chapter, to have a conceptual space that allows for thinking things in their own terms might result in a better ability to think about human things, such as my very own worldview, in particular.

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[18] Graham Harman makes an excellent case for considering philosophy as a discipline close to the arts by rooting its purpose in the Socratic notion of philosophy as the love of knowledge. See (Harman 2018a)

If my design methods were the "how?" and the design theory is the "what?", the "where?" is what I call the Milieu. The Milieu serves two purposes. First, the Milieu is the conceptual space where I place all the research artefacts I have designed in order to analyze, criticize and evaluate them. Second it is where I develop and test the elements of the design theory of Part III. I refer to this metaphysical context as Milieu in order to avoid giving primacy to certain things a priori, no matter they are real, fictional, cultural or human. My intention is to furnish a metaphysical workshop as fluid and resilient as possible where I am allowed to think as many things as possible and among them what is it that makes a design object real or fictional.

The next chapter consists of a comprehensive description of the Milieu. This lengthy account is akin to familiarizing oneself with a workshop. This workshop is, instead, a metaphysical one. During the visit, I hope the reader observes that just like any other workshop this one was not found but made or rather, designed. The Milieu is resolutely philosophical and grounded in the thinking of one particular philosopher: Tristan Garcia. I approached his work with great respect but also with great freedom and in turn, my effort did not turn out to be one of mimesis but rather one of making. The next chapter is not a summary of Garcia's book "Form and Object". It is also not an obscene transformation, a monstrous child or a violent assault a la Deleuze[19]. Rather, it is a sketch or a prototype where significant elements have been kept, interpreted, rearranged and at times slightly modified. My main goal was to produce a ground on which to materialize effective conceptual figures that the intended audience of this PhD, design researchers and practitioners, can mobilize in order to grasp the real or fictional character of the design objects they produce or encounter. This meant I had to sacrifice fidelity for the

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[19] One finds a strinkingly obscene description of Deleuze's approach to the philosophical thought of others in Slavoj Zizek's book "Organ Without Bodies". Deleuze himself described his practice as "buggery" or "encoulage" in French as follows: "to see the history of philosophy as a sort of buggery or (it comes to the same thing) immaculate conception. I saw myself as taking an author from behind and giving him a child that would be his own offspring, yet monstrous. It was really important for it to be his own child, because the author had to actually say all I had him saying. But the child was bound to be monstrous too, because it resulted from all sorts of shifting, slipping, dislocations, and hidden emissions that I really enjoyed." (Zizek 2012)

sake of flexibility. A loss I wasn't too sad to assume because, after all, the Milieu is not treatise of philosophy but a workshop for design.

Chapter 2

Milieu

In this chapter I will present the conceptual space I designed in order to develop a design theory of fiction. I call this conceptual space 'Milieu'. I've accessed it when I need to think about things, anything. It is also the place where I can think of objects, no matter how big or small, abstract or concrete, real or fictional. It is a metaphysical workshop where one can work on thinking anything. If a wood workshop, for example, has all the necessary tools to work on and make things with wood, this metaphysical workshop is the space where I find all the conceptual resources necessary to think about things and objects. In particular, in this thesis I will enter the Milieu to deal with ontology. Ontology is the part of philosophy that tends to the nature of being. A contrast might be helpful here. If epistemology is the study of how things are known, ontology is the study of how things are. What it means that something is, is the answer to an ontological question about that thing.

This Milieu is a crucial element in my enquiry. Like any other workshop, it limits complexity in order to facilitate a particular possibility. It is not recommended to bring aluminium to a wood workshop. The possibility that this Milieu facilitates, is a radical flexibility for thinking design objects. As a consequence, the complexity of incorporating many perspectives from many thinkers is drastically reduced. If I am to work on wood I

would rather have a wood workshop than a mixed wood/metal workshop. Similarly, if the thought of one thinker allows me to appropriately and accurately think the objects of my research question, for the sake of simplicity and clarity I will attempt to furnish this Milieu accordingly. The limitation I am facing is slightly similar to what Joseph Lindley, Paul Coulton and Haider Akmal describe when mobilizing the thought of one object oriented ontologist, Ian Bogost, in their paper (Joseph and Ali 2018b):

> *We are not philosophers and thus we acknowledge that this paper is built in from our interpretation of OOO heavily reliant on Bogost¹s Alien Phenomenology (2012), which itself is but a single scholar¹s take on a theory that is the subject of disagreement even among its proponents and it is therefore likely other scholars¹ perspectives may be subtly or considerably contrast with ours!*

This is precisely why I have tried to stress the design nature of my effort in engaging with the philosophy of Tristan Garcia: it is a sketch or a prototype that has yielded very effective results in terms of thinking about things. However, I am not claiming that this is the way Garcia should be read or understood but rather that this is the way that I have designed a design theory of fiction with some of his ideas.

2.1. Why a Milieu

As I noted in the previous chapter, this Milieu prefigures how one can approach and consider what things are, and among them, one's own worldview. What could be considered a detour into philosophy takes the character of necessity in order to address my research question and contribute to my intended audience for two reasons that closely relate to one another.

The first reason is imposed by design: it is quite difficult, if not impossible, to talk about design without assuming what design is. Any design talk takes an understanding of design for granted. It naturally follows that an honest excursion into design demands an equally honest depiction of what design is. There is a simpler solution: rather than using a general ontology to ground my study, I could appeal to the ontologies of design already developed by others. Some of these design ontologies won't escape my scrutiny in next chapters of this thesis where they will be addressed and critiqued. However, in order to do that, I need a levelling field that allows me to analyze and compare them. Part of this

chapter can be understood as an effort to define and display a particular conceptual space that I will use later to analyze, critique and make design theory.

The second reason is imposed by fiction: the main purpose of this thesis is to study the real, the fictional and what it all means for design. In a way analogous to the first reason, an ontology of fiction will clarify and facilitate my discussion. The option of adopting a stablished ontology of fiction and argue along with is also possible here but again, it is something to be resisted. Mainly because it wouldn't be an effective tool to understand other ontologies of fiction (something I will also do in the next chapters). Furthermore, whenever one takes for granted what fiction is, one is also taking for granted what "to be" is. A metaphysical workshop where I can think ontology is nevertheless necessary.

However, there is a line to be drawn. This is not a philosophical treatise but a design research endeavour so my descent into ontology stops marked by the choice of a philosophical stance. It would be terribly hubristic to assume I can develop a full ontological theory as powerful as those developed by philosophers themselves (a comment that is in line with other scholars bringing together design and philosophy (J. G. Lindley, Coulton, and Akmal 2018)). This is not only motivated by an alarming lack of philosophical knowledge on my part but also because I would be moving away from the target of this research and the audiences it aims to address: design researchers and designers that utilize their design practice as a method to access a particular realm of knowledge.

2.2. Why this Milieu

In the rest of this chapter I will furnish a metaphysical workshop with an ontology, a way of understanding how things are. In order to do so I will sketch and appropriate a philosophical stance but before doing so, I will position it in relation to other ontologies from well-known philosophical currents. After all, to take a philosophical stand is to answer to another. To think through a particular philosopher is to colour thoughts in a particular hue and differentiate contrasts that wouldn't otherwise be there. This is not to

say that philosophies are right or wrong but rather that taking a philosophical approach has consequences and impacts how things are thought.

The motivation behind my philosophical pretentions is not to set the right milieu for right thoughts to emerge later but rather to set a milieu that allows for the broadest possible way of thinking about design things. The choice is motivated and focused. Motivated by the attempt not to think through an ontology that gives thoughts the chance to be right bur rather the ontology that gives chances to as many thoughts as possible. Focused for although I won't be too strict, I will certainly place design in the ontological spotlight.

In a more pragmatic sense, the choice for the particular philosophical stance that I adopt in developing a design theory of fiction closely resembles (again) the thought of Lindley et.al in (J. G. Lindley, Coulton, and Akmal 2018):

> *OOO was demonstrably a generative and analytical tool to help understand the design context, and as such played a central role in both deconstructing the problem but also in assembling possible solutions.*

In very similar terms, the philosophical stance that has informed this thesis throughout has played such a central role in my research process that I consider it necessary to share the use I have made of it with the reader. I do this for two main reasons. First, in order to provide an account of the tools I have used to question my worldview in the context of my research question. This will facilitate and clarify the argumentative decisions taken further on in this thesis. Second, in order to provide the reader with a substantial enough representation of a conceptual space where she can develop her ideas if she wishes to do so. I will expand on this point later in the thesis but, in essence, my rationale for this lengthy discussion of my Milieu responds to my impression that if the reader where to benefit from the thinking of Garcia, a mere descriptive pointer to his books won't do.

Now I will take an entity as a companion and try to understand what this entity is through three different ways of ontological thinking in order to contextualize philosophically the stance I have chosen. Anything will do but for simplicity I have chosen a rather simple object: a piece black slate.

2.2.1. Ontologies of Substance

A person holds a piece of black slate in his hand. According to an ontology of substance, the black slate is primarily a single or an aggregate of substances, of other more fundamental things. This substance or substances is what the black slate is made of, the mineral, chemical and other material components that give it its consistency, its weight and the rest of its properties. What ontologies of substance have in common is that they define what something is through an essential thing that supports other entities. For example, what the black slate is, is a compound of quartz and pyrite that weights 100gr, etc. If something is, according to an ontology of substance, it is because there are things "in themselves" (that at the same time are made of other more fundamental substances). This way of understanding and dividing things is characteristic of classical and ancient ways of thinking. Plato[20], Aristotle(Wedin 2002), Kant[21], Hegel[22], Descartes[23] and Heidegger[24], for example, proposed, with important differences among them, ontologies of substance. In ontologies of substance one can always find a hierarchy from primary to secondary or from fundamental to derived or auxiliary. Things have more fundamental things that serve as their ontological support.

Figure 1 represents how being is understood in ontologies of substance. The properties, qualities or predicates that are part of things do not exist by themselves but channel their being into another entity on which it circulates in a closed loop, the substance or thing in itself. In the case of the black slate it could be possible to imagine

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[20] Plato's Theory of Forms in the allegory of the cave. (Plato 2004)

[21] For Kant "Substances—that is, a framework of stable, enduring objects—are essential, but the source of this necessity lies not how the world is in itself, but in the framework which we are obliged to impose." (Robinson 2014)

[22] From the preface of Phenomenology of Spirit ""In my view, which can be justified only by the exposition of the system itself, everything turns on grasping and expressing the True, not only as Substance, but equally as Subject" (Inwood 2018)

[23] Mind and body as substances in Descartes dualism. ("Dualism (Stanford Encyclopedia of Philosophy/Fall 2003 Edition)" n.d.)

[24] Although he rejected substance as understood by the classics and especially Descartes, Heidegger placed the sensing subject in a privileged position in the ontological hierarchy. (Heidegger 2008)

three arrows: being of slate, being of flatness, and form of square that enter a thing in itself: a flat and black piece of slate in the form of a square.

The crucial point here is the hierarchisation of being. This is not to be taken in a valuating sense, such that there is one way of being more important than another (which varies wildly according to different ontologies of substance), but rather that what something is, is dependent on a thing being substantial, *being in itself*, in conjunction with something being predicated on it. The thing in itself is responsible for sustaining the being of other things.
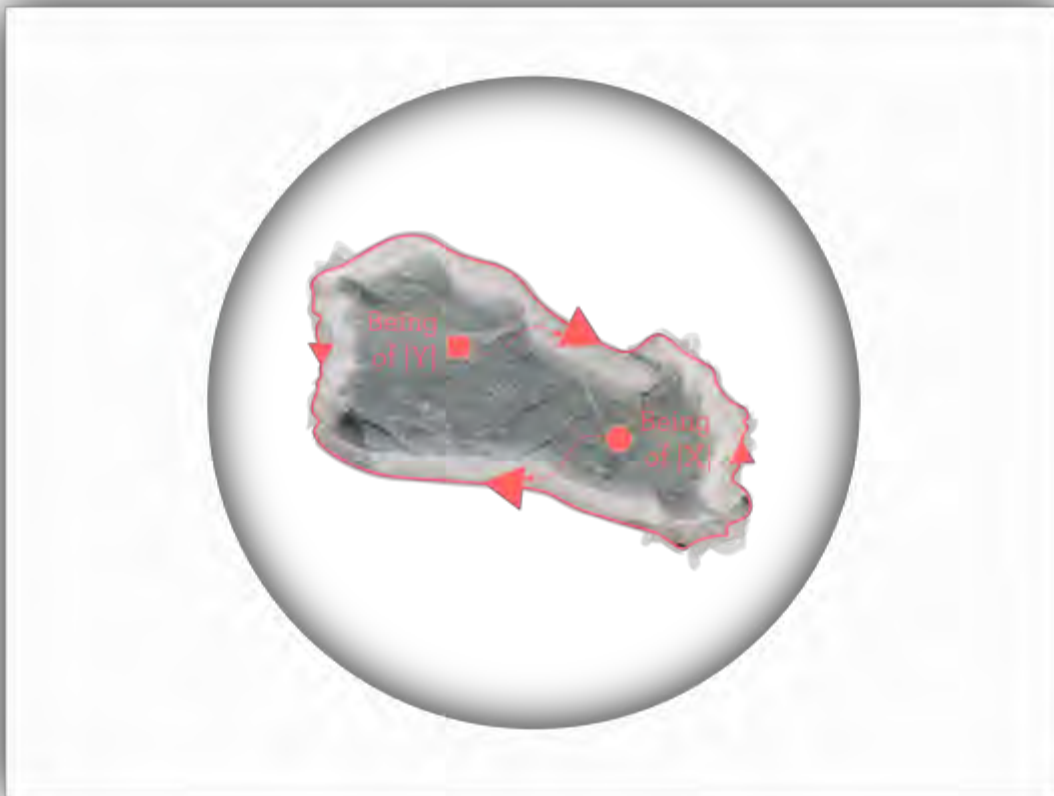

Figure 1 Being is trapped in a loop in Ontologies of Substance. Picture credits my own.

2.2.2. Ontologies of Transience

In this ontological model, substance is non-existent, there is nothing "in-itself". Here there are also vectors that carry being but there is not an arrow that closes upon itself

making permanent what something is. Ontologies of transience are, for example, those of Nietzsche (Poellner 2000, 32), Bergson[25] or Deleuze[26] where things are identified at the crossing of events, forces, relations or becomings. What makes a thing re-identifiable is the quasi-stable form that arises when these vectors of being encounter each other, like when the transient trails of smoke left by airplanes in the sky give the impression of forming a triangle.

In opposition to ontologies of substance, ontologies of transience result in things that can never be compact or stable. To be is to be in flux, in a permanent state of change and there is not a point where cohesion is achieved, where the flow of being closes upon itself raising a consistent structure. In a very simplified way, there is no substance in the black slate, there is nothing permanent or constant in it but rather, the black slates becomes a black slate when a series of cascading events coincide. The elements that compose the black slate are at its core a multiplicity of vectors of being, of relations that contingently produce it. Such relations are at every level of the black slate, from the microscopic to the macroscopic and as a result of their interactions the black slate arises a posteriori. The black slate is a transient mesh of relations and forces between atoms, molecules, the air that surrounds it, the eye of the observer, etc. (See Figure 2) and also all the relations that form those elements themselves (atoms, for example, are also meshes of relations between elementary particles).

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[25] The process philosophy of Bergson hinges on unforeseeable novelty. (Bergson 1998)

[26] Also a process philosopher, Deleuze even saw identity as a result of difference. (Deleuze 1995)
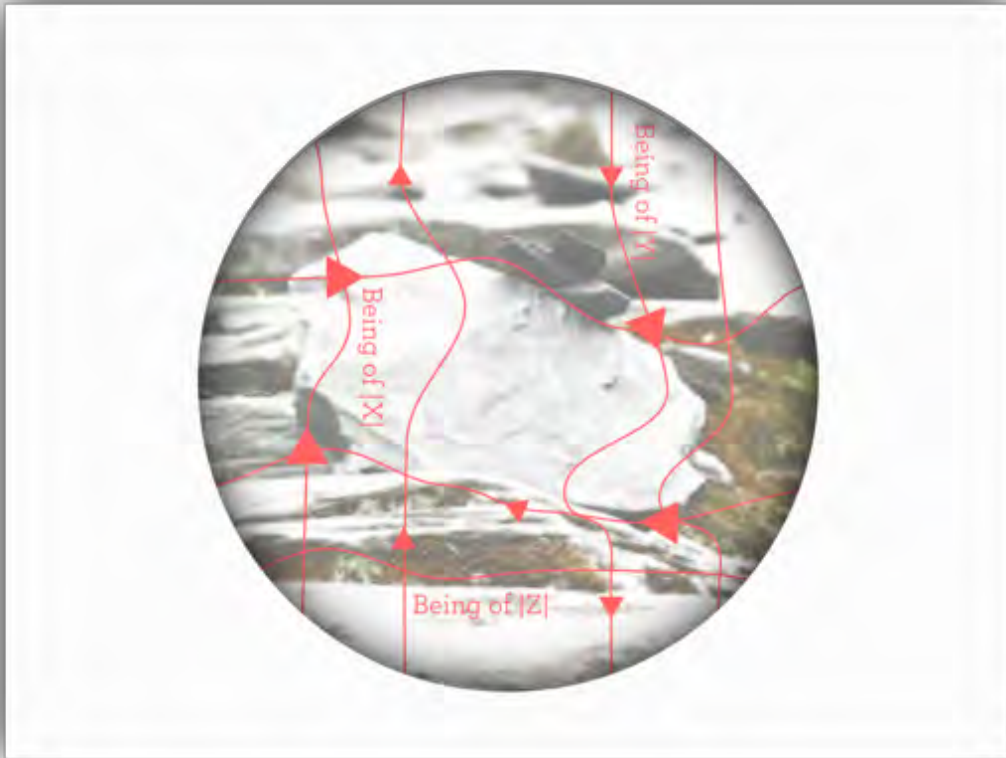
Figure 2 Being is dissolved in a flow of becomings in Ontologies of Transience. Picture credits my own

This Milieu is not furnished with neither an ontology of substance nor an ontology of transience. The choice, the selection of a particular ontological view, was neither fully picked nor imposed although there are components of both aspects present in it. It is not that among a catalogue of possible philosophical perspectives I singlehandedly chose one regardless of the others. It is, rather, that in choosing to let different philosophical perspectives inhabit me, one of them decided to remain more present than the others. As when one builds a birdhouse and is nonetheless surprised to discover that a particular bird, and not another, has made of it a home. When I wondered which ontological approach would allow me to think more thoughts, not the right thoughts, about design and my research question, I found a nest with a species of the thingly ontology of Tristan Garcia.

2.3. Thingly Ontology

Tristan Garcia is a contemporary French philosopher and fiction author. He worked in the Ecole Normale Superieur with Alain Badiou and Quentin Meillaisoux and was awarded his philosophy PhD under the supervision of Sandra Laugier in 2011. Three years earlier he published his first novel La Meilleure Part Des Hommes (translated into English as Hate: A Romance (Garcia 2012)) which won the prestigious Prix de Flore. While writing other works of fiction, his research into metaphysics resulted in Form and Object (Garcia 2014), a colossal systematic philosophical treatise that has become one of the main contributions to the young Speculative Realist (Harman 2018b) philosophical movement. The "thingly ontology" that Garcia develops in Form and Object is the main material that I have used to furnish this Milieu and have the conceptual tools necessary to think my research question.

If in ontologies of substance being enters into a thing to constantly circulate around the thing itself and if in ontologies of transience being circulates without any objective end point, in Garcia's "thingly ontology" *"Being enters into a loop wherein being is not projected in itself but cast outside itself."* (Garcia 2014, 11) According to this model, being has two senses: the sense in which it enters into the thing and the sense in which being abandons it. The entering sense is "what *is in* the thing" (I will call this sense *being*) and the abandoning sense is "what the thing *is in*" (which I will call *comprehension*). This time I will recourse to Garcia's prose in order to explain what the black slate is:

> *"Take, for example, a block of black slate, a random rectangular sample taken from a site of continental collision. Few people will deny that this block is a thing. One can of course point out that it is necessary to have an active subjectivity to divide or distinguish this block of matter lying on the ground of dusty soil, in order to perceive it as such. But this slice of black slate possesses certain qualities of cohesion and of solidity that allow one to dissociate it from its environment, handle it, transport it, and consider it quite simply as 'something'. What is it composed of? It contains quartz, clay-like minerals, mica, some traces of feldspar. And all these components themselves have a certain atomic structure. But in a wider sense, they also enter into the constitution of the rock as 'thing': its rectangular form, the irregularities of its surface, the porphyroblasts coated with pyrite, its sombre color, its delicate texture, its weight, its fragility, and all the primary or secondary qualities by which we can recognise the black slate. We say that this is all that is in this thing, all paths of being that lead to the constitution of this black slate in my hand.*

Yet, that in which this slate is can never be inferred from every thing that is in this slate. From everything which composes it, I will not obtain the slate's location in the world, the relations in which it inscribes itself, the fact that it is now in my hand, the function of a weapon that it can exercise if someone attacks me, its place in the landscape or in the series of slate pieces scattered alongside this valley. That which it is, this unique thing which exists in the world, and I hold in my hand, is outside itself. The slate can in fact enter into the composition of the side of a mountain, a roof, or a collection of rocks. As a whole, it then becomes a part of another thing, and it is no longer a question of that which is in the slate, but of that in which this slate is."(Garcia 2014, 12)

In the "thingly ontology" being enters into the black slate through its components, through the parts that compose it (Figure 3). The being of mica and quartz and the being of the elements that give rise to its atomic structure. Also, they enter into the constitution of the black slate as a rock defining the characteristics of its form, its surface and so on. Being enters into the thing. Things enter, form, are part, of the black slate. But crucially, the black slate *is not* these things. The black slate is not a sum or the whole of the things that compose it because if it were, the channel of being would be blocked (which, as we will see, is the whole reason why Garcia developed his "thingly ontology"). Also, and very importantly, the things that are in the black slate cannot explain the relations that the black slate enters into. Its components cannot explain its function, location or psychological implications. *We cannot know what the black slate is in from what is in the black slate*. These essential elements that define what a black slate is would be ignored if we identified the black slate with its ingredients.

Figure 3 In a Thingly Ontology the flow of being is neither constrained through components not dissolved through relations. Picture credits my own.

2.3.1. Thingly Ontology as a Response

Garcia's ontology could be read as a rational response to a particular event: there are more and more things. This is not meant as that there are more and more things in a person's life as time passes (which undoubtedly might also be the case) but rather that the universe is filled with more and more things. And because the magnitude and intensity of this event, it is, in Garcia's view very difficult to account, compare, understand, feel or even think about things without being absorbed in the maelstrom of their exponentially increasing numbers. One can find the following among the first words in the Introduction to Garcia's Form and Object:

> *"Our Time is perhaps the time of an epidemic of things. […] We live in this world of things where a cutting of acacia, a gene, a computer-generated image, a transplantable hand, a musical sample, a trademarked name, or a sexual service are comparable things. […] It is increasingly difficult to comprehend them, to be supplementary to them or to add oneself to oneself at each moment, in each place, amidst people, physical, natural and artefactual objects, parts of objects, images, qualities, bundles of data,*

*information, words and ideas - in short, to admit this feeling without suffering
from it. The goal of this work is to bring those who do not yet share it to
admit it, and to propose to those who already admit it a way of ridding
oneself of it."(Garcia 2014, 1)*

The universe of things is one in wild, unbridled expansion. And, in Garcia's opinion if one is philosophically unequipped to make sense of it, it might result in perplexity. This rather monstrous enlargement of the amount of things that are in the universe *"was brought about through the division of labour, the industrialization of production, the processing of information, the specialization of the knowledge of things and above all, the desubstantialization of the knowledge of these things"*. (Garcia 2014, 1)

This sense of perplexity when trying to think things is a feeling that I shared with Garcia and that motivated further study of his work. It instantly aligned with the design concerns I explore in this thesis because of the central role design plays or has played in some of these events. At the same time, A "Garcian" grasp on how to account and respond to the unstoppable accumulation of things in the world might prove fruitful to design researchers and designers.

There are two main reasons why, according to Garcia, people struggle in the face of a constant accumulation of things. The first reason is because the models used to recognize how things are, ontologies of substance and ontologies of transience, either block or dissolve the channel of being:

*"Substantiality tends to compact being in the final stage of its
process, overdetermining self-saturated things or things in themselves. The
pure eventiality of the vectors of being tends to dissolve and disseminate
being, and transforms things into effects, illusions or secondary realities…
The first produces a thing that is too much of a thing, that is "compact" while
the second generates a thing that is not enough of a thing, which is only a
construction or ephemeral projection."(Garcia 2014, 11)*

In a nutshell, there are more and more things because being "flows" leaving things in its wake. Ontologies of substance close the channel of being by conceiving of things as things in themselves. On the other hand, ontologies of transience dissolve the channel of being resulting in things that aren't able to retain any consistency. The thingly ontology of Garcia accounts for this flow rather than hindering or diffusing it. It provides a way of thinking things that have being (that *are*) without being in themselves.

The second reason is because the history of philosophy has given primacy to one particular thing: the thinking subject. Rather than thinking how things are accessed through the human mind or how they appear to the human consciousness, with a thingly ontology it should be possible to access *"a thought about things rather than a thought about our thought of things"*(Garcia 2014, 2) In this way, Garcia sides himself with critics of what has been called "correlationism"[27] The term was coined by Quentin Meillaisoux (Meillassoux and Badiou 2008) in his book "After Finitude" where he defines it like so:

> *"the idea according to which we only ever have access to the correlation between thinking and being and never to either term considered apart from the other"(Meillassoux and Badiou 2008)*

From a correlationist perspective, primacy is given to the thinking subject and the object becomes an elusive consequence. Phenomenology, for example, is one example of correlationism (Meillassoux and Badiou 2008). Things are out there but one cannot know them for what one can only know is her relation to them. It is in this sense that philosophies of consciousness, intentionality, language or action are known as "philosophies of access" for the privilege they, implicitly or explicitly, grant to the human being over other entities. The privilege of anthropocentrism is drastically rejected by Garcia. He poses the appropriateness of a thingly ontology in the form of a question:

> *"Is it better to begin by thinking about our access, which will never have access to things, but only to our conditions of access, or to begin by thinking about things, which, if we do not want to cheat, obtains thinghood in every possible mode of subjectivity?"(Garcia 2014, 3)*

A little unpacking might be helpful here. The first part of the question aims at how, when one thinks about something through the means of our thinking, ones never gets to the thing but gets stuck in the workings of the relation instead. Take language for example. For Garcia, a philosophy that claims to know things through language will never reach things (regardless of whether the philosophy in question claims to do so or not) because it won't be able to move beyond language (the relation) that it takes as the mode of access to things. It will be forever stuck in the means never reaching the end (things). In opposition to this one has the chance to think about things directly and gain access to

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[27] A critique of "correlationism" is what brings together different philosophical approaches under the umbrella of "Speculative Realism". (Bryant, Srnicek, and Harman 2011; Harman 2018b)

them bypassing subjective modes of understanding them. However, in order to achieve this, one must not cheat. Cheating for Garcia and as I will show below, is to be avoided through ontological generosity: one must grant being to all things.[28]

2.3.2. Thingly Ontology in Context

Affirming that in Garcia's universe every thing exists is not an exaggeration. Material, natural, psychological or fictional things all are granted the chance of existing, of being something. Although an atom, a body, a revolution, a cherry or the idea of a cherry are different, for Garcia, they are all equal in the sense that they exist, that they are something. Qualities are things, theories are things, organs are things, contradictions are things and for that matter anything can be a thing[29]. In philosophy, such a way of granting being to everything is known as a flat ontology because there are no distinctions when it comes to which things are and which things are not, all things simply are. This is drastically different from other ontologies that differentiate if things are or are not based on categories, effects, properties, etc. It is with reason then, that Garcia's thingly ontology is considered a flat ontology and has been compared with that of Alexius Meinong, an Austrian realist philosopher that at the turn of the XX century gave an ontological home to things that up to that moment had not been given the chance to be. Meinong believed that anyone could refer to non-existent things, like a unicorn or a Pegasus, so these things must be something. He made a distinction between existing and non-existing entities but did not reject non-existing entities as being nothing. A unicorn, for example, has wings and a horn so it follows that if we can conceive of these properties there must be an object that supports them.(Meinong 2018) The realm in which these non-existent entities are came to be known as "Meinong's Jungle" (Routley 1980) possibly due to the exotic nature of its dwellers.

There are many differences, however, between Meinong and Garcia. I won't be analysing them for reasons of space and clarity, but it is relevant to note that

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[28] I will briefly consider how Garcia can be considered a realist further on. An engaging discussion on this issue can be found in (Cogburn 2017)

[29] Garcia provides an extensive argument on why everything being a thing does not mean that nothing is a thing too through his concept of "no-matter-what". Also Jon Cogburn explains it from an analytic philosophy perspective in chapter 4 of (Cogburn 2017, 67)

whereas Meinong was very direct in asserting the non-existence of his "unicorn-like" objects, Garcia grants anything the chance of being, and likely, that of existence. In terms of contemporary discourse, Garcia is not alone in his apology for ontological equality. His message powerfully resonates with adherents of a rather young philosophical tradition known as Object-Oriented-Ontology (abbreviated as OOO)[30]. OOO mirrors Garcia's critique of "correlationism" and his reaction to the primacy of the subject in the history of philosophy by granting equal ontological status to nonhuman objects:

> "Some of the basic principles of OOO, to be visited in detail in the coming chapters, are as follows: (1) All objects must be given equal attention, whether they be human, non-human, natural, cultural, real or fictional. (2) Objects are not identical with their properties, but have a tense relationship with those properties, and this very tension is responsible for all of the change that occurs in the world. (3) Objects come in just two kinds: real objects exist whether or not they currently affect anything else, while sensual objects exist only in relation to some real object. (4) Real objects cannot relate to one another directly, but only indirectly, by means of a sensual object. (5) The properties of objects also come in just two kinds: again, real and sensual. (6) These two kinds of objects and two kinds of qualities lead to four basic permutations, which OOO treats as the root of time and space, as well as two closely related terms known as essence and eidos. (7) Finally, OOO holds that philosophy generally has a closer relationship with aesthetics than with mathematics or natural science."(Harman 2018a, 10)

Again, I am forced to avoid an in-depth discussion of the differences between Garcia's and Harman's thought but I will briefly point to an important aspect that might help understand the following chapters. As I have tried to show earlier, Garcia would fully agree with (1), however, his ontological liberalism would be compromised if (2) was fully assumed. We could say that Garcia professes an "extreme" or "radical" OOO where even the properties of objects are things in their own right.[31]

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[30] The main proponent of OOO is Graham Harman but others include Timothy Morton and Ian Bogost. OOO is deeply influenced by the philosophy of relations of Bruno Latour. (Morton 2017; Bogost 2012; Harman 2018a)

[31] As far as the rest of the aspects mentioned by Harman, we encourage the reader to follow the lively dialogue maintained by both authors elsewhere while we turn to examine the world, the universe and every thing. (Garcia, n.d.)

It is also important to note that OOO is a highly contested philosophical ground with many opponents. Lindley et al reflect on one of the most common criticisms of OOO (J. G. Lindley, Coulton, and Akmal 2018) as follows:

> *OOO is not without its critiques, the most prevalent of which is that if we abolish subject-object hierarchies then are we not by extension simply avoiding any responsibility for action?(J. G. Lindley and Coulton 2017)*

While I have encountered these debates while engaging with OOO and it would certainly be interesting to participate in them, ´I must reject its treatment in this document for reasons of space and rather provide a better description of the philosophical stance that has informed my research process.

2.3.2.1 OOO in HCI

With respect to design and OOO in particular, there are important research contributions within the field of HCI (J. G. Lindley, Coulton, and Akmal 2018; J. G. Lindley and Coulton 2017; J. G. Lindley, Coulton, and Akmal 2018). In a project on the Internet of Things (IoT), Lindley et al reflect on the appeal of OOO:

> *For the users of IoT devices the view of their constellation is obscured by HCD: they cannot even see the other objects. The point at issue in this paper is the question of how designers working with IoT products and services can appropriately 'design for constellations'. We turn to a branch of contemporary philosophy known as 'Object Orientated Ontology' (OOO) to shed light on this issue. We invoke OOO not to understand existing design practice but to provide a platform for performing future design practice.(J. Lindley, Coulton, and Cooper 2017)*

In a move quite similar to one that I am trying to perform in this dissertation, they intend to introduce OOO to a design audience in order to further design practice. Their approach relies in the material engagement with philosophy put forward by the OOOntologist Ian Bogost:

> *To do this we draw inspiration from the work of video game designer Ian Bogost who proposes his own formulation of OOO, called Alien Phenomenology, which allows him to practically engage with ontology using video game design. This approach transcends the metaphysical nature of ontology and allows direct experimentation with ontology. This is achieved through a 'material' engagement with the philosophy,(J. Lindley, Coulton, and Cooper 2017)*

Certainly, I agree that bringing ways of thinking that refuse correlationism into design is of great value for furthering the possibilities of what design can research and how it proceeds while doing so. However, I have my doubts concerning the effectivity of doing so within the limited space that an academic paper provides. Will a designer have enough material to be able to understand and design with OOO after reading a paper where its authors already know it show how they have applied it? I have no definitive answer for this question but after being engaged with philosophy as a part of this research project I have some doubt. While designers are extremely apt in the workings of sketches, the philosophical sketch that an author can provide in a paper is, most likely, too limited. There is no doubt that these papers serve as a necessary stepping stone, an important clue that a designer can follow (by reading the work of Ian Bogost and Graham Harman for example) in order to import OOO into their design practice. In this dissertation, I chose instead to provide a philosophical sketch comprehensive enough so that a design researcher grasping it might be able to directly incorporate certain philosophical ideas without resorting to the philosophy books where they came from. Furthermore, this dissertation is an example of how to go about mobilizing such ideas in order to generate not a theory of design but a design theory. In a sense, when Lindley et al provide an introduction to OOO like the one present in the second section of their paper (Joseph and Ali 2018b), they are also furnishing, in my view, a tiny metaphysical workshop where a designer can start manipulating new conceptual tools. As far as I don't face the limitations of space that an academic paper imposes, I have the opportunity to provide a much larger Milieu so the reader can have a more nuanced or descriptive access to the way of thinking I intend to share and wield through this text.

I now turn to examine how I have incorporated Garcia's Thingly ontology into this Milieu. A critical reader can compare the sketchy use of philosophy in what follows to how a designer makes sketchy use of a paper. They are not meant to be accurate but just illustrate an object or an idea in development. Both their strengths lie in fluidity. The main purpose they serve demands of them a degree of incompleteness so they can be effortlessly discarded in favour of better versions of themselves. The views that follow should be treated as philosophical sketches that show a distorted view of the objects they depict yet without being totally alienated from them. It is also important to remark that there was nothing to stop me from dismissing the Garcian ontological view a posteriori. If his treatment of ontology would have proven unsuccessful in furthering my

understanding of what makes design objects real and fictional, I would have doubtlessly done so.

2.4. Seeing Double: Being and Comprehending

One of the most difficult aspects of Garcia's philosophy is that it cannot be seen as a whole. This is a consequence of his thingly ontology: an effort into showing how one needs to be able to see double in order to actually see a thing for what it is. This is analogous to trying to see a film by looking at its individual photograms: one can intuit what the film tries to convey but its meaning will be drastically impoverished unless stasis is left behind and movement embraced. One frame per second tells a structure, 35 frames per second tell a story.

With Garcia's ontology, one is confronted with a similar situation. It is only when one allows herself to see double that one finally manages to see a thing, anything. There is a closer analogy in stereograms. A stereoscopic image is composed of two images, one for each eye. One can intuit what the image is about by looking at one or the other, but if one looks at them together, if one sees double, the full meaning is disclosed. My intention with this lengthy chapter could be formulated in the following Garcian: to furnish a conceptual space where design researchers and designers can find the necessary tools to see double and attain a different perspective on the design objects the devise or encounter.

The thingly ontology forces a grasping of things according to two senses. As we saw earlier with the example of the black slate, things *are in* the black slate (quartz, mica…) and also, the black slate *is in* things (my hand, the environment…). These are the two senses of a thing. I will call, following Garcia, the first sense *being* and the second sense *comprehending*. Quartz is in the black slate and the black slate comprehends quartz. This is the first step towards understanding Garcia's maxim "to be is to be comprehended". The environment comprehends the black slate and the black slate is in the environment. This is perversely simple and once we think of other things, it can get very complicated. A trick is to never think of the verb "to be" without adding "in": "to be" is to *"to be in"*. Now, let´s wear *"to be"* as contact lens in our left eye and *"to*

comprehend" as a contact lens in our right eye to look at a thing by focusing (or de-focusing) on the two senses that make a thing: being and comprehending.

Let's take an imaginary object and use it in a thought experiment to recount how being flows in Garcia's thingly ontology. Imagine a perfectly flat surface of acacia wood. On this surface there is nothing other than a white spinning top rapidly twisting on its axis. We look closer and we realize a thin cloud of mist enfolds the spinning top. We look closer still and we discover the mist is the result of tiny water droplets blasting off the surface of the top while it furiously spins. We want to know what it is made of, what it is like on the inside so we carefully grab it, stopping its movement. When we open our hand, we are utterly perplexed by the discovery: there is something else rather than a spinning top. It's a piece of fabric, an array of knotted strands of cotton, an elaborate white macramé. And this macramé is partially submerged in water held by our concave palm. Now we pick the macramé with the fingers of our other hand and observe that its form is similar to the spinning top: the macramé is a surface that closes upon itself, a container resembling the shape of an inverted cone, its apex a metal tip. We are bewildered and wonder what happened but we immediately understand. This intricate macramé and this water were in the spinning top but once the twisting motion stopped, the spinning top had to collapse. It was the flow of water from inside the macramé to its outside that supported the strands of cotton in order for the spinning top to be what it was. Without motion, water could not flow and without the sustained funnelling of water from inside to outside, the structure would simply fall apart. In order for the spinning top *to be* there had to be some thing in constant departure to its outside.

As we saw earlier, in ontologies of substance there is no macramé, and no water. The spinning top can be solid insofar as its being is sustained by its own ingredients. In ontologies of transience there is no macramé, there is only the flow of the water. There is no solidity whatsoever and the spin top arises, emerges or becomes out of pure flow. In a thingly ontology macramé and water are in the spinning top but for the spinning top to be, there needs to be a flow from its inside to its outside. There are things in the spinning top but the spinning top is in things too by virtue of its effusive flight of being. In the thingly ontology being *is in* the thing but also being *departs from* the thing. These are the two senses of a thing: being and comprehending.

Like any other verb, to be needs another sense: *to be being*. I will call, following Garcia, the opposite sense of being, to be being, comprehending. There is no "to eat" without a thing "being eaten". The extreme conclusion of this is that there is nothing that is not something (if anything, Garcia's method is anti-substantialist par excellence). An apple, love, a thought experiment, an imaginary white macramé spintop are all things and different things for that matter. A contradiction is a thing, for it exists and is different from other things, even other contradictions (a squared triangle is different from a squared circle).[32] Another consequence of this is that being can only be explained by its opposite sense, comprehending and vice versa: *"being is being comprehended"*:

> *"Comprehending is having something inside itself. Comprehending is also comprehending an element by being a set; comprehending one quality by being a substrata of qualities; comprehending someone by appreciating or paying attention to this someone; assimilating a way of thinking or an idea; having a part when one is a composite; or comprehending a temporal, historical, or evolutionary moment in a longer timespan"*

> *"Being is belonging to something. Being is also having a quality; being an organism; being in a situation, that is, being situated in some thing, and, more precisely, in a series of objects in each other, like Russian dolls but impossible to completely hierarchize; being a body; being a history; being a social function; being a community; being a language; being a consciousness; or being a sexual organism."*(Garcia 2014, 152)

This dual character of things can heavily tax common sense but not too much if we understand a few things. I say "the wall is white". This doesn´t mean that whiteness is a quality that is in this wall. The wall does not comprehend whiteness but rather, whiteness comprehends this wall. The wall is among things white. This rhetorical inversion puts being on the side of the predicate. Subjects are parts and predicates are wholes and being is antisymmetric: if a is (in) b, then b cannot be a. If I am a child I cannot comprehend childhood but childhood comprehends me. If I comprehend this, this is in me. If that comprehends me, I am in that.

Things are dyadic and as such cannot be grasped as a whole. One cannot say *a thing is this* or *this thing is that* because then, we would only choose one side of the

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[32] Cogburn considers Garcia a "paradoxico metaphysician" and encourages us to read Garcia as a revealing of the contradictory character of nature: "If our metaphysics is contradictory, that is because it accurately reflects reality." (Cogburn 2017, 89)

thing. If we define the black slate as a mix of mineral components we are reducing it and obviating how it belongs to this environment, how it is being held in a hand, etc. So how can one avoid reducing things to just one sense, to the things that a thing comprehends (eg. quartz and mica in the black slate) or the things that comprehend this thing (e.g. the environment, my hand)?

In order to think through a thingly ontology we need to first and foremost consider that things are a difference.

2.4.1. A Thing is a Difference

In order to see a thing, one needs to assume a difference. A thing *"marks the difference between two senses or directions of being: that which enters into and that which goes out."*(Garcia 2014, 107) If we nonetheless choose to do it the thing becomes compact and we are only able to appreciate one of its two faces: a bag is not what is in the bag. But then, how do we distinguish between the two sides of a thing? This difference is primary, everything else follows (or rather flows) in two senses.

I am in this room (sense of *being*). This rooms comprehends me (sense of *comprehending*). The first sense is being (to be in) and the other comprehending (to comprehend some thing). Both are different asymmetrical relations. I am in the room means I enter in a relation with the room. Let's call this relation *me->Room* which is unique between me and the room. A flower is also in the room so it also enters in a relation with the room. Let's call the relation between the flower and the room *flower->Room*. Now, the relation between me and the room, *me->Room*, is very different to the relation between the flower and the room, *flower->Room*. This is the first sense, the sense of being. The second sense, comprehending is from a different direction. From the room to the other things that are in the room. Let's call it *room->Thing*. This is the key: the relation between the room and its elements is the same for each one of them, that is, there is no *room->Flower* or *room->Me* but the same *room->Thing* applies to every thing that is in the room.

> *"Therefore, comprehending is maintaining an unequal relation.*
> *Entering into a relation with a thing and at least one other thing, without*
> *these two things being able to have the same relation between each other,*
> *is like loving two people equally who do not love each other. When I*

Figure 4 Each object relates to the room differently but the room shares the same relation to every object in the room. Picture credits my own.

Back to the room example, the room comprehends every thing that is in the room, maintaining the same relation. However, everything that is in the room maintains a unique relation to the room and to each other. A society maintains the same relation to its members but each member maintains a particular relation to a society and to each other. It is crucial that we don't "short-circuit" being and comprehending if we want to remain faithful to seeing double. So again, the relation I have to society is different from the relation society has with me. However, the relation society has with me is the same (ideally) as it has to other members. Yet again, in Garcia's words:

> *"In this sense, being in or entering is not a spatial metaphor; instead, it is the idea of an unequal and oriented relation: being is one direction and comprehending is another…Comprehending objectively is having the same relation to several things which cannot share this relation among themselves (and is also not being able to maintain this same relation to itself). Comprehending is having an effect of identity from a plurality of things, an effect of identity that these things cannot have on each other, and*

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that one cannot have on oneself. Comprehending is an effect of being greater, offset by the impossibility of being what one comprehends"(Garcia 2014, 112)

One thing is not what this thing comprehends. The room comprehends many things but the room is not these things. Remember, to be is to be comprehended and hence what the room is, is what comprehends the room. The room is in the house, in Latvia, in my friend's thoughts, etc.:

"From an objective standpoint, being is having a relation to a thing, one solitary thing, which has this same relation to other things. Being is an effect of being smaller, offset by the chance, by comprehending less than what one is, of being something more."(Garcia 2014, 112)

It is also important to retain the malleability of the senses of being and comprehending. Their character is not only spatial(entering) or only set-theoretical(including) but directional, one is the inverse of the other and they are unequal. A thing, any thing is then:

"A thing is precisely the difference between that which is the thing and that which the thing is. A star is the difference between what composes a star and what a star is. Nothing more, nothing less."(Garcia 2014, 118)

The sun is the difference between the components of the sun (what the sun *comprehends*) and what the sun *is in*. The Sun *is in* the solar system, *in* my thoughts, *in* the lenses of telescopes, *in* sensors and images and thoughts and theories. The sun *comprehends* helium and hydrogen and plasma flowing in a convective motion. What the Sun is, is the difference between *what is in the sun* and *what the sun is in*.

Although in Form and Object Garcia refers to things are differences, Jon Cogburn, one of the translators of Garcia's book has argued elsewhere[33] that a more suitable term would have been that of differentiator, differential or differentiation in order to precisely

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[33] The term "difference" was not optimal form translation from French and "differentiation" or "differential" might have better expressed what Garcia had in mind: "In retrospect, Mark Ohm and I perhaps should have translated the French différence as 'differentiation' and 'differentiator' in these contexts. 'Difference' sounds much too much like set-theoretic subtraction. But what you get by set-theoretic subtraction is what Garcia calls 'form'. What Garcia means by différence here is that which differentiates between what the object contains and what contains the object." (Cogburn 2017, 67)

avoid thinking of things as the difference in set theoretic subtraction (which is kind of similar to what Garcia refers to as form). In any case, what is to be avoided at all cost is any kind of reductionisms:

> *"Physicalist or materialist reductionism reduces things to the matter that composes them. Evolutionary or naturalist reductionism reduces a living organism to the evolutionary pro- cesses of which the living organism is a result. Other types of reductionism capture the chain of being from the other direction, and reduce a thing to what it is, that is, to what it is in. Social reductionism reduces a social element to its function in the social whole. Historical reductionism reduces a historical event to the history within which it obtains its place."(Garcia 2014, 118)*

There is a very high price to pay when one reduces a thing: the thing becomes compact and resembles a different thing than the one we try to understand.

2.5. Seeing Double: Formally and Objectively

Beyond accounting, or counting for things, the thingly ontology also allows for a fundamentally reconsideration of what is the meaning of things:

> *"In truth, this meaning - neither completely existential nor completely semiotic -is simply the possibility of passing from one thing to another. It is the possibility and necessity of never being reduced to a thing that would not exist in and by itself - whether one calls that matter, nature, history, society, God or an individual… As if one could consider matter, nature or society as things outside appearances, absolute, remaining in themselves. This ghost of "compactness", which will be the adversary of our whole adventure of thought, will only disappear on one condition: for each thing to make sense, it must have two senses. Nature and history as things contain many things (first sense), but they are contained by things other than themselves (second sense)."(Garcia 2014, 13)*

This passage reminds us that according to the thingly ontology, things have two senses, being and comprehension. But also, this passage is revealing in other ways. First, it relates his motivation to the method of inquiry: in order to make sense of things, we need to be able to pass from one to another, and to be able to continue this movement following as many things as necessary without discarding or even wondering whether it is some thing or not. It certainly is. Second, we get a glimpse of how this can be accomplished in the negative: by not reducing a thing to some other thing, which would make the thing we wanted to look at "compact" and something other than what it is. To

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make a thing "compact" is to reduce it, to turn it into a self-ball either in the first sense (being) or the second sense (comprehension). One must learn to see double or risk compacting things and losing them.

Garcia is coherent with his intentions even when laying his ideas down on paper (reading is linear but he wants the reader to see double) so the reader struggles when encountering ideas early in the book as things are only evident when we get the other side of the image later on. I have tried to minimize this effect but not nullify it because I am very interested in helping designers see double (and not philosophers, for example). To this end I deploy Garcia's ideas in a manner different to how they unfold in his book. I take certain things for granted, simplify and adapt others but I am still caught in a sort of back and forth movement. At times I need to introduce ideas or concepts only to fully explain other ideas or concepts that in turn will help us fully explain the ideas that we introduced in the first place. Like if someone recommended us to wear boots without being able to say why. We follow her advice, start walking and without knowing whether this water around our feet is that of a lake, a river or a pond. Only after we have crossed it we realize what it was and why we were told to wear boots.

The way I have used the term "things" is one of these instances. Through this chapter I have referred to things as basically any kind of entity regardless of it being material, imaginary, abstract, etc. I now turn to things in order to differentiate them from objects. In doing so, I will put forward another way to see double that the thingly ontology makes possible: to see an entity as a thing or as an object and in turn to see formally and objectively.

2.5.1. Seeing Formally: Entities as Things in the World

The main feature that supports Garcia's thingly ontology is ontological generosity. Any thing, no matter how big or small, material or abstract, fictional or real has being and exists. This makes for a thing overflow that must be dealt with so the thingly ontology can be effective. In order to be able to distinguish among things, to classify them, to value or worry about them one first needs to acknowledge that they are something, and not only that, that they are equally something. Once this "levelling field" is stablished, we can again look at things as important, better, immoral or beautiful:

"There is a strong belief that human persons, sentient creatures with values, works, and ideas, must not be considered as things. But how do I respect, protect, or control that which is not something for me? What is this respect, this consideration for what is priceless, this appeal to dignity that one hopes to gain by making an exception of an object – a person, human being, animal, or artwork – from the world of objects? One must understand a human person as a thing like other things in order to be capable of respecting a human person … Reification – the reduction of our world to a world of things – is not an evil, the dehumanisation, desensitisation, or disenchantment of the world, but the precondition of a human understanding of the differences between things. A system of exceptions in the world of things is never an 'ethical' or 'just' system, but rather a metaphysical system of the determination of inequalities between things, of 'more-than-things', which cannot be elements of this system"(Garcia 2014, 21)

The thingly ontology hinges on the fact that in order to arrange things according to values or morals or preferences there must exist a plane where all those things can first be considered equal. This levelling plane or zero level is where each thing exists equally to any other thing. If we can differentiate a cat, a triangle and a fear of heights it is because in reality there must be a plane where they all equally exist as nothing more or less than a thing. This ontologically flat plane is what Garcia calls the world:

… the flat world in which each thing is neither more nor less than a thing. This world is not the 'foundation' of things insofar as they matter to us, but, as it were, their 'gauge' or datum line in relation to which it must be possible that some things matter and that they matter to us more than others. In order for some things to matter more than others, whether they are more beautiful (for us or in relation to some idea that we have of them) or more ugly, more true or more false, better or worse, it is necessary that a plane exists on which no thing is either more or less a thing than another … This plane is nothing other than the plane of reference of what matters to us.(Garcia 2014, 31)

To envisage the formal world is perhaps the greatest speculative effort in facing the thingly ontology of Garcia's Form and Object. The need for a plane of reference where all entities can be considered as equally things splits reality in two and forces us to see double again. One's understanding of reality is split formally and objectively and consequently, entities can be looked at or grasped formally and objectively. An entity can be observed or understood formally and the same entity can be understood objectively. If an entity is understood formally it is a thing. If an entity is understood objectively it is an object. A chair for example, can be grasped as a thing or as an object. If a chair is considered formally it is a thing. If it is considered objectively it is an object. What does it mean to consider this chair as a thing? It means to see it as existing in the formal world where it is equal to any other thing, no more or no less loved, hated, valuable or ironic than a sneeze, a gun or a contradictory idea. The formal world

is a plane of reference in which all entities are equally things, nothing more and nothing less. Let's take the example of the branch of a tree:

> *"For the branch to be in the tree, to be a part of the tree, this branch must be in the world neither more nor less than the tree. As a 'thing', the branch is in the world – that is, in everything except itself, in everything that surrounds it, in everything that begins infinitely where the branch ends. As an 'object', the branch is in the tree."(Garcia 2014, 79)*

This is the crucial aspect of things: they are solitary in the world. When we consider the branch of the tree as a thing, it is alone in the world. The world is everything except the branch of the tree. To see the branch of the tree formally means to see it isolated in the world, in everything that is not the branch of the tree. When we see an entity as a thing, we don't see anything else because in the formal world, no two things can be together. In the formal world only one thing exists as a time.

The possibility of the formal world is what allows for entities to be considered together, and when entities are considered together is when we refer to them as objects:

> *"For there to be objective systems of knowledge, thought, action, memory, will, intention, perception, proprioception, desire, or any other active relation to objects, it is necessary that these objects also be solitary things; their manifold is impossible without the exclusive solitude of each one. If each thing were not exclusively alone, then there would either be a manifold of nothing, or a compact manifold of everything. In order for manifolds – given or constructed by objects (material objects, historical objects, linguistic objects, ideal objects) – to exist, it is necessary that these objects be distinct enough to be together. Solitude in the world is the condition of distinction for belonging to an aggregate."(Garcia 2014, 59)*

The first way of seeing entities is to see them formally as things. From a design perspective to try to approach the formal world and see an entity as a thing might be a very powerful exercise because of the way it challenges our understanding of that entity. If we want to see a tree branch as a thing, where should we exactly isolate it from the tree? Should we consider the nest that rests on it as part of the tree branch as thing? What about its colour or the chlorophyll that tints its leaves green? For the purposes of this dissertation, the formal is not only the necessary condition that allows the consideration of things together but also a way of problematizing our understanding of any entity whatsoever.

The formal world where things are alone is presupposed when things are considered together.

2.5.2. Seeing objectively: entities as objects in the universe

When entities are considered together with other entities we refer to them as objects. The tree branch as an object is part of the tree, of the ecosystem, of a park, of a memory, etc. Crucially, to see an entity objectively means to understand it is never alone: it is composed by other objects and relates to other objects. Here is where the previous section on being and comprehending becomes handy. Objects always are in and comprehend other objects. The tree branch comprehends wood, chlorophyll, a bird nest that comprehends eggs and also is comprehended by the park, the region, the ecosystem, etc. These were the two senses: being and comprehending. By focusing in one sense and the other we can see double and see objects without reducing them to either components or relations. Let's look again at the tree branch. Looking at the branch through the sense of being we see the components of the branch, the objects that "enter into" the branch: wood, microbes, chlorophyll, leaves, a nest, etc. We can also look at the tree branch from the other sense (comprehension) and we would see that the tree comprehends the branch, the park comprehends the branch, the ecosystem comprehends the branch, etc.

If when we see an entity as a thing we see it as solitary, when we see the same entity as an object we see it as hyper-related. If to see an entity as a thing means to consider it in the formal world, to see the same entity as an object means to consider it in the objective universe. The objective universe is simply the cosmos, the material reality where objects relate to each other. There need not be any abstraction in this. When we look at entities as objects, as relating to each other, informing each other, bigger or smaller, more real or more fictional than each other, then we are looking at them within the frame of the objective universe. As we saw earlier, the universe is in continuous expansion for, in human cultures, objects accumulate as new objects become possible but possibility is never exhausted. Furthermore, Garcia notes five main reasons that drive this accumulation. The first reason is historical: objects accumulate because we remember them and even if we forget them, they can be rediscovered (archaeology). The second is technological: we create new objects that are useful to us but the ones we leave behind don't stop existing: *"restoration reacts against accumulation but, far from neutralising*

or slowing down this accumulation, it intensifies it"(Garcia 2014, 94) Third is progress: the idea of progress (social, artistic, scientific) *"leads us over a mountain peak of things whose size we increase as we climb it."*(Garcia 2014, 94) The fourth reason is division: by increasing our knowledge of things we create smaller and smaller objects. This division is, for example, that between practical or theoretical objects. Finally, the fifth reason is desubstantialization:

> *"through our representations, we multiply the objectivisation of everything and anything. Taboos, sanctity, everything that by definition, ought not to be something (said, thought, imagined, conceivable, comparable, exchangeable, reifiable) makes these objects.*(Garcia 2014, 95)

As objects comprehend each other they become big things (which are also objects). The tree branch is comprehended by the tree, which is comprehended by the park, which is comprehended by the ecosystem and so on. The object that comprehends all objects, the biggest possible object, is the universe. The universe is an object that comprehends every object in it but as new objects come to be, its identity changes and expands:

> *"It is always possible to establish an order of objects in objects, which leads to a universe - namely, "the biggest possible thing" - manifesting the maximal comprehension of differences"*(Garcia 2014, 158)

Now we need to remember that when one object comprehends other objects, it shares the same relation to these objects. An ecosystem that comprehends trees and humans shares the same relation with those trees and with those humans. If we take one more step and consider the universe, what is universal shares the same relation with all objects that exist. The universal is then a unity that equates all differences. A universal object forces all objects that it comprehends to share the same relation. To consider an entity as a thing, on the other hand, cancels unity and turns the universe into a flat world. The universal assimilates things as "differently the same" while the formal determines things as "identically different":

> *"Therefore, one cannot derive an objective lesson from formal knowledge, nor can one determine, in virtue of this formal knowledge, what is best or more just. The universal permits the assimilation of differences, reducing them to a positive and new identity; the formal permits only the reduction of these differences to a plane of equality, which flattens them. The universal permits the determination of particular positions as differently the same; the formal permits their determination as identically different. The universal thus reduces objects to a universe that comprehends all objects,*

while the formal reduces things to a world that comprehends each object."(Garcia 2014, 96)

2.5.3. Example: Human Rights

In order to unpack this, I will follow Garcia´s own example of human rights. One can consider human rights to be a universal object or a formal thing. As a universal object, human rights comprehend humanity and hence they apply to every individual in humanity. However, there is a price:

> *"If one acquires the rights of all humans, then one must lose in particularity what one gains in universality…But no universal would be without the formal. If there were no things, equal and equally in the world, there could not be unequal objects in each other to form a universe, a 'biggest possible thing'"(Garcia 2014, 157)*

The differences between cultures or societies and how they understand their individuals are assimilated into the universal unity. Formal human rights, human rights as a formal thing, take differences to the other extreme and turn human rights into an individual notion:

> *"The relativist's mistake consists in confounding the universal and the formal, by attributing a universal character to the formal: each thing could objectively comprehend what comprehends it, thus each culture could comprehend its nature in the same way that nature comprehends each culture. But two very distinct orders of things exist: an objective order and a formal order. Humanity objectively comprehends different human cultures, while a human culture can formally comprehend humanity. The relativist aims at compactness by supposing that what is particular does to what is universal exactly what the universal does to the particular. For the relativist, a universal right is immediately a particular right like any other, since the relativist considers that a particular community can prescribe a universal right as one right in the same way that a universal right can be prescribed to a particular community as a universal right"(Garcia 2014, 158)*

The problem with the relativist is that she turns things into objects and turns the formal world into an objective universe. A fundamental problem arises, as things can only be alone and objects can only be in each other:

> *"This plane of equality, this plate on which the relativist places what they make relative, is the formal world, the flat world where each thing is equal to another. But the relativist makes this world (where each thing is solitary) a universe where things are together equal to, and comparable to each other. Thus, the relativist universalises the formal."(Garcia 2014, 158)*

The relativist cannot escape the need for a universal in her formal effort

and ends up turning the world into a universe as a result:

> *"The universal is an objective order which the formal permits, grounds, prevents, checks, and controls. The formal is situated either beneath or above the universal, but never beside it or on the same level as it. The relativist combines the formal and the universal into one and the same order. They conflate the universal and the formal to produce the relative."(Garcia 2014, 158)*

On the side of the absolutist, the opposite happens. The absolutist turns objects into things and the objective universe into the formal world:

> *"While the relativist makes the formal universal, the absolutist makes the universal formal. Consequently, the accumulation of objects produces a formal, absolute order, the order of the world; what comprehends something is never comprehended by what it comprehends. In this becoming-world universe, universal rights are absolute, since they can never be short circuited… In the universe absolutised into a world, nothing comprehends the biggest possible thing, the physical universe (absolute materialism), human society (holist sociology), or a god, allowing the establishment of laws, values, and rights that comprehend and assimilate differences between things into identities that cannot be differentiated, related to other possible identities"(Garcia 2014, 160)*

The formal system is grasped by the relativist, who sees things as equally in the world and turns them into objects. The world becomes a universe where every object is equivalent to another and *"nothing comprehends something without being objectively comprehended in turn by what it comprehends."*(Garcia 2014, 160) The universal system is grasped by the absolutist, who turn objects into things, establishing an absolute step by step "vertical" order where the objects that comprehend other objects are formally superior thus *"determining them and prescribing its identity absolutely on their differences."*(Garcia 2014, 160)

A human right for the relativist is a particular object, as valid as any other right defined by an individual. For the absolutist, a human right is absolute (which is, formally and objectively). It comprehends all other rights and assimilates their differences. Both the relativist and the absolutist fail see double as they try to fuse two images into one. They both modify the stereogram by making one picture instead of keeping two: a formal and a universal one. To properly see the stereogram of human rights, one needs to see two images, not side by side but one beneath the other: a picture where human rights are objectively different to each other and a picture where the assimilation of the differences is possible to further a cause. In seeing double one might

realize human rights gain universality by losing particularity and one is left with the universal as a real choice:

> "The universal exists and is not a particular claim to the non-particular, but the universal can only be known and defended on the condition of knowing that it doesn't formally yield more than what it causes us to lose. Therefore, the universal is the object of a real choice, since it never offers the guarantee of an absolute profit, but the prospect of a calculated loss."(Garcia 2014, 160)

2.5.4. Mixing up Things and Objects

In his own book, Garcia is quite liberal in his use of object and thing. There are many instances in which objects are referred to as things. I believe this is not a mistake on his part for it would be just too easy to correct it if he so desired. The ambiguity of its use might be accounted for how it helps avoid distractions when developing certain arguments.[34] More importantly (and this is pure speculation) I have noticed that while shifting between thing an object without too strictly sticking to a definition has greatly enhanced my ability to quickly shift between the general and the particular, to see double formally and objectively:

> "How do we obtain universality and maintain the sense of relativity at the same time? The price of this twofold commitment both to universalism and to the sense of relativity will be the abandonment of ecstatic becoming and of self-saturated things. In Book I, we must conceive of things emptied of themselves, without identity and de-determined. In Book II, we must conceive of things replenishing each other and ordered encyclopaedically. Therefore we must learn to see double, formally and objectively, so that thought advances through a formal step and an objective step."(Garcia 2014, 15)

As I explained earlier, it is my intention to help the reader (with a special emphasis on design researchers and practitioners) to "see double" in terms of Garcia's thingly ontology so in the following sections there will be occasions where the thought "but this is an object!" will arise. It was my intention that these thoughts happen, and should be taken as an invitation to see double by quickly shifting between the formal and the objective. In what follows however, I won't be dwelling into the formal world and instead will focus in the objective universe, where most design happens.

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[34] Jon Cogburn is also concerned with this aspect here: (Cogburn 2017)

2.6. Intensity and Extension

The formal world is the condition for the objective universe. In the objective universe things are in each other as objects, determined and intense. The objective universe is where objects finally gain intensity and are able to attain presence and achieve value.

In the universe, there is nature and culture but they are not the opposite of each other. In the objective universe, the opposite of nature is the universe. Metaphorically, nature and culture are the bottom and the top of the universe: Nature is in every object of a universe (sense of being) and a universe comprehends every object (sense of comprehension). But nature is not natural, no object is natural (no object can be *in* nature, nature *is in* objects) but every object comprehends nature, because nature does not comprehend any thing, it enters into things. Culture is the context of nature. When an animal aims at the universe and tries to understand it, it does so through the intermediary of a culture. Thus, many animal species have presentational cultures but only the human animal has a representational culture, a culture in which the human self-represents itself. Culture is a set of (presentational or representational) rules that hold between nature and the universe. It is precisely what separates them and for this very reason, no culture can be universal or equivalent to any other culture. They are systematic sets of rules that make a common sense possible. Nature and universality are defined not through one culture but through many, via many different sets of rules.

Each culture is not formal but objective, a particular transformation of nature to understand the universe.

There is however a determination that affect all objects and engenders events (cultural, psychological, physical, etc) that of presence.

2.6.1. Events, time and the future

In the formal word things are always present while in the objective universe, things are present or absent. By presence we understand the relation between a

thing's being and comprehension. One can approach the issue of presence through its negative: absence. There are two types of absence, emptiness or exile. Emptiness is when an object comprehends another but this one is not there. Exile is when an object is in another but this one does not comprehend it:

> *"I am present in this room when I am in the room and when the room comprehends me. I am absent from this room when this room comprehends me in some way (the room comprehends my memory, the fact that I was there, my footprints, the possibility that I could be there, for my thought or for that of another), though I am not inside the room. And I lack this room if I am in this space – for example, by imagining that I remain there – when the room doesn't comprehend me or is not around me."(Garcia 2014, 169)*

While absence is a unilateral relation, only one sense of things prevails, presence is bilateral and between two objects: the first being in the second, the second comprehending the first. It is crucial to note that an object can be without being present, when this is the case, the object can be absent, either through emptiness or exile. Also, presence is not disclosed only to sensible intuition but also through language or thought. As far as being and comprehending cannot be defined separately, presence is primary and absence secondary. Presence is real but absence is a subjective operation on reality:

> *"By accumulating the memory of my lover, which is with me, and the fact that my lover is currently elsewhere, I create the chimera of an absence, an emptiness, or a being that I comprehend within me, but which is not with me. In reality, my lover is not absent, since I must relate to her memory or to the projection that I make of her actual, distant being: her memory or image is present for me. Strictly speaking, of course, my lover is neither her memory nor her image. But since I can identify my lover with what she is in my memory or in my imagination, I can lack her, I can artificially comprehend her, contain her inside me without her being there inside me. This is what we call emptiness.*
>
> *If I have the impression of always being in my country, while my country does not comprehend me, while it is not around me, I can remain in something without this thing accommodating me. This is what we call exile."(Garcia 2014, 170)*

In the universe, there are both objects and events. An object is a thing in other things while an event is the presence of an object. It concerns how is the presence of an object. However, objects and events are indifferent to each other:

> *"A primary event is a thing's presence in the world. While this chair is an object, like this colour green is an object, the fact that this chair exists is an event, and the fact that this green exists is also an event. The fact that*

this chair is green is a secondary event, since it is not an event of a thing, but of an object. The existence of this chair in the world makes this chair a thing. The existence of this chair among green objects makes this chair an object (a green object). On the other hand, the fact that this green chair exists in the world is again a primary event, an event of a thing, because this green chair is 'something'." (Garcia 2014, 171)

But this is not to say that objects and events are secondary to things. Things exist formally, objects and events objectively and they are necessary condition for each other. Events are the ways in which things belong to each other while objects are things in each other. An event mobilises a certain number of objects that can be physical (bodies, tools) or non-physical (intentions, fears). It makes them interact with each other so the result is another object (physical or non-physical). Imagine the objects of a murder: a knife, a victim, a killer, a scene, intentions, fears, etc. The murder as an object comprehends all these and can be part of something else, like an investigation or a newspaper article. However, the murder as event is just a person killing another. The murder as object is a deed and the murder as event is a doing. Once an event is done, it can become an object. An event takes place while an object is just present or absent:

"Whereas an object is present or absent, and event self-represents or self-absents. In this way, the red armchair is certainly an object, although the fact that the armchair is red (that is red for a minute, that has always been red, that is increasingly more or increasingly less red) is an event."(Garcia 2014, 173)

If one considers a thing in another thing, one gets an object. If one considers the being of the primary thing in the secondary thing and the comprehension of the primary by the secondary, one gets an event. The object is either present or absent in another object. The event is the presence or absence of a thing in another:

"Objects and events never communicate with each other but only through things; the armchair in the room and the fact that the armchair became red are only related to the fact that the armchair is 'something'. Several objects never yield an event and an event is never composed of objects… Given all the objects of a murder, I can never derive an event from the murder, the fact that the murder happened. I can never decompose an event, in which one person kills another, into fixed objects, but only in earlier events in some causal chain. Things connect the chains of events to pictures of objects. Each object is a thing and each event is also a thing."(Garcia 2014, 175)

Objects exist among objects and events among events but they never communicate directly. One cannot get the murder (doing) from the objects that compose the murder (deed) and vice versa. They "objectivise" things in different ways:

"The distinguishing feature of objects corresponds to what escapes events and vice versa... The passage from presence to present is what objects lack and events exclusively carry."(Garcia 2014, 175)

However, a universe in which only objects and events exists would be a very strange one: a universe where static things continuously become present. A universe of deeds and only momentary doings. For the present to be there needs to be an order in which the present is arranged: there needs to be a past and a future. Garcia sees the problem of time as a problem of intensive variation of presence. I will further expand on this understanding of time in the following chapters to articulate our discussion on how design objects consider the present or the past in order to provide counterfactual narratives or stories of a time yet to come.

The past is present but it is just less present than the present is present. The intensity of presence of the past is inferior to that of the present. The present is the maximal intensity of presence. The future is the total absence of presence.

In this view, the past exists objectively and as a process and concerns all that weakens in presence. It moves towards absence but never reaches it completely so one can establish an order of the past according to its absence. On the other hand, the present is the maximum state of things being and comprehending each other. As a result, no event has ever existed in the future:

"If the past is the minimisation of presence, then the future is the maximisation of absence. The future is not a non- existence, but an absence that could not be greater – which does not mean that this absence is absolute, but simply that nothing is ever more absent than the future… The future is indeed the greatest possible absence of determination."(Garcia 2014, 184)

The future is essential, like a force field of absence that pushes events from the present back into the past. When events move into the past, they become less determined than the events that follow them, more absent and following this logic, closer to the future, the maximum absence of determination. However, when an event sinks into the past it retains the future it had when it was present. This guarantees that past events don't collapse again into the present:

"What makes every moment of the past retain an individuated form, which history or memory can voluntarily revive, is not the relation between the past and present moment, which engulfs and buries it. On the contrary,

it is the relation between each past moment and what was its future, and which remains what was its future."(Garcia 2014, 185)

When a person was 8 years old she had a future, a maximum of indeterminacy. Twenty years later, the person recalls the memory of her being 8. The reason the memory can be recalled, is not that the person becomes 8 again, it is that the memory retained the maximum of indeterminacy that it had once it was present. It is this that warrantees its distance from the now. Garcia explains it also through a deceptively simple example:

> *"One ought to think about every present event as being at the top of an infinite stack of sheets of paper. The future is the foundation, the ground on which the stack of paper rests. The present is the sheet at the top. Each time a new sheet covers up the previous sheet, any particular sheet in the middle of the pile, a 'past sheet', moves further from the top, which becomes situated higher and higher. But the distance that separates our 'past sheet' from the foundation – from the ground, however far that may be, perhaps even infinitely far (if one assumes that time has no beginning, that no pure future or pure primordial absence has ever been) – never changes."(Garcia 2014, 186)*

We can think the future through a thingly ontology as a magnet that repels presence. The maximum of presence will be on the opposite side of this magnet, that is, on top of the stack of papers. As the presence weakens, by becoming past, it can get closer to the magnet. However, a moment past still retains the distance from the future that it had which keeps it apart from new present moments:

> *"The key to our model of the temporal order is therefore the following: every event is doubly temporally localisable – in relation to the present (the top of the stack) and in relation to the future (the bottom of the stack, what the stack rests on). The same event, for example the accretion of the planet earth, sees the present move away from it, but, once past, remains at the same distance from the future that it had and that it retains. This permanent relation to a fixed future safeguards its possibility of always being the moment that it had been, of not completely fading into a continually renewed present. If our stack had no bottom, then every event would only be localisable in relation to the changing present; every past event would only exist in relation to this present, which alone would really be. Within this present, absorbing the totality of what had been, we would no longer be capable of regaining the more or less past. We would only ever discover an instantaneous eternal: a bottomless stack of paper whose most recent*

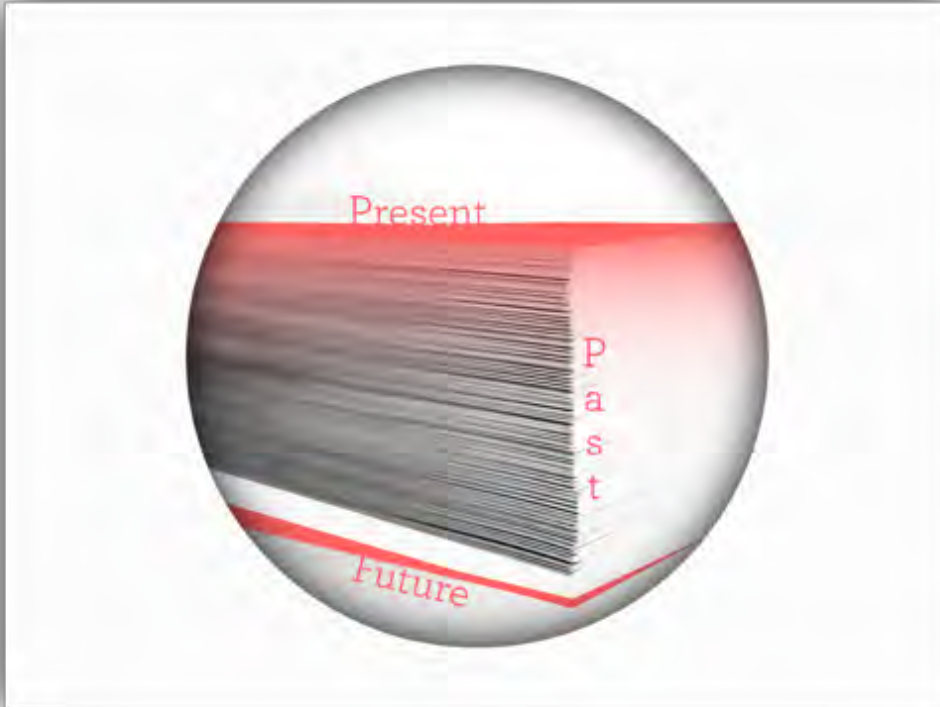*sheet would always subsist, the others already disappearing into non-being.* "(Garcia 2014, 186)

Figure 5 The future is the maximum of absence, the base that warrantees an order of the past and the maximum of presence in the present. Picture credits my own.

A stable base and a moving top are the keys to Garcia's temporal model. Remember what he is trying to account for here is for the endless accumulation of things that this model of time explains. The universe is increasingly loaded with determinations and presences and time is "the index of this accumulation". I will employ Garcia's temporal model in the section Metaphysical Probe #8 to talk about the future.

2.6.2. Intensity and Values

In the flat, valueless world, no thing is ugly or beautiful, true or false, real or fiction. It is a world devoid of any intensity where things simply are alone. The objective and evential universe is where we live together, with other objects which we value. In the objective and evential universe, objects are objectively more or less than others, a condition made possible by the existence of the formal world. This means the universe is a field of objective intensities where objects are more or less than other objects

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(more or less good, beautiful, utilitarian, logical, etc.). The name for these objective intensities is what we will call values:

> *"All value is therefore situated at the crossroads of the replaceable and irreplaceable. Value is the intensity of objects and events. Value allows their comparison (in terms of 'more' or 'less') or their exchange (in the economic channel), and their singularity, their differentiation, and the determination of what makes them irreplaceable. The value of things is both what makes possible the exchange of one thing for another and what precludes the exchange of one thing by another."*(Garcia 2014, 335)

This is certainly paradoxical but does it make it less true? A value has two senses, on the one hand valuing something is making it singular, unique and at the same time by valuing something I can put it side to side with other things and compare it. If I find a face beautiful I discover beauty on this face although beauty was not there before, it is at once both unique and comparable to other faces. Values, as intensifications of things, are antagonistic:

> *"Intensification consists of rules and norms that are partially natural and partially cultural. But the intensification is always of the thing's identity; a face, which is what it is, has value if it becomes either more or less itself. Someone must activate it and find it beautiful; beauty becomes the transformation of what something is into a relative intensity, into something either more or less itself. The intensification of what constitutes this face (which belongs to the face, and not to the one who sees the face), in various degrees that this face does not control, is activated by the seeing. The beauty of a face is thus found by the seeing, though the beauty of the face is nothing other than the face itself. What the seeing finds is intensified: what is irreplaceable about the face. But what the face acquires is some intensity, a measurement or gradation of beauty. The face has something either more or less beautiful, which allows us to compare this face with another face. The evaluated face becomes comparable and exchangeable with another (for example, the hesitant lover who must choose between two faces), included in some economy, which involves the interplay of exchangeable values."*(Garcia 2014, 336)

Values (i.e. the true, the good and the beautiful) are not substantial or reducible to economic valuations but they are objective, situated in things without the values being in the things. The beautiful, the good and the true are not values "in themselves" and they are neither reducible to exchangeable things in a system, economic for example. Like things, objects and events, values have two senses that one needs to account for in order to understand their meaning. Again, one can witness the ghost of compactness reducing things to only one of its senses. The first sense in terms of values is to consider them substantial, in themselves. The second sense is to consider them fully exchangeable, utterly relativistic (like in an economic system):

"All values stand between a single compact, substantial value, which tempted the Greeks and traverses the myths of numerous peoples, and a single economic value, which makes things interchangeable and exchangeable, crystallising during the Victorian era of utilitarianism and progressively dominating the Western and contemporary world."(Garcia 2014, 352)

2.6.3. Extension and Classes

To give an intensity to an object is the first main category that allows for an ordering of the universe. The second category, aside from valuing, is classifying. To classify is to not consider the intensity of the objects but rather their extension. As we saw, objects are never alone in a thing that comprehends them as it is only things that are alone in the formal world. In the objective universe, objects are never alone. The way we account for different objects that share a relation is what Garcia calls class. If various objects are together in a class they all share not a value relation but a class relation. Things get complicated when we talk about certain objects (like humans) that can be comprehended not in one thing but in many things. A human can be part of a class (sharing a class relation with others or being determined by a common membership) and also be a part of another class. A class is the extension of objects or events whereas values are the intensity of these objects or events. Classes, like any thing, pay the price of their double nature in multiple ways. First, a class encompasses objects by accounting for what they have in common and at the same time, precludes (or attempts to) these objects from being in another class. A member of Christianity can be more easily excluded from other religious classes. Second, in order to account for its members a class is forced to reduce them to that which they have in common:

"A class is a minimal relation between objects which have a common way of belonging to the same thing. This relation can be minimised until it is almost confounded with each object. It can also be maximised until it is confounded with the thing which comprehends all these objects. In the first case, class leads to the individual without reaching it, for class is always a relation between two objects, and a relation with a thing. The nominalist or ultraliberal mistake is therefore to think that they can dissolve every class simply by keeping the individual. But an individual object is never alone in a thing that comprehends it (since only a thing is alone in the world): no human is alone in humanity, no peasant is alone in the peasantry, and so on…Social beings can only be in society together. In the second case, the mistake – which preoccupied the history of Marxism – consists in confounding these classes with that in which individuals are located. Identitarian compactness is the constitution of an individual identity by what is common… By self-identifying with one's class, whether it be ethnic, of

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thought, of belief, or of interest, one reduces one's self to what everyone identically shares with others."(Garcia 2014, 362)

Here we have a confrontation between a holist and an individualist. One believing the individual is inside a class, the other affirming the individual is outside. However, both compact the individual reducing it in one direction or the other. It is not the individual that is in the class but that which she shares with other like her that is in the class. Those are two different things:

"As an individual, I am neither reducible to being the member of a class which comprehends me nor irreducible to all classes, like a free electron without determination. I overlap different classes, reduced or enlarged – classes of inheritance, of ideas, of thought, of belief, and of action. My individual identities may appear ordered or contradictory, but they are above all overlapped and overlap- ping. I am never in any one of these classes alone: culture, society, community of ideas, family, group of interests, professional body, or cultural domain. Rather, what I have in common with others is in these classes."(Garcia 2014, 364)

2.7. Seeing Things and Objects

I began this chapter with the clear purpose of furnishing a Milieu with an ontology in order to be able to think objects of design. Not to allow myself to think right or wrong thoughts but just as many thoughts as possible. The task was not easy but neither is the topic I approach. How am I to think design and designers, realities and fictions if not with a structurally sound conceptual support that allows me to remain balanced? It was my intention to provide that support to the reader with this rather dense chapter. If my invitation to "see double" has been succesful, hopefully, in what is to come the reader (design practitioners and researchers in particular) will be able to join me in thinking similarly about what any entity is. Hopefully, it won't matter whether the entity is real, constructed, symbolic or artificial, logical or paradoxical, the reader will be able to see double formally and objectively, as things or as objects. And if I consider them as objects, the reader will hopefully benefit from the ability to see double yet again, through the senses of being and comprehending.

This is yet another motivation behind dwelling in the flat formal world of things and then returning to the rich universe of objects: in outlining a formal plane of

equality, the levelling field is clear when making or reflecting on objects. My research through design process starts not too differently from others: I also start sketching an idea. This Milieu is a conceptual prototype showing a rudimentary but helpful philosophical arrangement in order to think the characteristics of a research question. A rudimentary and preliminary exercise in order to advance towards knowledge.

Primarily this chapter has been about chasing the meaning of things. In this undertaking, I have tried to show that meaning has two senses: that which is a thing and that which a thing is. Being and comprehending. I have postulated the danger of reductionisms that reduce a thing to either its parts or its relations. How in order to see things it is necessary to keep the channel of being flowing. However, this comes at a price: things and objects are everywhere and everything is some thing. I have tried to describe a few ways to deal with this complexity although I haven´t been too exhaustive in doing so for, after all, arranging the objective universe is an act of realist creativity that would not fit in this dissertation.

This chapter is an invitation to see entities, things and objects, not only differently but as differentials.

A great example, in my opinion, in Garcia's book describes a painting:

"Before me is a picture, a painting, framed and at the centre of a museum. I try looking at this landscape, this scene, this composition. But as soon as I look carefully at the painting – if I no longer consider the room of the museum that the work belongs to – I am no longer very certain of truly seeing it. I am seized by doubt. I plunge into the painting. I examine a mass of significant or seemingly insignificant details – distant characters, scattered objects, movements, layers, shades, and so on. By examining the varnish, I perceive coloured matter and its tiny waves on the surface of the canvas. I follow the brushstrokes. I approach an area where there is a subtle overlapping of an almost transparent sienna and Bismarck red, and so on. I see the object closer and closer, but in so doing I have lost sight of the object as such.

I wanted the thing, but only ever had that which enters into the thing."(Garcia 2014, 129)

Now if one tries to obtain the meaning of the thing from the other direction:

"By thinking of the painting in some context and history, I can survey its effects, its consequences, and its posterity. But I also have the opportunity to situate the painting within my singular history, to obtain

control over its accidental relationship with what I have experienced up to now. It is possible for me to place the painting in many contexts, with many conditions, and always seek the meaning of the painting. What the painting is is what it dwells in, where it is situated. If the painting remains in its historical context or in art history or in the perception that I have of it or on the market, and so on, the painting always has one distinct meaning. Its matter (what is the painting) will be the same. But what the painting is will depend on what the painting is temporarily located in." (Garcia 2014, 129)

When one looks carefully at things through a thingly ontology, they appear as split. Either one grasps what is in the painting or what the painting is in but one cannot grasp the painting as a whole. What I hope to have achieved with this philosophical sketch is precisely a better understanding of two notions. First that entities can be grasped as things and as objects. Secondly, that to see an object one needs to constantly oscillate between that which is in a thing and that in which a thing is.

Part 2

Insight

In the last chapter, I furnished a metaphysical workshop through Tristan Garcia's flat ontology and called it Milieu. The reason for this is to be able to think about the objects I have created during the last three years in terms of my research question: what makes a design object real or fictional. I was comprehensive in the description of the Milieu in order to provide the reader with the same lenses I am wearing. But before I proceed to the objects let's review some of the more important elements from the Milieu that will constantly appear through this Chapter 3.

In the Milieu, there are things. Anything can be a thing. A thing in the Milieu is the only thing, it is not together with other things but rather it is alone in the world. One thing is a thing as long as it is the only thing. The world has the capacity to annihilate anything except one thing. This thing is solitary and exclusive: "If something is something, nothing else is something"(Garcia 2014, 58). If this chair is something, my body resting on it, the room it is located, the sketches that imagined it or the manufacturer that sold it are not something. As long as this chair is something, everything but this chair is equivalently not a thing.

In the Milieu, there are also objects. Objects are things in relation to other things and are not alone in the world. They are not in different universes, pluriverses or alternative realities. All objects are in the biggest possible thing, namely, the material universe or the cosmos. Together with Garcia, I am a materialist when I talk about objects. At the same time, I also join Garcia in a rejection of absolute materialism by embracing the idea of the world:

> *"I believe that each object is something and the universe is something, so the universe is in the world. So I'm not absolutely materialist, because I don't think that the world is something material."(Peters, Harman, and Garcia 2013)*

Objects are in relations with each other. These relations can be extensive or intensive. If they are extensive we talk mostly about classes. When relations are intensive we think of values, life or time. Things are alone in the world but objects are in relations in the universe. There are no solitary objects. Universality is a process based on identities and differences so when an object is in relation with (being in or comprehended by)

another object they have something different and something identical. Also, and very importantly, nothing is in-itself, everything lies outside itself.

In Chapter 3, we will be talking only about objects. In the process of doing so, I sometimes looked at them as things because it helped me reconsider how I understand them as objects, as a difference between components and relations. Furthermore, to briefly see them as things helped me in being very careful with how I define their limits, how do I consider what the object in question actually is.

Chapter 3

Object

This chapter focuses on the design objects that I have worked on for the duration of this study. It is through designing these objects that I, somehow paradoxically, both discovered and created the basic elements that inform the design theory of fiction that I present in Part III. This chapter is about design objects and importantly, as far as objects are never alone but together with other objects, in developing this chapter I am setting up limits. A limit is of the same nature than the objects it tries to separate. It is like a thin layer, a membrane, that pretends to disappear within or mimic the objects it is attached to. The limit between a branch and the rest of the tree is of the same nature as the branch and the tree. The limit between love and hate is an emotional threshold. Limits are contingent and non-necessary which makes them open to question and redefinition. Once one speaks of objects there is no way to avoid the limits that accompany them and with this move, with the move of dividing the universe into objects, one surrenders how certain things matter:

"This book is limited by the room in which it is, provided that it is in a room, just as it is limited by its time – it is enclosed in a place, in a time, in the consciousness that you have of it, in its economic value, and so on. If I put this book in a bag and close it, this bag captures it. This is yet another limit. But limits change and depend on a point of view, on interests attributed to a thing, on a scale of perspective."(2014, 143)

Limits render matters of meaning obscure or obsolete while bringing others to the spotlight. It is necessary, then, to proceed carefully when dividing things into objects.

Limits as Metaphysical Probes

To see double through the thingly ontology of Tristan Garcia might result in a sort of ontological flood. Objects are everywhere and never alone but together with other objects in the objective universe. The complication is not only one of extension or profusion but one of delimitation: how is one to limit the objects under scrutiny? In the case of this dissertation I have proceeded by identifying limits with what I have termed "Metaphysical Probes".

In the research through design community the term "probe" is a loaded one. Perhaps the best-known example of design researchers mobilizing the term is accompanied by the term "cultural". In an effort to reach an empathic understanding with senior citizens and better understand their lives in their communities, Bill Gaver, Anthony Dunne and Elena Pacenti, designed kits of objects and tasks meant to provoke a response. In their words, the Cultural Probes are a "Design led approach to understanding users that stressed empathy and engagement"(B. Gaver, Dunne, and Pacenti 1999b). Participants that receive a package of cultural probes become a self-reporting actor by drawing maps, taking pictures or writing diaries for example. Afterwards, the cultural probes are returned to the design research team and serves to inspire and inform design decisions. Beyond Cultural Probes, design researchers have experimented with similar methods of self-reporting and participation in a plethora of contexts for many different reasons. Among many others, there are Residential Probes (Crabtree et al. 2003), Technology probes (Hutchinson et al. 2003), Urban Probes (Paulos and Jenkins 2005), Mobile Probes (Hulkko et al. 2004) or more recently Gamified Probes(Gennari, Melonio, and Torello

2017). Avoiding specificity, Tuuli Mättelmaki referred to probes in design as simply "design probes" and traced for important reasons for which probes are typically used:

> 1. Inspiration – Probes can enrich and support the designer's or the team's inspiration
>
> 2. Information – Probes can collect information about the users
>
> 3. Participation – Probes can provide the users with an opportunity to participate in ideation
>
> 4. Dialogue – Probes can build up an interaction between the users and the designers, as well as within the design team, in accordance with the user- centred design principles.
>
> *(Mattelmäki and others 2006)*

It is important to note that the reasons underlying the use of design probes and those behind an ethnographic study bear nothing more than a faint resemblance. Paul Dourish argues that Instead of placing an emphasis on implications for design, cultural probes should be valued as an inspirational resource:

> *Cultural Probes (and a series of related approaches such as Technology Probes) arose within the design community as a means to conduct broad-based surveys of user experience. Cultural probes are self-report packages of artifacts, questionnaires, and exercises that encourage users to reflect on their experience, often provocatively. The data generated by the probes are intended to provide inspiration rather than the basis for analysis.* (Dourish 2006)

The Metaphysical probes that populate this chapter and scaffold my experiments and other design probes are similar in certain respects. In both cases there is an act of "probing", of reaching out and exploring, through design. Importantly, in the case of the metaphysical probes, the "probing" targets a metaphysical space and particularly, the ontological nature of design objects with respect to their real or fictional character. Also, the metaphysical probes and the design probes share the inspirational and responsive character, that is, they invite for an answer that leads to further design knowledge. Elizabeth Sanders and Peter Jan Stappers' discussion on design probes resonates with this idea:

"Probes are materials that have been designed to provoke or elicit response. For example, a postcard without a message." (Sanders and Stappers 2014)

However, more salient are the differences than the resemblances between design probes and metaphysical probes. Crucially, design probes place an emphasis on involving other people to navigate a knowledge space with them. Instead, the metaphysical probes that I present below are reflective, in the sense that they help me investigate a metaphysical space through design. Each Metaphysical Probe establishes the boundaries of an experiment "probing" the real or fictional nature of design objects and creates an access to insight through design events and objects.

Each metaphysical probe comprises three elements:

- A design event. Each act of probing into reality happened in the context of a design event. Here I mean event as I described it in the Milieu, as a doing that connects a series of deeds. A set of design circumstances that lead to a particular set of design objects and insights of relevance for this inquiry.

- A final design object. For the sake of clarity, I have chosen one primary object that has been chiefly influential in the development of each design event and called it "final design object". The final design object is usually that object that motivated the design event in the first place or that once its design was completed resulted in the design event dissipating, mutating or splintering into other important design events. Aside from the final object, I will superficially review other influential secondary objects mobilized by the design event in question.

- Insights. A set of insights gained from testing reality through that particular metaphysical probe.

Before I examine the first metaphysical probe, however, I need an experimental definition for real and fictional. But this is conceptualization is a sensitive exercise. On the one hand, a basic understanding is necessary in order to advance with this enquiry.

On the other hand, I am aware that being very thorough with this effort would drastically reduce what can be discovered with each metaphysical probe. It is likely that providing a very comprehensive definition at this point in the thesis would require an effort of critical analysis that might be better performed after I have completed my experiments, after I have analyzed the design events and objects resulting and informing my inquiry and not before. So, I rather choose to define the real and the fictional in very loose terms by means of the imaginary. If an object is an artefact of the imagination, then it is fictional. If it is not, then it is real.

Finally, there is one important object to consider before moving on: my position of enunciation as author. The present chapter, Chapter 3, is intentionally written using the first-person plural 'we' in each "Design Event" and "Final Design Object" section. The reason for this move is not to benefit from the position of a detached observer that implicitly enlists the reader in agreeing with his assertions. I do so in order to foment a situation of productive ambiguity in the mind of the reader. I feel compelled to use we in order to bring to the fore that I am speaking my own voice but also the voice of other objects, human and non-human. Objects that I have designed and have a rather quiet voice, or the voice of kind co-authors that deserve to be more present than just through a simple reference (which of course I have provided too). It is not a "we" as in everyone, as in every person including me, but a "we" as in "the objects that make this assertion possible".

3.1. Metaphysical probe #1: Existence

My first attempt at disentangling the real and the fictional uses existence as vehicle. The premise could be stated as a question like so: can one, to any degree, isolate fictional and real objects on the basis of their existence? Or, is it possible to consider existence as a property of objects that leads to some degree of differentiation between the real and the fictional? If one were to say that imaginary objects don't exist and real objects do, what sort of implications would one have to deal with?

The design event that serves to articulate the consequences or implications of existence as a mode of access into the real and the fictional began in late Autumn of 2015 and ended around Spring 2017. In this period, insights gained through design sparked other events that I will analyze in the next sections of this chapter. I will also try to illustrate the connections between them, however, we won´t be too exhaustive for reasons of space.

The final object in this event is the Digital Dreamcatcher. The design event of which it is part started earlier than the construction of this object and mainly comprised research events into the literary genres of magical realism and speculative fiction. Both these literary genres heavily rely on the use of fiction for the crafting of narratives. However, they are separated by a fundamental difference. Speculative fiction aims at a high degree of mimesis with the reality where the work exists. Margaret Atwood's Oryx and Crake, first book of the Maddaddam trilogy (Atwood 2014), for example, describes a post-apocalyptic world of wicked creatures where a technologically plausible causality connects objects and events. In it, the Crackers, primitive human like creatures that resulted from bioengineering have extraordinary abilities because of their technologically enhanced genetic makeup. E.g. are able to cure themselves from illness by purring on each other. Magic realism, on the other hand, is unapologetically inexplicable in terms of technology or otherwise when it comes to certain elements of theirs stories. In García Marquez's Hundred Years of Solitude (Márquez 2014), Remedios the Beauty is too beautiful and wise for the world and one day, while folding sheets in the summer sun, she ascends into the sky. I interpreted this difference between speculative fiction and magical realism in terms of the existence of fictional objects. It would be possible to hypothesize

that speculative fiction tries to compensate for their non-existence by bringing them to the niche of real objects whereas magical realism remains unconcerned with their ontological status. In design, speculative fiction deeply influenced various approaches that take fictional objects of central importance. Design fiction (Bleecker 2009b)(J. Lindley and Coulton 2015)(Kirman et al. 2018)(Blythe 2014)(Tanenbaum 2014), for example, also largely relies on the possibility of fictional objects resembling real, existing objects. Furthermore, and according to one of its major proponents, prototypes of design fiction are diegetic, that is, they are meant to support a story and also are meant to "suspend disbelief about change" (Sterling 2009). I viewed this definition as sponsoring a consideration of the fictional as non-existent, while supporting a sort of strong realism of the real that, however, could be cheated upon through design. It is not that belief is achieved through a fictional object but its negative, that disbelief is suspended. Figure 6 shows a work in process map with a multitude of design objects that relied on fiction. In doing this map I realized the magic realist approach was underpopulated with examples in relation to the more rationalistic. This seemed relevant and served as an invitation to explore the possibilities of the fantastic that does not rest on the scientific or the logical. I felt compelled to design a fiction that could not be explained away through technology or science in order to explore the central map of figure 6 and its implications for designing with a focus on fiction. This is the reason why I chose the topic of sharing dreams.

Figure 6 Early work in process map of the uses of fiction in design. Picture Credit my own

In a Design Studies paper, Johan Redström presents a conceptual exercise to think use without the user (Redström 2008). This is necessary because, in his view, the user does not precede the object designed but rather emerges as a consequence. He distinguishes between two acts of use, acts of use through design and acts of use through use. Acts of use through design are those directly prefigured by the design object in question: a chair is designed to be sat on. On the other hand, acts of use through use are those that happen independently of the design intentions: a chair can be also used to light a fire (especially if it is made of wood). In a similar way, I proceed to investigate the existence of fictional objects by designing a design fiction prototype, the Digital Dreamcatcher, and attempting to examine its diegetic[35] capabilities (its ability to be a part, sustain and evolve a story) through design and through use.

3.1.1. Design Event: Diegesis Through Design

The Digital Dreamcatcher was initially designed to exist as a prop within a story. This is the reason why we refer to its effect as diegesis through design. By completely defining both the story and the prop that accompany it we aimed at achieving a high degree of control over the fictional objects created in the mind of the reader. We knew the story we wanted to tell and the elements that were part of it. The Digital Dreamcatcher was a sort of McGuffin[36] that would allow us to anchor and develop a particular narrative: one particular night thousands of people shared the same dream. In order to explain the characteristics of a dream shared by everyone, we needed a device that took pictures of that dream so discussions on what the dream might have meant could be triggered among people. Our story took the form of a scientific paper and its abstract read as follows:

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[35] Diegesis derives from the Greek "to narrate". A diegetic element is understood here as forming part of a story. A prop in a movie is diegetic, characters interact with it for example. Whereas the soundtrack that serves to set the scene is non-diegetic. It is "added on" to the story.

[36] Macguffin is a term coined by screenwriter Angus MacPhail and popularized by Alfred Hitchcock during a conversation with French film director Fracois Truffaut. A MacGuffin is a plot device, usually an object, that works as a goal that protagonists in a story pursue for some, usually underexplained reason. An example would be the robot R2-D2 in the film Star Wars: A New Hope or the briefcase in Tarantino's Pulp Fiction. For more on MacGuffin see (Blumenberg and Adams 1991; Toran, Kular, and Jones 2008)

This paper is presented as a "design fiction" because nobody would accept these findings in any other form though they are as true as anything else published at CHI. It begins with empirical investigations into the infamous dream simultaneously experienced by thousands of people. We describe the development of a device designed to capture images from that extraordinary dream. This was a prop, or diegetic prototype that unexpectedly began to work. We then report a range of other fictional devices developed at the Solutionist Studio which began to function as described. We argue that the line between fiction and reality has become entirely porous.(Encinas and Blythe 2016)

Our paper could be read as a thought experiment. A "what if" that alters the coordinates of reality and dwells on its implications. In the story, an episode of massive collective shared dreaming happened on the night of the 7th of July of 2015 affecting millions around the planet. Although the evidence was conclusive and its presence in the press a constant since the event (see Figure 7), the shared dream was still dismissed by the scientific community and subjected to all sorts of "conspiranoic" explanations. The paper was written by members of the "Solutionist Studio" a design research lab in the city of Newcastle. The morning after the dream took place, researchers at the "Solutionist Studio" all shared a similar dystopian dream: they walked among the ruins of their city. The effect on the research they were carrying was immediate and drastic for they saw their earlier projects as pointless in the face of such a potential catastrophe. In particular, researchers employing "design fiction" became totally disappointed because up to that moment they had thought the best approach into reality was through rationalistic fiction. Now that magical things were happening, how could they, paraphrasing Terry Eagleton, resolve at the level of fantasy that which cannot be resolved in reality(Eagleton 2011)? How could they mobilize the rational to make sense of such a magical real? They changed direction and, influenced by the magical realist tradition of tales that stretched back to the Arabian Nights, built a prototype that was meant to take pictures of the shared dream.

Figure 7 Digital collages I authored with fictional press articles about the shared dream. Picture credit my own

Researchers at the solutionist studio built a Digital Dreamcatcher but they didn't expect it to actually work. They packed inside electronic components, wired a camera to point at the retina of any would-be user and a screen where images of the dream should appear. Their gamble was that in a world where the magic was just happening, why not design a device that doesn´t work through technology alone but is somehow aided by magic? In any case, if the device didn´t work, they could use it to stimulate discussion and reflection on the shared dream with those testing it. The digital dreamcatcher started producing images. They portrayed familiar spots in the town of Newcastle but imbued with an aura of wickedness. Buildings in the riverside were empty and derelict, nature claiming back even the most modern places, like the Sage building and gigantic menacing figures towering over the horizon (Figure 8). The responses of participants were varied, some clearly recognized elements of the shared dream and the images were a confirmation that the dream was real. Others remained sceptical, attributing the images to some sort of CGI trick played by the researchers.

The researchers attempted to rationalize the results from their experiments. First, they attributed responses according to a psychotherapeutic argument: people found something utterly reassuring in the confirmation of an impending apocalypse. Everyone dies and the world dying along means that it is not only the end of life for one person but rather the end of life itself (Encinas and Blythe 2016). With more evidence gathered however, researchers at the Solutionist Studio had to abandon this line of reasoning and face the obvious: the laws of nature had changed.

Figure 8   Images supposedly belonging to the shared dream produced by the Digital Dreamcatcher. These images were edited using Adobe Photoshop and introduced as diegetic elements for the purpose of illustrating the story. Picture credit my own.

Other researchers in the studio decided to test the new situation by building other prototypes where the magical was part of their functioning. One researcher, for example, built the "Author Eraser":

> *A sociologist presented a device he called the author eraser. It looked something like a small vacuum cleaner and when it was passed over the list of authors on the front page of an academic paper it sucked off the names of all the senior academics who had added only minor edits or made*

no contribution at all. Not only did it hoover the names from the physical piece of paper it removed them from all digital archives as well.

One researcher built a phone app, the GossApp, that would record gossip and make them effective, people being gossiped about succumbing to others descriptions of them. There was also an "Asset Stripper", a "Brilliantification Pad" and a "Book of Sandpaper". Finally, a young researcher decided to build a machine that would solve any problem whatsoever. She named it the "Solution Printer":

> *A young researcher finally decided to create a solution printer. Adapting the largest 3D printer in the lab she created a device which would print solutions to whatever problem was specified. The first print outs addressed some of the fairly trivial problems that beset members of the lab: there was a machine that cured baldness, a skin stretcher that would iron out wrinkles without leaving the surprised look of plastic surgery, there was a volume control to turn down loud and vexatious people. The researcher became convinced that this solution printer could avert the catastrophe that we had all dreamed about. She specified a device that would provide energy without creating an environmental catastrophe. It printed out a windmill.*

The efforts of the researcher continued but the prototypes resulting were always unsatisfactory and the Digital Dreamcatcher kept producing images of the apocalyptic dream. In despair, she desisted from her effort concluding that the solution printer was useless when the problem could not be understood or when an issue could not be properly stated as a problem.

In the discussion of the paper, the researchers of the solutionist studio argue that everything seems to indicate that the world reached the limits of reason long ago specified by David Hume (Hume 2016). Grasping their utterly wicked reality by means of mimesis was a fruitless endeavour. Although in the past fictional objects had occasionally become part of reality, as with the many examples of science fiction author's predictions in their books, at the time of their writing the membrane that separates the fictional and the real was entirely porous. The speed of change was so fast, so miraculous that mimesis or attempts at prediction were condemned to be absolutely useless. They quote a passage from the highly anticipatory book by H.G Wells The World Set Free (Herbert George Wells 1914) in which it is described the appearance of the storyteller, not as a mere entertainer, but as an enabler. Before a man killed a mammoth, a storyteller told a man would come and do so, rendering it possible:

"Such a man was that Leondardo da Vinci, who went about the court of Sforza in Milan in a state of dignified abstraction. His common place books are full of prophetic subtlety and ingenious anticipation of the methods of the early aviators. Durer was his parallel and Roger Bacon - whom the Franciscans silenced – of his kindred. Such a man again in an earlier city was Hero of Alexandria, who knew of the power of steam nineteen hundred years before it was first brought into use. And earlier still as Archimedes of Syracuse, and still earlier the legendary Daedalus of Gnossos."(Herbert George Wells 1914)

For the researchers at the solutionist studio, plausibility is to be abandoned for the sake of addressing such wicked times. Their magic realist prototypes that suddenly started working struggled in the face of problems, because in wicked times, problems are as problematic as the solutions they propose or facilitate.

3.1.2. Final Design Object: Poetic Dreamcatcher

Upon returning from the conference where we presented the story of the solutionist studio we wondered, together with Tommy Dylan, on what would happen to the diegetic capabilities of the Digital Dreamcatcher if we isolated it from a story. This would mean going from diegesis through design (of a story) to diegesis through use (of the Digital Dreamcatcher). Instead of fully designing the story that accompanied the Digital Dreamcatcher, in the next iteration the Digital Dreamcatcher would be redesigned to be used. With this redesign we were also asking if the Digital Dreamcatcher could also serve as a vehicle of introspection and discovery of the fictional objects generated by people in interaction. In order to fulfil its new purpose, we decided to revise its functionality and add an extra element of interactive possibility: personalized poetry about its user's dreams. The Digital Dreamcatcher became the Poetic Dreamcatcher. This is how we introduced it in a design research conference:

What design fiction is seems to be a matter of debate whilst how design fiction accomplishes its feats lacks attention among the design research community. This research program focuses on how people engage with a fictional story world through interactive artefacts or in other words, how disbelief is suspended when design is employed as an ingredient that embodies some aspects of a fictional narrative. In order to explore this, we invited four participants to interact with a purposefully designed prototype: the Digital Dreamcatcher. The Digital Dreamcatcher is a fictional device that interprets dreams by printing personalized poetry.(Encinas, Dylan, and Mitchell 2017b)

The notion of suspension of disbelief is attributed to the poet Samuel Coleridge[37]. Later, science fiction author Bruce Sterling borrowed the expression to define the objects of design fiction as diegetic prototypes to suspend disbelief about change. While we sympathised to a certain degree with this definition for the workings of fiction in literature, we wondered whether the same held in design. We were to depart from the diegetic effort performed through the Solutionist Studio story and test a form of diegesis through use. If instead of fully designing the story of the Digital Dreamcatcher, we intentionally left spaces for people to wonder in while interacting with the device, would we get to better understand how suspension of disbelief happens and what it entails?

The Digital Dreamcatcher evolved from an image producing artefact to a poetry generator. It consisted of two modules (see Figure 9). The first module we called the Sleeper. Each participant would take the Sleeper home and place it next to the bed where they slept for data capture. The next day the participant was invited for an interview. At the beginning of the interview the sleeper module would be installed in the base module and the data captured during the night, as if belonging to the dreams of the participant, would serve to develop a string of poetic verses. After a short processing time, the base module would buzz and print a poem. Unbeknownst to the participants themselves, these poems would be the result of a basic generative software algorithm("Interactive Poetry Generator" 2018) that captured publicly available information from them in various websites (like Facebook, Twitter or their personal sites) and arranged it in poetic form. With the push of a button, the Digital Dreamcatcher produced an abstract, ambiguous and of course fictional representation of the participants dream such as:

University, and systemic moves
School of design, Manchester sustainable
Aims. Previous academic studies
In a three-dimensional design consultancy

The discoveries of master of the starting point
Looked into doing global. We make sources

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[37] Writing in the beginning of the XVIII century, Coleridge felt the need to justify the use of the supernatural at a time when doing so had fallen out of fashion due to rational impulse of the new science of the time. (Coleridge 1817 Chapter XV)

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And social problems. Yet in three-dimensional
Local circular political practice

Found political practice. Yet in design
Local varieties design together
And a distinction of distinction of
Is because opportunities each condom

Pair focuses on asking 'how do we'
All deserve a big name, supervisor
With a 'transformational' political
Enabling the starting point. A local

The poems were bizarre and created an impression on the kind four participants that joined us for this study. The performative activity we proposed is related to some extent to what is known as Speculative Enactments (Elsden et al. 2017a). Our participants were PhD students in Design and Media from Northumbria University that were explicitly invited to interact with a fictional prototype:

> *Each participant followed the same procedure. First, we briefed the participant regarding the overall research project. We mentioned the Digital Dreamcatcher was a design fiction and handed over the Sleeper module. We instructed the participant to position it next to the bed where dreaming takes place. If a participant asked to explain the reasons for it, we just indicated that the device would capture relevant information regarding dreaming patterns. On the next day, the participant was invited to take part in a semi structured interview. This interview was structured in 3 stages. During stage 1 we asked participants questions related to the previous night such as "How did sleeping next to the Sleeper module make you feel?" "Do you remember your dreams from last night?" "What do you think the device was doing?". Stage 2 saw the assembly of Dreamer and Sleeper module, a photo of the retina of the participant, the production of the poem and a discussion on how the poem related to the participant. Questions in this stage were similar to "How is this poem related to your dream" "Why is the machine printing this?" Stage 3 comprised an explanation of the actual workings of the prototype and a discussion on the overall experience interacting with the Digital Dreamcatcher.(Encinas, Dylan, and Mitchell 2017b)*

The responses we received in stage 1 of the interview not only addressed technical issues related to the digital dreamcatcher but also provided insight into the personal meanings and routines that influenced our participant's dreams. We got plenty of advice for how to redesign the sleeper module to be less intrusive, recollections of nightmares from the past and vivid portrayals of the dreams that happen the night of the experiment. One participant went further to speculate on the reason why she had no dreams the night

the sleeper module was next to her bed: "Maybe because I knew this was gonna sort of capture what I dreamt, I sort of store it there[in the Sleeper module] instead of knowing when I woke up" which seemed to be a desirable design feature if the experiencing for nightmares could be shifted from dreamer to Digital Dreamcatcher. For stage 2 we intentionally hid from participants how the poems were produced (by scraping public details about them from the internet) but reminded them they were interacting with a speculative artefact to help research design fiction. During stage 2 participants were invited to play along with us in interpreting the poems generated. Their responses wildly varied. One participant seemed to be affected by the uncanny feeling of recognizing herself in the poems printed. For her, it came as an unpleasant surprise that a machine could intrude in her personal dream space. Although in no way she believed the digital dreamcatcher was actually capturing her dreams, the fleeting doubt that very briefly infected her was enough to grasp the intimate nature of her dreaming. Another participant's curiosity was triggered by singular words and how they related to his every day and the history it belonged to. Interestingly, for these two participants, the salient content of their poem corresponded to their theoretical understanding of dreaming: the first participant saw dreams as storage and disposal of events while the second read dreams as processes that expose hidden desires. Finally, a third participant responded to the poems in a very different way. After reading the first verses he announced that those were just random bits from his LinkedIn profile. Any following invitations to "tag along as if" failed and the conversation became a very valuable exchange on why this failure happened: there seemed to be "too much truth" making the Digital Dreamcatcher "too believable". Stage 3 of the interview mainly provided us with ideas on how to take diegesis through use further by, for example adding dream catching functionality to domestic products like toasters or coffee makers. We won't be giving here more detail concerning the methods or particular data (like quotes from participants) for reasons of space. In case the reader is interested the paper (Encinas, Dylan, and Mitchell 2017b) contains greater detail and can be found in the appendix.
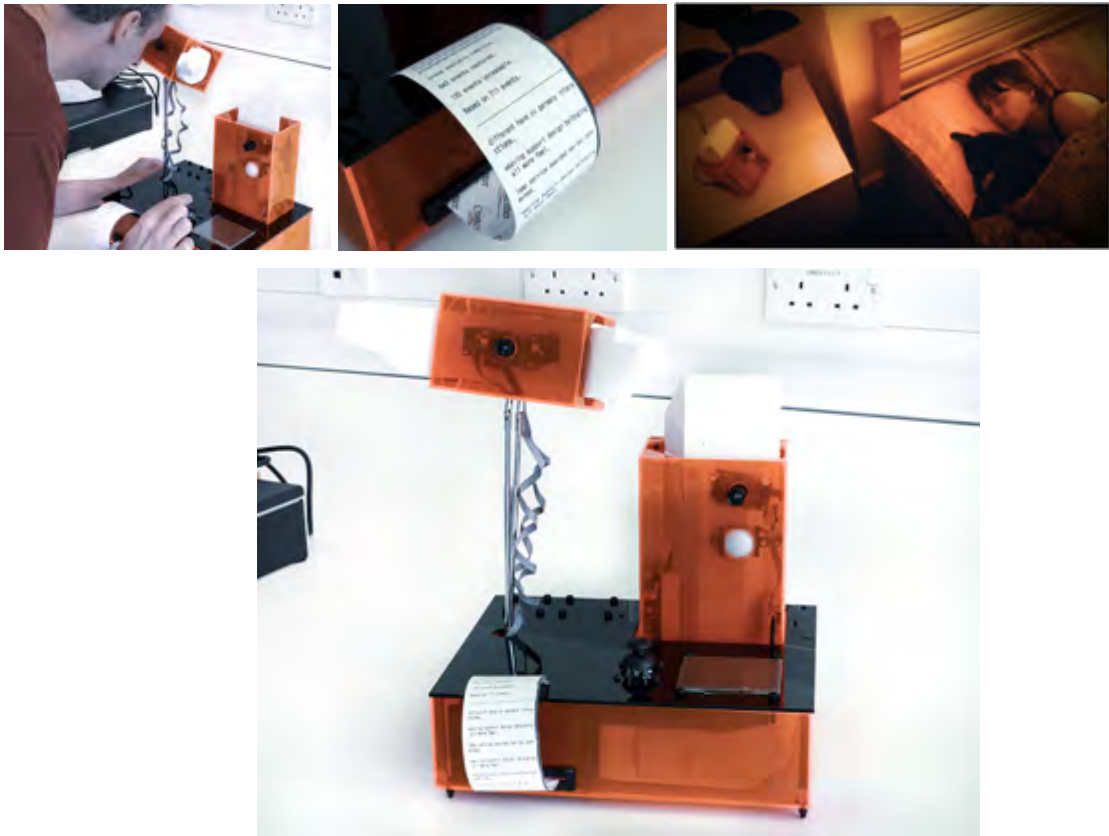
Figure 9 The Digital Dreamcatcher. Full device (bottom). Retina analysis procedure undergone by participants during stage 2 (Top left). Poetry in the process of printing (Top center). Actress simulating the functioning of the base module (Top right). Picture credit my own.

Diegesis Through Use

The digital dreamcatcher as a design artefact that generates fiction through use persuaded us to conceptualize fiction as a system. Rather than a compact object with rigidly defined boundaries, the fiction that emerged in the presence of the participants of our study seemed to be limited by a permeable membrane. Certainly, in the centre of the fiction was an artefact and surrounding it a story but participants and us, as researchers, constantly affected the role of the prototype and the range of the story. The fiction was "inflated" or "deflated" by the flows originating in the people engaged while interacting. For one participant, the story of the digital dreamcatcher involved arguments supporting personal experiences, memories of the past or surprising technological affordances. For another participant, the digital dreamcatcher was just a lousy printer from LinkedIn.[38]

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[38] For reasons of space we won't be reproducing the quotes from our participants here, but they can be found, along with an analysis on them in (Encinas, Dylan, and Mitchell 2017c)

Suspension of disbelief seemed to be a rather special and contingent event happening for some but not for others with severe consequences for the range of influence of the fiction. Furthermore, there was much to be lost by assuming suspension of disbelief by design: radically important insights emerged locally in the interaction of the agents within the fiction. Rather than finding out that a fiction is embraced as an automatic response to the imaginary, we realized that the people that engages in the fiction does so in unique, often unpredictable ways.

3.1.3. Insight: On the Existence of Fictions

The book *The Different Modes of Existence* by French philosopher Etienne Souriau (Souriau 2015) is an excellent and sadly, much too sort treatise on how different things exist in different ways. This is a brief excerpt introducing the beings of fiction:

> *"Conversely there are fragile and inconsistent entities, which, by virtue of that inconsistency, are so different from bodies that we may hesitate to grant them any manner of existing whatsoever. We are not thinking here of souls (which have already been in question), but of all those phantoms, chimeras and fairies that are the representations of the imagination, the beings of fiction. Is there any existential status for them?"(Souriau 2015, 150)*

This is precisely the question that I aimed to address through the Dreamcatcher event. I wanted to address the ontological status of fictional objects through design. First, I designed a fictional story and substantiated its diegetic prowess via a real object, the Digital Dreamcatcher. Then, I proceeded to situate the Digital Dreamcatcher in an environment conductive of fictional formation or emergence. I deepened my understanding of how disbelief is suspended and analyzed not only the fictional objects I designed but those that emerged in the interaction with them.

Usually, discussions about the existence of the beings of fiction involve a number of modifying statements of the sort "Yes, although fiction does not exist it is important or necessary because…" (Walton 1978a) or for some they are simply deemed non-existent and reduced to the existence of something else, like, for example, the brain or the mind. For the purposes of my inquiry, modifying the existence of the fictional with any clause would be to betray my early findings. In the study I have presented in this section I have shown how fictional objects existed alongside real objects, to the point of

sometimes having difficulties differentiating them. Nightmares stood next to machines that dreamt that co-existed with imaginary verses about real linked in profiles and published papers in serious conferences. The number of objects and their importance imposed on me a sort of ontological duty: for the rest of this inquiry I need to acknowledge fictional objects as existing objects. I feel that for the rest of this dissertation, I need to side with Étienne de Souriau as warrantor of ontological value to the beings of the imaginary:

> *How positive they are, from a certain point of view! Even the monsters, even the chimeras, even the beings of dreams. We have been able to study some of them with the same objective spirit as that of natural history, history, or political economy. There are concrete investigations by artists into the anatomy of the angel (how exactly is the wing bone joined to the shoulder blade?), into those of centaur or the faun (cf. E. Valton, Les Monstres dans l'art, p54 and 62). When Napoleon reread Richardson on Saint Helena, he carefully established Lovelace's annual budget; and Hugo, when he was preparing Les Miserables tracked Jean Valjean's accounts for the ten years during which he did not appear in the novel. (Think about it: the remote presence of a character in a novel in relation to the novel itself; now that is a strong dose of the imaginary!)(Souriau 2015, 152)*

I have observed that fictional objects exist and I am prepared to say that in matters of basic existence they don't differ from real objects. Both real and fictional objects exist. This assumption in no way represents a hurdle, after all the Milieu already and quite comfortably accommodates this notion. Both the fictional and the real exist as objects and the metaphysical probe of existence has not given us any clues on how to differentiate them. However, there is no reason to be discouraged for the digital dreamcatcher illuminated the next step of this inquiry. If both real and fictional objects exist, can we differentiate them based on their effects?

3.2. Metaphysical probe #2: Effect

The metaphysical probe of existence failed to provide a differentiated view of real and fictional objects. After my efforts, I assumed the existence of fictional objects and identified their ontological status as tantamount to that of real things. My effort turned to trying to test reality with a new probe: that of effect. The metaphysical probe of effect

represents an attempt to consider objects through their power to produce results or fulfil requirements. Essentially, I am interested in finding any clues about the real and the fictional through the force or efficacy of the objects they enter in relation with.

The design event I have chosen for this purpose is a design effort in studying the implications of considering problems and solutions as a form of framing and evaluating design research. It is perhaps the most extensive event from all those presented in this dissertation as far as time is concerned. It took place roughly between the Spring of 2016 and the Summer of 2018.

The final design object on which this design event hinges is not the prototype of a product but a research paper (Encinas et al. 2018). There is a reason for this choice: with a research paper, we can maybe investigate the effects of fictional objects by proxy of the research impact they deliver. It is common for papers to get published if they fulfil a research requirement, if they are able to articulate an argument that represents a valuable contribution to the knowledge of a particular research community. I thought there would be much to learn from real and fictional objects if the contribution to knowledge was not grounded on a real object, like a user study or a set of statistical measurements but on a fictional object. After acknowledging the existence of fictional objects, could I go one step further and situate their effectiveness on a similar level to that of real objects? Or on the contrary, should fictional objects, by virtue of their imaginary nature, be confined to the outskirts of knowledge never to enter the respected realm of the academic? Certainly, there is a strong body of literature supporting a negative answer to this question. The work of Joseph Lindley and Paul Coulton (J. Lindley and Coulton 2016), Ben Kirman, Conor Lineham, Shawn Lawson (Kirman et al. 2018) and Mark Blythe(Blythe 2014), for example, has constantly pushed the boundaries of what fiction can do in academia. But as far as this research effort is a research through design endeavour I felt compelled to investigate what happens when trying to embed effectiveness in a fictional object within an academic context. I relied upon the practice of research through design fiction (Blythe 2014) and in particular, in the invention of imaginary abstracts, abstracts from papers that don't exist, to guide the reader through the nuances of an argument. What could I learn about real and fictional objects by using an imaginary substrate for an argument in a research paper on design?

3.2.1.   Design Event: The Problem with Problems

One of the research objects from the design event that resulted in the Digital Dreamcatcher was published in a conference in San Francisco in 2016 (Encinas and Blythe 2016). It was not published as a full paper and was not presented in one of the main paper tracks of the conference but in alt.Chi, a forum that pushes the boundaries of what can be published in the field of Human Computer Interaction. Its topics and presentation styles are often extraordinary, leaving the audience in awe with critical and insightful takes on a variety of topics. Alt.Chi was a very welcoming venue for our magic-realist paper on design, fiction and the implications of technological solutionism. If alt.Chi was unapologetically extravagant, risk taking and carnivalesque, the paper tracks were measured and, for the most part, rigorously scientific.

One of the papers strongly caught our attention. It was an essay by Finnish researchers Antti Oulasvirta and Kasper Hornbaek proposing a vision of the field of Human Computer Interaction as problem solving. Their concern was that HCI lacked a coherent and generalized ontological basis, that is, there are many competing and even contradictory visions of what HCI is and what it can accomplish. In their view, this disagreement lead to a troublesome confusion when trying to communicate results or build on the work of other researchers. In the paper, they build on the work of the philosopher of science Larry Laudan and introduce the concept of problem-solving capacity as a parameter to evaluate HCI research. This is the abstract:

This essay contributes a meta-scientific account of human–computer interaction (HCI) research as problem-solving. We build on the philosophy of Larry Laudan, who develops problem and solution as the foundational concepts of science. We argue that most HCI research is about three main types of problem: empirical, conceptual, and constructive. We elaborate upon Laudan's concept of problem-solving capacity as a universal criterion for determining the progress of solutions (outcomes): Instead of asking whether research is 'valid' or follows the 'right' approach, it urges us to ask how its solutions advance our capacity to solve important problems in human use of computers. This offers a rich, generative, and 'discipline-free' view of HCI and resolves some existing debates about what HCI is or should be. It may also help unify efforts across nominally disparate traditions in empirical research, theory, design, and engineering.(Oulasvirta and Hornbæk 2016)

At the time, this paper strongly resonated with the work we were presenting at the same conference. However, the resonance was in the form of a destructive interference. While in our magic realist paper we were making an argument for the dangers of quickly

embracing technological solutions for problems that either, don't exist or resist their own definition, in Oulasvirta and Hornbaek's paper the argument went in the opposite direction. Research should be valued according to how it advances the possibility to solve particular problems. We found this notion deeply disturbing for research practice, especially in matters related to design where problems are in many cases "wicked"(Rittel and Webber 1974). The definition of a problem in design can quickly and easily turn into a research effort in and on itself. Furthermore, it is common for design practitioners to acknowledge the mischievous nature of problems and the feeble character of solutions: a problem obscures as much as it reveals (Dorst 2003). Furthermore, there was yet another idea in the problem-solving paper that stubbornly remained in our memory. Is there really a "discipline-free" view, not only of HCI, but of anything? Can research attain a degree of objectivity such that claims of emancipation from disciplines are valid? It seemed to us that this could hardly be the case for even the most straightforward exercise of research is tied to political structures, social niches and cultural contexts. Objects of research are in the universe, never alone but in other objects. It is only in this way that research can be considered objective.

We left the conference with the idea of contributing to this debate. Although at the time no detail was clear, the overall aim certainly was. Could we build an argument on the necessity to consider problems and solutions as research efforts in themselves and evidence their context dependent nature? The idea faded in the background of other research activities till we stumbled upon an article about the teenage shoplifting community in the online social platform Tumblr through Sean Bonner's excellent newsletter Just Another Crowd.(Bonner 2018)

3.2.2.   Final Design Object: #LiftBlr

#LiftBlr was the hashtag that a community of users in the social platform Tumblr used to share blog-like posts about, among other issues, shoplifting. We decided to focus on the #LiftBlr community for two reasons. First, a comprehensive examination of the content made public by this community might be of interest to those researchers interested in social computing. How are public social sites idiosyncratically appropriated and the implications this can have on the design of interactive systems. Second, a study of #LiftBlr might allow a researcher to attain a certain perspective from the ethically charged

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responses to this community made in the mainstream media outlets. Usually, teenage shoplifters from Tumblr were portrayed superficially and through clique: a sort of online "Bling Ring" a la Sofia Coppola(Coppola 2013). Ethically unconscious teenage girls stealing to escape boredom and taste luxury. After a rather brief examination of some posts, it became clear to us that this community was highly contested and politicized. The #LiftBlr community seemed like a perfect candidate to examine how designers might bring their own context, assumptions and motivations, with them in defining the "problems" regarding shoplifting according to different stakeholders involved.

After analysing more than 1000 posts of the community we realized how heterogeneous the messages of the community were. Shoplifting was the act that bonded together all sort of cultural concerns of teenage life. Values regarding sex, race or social class or political attitude were intensely present and openly manifested in a forum. Teenage shoplifters in Tumblr were stealing but they were also doing many other things. To form our corpus of data, we gathered all the messages posted in the blog post @liftermeetup, cheerily encouraging to "find a partner near you" so shoplifting is not a solo act, during the month of July 2016. We carried an inductive thematic analysis on our "found data" and organized the posts according to themes and sub themes. In full awareness that our data could be interpreted in many ways and always trying to avoid generalization beyond the boundaries delimited by what we found in the posts, we presented three main themes.

3.2.2.1.   Theme 1: Tips and Advice

This category was, basically, a catalogue of practical knowledge about shoplifting explained by shoplifters themselves. Here we included shoplifting guides into more than 27 retail stores, like Walmart or Victoria's Secret. Shoplifting methods, tools and techniques, like how to embed a magnet in a shoe in order to remove security tags or what are the best movement routines to follow within a shop to avoid being spotted. There were also extensive accounts of shoplifters reflecting on a particular shoplifting episode, what happened and what can be learned from it. Finally, in this category we also located other practical info for shoplifters, like tips on how to perform self-defence moves in order to free oneself from an attacker. The following are some examples:

"The Body Shop/Lush. These stores are easy to lift from due to their lack of cameras (they literally don't have any), so you just have to watch out for employees! The Body Shop is usually a very small store so I would recommend having a partner to act as a shield to conceal behind. You don't have to worry about tags or cameras in either store, so be very cautious of the SA and other customers! Not sure about The Body Shop's chase policy, but Lush is no chase!"

[lifting-madjick.tumblr.com]

"Ticket Switching. You find an item on clearance and remove the clearance tag. You then find a similar high dollar item and apply the clearance tag to it. You then bring the high dollar item to an unsuspecting cashier and pay for it at a clearance price. Unfortunately most retailers today now utilize electronic barcodes that when scanned will ring up the correct price".

[pale-history.tumblr.com]

"Make a fist with your thumb outside, not tucked inside. If it's tucked inside your fist, when you punch someone, you might break your thumb. The thumb goes across your fingers, not on the side. "

[liftyhippy.tumblr.com]

3.2.2.2.   Theme 2: Resistance and Activism

Theme 2 includes posts dealing with, at the time, actual political and social events that impacted the shoplifter's lives. Here, members of the community shared their views on capitalism and communism, anti-war manifestos, animal rights, feminism and the political campaigns from Clinton and Trump. They engaged in an ethical examination of their own shoplifting practices, drawing clear lines between the right and the wrong. They also responded to members of other controversial online communities, mostly to try to distance or to protect from them in the offline world. What these posts made clear is that, for #LiftBlrs, shoplifting was legitimate activism. Some of the posts were:

"I'm not going to get too deep into the Shoplifting Discourse but I will say that "stealing for survival" encompasses a lot more than just food. You could be stealing makeup (which is already always absurdly expensive) so strangers read you as a woman, or stealing a toy so your kid doesn't feel like she's a bad person because Santa didn't bring her anything, or stealing tampons or toilet paper because everybody deserves basic hygiene, or stealing nice clothes for a job interview, or stealing school supplies so you can study, or stealing any other number of things that are truly necessary but you won't immediately die if you don't get them."

[lifting-madjick.tumblr.com]

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"I 100% support women stealing beauty products instead of throwing every spare penny she has away chasing after an impossible pipedream sold to her since the moment she was born. "

[lo-lolifting.tumblr.com]

"The lifter's commandments: 1. Thou shalt not judge other's hauls or techniques. 2.Thou shalt not be a snitch. 3. Thou shalt support fellow lifter's endeavors and answer questions when possible. 4. Thou shalt not steal from small businesses. 5.Thou shalt not get caught. 6.thou shalt be a bad bitch."

[britishlifting.tumblr.com]

3.2.2.3.   Theme 3: Storytelling and Community

This is the theme that comprises all idiosyncratic accounts of what it is like to be a part of the #LiftBlr community on a personal level. Here we grouped stories of the practice involving success and failure, looking for or providing support to other members of the community. The most common kind of post in this category was possibly what #LiftBlrs referred to as "hauls": carefully arranged items of purloined merchandize meant to boost the sense of possibility or just gain popularity among others. Humour, in the form of jokes, comics or videos was also present and gave a vivid portrayal of the mixture of drama and euphoria on which the life of a #LiftBlr oscillates. These are some instances of posts:

Figure 10 (left) - "These were the type of underwear i used to wear on a daily basis before i started lifting — overstretched, bleached, discolored, old, wrinkly, disgusting. i was always super embarrassed when my LDR(Long Distant Relationship) boyfriend asked for panties pics because these were the only panties i have and obviously they looked like shit in real life and will look even worse in photos.

Figure 10 (right) – "and these are the types of panties i get to wear now — cute, sexy, clean, colorful; every positive adjective you can think of to describe panties. i'm so glad I have these now because i feel super confident in them. that's all. :)"

[lifting-madjick.tumblr.com]

Figure 10   Underwear available before (Left) and after (Right) becoming a member of #LiftBlr. This image was found in a post entitled "the benefits of lifting". The author claimed that shoplifting improved her self-confidence. Picture credit my own

"I am so impressed with the lifting community, seriously. I see SO MUCH diversity, and SO MUCH support for POC, sex workers, body positivity, LGBTQ, religious tolerance, disabilities and mental health, income levels... Seriously you are all just the absolute best. In the fucking SHOPLIFTING community. We're supposed to be some sort of detriment to society, but I have never felt so comfortable and safe in a community before. You have all exceeded my expectations and restored a little bit of my faith in humanity. Thanks."

[lo-lolifting.tumblr.com]

"Hey guys, taking a break from liftblr for a few weeks, maybe months, idk. I got caught at Walmart of all places. I'm sorry for anyone who asked me stuff or messaged me recently, I need to get away from liftblr because I feel very bitter and sad and stupid and I don't want to talk about my experience. I love you all, I wish everyone good luck with lifting and life in general, please be very careful out there for me"

[civildishoebedience.tumblr.com]

The problem with the #LiftBlr community, seemed to us, was firstly, the consideration of the problem. #LiftBlr could be easily considered a problem to the preservation of private property, and hence, the solutions would mostly address issues of security and detection. At the same time, another problem might be the structural social or political inconsistencies that gave rise to the community of #LiftBlr in the first place.

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We realized that the moment something is perceived or objectified as a problem, another object hunts it avidly: a solution.

To respond to our data, we decided to resort to fiction. After all, this research effort also involved an examination of the possibilities of fiction in producing a research impact. To articulate and illustrate our anti-problem-solving argument we created a series of imaginary abstracts.

3.2.2.4.   Imaginary Abstracts

Our imaginary abstracts were meant to act as possible but not actual abstracts of Human Computer Interaction papers. Interestingly enough, some thirty years earlier, an HCI researcher wrote an influential paper and also employed a creative version of abstract writing to support his argument. William Newman used what he called "pro-forma abstracts" (Newman 1994), models that would fit most papers in engineering research, and articulated a need to abandon "radical solutions" in HCI research in favour of more engineering-like forms of research production. We were certainly inspired by his imaginative use of abstracts but stood in opposition to his argument, after all, we were definitely not arguing for more or better efforts to normalize the output of research in the HCI community. With our abstracts, we wanted to "provide a space for research focused critique and development" (Blythe 2014) by locating them in the context of well-known design approaches within HCI that greatly differ in their goals and aspirations.

3.2.2.4.1.   Design Against Crime

Design Against Crime(R. V. Clarke and Newman 2005), or DAC, was a practice-led approach to design that attempted to reduce crime by better designing objects, mostly in the built environment. We speculated on approaching #LiftBlr from this design perspective by taking advantage of the body of information gathered under the theme of Tips and Advice. What we tried to show with the abstract below is that this problem was not discipline-free, but rather situated in a very particular context with clear goals: to reduce crime.

LightSpot: Challenging Shoplifting Practices Through Increased Situated Awareness

Shoplifting in retail stores is a widespread criminal offence that damages businesses, employees and consumers in general. In this paper we propose a novel solution to prevent theft in "blind spots" - unsupervised spaces - of any business establishment selling goods. Using thematic analysis on online data detailing shoplifter's practices, we focus on how shoplifters identify "blind spots". We highlighted the kind of activities they perform once their anonymity is ensured, including using strong neodymium magnets as a tool to remove security tags. We introduce LightSpot: an inconspicuous device that combines a powerful source of light with a magnet detector. Carefully positioned in a blind spot it will respond to the presence of any itinerant magnetic source with gentle glowing patterns noticeable by both shop assistants and potential shoplifters. Our initial field trials suggest that LightSpot might support a reduction in shoplifting behavior due to increased situated awareness and exposure to shopping assistants, lost prevention officers and other customers.

3.2.2.4.2.   Critical Design

In the last decade, conferences in HCI have published many papers with design objects that rather than presenting a solution, problematize a particular socio-political context(DiSalvo 2012; Dunne 2005). In the excerpt below, we imagined the abstract of a paper that saw the #LiftBlr community in this light and rather than "designing them out", supported them. It is as follows:

"Capitalism scammed me first": Designing to offer offline support to the teen shoplifting community online.

In this paper we design to support the agonistic work of members of LiftBlr, the online teen shoplifting community. A thematic analysis of online posts indicated the ways in which LiftBlr members see shoplifting as a form of civil disobedience and resistance to consumer culture. The posts also show the difficulties faced by members when trying to meet offline, in particular how to effectively recognize each other. We designed a peripheral device and a smartphone application that denote membership of this community when two LiftBlr members meet offline. Specifically, the peripheral device comprises an array of sensors capturing physiological measurements (heart rate and sweat production) worn secretly inside a bra. The smartphone app reads biometrics and builds a correlation identifying whether the person was shoplifting or not. The result is an identity data trail that serves to authenticate a member as an actual shoplifter. Our aim is to provide shoplifters with the means to meet offline with the assurance of belonging to the shoplifting community and believe that in this way we are supporting their agonistic efforts against capitalism and social inequality.

3.2.2.4.3.   Value Sensitive Design

The fulcrum of value sensitive design (Friedman 1996) is that of engagement. Engagement with the values of individuals and communities not to solve or criticize but in order to expand the space of design. Insights gathered under the third them could easily

inform a design effort in this direction. This is how we approach #LiftBlr through a Value Sensitive Design approach:

"No One Ever Saw The Greatest Moment Of My Life": embodying the life of a member of LiftBlr, the teen shoplifting community online.

Social media platforms allow exceptional communities to overcome offline obstacles and flourish online. In this paper we take a value-centered research agenda to ask: how does it feel to belong to the teen shoplifting community? In order to discover what are the values that propel young adults to engage in the risky practice of shoplifting. A thematic analysis was carried out on a corpus of data consisting of posts from LiftBlr, an online teen shoplifting community. Analysis of personal narratives of teen shoplifters served to inspire the design of a "research product" [40]: the UnderSwitcher. The UnderSwitcher is a drawer in a wardrobe that, unbeknown to the user, shifts between two sets of underwear, a worn-out unattractive set and a new colorful fashionable one. This allows the user to hide stolen goods from family members and experience a glimpse of a reality before and after becoming a member of LiftBlr. We discuss the Value Sensitive Design research process involving design for ambiguity, risk and controversy and hope to stimulate conversations regarding community formation, teen lifestyle or the meaning of law in personal contexts.

These imaginary abstracts illustrated how different and valid design responses could be attained when approaching #LiftBlr from different perspectives. We didn't want to show which approach was better or more valuable from a research perspective but rather make obvious how context dependent a problem is and how singular, focused and interested are the solutions that any problem brings irremediably forward. Each problem is a process that, as many have showed, only in very special instances produces neat solutions(Morozov 2013a). Furthermore, in many occasions a problem is defined not because it is "out there" waiting to be addressed but because it addresses an issue that can be solved. What we hoped to show with our imaginary abstract is that the moment a problem structures a research effort, researchers are forced, by funding agencies as well as by epistemic understandings of science or research, to take sides. Like any other object, a problem and a solution are never neutral and alone, but a differential between the objects that constitute them and the relations they enter with other objects. As a result, problems and solutions should be handled as the creative acts they are with an awareness that in taking advantage of their capacity to bring forward a preferred state of affairs, we are also silencing the shouting of a crowd of meanings.

3.2.3.   Insight: On the Effect of Fictional Objects

#LiftBlr was a multifaceted effort. To a certain degree, It was oriented towards giving visibility to the #LiftBlr community and show the nuances of their struggle against a system they considered unfair. Also, I wanted to make an argument against problem-solving normative efforts trying to pin down the form and nature of research in the Human Computer interaction community. Finally, I wished to do so not by means of a real object but through the imaginary in order to evaluate the effective capacity of fictional objects. To explore the capabilities that fictional objects have to be effective and productive (in this case to accomplish an academic result) without being deceptive and position myself with respect to the work of others in the field (Coulton, Lindley, and Akmal 2016).

In this section, I probed into reality through effect with mixed results. It is not as with the metaphysical probe of existence in that reality remained unaffected but rather, it is as if the metaphysical probe of effect has showed not the division between real and fictional but of something else. Would one be correct in associating the effect, the research impact or the power to generate a result, to a fictional object? Of course, the effect produced by the #LiftBlr event is the result of a number of objects and many of them have nothing to do with the imaginary, like reviewers or co-authors, but the question remains, to what extent do our imaginary abstract belong to the realm of the imaginary? How are they fictional objects? It seems to us that they stopped being imaginary to become real the moment they materialized, the moment they turned into words and became exchangeable, addressable or useful. Both a real abstract and an imaginary abstract are both real if we look at them as objects and as in terms of the effects they produce: they have a similar structure and fulfil a similar function and are effective in the same context of academic publication. It is not that the imaginary abstract is effective because it is a fictional object but because it is a real object that interacts and effects other real objects like arguments, reviewers or a conference paper[39]. The effectivity of the imaginary abstracts does not derive from their fictional nature but rather from their real nature.

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[39] Lindley, Coulton and Emmet have reflected on the challenges that research fiction like imaginary abstracts poses to the academic community here (J. Lindley and Coulton 2016)

But then, if a real abstract and an imaginary abstract are both real objects, where is the fictional in all this? In my view, the fictional objects are there, together with the real ones but in the background. Not effective by themselves but by proxy of a real object that sustains them. What structures the effect of an imaginary abstract is a fictional object (the imaginary paper that only exists in the mind of the reader that encounters the imaginary abstract). What is effective is the very real imaginary abstract. The fictional object is not effective but rather, structures or makes possible the range of effects that the real objects associated with it are able to accomplish. The fictional paper that the imaginary abstract describes accompanies and structures the very real object "imaginary abstract". Fictional objects have an escapist nature, an ethereal character. They are always present in the background, ready to effect but never actually doing it themselves but via a real object that manifests their intents.

Effect has not been able to separate the real and the fictional but has provided a clue as to their working together. We are now in a position to better explore this insight by turning to undoubtedly real objects and test one of their weak spots: their ironic and at times absurd disposition.

3.3. Metaphysical probes based on Design Briefs

Earlier sections in this chapter have dealt with the real and fictional by examining fictional objects. First, with the metaphysical probe of existence, we realized that fictional objects, much like real ones, exist. Then with the metaphysical probe of effect we discovered that fictional objects are not effective but structure the effect of the real objects they accompany. Now I proceed with a description of three efforts in designing three real objects. The reason I consider them real objects is because in the design and making of these objects I tried to follow a design process analogous to that pertinent to the development of other design products. Each of the three design events below started with a clearly defined brief describing a set of design requirements for an object that was dictated by an external stakeholder. The final object for each one of the events was

delivered to the stakeholder at the end of the design process and did not result in any sort of research outcome, such as paper publications, as in the design events for the metaphysical probes of existence and effect. This doesn't mean however, that they didn't contribute to my overall study on the real and the fictional. On the contrary, these attempts at designing following the parameters that usually determine how design is carried out in industry for example, with deadlines, requirements and clear, functional outcomes provided me with a peculiar awareness of the real and fictional objects that come into play when designing something outside of academia.

The design events for these three metaphysical probes were relatively short in terms of time dedicated to them as they happened in parallel with other research efforts. They were also informal when compared with an event of professional design, for some objects were absent from their design process like contracts or co-workers. Money was also mostly absent, for only the one metaphysical related to it in the form of a prize. Regardless of the differences with professional design practice, I considered these design events valuable in terms of their commonalities: the presence of what could be considered a client, a deadline to ascribe to and a finalized design object that to a higher or lesser degree, fulfils the expectations embedded in a brief.

3.3.1.   Metaphysical probe #3: Irony

As a part of the background research work for the design events that resulted in the final design objects DigitalDreamcatcher and #LiftBlr, I carried a comprehensive literature review of how fiction was conceived and applied in design. This resulted in the study of a number of approaches that we have already mentioned earlier in this document: Speculative Design(Dunne and Raby 2013b), Adversarial Design(DiSalvo 2012), Critical Design(Dunne 2005) or Design Fiction(Bleecker 2009b). In compiling a library of examples[40], I noticed that many design objects make use of irony in order to gain effectivity or create an impact. The background of the design event for this research probe is a consequence of this realization. Why was irony so prevalent when using fiction in design?

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[40] This library of examples or design review was published in the paper (Blythe and Encinas 2016b)

The final design object that resulted from this design event that tried to grasp irony and the motivations for its widespread use is what I called Soylent Cultery. The design event that motivated Soylent Cutlery spammed from Autumn 2015 with my initial finding of the many ironic examples in design and fiction and ended in Autumn 2016 with the publication of a research paper in the ACM Group conference (Blythe and Encinas 2016a) that included an ironic take on a software app to get divorced avoiding all the bureaucratic hassle (Figure 11). Soylent Cultery, cutlery set for the Soylent community designed in the Spring of 2016, was an object meant to exist as a real object and was to be developed in a slightly similar manner to design objects outside academia. Before describing the Soylent Cultery, however, let's take a brief look at the design event in which it happened.

3.3.1.1.   Design Event: The ways of Irony

There is a great number of ironic or satirical uses of fiction in design. One of the most famous examples happened early in the tradition of critical design. Anthony Dunne, Fiona Raby and Michael Anastassiades designed the Huggable Atomic Mushroom(Dunne, Raby, and Anastassiades 2014), a stuffed, fluffy toy in the shape of the mushroom cloud resulting from an atomic explosion. The ingenious idea behind its design was to provide people traumatized by the fear of impending nuclear war a means to ease their anxiety and gradually overcome their weakness. The Huggable Atomic Mushroom attained worldwide notoriety when it became part of the permanent collection of the Museum of Modern Art in New York. Also playfully incorporating catastrophe into their design, the Near Future Lab published the advertisement of the Michael Bay Driving Company (Bleecker et al. 2014). It was one of the many ironic or satirical products that the design studio assembled in their fictional catalogue of the near future. The Michael Bay Driving Company was a product that aimed at spicing up the traveling experience of bored commuters by turning the windshield into a video screen where catastrophe unfolded, for example, a sort of meteorite apocalypse. The design studio superflux also intelligently capitalized on the use of irony in their short movie "Uninvited Guests"(Superflux 2015). In it, an elderly man is gifted with a set of smart utensils: a cane, a fork and a mat. These utensils monitor the man's daily physical activities, eating habits and sleeping patterns and directly notify his concerned siblings that don't wait a moment to call whenever something deviates from normality. The old man, tired of these

threats to his independent life decides to "hack" the utensils so they always provide satisfactory readings. For example, every day he handles the cane to a young neighbour that goes for a long walk with it in exchange for a beer or two.
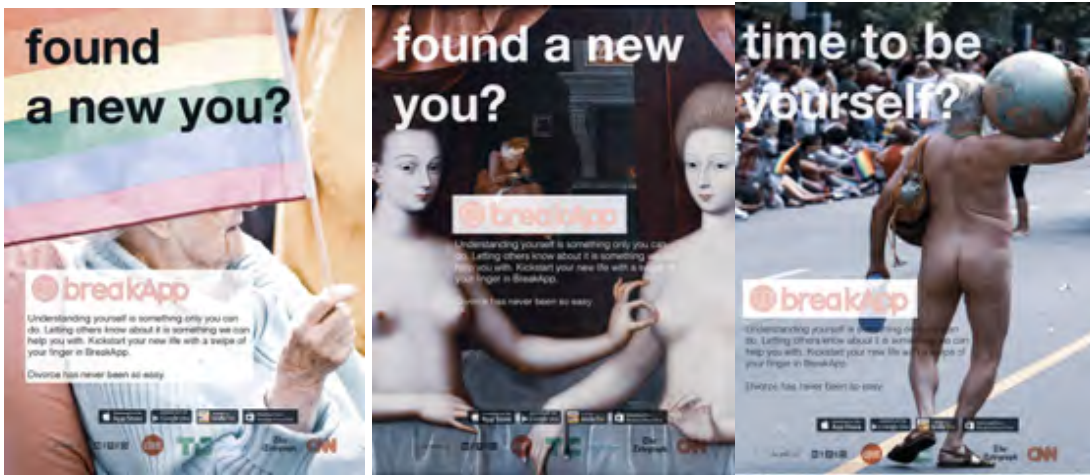
Figure 11 Ironic Advertisements for a fictional divorce app included in an ACM Group conference paper. Picture credit my own

The ways of irony are powerful, inspiring and certainly quite critical. In regard to technology and its (mis)uses, the works of Kurt Vonnegut (Vonnegut 1999) or Douglas Adams (Adams and Marrs 2012), for example, have captivated and entertained audiences and in many occasions inspired technological critique that was everything but ironic. However, there are also discordant voices when it comes to how effective irony actually is. Perhaps a loud critic of certain ways of irony was David Foster Wallace (Wallace 1993) with his statement that ultimately, when irony has been accepted as a norm and not an exception in everyday argumentation, it becomes "enfeebling". Nobody knows what one is really saying or if one stands by her words because, actually, it was a joke or what one meant was the opposite. In the paper co-authored with Mark Blythe, we observed how irony was also the dominant form of expression in the design fiction community and proposed other forms of engagement with fiction that departed from the satirical and ironic (Blythe and Encinas 2016a). Before the paper was published, however, we had the chance to attend a design event where we could put our knowledge about ironic engagements in practice by designing a consumer product.

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3.3.1.2.   *Final Design Object: Soylent Cultery*

The design event that resulted in the Digital Dreamcatcher included the publication of a paper in a conference in California in 2016 with an argument on the dangers of techno-utopian ways of thinking. Surprisingly, once the conference was over, another event was to take place in the city of San Francisco that was aligned with the interests that accompanied us to the conference. The event was the Stupid Shit No One Needs & Terrible Ideas Hackathon(Lavigne 2016). This event was born in the city of New York(Lavigne 2015) a few years prior to 2016 and since then the event was taking place in other cities. In this hackathon, attendees are encouraged to develop worthless and redundant technological products. The idea behind it is to criticize the usual techno-triumphalist motivations that drive hackathons and similar gatherings in which technology seems to be able to solve anything, from poverty to debt to existential crisis. Previous Stupid Shit No One Needs & Terrible Ideas Hackathons saw the design of all sorts of objects. From 3D printers that use cheese as printing material to ad blockers for internet browsers that block everything that is not an ad, to virtual reality games consisting in just looking at a fireplace.

We thought the opportunity to attend the Stupid Shit No One Needs & Terrible Ideas Hackathon was at once timely and relevant to the work we were involved in. Attending to the event would allow us to learn and share our critical ideas of techno-solutionism with other designers and, at the same time, it would allow us to put our insights on irony to the test by designing a product. The workshop spanned for two days at the end of which one product should be delivered and presented to the rest of the group of participants. Interestingly for us, this was a design sprint meant to result not in a fictional object, a prop within a story, but rather a real object. Just a very worthless, ironic even ridiculous and absurd real object.

We were deeply influenced by conversations carried at the time with design researcher and food hacking specialist Markéta Dolejšová (Markéta Dolejšová and Kera 2016). Her investigations into the feeding habits of particular communities led us to consider one in particular: the Soylent community (Marketa Dolejšová 2016b). Soylent(Soylent 2018) is a brand meal replacement in liquid form that supposedly meets all nutritional requirements of an average adult person. Soylent started as a San Francisco

bay area start up and went on to benefit from a large funding campaign. It vigorously appealed to busy professionals that needed to make the most of every minute of their day. Thanks to Soylent, loosing time in cooking and eating is a thing of the past. Now, a person could maximize his productive time by transforming eating into drinking without, allegedly, sacrificing health in the process.

Together with Markéta Dolejšová we decided to design a product for the Soylent community. Our pitch proceeded as follows: even the most career-oriented person finds herself or himself in the position of sharing a meal with someone who aside from drinking, eats. We proposed a set of Soylent cutlery (a fork, a knife and a spoon) to address the imbalance in eating practices between the eater and the drinker. It allowed the drinker to enjoy his or her meal without renouncing the pleasure of employing a range of tools while doing so. Also, and very importantly, it creates further opportunities for silence so the eater has a chance to speak and be a part of the conversation. As Figure 5 shows, the Soylent cutlery is nothing more than the rough prototype of an idea for a product. With a bit of funding, possibly spared from the Soylent community, it could be further developed into a commercial product using appropriate materials like stainless steel or, for those with sufficient purchase potential, Sterling silver or "monarch" gold.

Figure 12 Soylent Cultery, a cutlery set for the Soylent community. The cutlery is color coded like resistors (top) to appeal to technologically oriented people. The bottom anonymized images show the artefact in use. Picture credit my own

3.3.1.3.   Insight: On the Irony of Real Objects

Perhaps the best examples of effective irony can be found within the annals of the IG Noble Prizes(IgNobles 2018). The Ig Noble prizes are an annual celebration of research that "honour achievements that first make people laugh and later make them think". They usually identify and celebrate absurd research that has been published in areas like physics, chemistry, psychology, economics, nutrition and many others. For more than 25 years, the Ig Nobels have been awarded to professional researchers that have dared to approach reality and know it regardless of how ironic or absurd might seem at first glance. Brilliant examples abound. In 2010 the Ig Nobel in Economics went to Matthew Rockloff and Nancy Greer, "for their experiments to see how contact with a live crocodile affects a person's willingness to gamble"(Rockloff and Greer 2010). In 2017, Atsuki Higashiyama and Kohei Adachi won the Ig Nobel in Perception "for investigating whether things look different when you bend over and view them between your legs"(Higashiyama and Adachi 2006). But it would be erroneous to conclude that because this research is ironic, satirical or even absurd it is useless or unnecessary. In 2000 the Ig Nobel in physics was awarded to Andre Geim and Michael Berry for accomplishing the feat of magnetic levitation of a living frog(Berry and Geim 1997). Unfortunately, or fortunately, Geim wasn't able to personally attend the gala and receive his well-deserved prize for he had to go to Stockholm instead to receive a Nobel Prize on his work on graphene. But perhaps the unexpected value of research that might appear absurd at first is better exemplified by a study by Knols (B. G. Knols 1996). It first won the Ig Nobel for its study on how malaria mosquitoes are similarly attracted to the smell of human feet as to the smell of Limburger cheese. Months later and as an immediate result of his findings, traps baited with this cheese were employed in various African regions (B. G. J. Knols and De Jong 1996).

This section started with an examination of irony in fictional objects and led to the creation of an ironic, even absurd, real object: a consumer product. In the process, I learned a valuable insight. Irony, regardless of its adoption by the real or the fictional performs a careful operation on objects. It avoids its reduction to a single definition, its degradation to a single sense. Irony extends the impact of an object by enlarging its scope of influence or its horizon of meaning. This does not mean that the object automatically

attains a higher degree of effectivity, a more powerful impact for, a la David Foster Wallace, it can become enfeebling in a context where its use is dominant. The use of irony is also independent from the real or fictional character of an object, what it mainly influences however, is its character as object. Through irony, the split inherent in any other object (between the senses of being and comprehending) becomes in a way apparent: the object is irreducible to its parts or its relations. Soylent cutlery makes clear that it cannot be reduced unidirectionally to the sense of being, to the parts that compose it and neither to the sense of comprehending, to the relations it enters into. As any other object, the Soylent cutlery is a differential and through its ironic character, its resistance to being reduced to something else becomes more easily discernible. It is not just a set of spoon, knife and fork with a straw clumsily attached, it is also a rational and absurd product that contests and embodies a critique of a modern and techno-utopian understanding of the social practice that eating is, however enfeebling or even useless this critique turns out to be. To engage ironically with the Soylent cutlery is to perceive the inherent discontinuity of an object and to be invited to oscillate between its various meanings.

3.3.2.   Metaphysical probe #4: Identity

This research project has made possible the sharing and discussing of my work with a number of researchers that have been kindly involved in its development through various activities. One of the most significant influences has been that of the Northumbria Social Computing Group (NorSC 2016) (//nor.sc) into which I can proudly count myself as an "unofficial" member. //Nor.sc has been instrumental in the development of the final design object #LiftBlr and has invited me to join in the organization and facilitation of a number of workshops, presentations and lectures.

In the Autumn of 2015 //nor.sc was at an early development stage: the group had only recently been formed and counted with only few members. One of the things that was absent from the group was a coherent visual identity that would facilitate the presentation of the group in events, conferences or lectures. The design event that I call //nor.sc refers to the objects that lead to the design of a full visual identity for this research organization. Through designing the visual identity of //nor.sc during the winter of 2016

I was able to investigate the concept of identity and speculate on how it can be expressed in real and fictional objects of design.

3.3.2.1.   Design Event: //nor.sc

Today, //nor.sc is a multidisciplinary research group in Northumbria University that brings together more than 20 researchers from areas such as computer science, urbanism and design. This description can be found in the group's website:

> *"Nor.SC was created at the beginning of 2016 to support, represent and disseminate the emerging work in computer science at Northumbria University related to social computing, human computer interaction (HCI), interaction design and digital aspects of living. Though as individuals we are inherently multi-disciplinary in our backgrounds, at our core we are interested in critically understanding the role, and implications, that computer science has in delivering future digital systems and digital aspects of living."(NorSC 2016)*

The research scope and intentions of Nor.SC reflects on its output. In 2018, one can find papers researching bullying and discrimination online, twitter timeline data, DIY and maker movements, and design fiction (NorSC 2016). The group is also notorious for their ingenious addressing of complex topics via ironic and sometimes humorous engagements. Two examples, among the many published cases, might suffice: One paper problematized the way technological innovation is extended into the domain of animals through speculative design(Lawson et al. 2015) and another criticized techno-utopian approaches in the HCI community through a fictional paper where robots of the future thanked past HCI researchers for making the enslavement of humankind such an easy accomplishment(Kirman et al. 2013).

The brief started with a simple request: the design of a logo. After a discussion with other graphic designers we proceeded by trying to get a better grasp of the character of the group. During the weekly meetings of the group we would spend some minutes discussing ideas that the logo should bring forward. The notion of the computer and research-oriented nature of the group emerged early. Other notions like the value of speculation or the possibility of aligning the aesthetic value of the logo with that of brutalism also became part of the brief. The choice of brutalism was particularly interesting as the fundamental reason for its influence was never fully elaborated. It might

be because it is famously British, unapologetically ugly and profoundly democratic but all this is just speculation. In any case, we proceeded to design the logo and realized that beyond an image what we were really designing was an identity. When the first versions of the logo were presented we encountered a very kind and polite rejection to our designs by the rest of the members of the group. It is very likely that the main reason for this rejection was the lack of quality in the logo presented, after all, it was our first attempt at a design project of this magnitude and our skills needed some serious attention (See Figure 13).

Figure 13 First and rather unfortunate attempt at designing a logo for //nor.sc. Picture credit my own.

After few months however, we realized that the reasons for rejection might also have to do with something else: a logo as one single image is a very poor object as an identity. An identity is an effort of presentation for a context and in the case of //nor.sc, the context is so different from one occasion to the next that just a single logo would not do. We needed to illustrate the identity with other objects that would support the presentation of the group regardless if the context was a conference, a talk, a lecture or a funding call. We decided to expand the scope of the project from logo to visual identity and design not only a logotype but also fonts and icons and present them in potential contexts of use. The final visual identity comprises a basic black and white logotype that can be inverted so the negative version would also suit particular uses. The font used in the logotype has a certain brutalist bold form that directly shows the website of the group. The two slashes that precede the lettering remind of this fact and of its computer-related attitude. Finally, we developed a small generative algorithm that when fed with images

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would generate a colourful symbol that would accentuate the brutalist form of the letters in the logotype (see Figure 14).

Figure 14. Visual Identity for //nor.sc Picture credit my own.

3.3.2.2.   Insight: On the Identity of Real Objects

Soetsu Yanagi was a Japanese philosopher, founder of the folk craft movement in Japan. His honest respect for the traditional pottery of Korea and Japan led to the establishment of the Japanese Folk Crafts museum in 1936. He wrote extensively on the topics of craft with "the Unknown Craftsman"(Yanagi and Leach 2013) being one of his most well-known books to the English audience. It is in the chapter about patterns in this book that we find the following passage about a bamboo pattern from a Japanese family crest:

"How is it that one sees bamboo in the pattern? Because the essence of bamboo is there, just as prolonged boiling renders a concentrated flavour. The process of making a pattern out of raw material is similar, it is an extract, so when we look at a good pattern we perceive something of greater content. No bamboo grass in nature can be more beautiful than a bamboo grass pattern. We can never see nature as more beautiful than a beautiful pattern. If we see nature as beautiful, then we are, in a sense, seeing it in patterns. Pattern is the crystallization of beauty. To understand beauty and understand pattern are aspects of the same thing."(Yanagi and Leach 2013, 115)

As I tried to make evident while describing the Milieu, the notion of essence is one that I find rather problematic. However, it is not because of Yanagi's consideration of essence that I quote him here or even because of his depiction of beauty. What I find most interesting in this brief passage is how well it matches, as a description and in an analogous manner, the process I underwent to define the visual identity of //nor.sc. The identity of this social computing group was a raw material that needed to be condensed or extracted into a visual form "like boiling renders a concentrated flavour". This process of crystallization resulted in a number of real objects, logotypes and fonts for example, that effectively execute an act of representation. However, to make the crystallization occur, a number of other objects had to be thrown into the design mix and it wouldn't be wrong to assert that some of the most significant ones were purely fictional. Imaginary objects that did not have an effect but rather structured effect. Imaginary letters, emails or conference posters where the logo figured. Imaginary researchers and their ideas when confronting a visual image. Imaginary understandings of brutalism outside of architecture and in the realm of graphic design. Although the various visual representations of the identity are real objects (even the failed sketches or prototypes that failed to represent as

the group deemed acceptable) they relied during the design process on the support of fictional objects that permitted the realization of their effect.

3.3.3.   Metaphysical probe #5: Recognition

This metaphysical probe was an indirect result of the interest in how fiction is sometimes being publicly advertised as real. We seem to be living in a "Post-truth" era where "fake news" based on "alternative facts" are real enough to provide, among others, succulent political benefits (Allcott and Gentzkow 2017). This shift in the perception as to what can be considered a real object and how to differentiate it from a fictional object has led some to the opinion that the difference between what is real and what is fictional is a matter of consensus or recognition by, for example, a particular authority. While I agree with the underlying sentiment that the boundary between reality and fiction is becoming increasingly porous, I wanted to question the idea that real and fictional objects can be quickly transformed into formal things, living a relativistic existence anchored to interpretation.

In order to explore how the recognition of an object influences its status as real or fictional I participated in a design competition. I have called this event Pneubilia. It took place during the Spring of 2017. With the support of some colleagues at the Madeira Interactive Technologies Institute and the invaluable help of Tom O'Brien I designed an outdoors furniture set for the urban coast of Funchal.

3.3.3.1.   Design Event: Pneubilia

The municipality of Funchal in the island of Madeira organized a series of initiatives to celebrate the World Environment Day on June 5 of 2017. One of these activities was promoted by the Department of the Environment with the main objective of sensitizing the citizens to the importance of reuse and recycling of waste. It was the contest "(Re)Mobile A Nossa Cidade" and what follows is a summary of the regulation:

Brief

To participate each competitor must create a piece of urban furniture (parts and equipment installed in public spaces, for citizens' use) made from waste.

Requirements

To present a piece of urban furniture made with residues fulfilling the maximum dimensions of 260x260x260 cm and minimum 50x50x50 cm;

Exhibition period

The best works will be invited to be exhibited at Praça do Município during the Environment Week between June 5 and 9, organized by the Municipality of Funchal.

Classification

The following parameters shall be taken into account:

- Originality in the use of waste

- Variety of wastes used

- Usefulness of the piece as urban furniture

Jury

Constituted by 5 members of the Municipality of Funchal.

Awards

1st place - check in the amount of 500 €.

2nd place - 2 night stay voucher for 2 people at Hotel Pestana CR7 Funchal

3rd place - A smartwatch worth 150 €

Our entry in the contest was Pneubilia, a furniture set for the urban coast of Funchal (see Figure 15).

Figure 15 Pneubilia furniture set. Picture credits my own except for the poster which is the public ad by the Funchal municipality.

The following is the text the accompanied our two-piece outdoor suite:

Funchal is a rather peculiar urban area. Highly touristic but traditional, accessible and messy, green and blue. Urban furniture in such multifaceted environment should reflect this and provide passer-by with original artefacts that facilitate interaction, not only with the specific space around them, but with each other too. Here at M-ITI we have accepted the design challenge and created "Pneubilia". It is a furniture set composed of two elements: a bench and a stool. The habitat for this two pieces is that coastal zones of Funchal where everyone (locals and tourists alike) gather to fish. This space could be Pontinha, or Lido, or maybe Ponta Gorda. In these spots, a fisherman has no stool to sit while the fish bites and an observer has no bench where to watch it happen. "Pneubilia" provides just that, urban furniture that makes the waiting comfortable and the interaction possible.

Materials: Repurposed steel from old machine scaffolding. Used tyres. Old thick fishing line.

Pneubilia won the first prize in the contest. However, the real richness of the project came in the form of insight.

3.3.3.2.   Insight: On the Recognition of Real Objects

The influence of how an object is recognized by another object and how it affects its real or fictional status has been a continuous research thread through this project and is in no way exclusive to the design event that resulted in Pneubilia. For example, early design events like those that resulted in the Digital Dreamcatcher or #LiftBlr already dealt with this issue by means of how their objects are recognized by the academic community once papers are published. Granted that publication is a form of very limited acknowledgement, for nothing warrantees that a paper will be cited. With Pneubilia I attempted to have objects recognized by a different community and in a different context while keeping track of its ontological status as real or fictional through the process.

Although brief in terms of time, Pneubilia provided me with an interesting insight into the ways of the real. The furniture set took about two weeks to be finished and then it was presented to the competition. There was a time in between the objects being finished and them being exhibited that was quite thought provoking. It was a period of about two to three weeks were the furniture stood outside of the workshop, in the garden of the research institute where I worked, waiting to be transported to the exhibition venue. In this time, the furniture started to be used as public furniture by any passer-by. People used it to chat and conduct informal meetings. The object was real and effective in its

influence in the context where it was located. This rather obvious fact was interesting, for at all times I had understood that the object was still a prototype till it was to be presented or exhibited, in other words, recognized. Recognition however, sidestepped the authorities that motivated the creation of the design objects in the first place. Recognition was an act by those immediately exposed to the artefacts. This lead me to the realization that what recognition of a design object does, is not to define or redefine its fictional or real status but rather, to redefine the effects of objects that are already real. Recognition only works on the level of effects of objects, not on the level of objects per se. An object is not recognized as real or fictional, but rather, its effects are recognized as real effects.

Another interesting insight concerns the fictional objects that structured the design of Pneubilia. One of the most insistent criticisms of design approaches that carry a sort of reference to fiction in their name (like speculative design or design fiction) relies on the fact that any sort of design exercise already uses fiction or speculation as fundamental design elements (Tonkinwise 2015b). Whether this argument is valid to criticize design instances or not, the fact that it stands on is solid. Any attempt at the creation of the new relies in more or less obvious fictional objects that are mobilized in various ways by the designer and serve to structure the effects of a number of sketches, prototypes and products. One of the fictional objects that structures the real object Pneubilia is an imaginary conversation between tourists and a lonely fisherman in the coast of Funchal. Without it, the objects that were designed and exhibited would have not existed as real. However, recognition facilitates or enables the visibility of this fictional objects. If recognition affects the capacity of real objects to create an effect, recognition affects the capacity of fictional objects to structure or inform the effectiveness of the real objects that accompany them. Both real and fictional objects exist but once they are recognized they influence effects and possibilities, respectively.

3.4. Metaphysical probe #6: Plausibility

Through the three previous metaphysical probes, I examined the real objects that resulted from my participation in design exercises motivated by an external brief. I looked at how irony, identity and recognition influence characteristics of real and fictional objects but not their status as real or fictional. After a short detour into real objects I resume the study of fictional ones with another metaphysical probe. This time, the metaphysical probe is that of plausibility.

During the design event that produced the Digital Dreamcatcher, I loosely associated plausibility with reality by proxy of existence and finally had to end the effort and grant both fictional and real objects the same ontological status: that of fully existing entities. Without any doubt as to whether fictional objects exist, I proceed now to examine the ways of plausibility, its impact and its consequences for better understanding the character of design objects.

Plausibility is normally considered a valuable companion to fictional objects. The tragic sinking of the Titanic, the unexpected rise of Donald Trump to the presidency of the United States or the devastating release of nuclear terror on Hiroshima and Nagasaki all have something in common: to have been preceded by rather accurate fictional stories describing stunningly similar events. It is as if Morgan Robertson(Robertson 2017), Ted Allbeury[41] and H.G Wells(H. G. Wells 2005) had, while writing their novels, been connected to an impending future and rather than inventing it, they were just narrating it. From a historical perspective where both fictional and real events belong to the past, one can feel the uncanny sensation that the future was already written in the imagination of some and that their books had the power not only to inspire and entertain but also to predict. The powers of fiction for prediction seem to be astonishingly present in the genre of science fiction where the possibilities of science and technology are located in the context of the future. The examples of technological artefacts that were first imagined by sci-fi writers and later become a part of the everyday are so numerous and their impact

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[41] This book was first published in 1980. (Allbeury 2018)

so prevalent that, unsurprisingly, some claimed science fiction should be the fiction of the XX century. The following belongs to the prescient J.G Ballard:

> *"We're living in the year 1970, the science fiction is out there one doesn't have to write it any more. One's living science fiction. All our lives are being invaded by science, technology and their applications. So I believe the only important fiction being written now is science fiction. [..] A ton of Proust isn't worth an ounce of Ray Bradbury"(J. G. Ballard 2014)*

The fiction of Ballard is, nevertheless, very far away in terms of form and content from the laser and spaceship fiction from the golden age of science fiction of the 1950's. It is a fiction that attained its character of plausible by majestically embroidering real objects in its narratives. Ballard witnessed the everyday colonization of consumer culture and the virulent expansion of reckless urbanization and embedded them in histories of the future. Ironically, the future in the UK and the USA turned out to be pretty similar to what he described. The meaning of people's lives progressively shifting to the mall and their isolation resembling parking lots or other concrete islands (James Graham Ballard 2018). The fiction of J.G Ballard had an indubitable potency with regards to reflecting reality, the real objects that effected the present and the fictional objects that structured their possibility. Did it also, however, have a power of prediction activated by the plausible nature of the narrative objects he wrote? Is the value of Ballard's fiction, and other prescient science fiction authors, to be found in prediction, reflection or something else?

Some actors clearly see the primary value of fiction in its supposed ability to predict the future. Multinational companies hinge the validity of their products in carefully, and expensively, developed visions that shamelessly present the illusion of the successful adoption of a new product or service[42]. Science fiction writers are hired as futurists advisors or even heads of entire research departments in companies[43]. There are science fiction consultancies that learn about their client's products to later provide a finished science fiction story with a future where the client's product is the main character(SciFutures 2018; Romeo 2017). Stories secondary to product placement seem

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[42] One example is Corning, a glass manufacturer, that presented its ideas on a digitally enhanced glass made future in (Corning Incorporated n.d.)

[43] Nick Foster is a futurist and member of the Near Future Laboratory, a well-known design fiction group and also Head of Design at X (Google X) ("Profile" n.d.)

to sell well and big business, from Coca-Cola to Google to Wall Street Giants like Visa are all quickly to buy them. The form of the fictions that are sold, to clients or spectators, are usually coated with a veneer of verisimilitude that makes the future shine bright when illuminated by a particular product or service.

With a lower dose of prediction, the field of design is, for the most part, slightly similar in the forms of their fictions. The main design approaches that claim to mobilize fiction do so with a firm intent on the achievement of plausibility in order to reach a wider audience (Coulton, Lindley, and Akmal 2016). In his book "Speculative Everything"(Dunne and Raby 2013b) Anthony Dunne emphasizes their aim to do with design what writers of speculative fiction do with words: to talk about the future but remain anchored to the present through plausibility. Similarly, Bruce Sterling famously remarked how design fiction needs to be credible and not to stray too far away in the world of the overtly magical in order not to lose potency, in the form of impact or effectiveness (Sterling, Bruce 2013b).

I have called the final design object that resulted from this design event exploring plausibility, Bookonon. The design event that contains it took place from around Spring 2017 to Summer 2018 when the results of the research effort were published as a short piece in a magazine, a research paper(Blythe et al. 2018) and a journal article(Blythe and Encinas 2018b). The last two were presented in an academic conference. The final design object, Bookonon, is a book of totally implausible and fictional technological designs. With this design event, we wanted to probe the partially stablished view that for fiction to be valuable it needs to be plausible. It was our intention to take a look at fictional objects as distant from being plausible as possible and in the process, gain a better understanding of what makes objects fictional or real.

3.4.1. Design Event: Valdis

The beginning of this design event can be traced back to an invitation made by the editors of the journal Foundations and Trends in Human Computer Interaction to Mark Blythe to write an article about design fiction. Mark Blythe kindly invited us to co-author the piece and provide a number of design objects. The article develops a historical account of design fiction and goes on to provide an argument on the main value that

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design fiction has through its ability to envision future technologies and the contexts where it could be used. It goes on to propose a critical reading of views of fiction in design that associate its validity to prediction grounded in credibility or verisimilitude. The article is divided in five sections and each section is preceded by a fictional text in the form of an imaginary Wikipedia article belonging to a Latvian science fiction author named Valdis Ozols. The first section describes a history of design fiction and introduces Valdis Ozols in the following manner:

> *"Ozols spent much of his working life as a Lecturer at the University of Latvia. He wrote two modern histories of Latvia dealing primarily with the Soviet occupation of Latvia. The Latvian Experience of Soviet Democracy (1945) is a pro Stalinist account of the early years of the occupation. The book is based largely on official Communist Party hagiographies of Stalin and is for the most part unremarkable but it was republished in the nineteen nineties as part of the Reading Propaganda series [citation needed]. The book ensured Ozols' position at the University of Latvia when it became a standard text in the national curriculum for modern history."(Blythe and Encinas 2018b, 4)*

Ozols historical work is similar to that of others writing under the communist regime: to provide an interpretation of events under communism for the purpose of propaganda strongly grounded in plausibility but that could be easily classified as fiction by virtue of its distance from the actual, historical events they attempt to depict. Ozols also wrote fiction about technology and when a postgraduate researcher named Inga Balodis rediscovered his work, he was the first to provide a definition of design fiction:

> *Baldois: Do you consider yourself to be a science fiction writer?*

> *Ozols: No, I never liked that term. For me this is bug eyed aliens and zap guns. I saw my fiction as an extension of history. Historians take fragments we find in the present and try to reconstruct the past, writers of future fiction do exactly the same thing but they are looking in the other direction, no? This has nothing to do with science but then, hehheh, history has nothing to do with science either. You might call it Engineering Fiction, you might call it Design fiction, It is about the choices we make and what those choices might mean. It is based not only on technological plausibility but also historical precedent.(Blythe and Encinas 2018b, 7)*

The use of fiction in design, and in Human Computer Interaction in particular, has a history that well predates the coining of the term design fiction. Technologists used scenarios (Weiser 1995) as short contextualization of a particular designs or personas as imagined users. There were techniques like the Wizard of Oz (Dahlbäck, Jönsson, and Ahrenberg 1993) that would anticipate how a prototype could be used before it actually worked. Later, fiction sneaked into academia and a number of fictional abstracts, papers

and even conferences made an appearance (Kirman et al. 2018). Fiction arrived to academic conferences and journals and section two looks into how it is used. Here, the Wikipedia article looks at Technopedija, a compendium of Ozols's fiction:

> *Technopedija features two stories which scholars with an interest in design fiction have singled out for attention. Almost two decades before the first cell phone Ozols describes a young woman using a "Talking Rectangle" to conduct "mobile" conversations in order to organise a murder. The murder plot in the story is relatively uninteresting but it vividly describes a recognisable mobile phone and the story has been claimed as an early example of design fiction. But perhaps the most disturbingly prescient story is Zina no Prezidenta in English "Message from the President". This describes a one-way audio system that allows politicians to deliver ten second messages directly to every citizen of the state through the "talking rectangle" featured in the earlier story. In the un-named city where the story is set citizens must carry their talking rectangle at all times. It is used by an American President named Dimanta, a billionaire running an election campaign based on thinly veiled racism who wins with the support of the Soviet Union. It is believed that this story represents the first use of the term viltojums jaunumi in English "fake news" as the story describes deliberate campaigns of misinformation by President Dimanta to create a credulous populace that mistrusts the very idea of truth, facts or reality. Interest in this story intensified when it was revealed that in the nineteen eighties that Donald Trump, not normally an avid reader, spoke about the story to almost everyone he met, citing it as the best short story ever written (citation needed).(2018b, 25)*

Paradoxically, the fiction of Ozols is more historically accurate than his hagiographies of the communist regime. It is just that his fictional stories only became historically accurate once the future happened and his work was rediscovered. The "what ifs" that the Ozols story facilitates is the thread that connects the uses of fiction as prediction or deception, as in the (in)famous case of "fake news". The value of design fiction is discussed in the next section and it hinges around its consideration as a thought experiment. Not in order to validate or disqualify a theory but in order to surface, for example, ethical questions concerning a particular technology. Undoubtedly, a thought experiment does not discard practical implications a priori but rather facilitates its conception: "Fiction can be a tool for reframing and questioning dominant narratives in our lives, our work and our theory." (Blythe and Encinas 2018a, 66)

The narrative work of Valdis resulted in the design work of a fictional and unknown designer. We designed a found design workbook to imagine or reframe possible new technologies and brought it to a workshop in the company Mozilla.

3.4.2.   Final Design Object: Bookonon

During the summer of 2017 Mozilla was going to hold an All Hands meeting to discuss the idea of the home hub: a device in the intersection between router, digital voice assistant and internet of things artefact. Mark Blythe was invited to run a workshop during the meeting so participants could have a fresh perspective on the technology they were developing and its potential social impact. As material for the workshop we designed an "imaginary design workbook" and other activities that would use it as support.

Developing the activities for the Mozilla workshop we were inspired by another kind of workshop where participants are encouraged to think beyond the more plausible technological possibilities of present technologies. "Magic Machines"(Andersen 2013) workshops normally start with a reference to the famous Arthur C. Clarke quote that "any sufficiently advance technology is indistinguishable from magic" (A. C. Clarke 1979). Participants are then encouraged to build devices from lo-fi materials like paper cups, cardboard or straws and articulate through them their most pressing fears or desires surrounding technology. We wanted to attempt something similar in the Mozilla Workshop and invite participants to leave the possible behind when envisioning what the home hub could be. As we were already working on Valdis Ozols, the idea of an imaginary designer naturally followed. This time however, we left the details of the life of the imaginary designer unanswered and instead focused on developing his or her sketchbook. In developing it, we were very inspired by the work of Luigi Serafini in his Codex Seraphinianus[44]. The Codex is a celebration of the extremely ambiguous imaginary. It is a lengthy collection of surreal and sometimes absurd devices that cross technological, natural and social elements without providing any sort of understandable explanation while doing so. We say understandable because every portrayal of a possible technology is heavily annotated but it is done in an invented language that in no way resembles, neither in content nor form, any other. Every page is full of meaning, however, what this meaning exactly means is impossible to know. Luigi Serafini intentionally wrote the book this way in order to provide the reader with an experience long ago forgotten: that similar to a child before she is able to understand the text that accompanies illustrated books. What the author wanted to accomplish was such mixture between awe

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[44] The Codex Seraphinianus was first published in 1981. (Serafini 2013)

and curiosity that resulted in idiosyncratic accounts of ambiguous content. With the same aim, we proceeded to create a book of imaginary sketches of connected technologies that would ambiguously connect with ideas for the home hub.

The name for Bookonon is a playful take on the ambiguity of the designs that one can find in it: Book or non-book, Bookonon. It comprises 58 pages of collage and watercolour through which we engaged in a creative process that tried to push ambiguity to its limits but still retain a sense of intelligibility. The first and last pages seem to indicate that the sketchbook deals with technologies of interconnection and that it belongs to a designer somewhere in Asia. However, we cannot be sure because, just as in the case of the Codex Seraphinianus, the characters that accompany and seem to explain the images are written in an incomprehensible language. The book seems to be divided in three sections. The first section artefacts seem connected in one way or the other to nature or biology. The second section appears to have a link to some sort of computerized or mechanical technologies. Finally, the third section appears to address technologies that involve more than one person (see Figure 16).
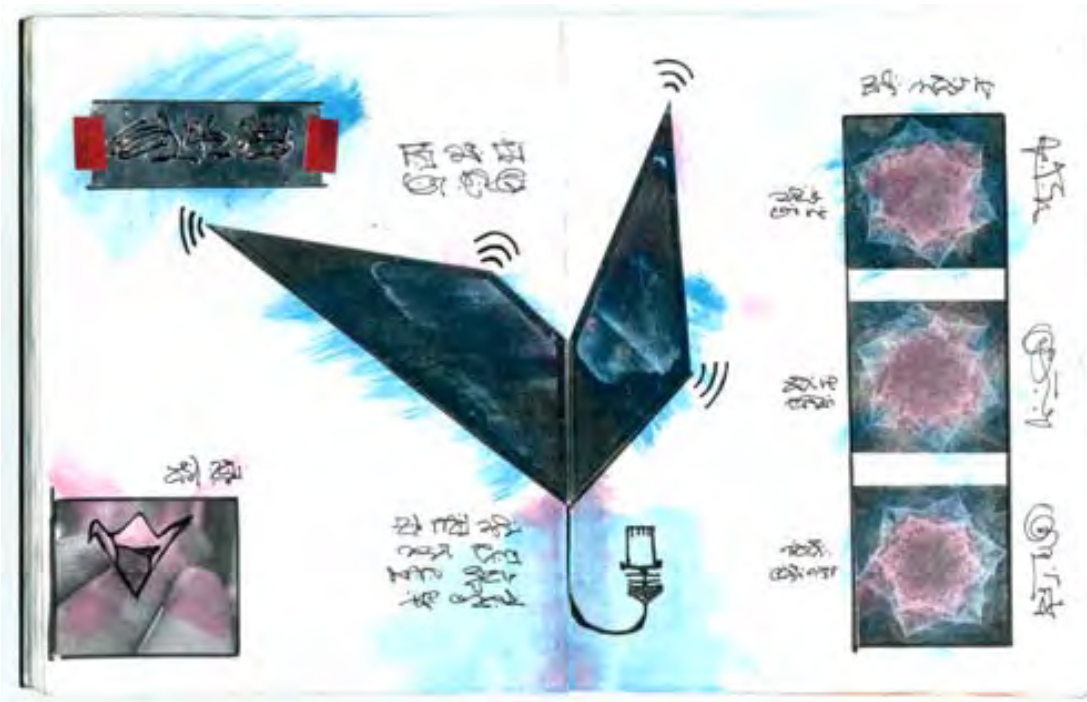
Figure 16 Two out of the twenty-seven spreads from Bookonon. Picture credits my own.

Bookonon is added in full in Appendix 1 of this dissertation. The original sketchbook was scanned and printed and at the All Hands Meeting, a copy was distributed to each of the participants. In the morning session, Mark Blythe began the workshop with the following:

> *"What if we found a designer's notebook in a non-place, like an airport? We know nothing about them, not even where they live or what language they speak, the notebook is written in an invented language. Could we make any sense of it?"(Blythe et al. 2018)*

Participants were then invited to choose one spread from the book, annotate it and try to elucidate the meaning of what was being depicted (See Figure 9).
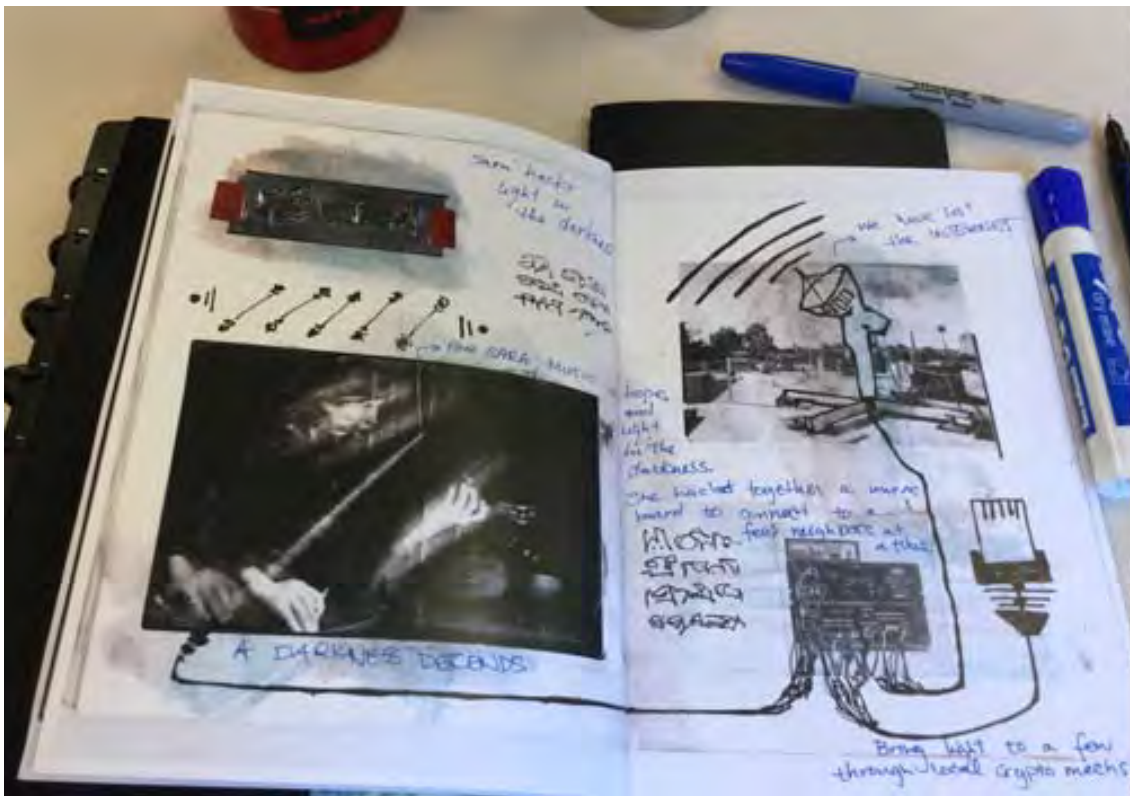
Figure 17 Miriam Lueck Avery's annotated Bookonon. Picture credit Mark Blythe.

Participants found the activity engaging and a number of good humoured and interesting discussions ensued. Some of the concepts associated with the ambiguous images were strange and magical, others were plausible and similar to already existing products. In order to better identify design possibilities, participants were instructed to develop stories around the Bookonon spread of their choice. Some of the stories were sinister and described post-apocalyptic events that saw important communication networks being destroyed or restored. Other stories imagined the technologies facilitating the interaction of people in totalitarian events where traditional means of communication were heavily monitored. Some stories dwell on the everyday.(Blythe and Encinas 2018a) How algorithms might be able to encourage romantic relations or better parenting practices. Also, a participant suggested how a pet might be technologically enhanced to recognize and transmit emotions to other connected devices in the house: if there was a substantial rise in the volume of a conversation and no laughter accompanied it, some particular lights or music could activate and influence the situation. There were stories of resistance to driverless cars by hacking their navigation systems in order to reclaim the highway and the pleasure of driving. In the afternoon session, participants were invited

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to create their own imaginary workbooks but based on any country of their choice other than the one they lived in. They could be from North Korea, Nepal or Nicaragua but also from alternative presents or made up historical pasts, like a home hub from 1980's Soviet Union. This resulted in sketches that even incorporated made up languages and that were shared and interpreted by others.

Although most participants were coders and engineers there were also some participants that were more used to create scenarios involving imagined technologies. One participant in particular was particularly apt in this task. Miriam Lueck Avery is the director of Strategic Foresight at Mozilla and before that she was research director at the Institute of the Future. Miriam decided to take her work one step further and created a short story entitled "Andrew and the Synaesthesia Machine". In it, Andrew tries to find out why things around him don't work or do so poorly and becomes an activist. After a while he is introduced to a researcher in the university that is working in a new prototype:

> *"She had built something that might change everything. We went to visit her in the lab. The second prototype box was black and shiny and the size of an apple. The first prototype covered the bench. A cord snaked between a microphone stand, a Lexan box lined with mirrors and screens, asynthesizer, and several laptops. […]*
>
> *Andrew had so many questions. The student had many answers. The microphone listened. The lexan box and synthesizer hummed to life. Images swirled in the box. Ghostly fingers seemed to depress the keys. Soon the room came alive with noise and light.*
>
> *The questions and answers had become explainer videos, set to custom music. […]. It took voices, and turned it into videos. It took videos, and turned it into music. It took music, and turned it into text. It took text, and turned it into smells. She called it the Synesthesia Machine. […]*
>
> *Then, one of the other labs pinged back. The student stopped. That had never happened before! Their output system uses viruses. They infect, and persuade. Like that virus that rats get, which makes them more likely to be eaten by cats. The two projects could work together! […]"*

The system that was been developed had negative consequences but Andrew saw a different possibility too:

> *"Last week, some rogue government agents deployed a similar technology in the Philippines, and things got dark. (Many were arrested, and others died). But we could use it for good. It must be used for good."*

Andrew and the other main characters in the story took the synaesthesia machine to a gathering of the rich and the powerful and the results were unexpected:

"Two thousand people, people of power, were breathing my special air.

The lights dimmed slightly before the schedule indicated they should. The images and voices and music started flashing across the screens. They also flashed across the tables. Moods and smells flooded the room. Smells of sewage and sadness joined my spikey persuasion viruses in the nostrils of the powerful. Strange music keened overhead, abstract but unforgettable. A low murmur of reaction soon mounted to a roar. It started as a roar of confusion. The pitch then changed to consternation. Finally, outrage."

This story was also a creative compilation of many of the issues treated during the workshop. The technologies discussed had an ambiguous character that seemed to have filtered into the ideas for the home hub. There was a dystopian sense but also the chance to use technology "for good". The implications of this new device were not clearly positive by default because it also incorporated some worrying possibilities that had to be addressed and carefully considered in the process of designing the new product.

After the workshop, both academic and industrial partners decided to developed the ideas discussed further and the workshop material was brought to a senior social worker from the Birmingham city council. The ideas for the home hub informed the conceptualization of a digital social worker through a number of scenarios and also, through the design of new pages of an imaginary workbook. The design ideas regarding the digital social worker were later brought to other members of the Birmingham city council where this use for a home hub was viewed as potentially positive as a substitute to incarceration much like ankle tags (See Figure 18).

Figure 18 Vinnie, the digital social worker and Vipah, the monitoring device. Picture credit my own.

3.4.3. Insight: On the Plausibility of Fictional Objects

It would be fantastic to bring together Luigi Serafini and Dougal Dixon to have a conversation about fiction for it is difficult to think of two authors that have better married fiction with nature and done so from such opposed perspectives as to the value of fiction. The topic of the talk would be something along the lines of "what makes fiction good?" and ideally it would take place for a good couple of hours in a carefully designed environment that would favour the disclose of personal insight.

Both the Codex Seraphinianus by Serafini and After Man (Dixon 1981a) by Dixon have in common two things: a treatment of nature through a fictional lens and being excellent and unique pieces of fictional work. Aside from that, every other object is a matter of difference, starting with the professional background of each author: Serafini is an architect and industrial designer and Dixon is a palaeontologist and geologist. If the Codex is unapologetically ambiguous to the point of even rejecting intelligible language, After Man offers a comprehensive and rationally grounded description of even minor details. If one is impossible to locate in any time present, past or future, the other locates its work in a precise moment in the future and explains how and why the reader got there. Where one leaves the reader all the burden of interpretation, the other educates her to precisely agree with what the author tried to convey. If one is about ambiguity and possibility, the other is about reason and causality. Earlier in this section we briefly described the Codex Seraphinianus, this is how Dougal Dixon introduces his work:

> *"The future world is described as if by a time-traveller from today*
> *who has voyaged the world of that time and has studied its fauna. Such a*

Figure 19. Illustration from Dougal Dixon's After Man. Picture credit Dougal Dixon.

After Man is a painstakingly detailed description of the kind of fauna populating the world 50 billion years after the disappearance of humankind from the surface of the Earth. It was published in 1981 and one third of its content is a text-book compilation of purely scientific explanations in topics like evolution, mammals, food chains or the Age of Reptiles. A lot of praise for the book hinges on the fact that it was so well grounded on the science of the time. This is why, according to the zoologist and British TV personality Desmond Morris, the book is extraordinary:

> *"Setting his scenario in the distant future, about 50 million years from now, he has given the members of his new animal kingdom time to undergo dramatic changes in structure and behaviour. But in doing this he*

has never allowed himself to become too outlandish in his invention. He has created his fauna of the future so painstakingly that each kind of animal teaches us an important lesson about the known processes of past evolution - about adaptation and specialization, convergence and radiation. By introducing us to fictitious examples of these factual processes, his book is not only great fun to read but also has real scientific value. The animals on these pages may be imaginary, but they illustrate a whole range of important biological principles. It is this - the way in which he has perfectly balanced his vivid dreamings with a strict scientific discipline - that makes his book so successful and his animals so convincing and, incidentally, so superior to the often ridiculous monsters invented by the cheaper brands of science fiction."[45] (Dixon 1981b)

Certainly, one can think of a better present for Desmond Morris's birthday than the Codex Seraphinianus. Desmond's opinion on what constitutes a valuable fiction strongly echoes the opinions of contemporary designers arguing for a fiction that is strongly plausible (Sterling 2013). In my view however, the nexus between value and verisimilitude is not so clear. In the papers I have described above I employed fictional objects that were disconnected from verisimilitude and argued for their value not in terms of how practical the fictions can be but in terms of how rich they are as thought experiments. We could go one step further and consider fictional objects in line with previous insights from earlier sections of this chapter. To me, both After Man and the Codex Seraphinianus are not fictional objects but real objects. They are effective for they are able to create an impact that influences other real objects, like readers or workshops. They bring together fictional objects along with them but they do so indirectly, by means of possibility and only once a person gets to interact with them as real, effective objects. The fictional object, in my view, is not the swimming monkey of After Man, but the imaginary object swimming monkey that exists once a consciousness comes across the real descriptions and images that it finds in the book. The imaginary swimming monkey is the fictional object that structures what the real swimming monkey does, its effects and its impact as a real verbal or visual description. Plausibility is, for me, not a quality of fictional objects but of real ones, just as any other effective quality is. To consider a fictional object plausible or implausible misses a very important point: once an object is

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[45] There is a connection here to Samuel Coleridge argument for using the supernatural in his poetry and his definition of fiction as suspension of disbelief (see the discussion on Metaphysical probe#1: Existence). It seems that a century and a half later there still seemed to be a need for "backing up" fiction with plausibility.

plausible, that is, capable of effectively resembling other it is precisely because the object is already real.

Figure 20 Illustration of the Codex Seraphinianus by Luigi Seraphini. Picture credit my own.

The Codex Seraphinianus seems to be proudly aware of this fact and goes to extremes in its effort to create objects that are undoubtedly real but that make the fictional objects that serve as a scaffold for their effectiveness shine with marvellous brightness. Paradoxically, the veneer of verisimilitude that covers the objects in After Man hides the reality of the objects it portrays and makes them shine as fictional, as not effective but as potential. And this effort seems slightly apologetic while doing so and hence provides an excuse in terms of rationality or causal links. On the other hand, the objects one finds in the codex are unapologetically real, they are aware of the effects they cause, emotional, inspirational, practical or otherwise. At the same time, in their rawness they allow one to get a glimpse of the imaginary objects that structure their possibility. Once one tries to grasp what these real objects are, what they mean, one is immediately forced to deal with possible, potential or in other words, with fictional objects.

3.5. Metaphysical probe #7: Functionality

In the previous section, we followed the design event that resulted in the final design object of Bookonon to explore how plausibility is associated with fictional objects.

The design event hinged on an imaginary design workbook from an unknown designer that tried to remain as far away from verisimilitude as possible. In this section, we will take the opposing direction and rather than designing against plausibility I design for an extreme form of it: functionality. Plausibility retains an element of doubt that I wanted to get away with in this section. It is not whether a design object retains a degree of possibility but rather the possibility is completely achieved as the device is completely operative, it works without any sort of doubt.

It is a common practice for the objects of design that tackle fiction to leave functionality as a secondary achievement. Many objects of speculative design, for example, aim to represent a fictional element that is so profoundly fictional that its very working is impossible within the coordinates of the reality where it is designed. A straightforward example is the Fifth Dimensional Camera(Superflux 2005) by design studio Superflux, a fictional device capable of obtaining images from parallel universes. The camera stands as a prop in a story where quantum computing technology has been applied in the domain of photography. As a real object, it is effective as a prop but it is not functional, it does not work, as a camera. Its real user is effective as a spectator or a witness but it is not effective as a photographer.

With this metaphysical probe I have tried to retain use as an effective and direct consequence of the object I designed. I wanted to approach the fictional without sacrificing the capacity of the design objects involved to remain functional or operative. Many questions propelled my inquiry, do fictional objects need to forfeit their capacity to work in order to engage with fictional objects? How are the fictional and the real objects involved in a design process affected by a designer that sticks to the need to make an object function? And about the user, what sort of transformations in how the user is conceptualized occur when the fictional and the functional are married?

The final object that resulted from this design event is what I call Verp and it took place approximately from Winter 2017 till Spring 2018. The beginning of the year 2017 saw my relocation from the city of Newcastle Upon Tyne to the island of Madeira in order to carry a period of design practice in the Madeira Interactive Technologies Institute. James Auger kindly agreed to host me for a year and tutor some of my research efforts. Immediately after my arrival I was included in a number of research activities initiated

by James Auger and Julian Hanna. One of them was to help in the formation of a research group that would later be known as the Reconstrained Design Group and that would come to include James Auger, Julian Hanna, Mohammed Ali, Parakram Pyakurel, Laura Watts and me. On the anniversary of the group we published a paper with a manifesto in 12 challenges(Hanna, Auger, and Encinas 2017). In order to give an accurate picture of the context where the design event that structures the metaphysical probe of plausibility, I reproduce the 12 challenges here:

Challenge #1: Reverse this statement.

'We must shift America from a needs, to a desires culture, people must be trained to desire, to want new things even before the old had been entirely consumed. We must shape a new mentality in America. Man's desires must overshadow his needs.'

Paul Mazur (in the Harvard Business Review, 1927) [6]

Challenge #2: Reclaim the means – stop obsessing with the ends.

'Modern anthropology … opposes the utilitarian assumption that the primitive chants as he sows seed because he believes that otherwise it will not grow, the assumption that his economic goal is primary, and his other activities are instrumental to it. The planting and the cultivating are no less important than the finished product. Life is not conceived as a linear progression directed to, and justified by, the achievement of a series of goals; it is a cycle in which ends cannot be isolated, one which cannot be dissected into a series of ends and means.'

John Carroll [7]

Challenge #3: As things become increasingly automated – facilitate action not apathy.

'[W]hen it becomes automatic (on the other hand) its function is fulfilled, certainly, but it is also hermetically sealed. Automatism amounts to a closing-off, to a sort of functional self-sufficiency which exiles man to the irresponsibility of a mere spectator.'

Jean Baudrillard [8]

Challenge #4: Bring an end to this vacuous celebrity designer BS.

'My juicer is not meant to squeeze lemons; it is meant to start conversations.'

Philippe Starck [9]

Challenge #5: Interrupt legacy thinking and product lineages.

'All inventions and innovations, by definition, represent an advance in the art beyond existing base lines. Yet, most advances, particularly in retrospect, appear essentially incremental, evolutionary. If nature makes no sudden leaps, neither it would appear does technology.'

Robert Heilbroner [10]

Challenge #6: Rather than feed the illusion of invincibility, work from the reality of uncertainty and transience.

'Everywhere gold glimmered in the half-light, transforming this derelict casino into a magical cavern from the Arabian Nights tales. But it held a deeper meaning for me, the sense that reality itself was a stage set that could be dismantled at any moment, and that no matter how magnificent anything appeared, it could be swept aside into the debris of the past.'

J. G. Ballard [11]

Challenge #7: Set aside the easier work of armchair critique and take up the more difficult work of proposing viable alternatives.

'It is true that I can better tell you what we don't do than what we do do.'

William Morris [12]

Challenge #8: Ask yourself (before putting things in the world): Am I prepared to play God?

'It's not right to play God with masses of people. To be God you have to know what you're doing. And to do any good at all, just believing you're right and your motives are good isn't enough.'

Ursula K. Le Guin [13]

Challenge #9: Design ecologically.

'One merges into another, groups melt into ecological groups until the time when what we know as life meets and enters what we think of as non-life: barnacle and rock, rock and earth, earth and tree, tree and rain and air. And the units nestle into the whole and are inseparable from it … all things are one thing and one thing is all things – plankton, a shimmering phosphorescence on the sea and the spinning planets and an expanding universe, all bound together by the elastic string of time. It is advisable to look from the tide pool to the stars and then back to the tide pool again.'

John Steinbeck [14]

Challenge #10: Adopt a khadi mentality.

'True progress lies in the direction of decentralization, both territorial and functional, in the development of the spirit of local and personal initiative, and of free federation from the simple to the compound, in lieu of the present hierarchy from the centre to the periphery.'

Petr Kropotkin [15]

Challenge #11: Be patient for the quiet days.

'Another world is not only possible, she is on her way. On a quiet day, I can hear her breathing.'

Arundhati Roy [16]

Challenge #12: Start building the future you want, with or without technology.

'People ask me to predict the future, when all I want to do is prevent it. Better yet, build it. Predicting the future is much too easy, anyway. You look at the people around you, the street you stand on, the visible air you breathe, and predict more of the same. To hell with more. I want better.'

Ray Bradbury [17]

In Spring 2017 the Reconstrained Design Group, got awarded the II Cultural Innovation International Prize by the prestigious CCCB museum in Barcelona. With it came a grant to develop ideas regarding energy and the possibility to exhibit our work for 3 months in one of the main halls of the Museum(CCCB 2018). The name of the project was The Newton Machine.

3.5.1. Design Event: Newton Machine

The Newton Machine was an effort to reconstrain energy. To think energy in alternative terms to those that dictate how it is generated, transferred and consumed in modern and industrialized regions. Laura Faye Tanenbaum, senior science editor at NASA Jet Propulsion Laboratory and part of the CCCB jury that awarded the prize stated the relevance of our project with the following statement:

"it empowers people to take responsibility and to use local resources and expertise to face their own challenges… The Newton Machine is honest in that it accepts that there is no universal solution to such a multifaceted issue as climate change"(CCCB Lab 2018)

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One of the most challenging aspects of the project was to design according to oblique energy constraints. Oblique constrains are constrains that remain obscured and only become apparent once a certain level of critical analysis of a particular parameter, like context for example, has been carried out. In the particular case of energy, we realized that energy had become a commodity with a set of practices of use that obscured most aspects to its generation and transfer. A plug in a socket brings energy magically into any built environment without accounting for where it came from or how it got there. To make energy visible we implemented a domestic version of a method of energy generation that relied on gravity: a gravity battery. In very simple terms, a gravity battery is an energy generator that produces electricity while a heavy mass falls. It is mainly composed of three elements: a heavy mass, a gearbox and an electrical generator. The heavy mass is attached with a rope to a pulley connected to the gearbox. The slow falling vertical falling speed of the mass is turned into the fast rotation of a gear at the end of the gearbox. This gear is coupled with the electrical generator and its movement results in the generation of electricity. Once the heavy mass hits the ground, the generation of electricity stops. If electricity is fed to the electrical generator it will behave like a motor. We took advantage of this in order to lift the heavy mass back to its initial position by means of solar energy. The initial scenario of use we envisioned had nothing to do with fiction. It was that of a house that had a gravity battery installed in its highest point. During the day, the heavy mass would be lifted by means of the solar energy produced by solar panels. Once its inhabitants came back from work at night, the weight would be released and energy would be provided by the gravity battery.

We made a total of three prototypes of the gravity battery. For the first prototype, we recycled the gears from an old lathe and made a custom gearbox in a frame of wood[46]. In the second prototype, we salvaged the gearbox of a motorcycle and installed with the pulley mechanism and the motor of the first prototype. This allowed us to increase the weight of the falling mass and generate more energy. For the third prototype, we speculated on the possibility to reduce the making of custom parts to a minimum by recycling an old broken motorcycle. We realized this would be the option best aligned with the spirit of the project for it would make the generation of energy visible through

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[46] The following video shows the first prototype at work. (Auger 2017)

the use of local knowledge and materials. Within the Newton Machine project, we were fortunate enough to count with the support of Eday Renewable Energy Ltd. And Community Energy Scotland and for a week we were invited to come to the island of Eday in Orkney and try to build the third prototype of the gravity battery together with the local residents. Their fantastic support and expertise resulted in a fully functioning gravity battery built in just few days. This experience in Eday perfectly embodied the reason why our project was called the Newton Machine and not the gravity battery: a Newton machine is a system that comprises a technological artefact but also the local knowledge and materials of a community that gets together to build it. The Newton in Newton machine was meant to be a straightforward reference to Isaac Newton, the renowned natural philosopher whose work greatly advanced the understanding of gravity.

The Eday experience had a profound effect in the Reconstrained Design Group and upon our return to Madeira we decided it was the time to leave the realm of engineering and enter design. We gathered all our knowledge up to that point in a wiki site("Introducing the Newton Machine - NewtonMachine" n.d.) that we publicly shared and set ourselves to bring the Newton Machine farther into the domestic environment. Now that we had figured out most of the engineering requirements for a gravity battery we were ready to reconstrain the energy of everyday, domestic products.

3.5.2.   Final Design Object: Verp

The attempt to bring the Newton Machine into the living room was motivated by many of the challenges that were part of the Reconstrained Design Manifesto. Possibly challenge #2 about reclaiming the means rather than focus on the ends was most important. We wanted to stop being inseparable from alien infrastructures of energy production and transfer by designing the means of energy generation into domestic devices. Instead of relying on a magic wall and its wall plug to make function come alive, we wanted to go beyond the wall and do away with the plug altogether. Our design artefacts would not be grid dependent but context dependent.

The ethos of the Newton Machine was to bring local knowledge and materials to the foreground in order to design objects in order to satisfy an energy need through bespoke technological means. When talking about the domestic environment, this meant

the creation of products that would generate their own energy and do so visibly. But we did not want just to restrict ourselves to the design of do-it-yourself objects that were satisfied with performing a function. In our view, this would not differentiate our project from other techno-solutionist attempts, weekend projects that mostly focus on achieving a degree of functionality without much aesthetic concern(Experimental Fun 2017). We wanted to go beyond the do-it-yourself that excludes aesthetics and design objects that, although eminently DIY in terms of how they can be created, they were designed to be used and that could be seen as an alternative to a purchase in a shopping mall. The goal was beyond engineering and hence we liked to think of it, not as Do It Yourself but as Do It With Others. Our domestic Newton Machines were to be accompanied by online instruction manuals and blueprints that some might find too difficult to build by themselves but that should represent no problem for a professional in their community. A small aluminium pulley or an irregular cut of wood, for example, would take just minutes for a local metal worker or woodworker to make. Local craftsmen have hidden amounts of expertise that we hoped people trying to follow the steps of building our products would be able to tap into. It was very likely too that these craftsmen would be able to improve our designs. We saw this increase in complexity and quality of materials used for a DIY project a reasonable price to pay in order to design things instead of devices. This is how we explained the difference between thing and device in a paper published in a Portuguese conference(Encinas, Hanna, and Auger 2017):

> *"In Autonomous Technology , Langdon Winner describes how 'abstract general ends' such as 'health, safety, comfort, nutrition, shelter, mobility, happiness, and so forth' have become highly instrument specific: 'The desire to move about becomes the desire to possess an automobile; the need to communicate becomes the necessity of having a telephone service; the need to eat becomes the need for a refrigerator, stove, and convenient supermarket'(Winner 1978). Borgmann took this idea a step further in Technology and the Character of Contemporary Life with his description of the 'device paradigm', which differentiates between things and devices. Things are inseparable from their context: we engage and interact with them in their worlds; means and ends exist in an unbroken continuum. Devices, on the other hand, conceal their contexts. In his study Borgmann examines the human need of warmth, detailing the shift from the stove as thing— 'a focus, a hearth, a place that gathered the work and leisure of a family and gave the house a centre'—to the device, the central heating plant that 'procures mere warmth and disburdens us of all the other elements'"(Borgmann 1987)*

It is at this point that the fictional enters the scene in this design event. Our effort at making things as understood by Borgmann was structured by an imaginary object: we based our design on an idea of the island of Madeira with no radial infrastructure for the

distribution of electricity and no plug sockets in rooms. This forced us to forfeit the plug as the ending point of our designs and doing away with the plug meant welcoming their context, promoting their thing-ness. Together with James Auger we designed two objects: a gravity powered lamp and a vertical record player. We were mostly focused on the development of the second and named it Verp (VErtical Record Player), James Auger focused on the Gravity Lamp. As they were part of the Newton Machine event, we couldn't avoid thinking about them in those terms too and hence the notions of local knowledge and expertise were fundamental components of their design. Also, their energy producing capabilities were adapted from the gravity battery.

The design rationale for the record player to be vertical was to facilitate the generation and transmission of mechanical energy. By keeping the record player spinning in a vertical plane, the gearbox and pulley arrangement would be simplified. Later, we realized that keeping the record constantly spinning at a speed of 33 and 1/3 rpm by means of mechanical transmission was a too ambitious engineering task. Instead, we isolated the record player and the energy generation modules. The energy generation module had three elements: a speaker encased within two heavy led-infused semi-spheres, a pulley system and a gearbox and an electrical generator. The energy was generated by releasing the concrete from a height of two meters. Once the concrete reached the floor it had to be lifted again through the spin of a handle or by connecting it to a source of energy, like a solar panel or a wind turbine. The vertical record player needed was custom build and incorporated a small amplifier and an electrical module for signal treatment (i.e. filtering and equalization). A cable powered the record player and the speaker with the electricity coming from the generator while the concrete ball fell. We estimated around 12 minutes of playback time per drop. It took 4 physical prototypes and 13 virtual prototypes to bring the object to its final state. The materials employed were acacia wood, acrylic, aluminium, nylon cord, iron gears, black sand from the coast of Funchal, cement and quite an amount of lead. After all, we claimed Verp (see Figure 21) was a thing (in the Borgmann sense) and not a device:

> *"The gravity turntable is a 'thing' rather than a 'device' because of the shift it causes in the practice and attitude of listening to music. The gravity turntable is wall-less: the gravity-based mechanism for energy generation is an integral design feature. Hence, its energy infrastructure and its functionality are components of equal aesthetic relevance. The experience of listening to music on the gravity turntable is highly influenced by its design. Its maximum playback time—10 minutes—and the slight effort*

Figure 21 Verp (left), a physical prototype (center) and a virtual prototype (right). Picture credit my own.

Verp was the final design object in the chain of Newton Machines that we developed for the CCCB. All the material we worked on, three prototypes of the gravity battery (see Figure 22), a documentary about the Eday experience (see Figure 23), the gravity lamp (see Figure 24) and Verp (see Figure 25) were exhibited in the museum from the first of February to the fifteenth of April 2018 in a dedicated hall. The exhibition was called The Newton Machine.

Figure 22 Three gravity battery prototypes exhibited in CCCB. Picture credit James Auger and Julian Hanna

Figure 23 Documentary shown during the Newton Machine exhibition in CCCB. Picture credit James Auger and Julian Hanna

Figure 24 The gravity lamp in CCCB. Picture credit James Auger and Julian Hanna

Figure 25 Verp in CCCB. Picture credit my own. Picture credit James Auger and Julian Hanna.

3.5.3.   Insight: On the functioning of Fictional Objects

The Milieu allows for a precise consideration of the terms thing and device from Borgmann that is relevant in this discussion on the functionality of fictional objects. The thing according to Borgmann is very different to my Milieu-understanding of thing. A thing is not together with other things in the objective universe but alone in the world. Things don't allow us to access any context directly but rather to consider one thing alone and isolated, to ponder on what it is that makes it a thing and calculate the implications if we consider it an object. The thing according to Borgmann, however, bears a striking similarity to my Milieu-understanding of objects. Things for Borgmann bring a court of objects with them. They bring practices, attitudes, rituals and habits. Things illuminate contexts and make them possible. In my view, any object does that because there is no object that is alone as they comprehend other objects (the components of the objects) and are comprehended in turn (the relations that the object enters into). Any object is not in itself but brings along other objects that define it and defines them in turn. Devices, on the other hand, are very different to things. They reduce the context where they are situated by eliminating some of its elements. They are shortcuts to a preferred state of affairs that do away with the practices that make them possible in the first place. We can take Juicero as an example. Juicero was a, now defunct and seemingly ridiculed, start-up that sold rather pricey juice machines that squeezed pre-sold packages of diced fruit instead of squeezing fresh fruit(Levin 2017). It would be difficult to find a device with a higher degree of device-ness than this artefact where the act of drinking juice was even isolated from fruit itself. Borgmann's notion of device is for us also an object: it is also a differential between the objects that compose it and the objects it enters in a relationship with (a differential between the senses of being and comprehending). A device is just a very very poor object, an object intentionally isolated from a large cohort of other objects that would easily enter in a relationship with it but that was prohibited by design from doing so. One of the imaginary objects that structures this real juicer object is particularly interesting: the imaginary idea of what making juice is. This fictional object becomes obvious once one encounters Juicero even as a spectator witnessing other real objects like images and descriptions: making juice is, basically, the empty space between the decision and the action of bringing a glass filled with a colourful liquid to one's mouth. It's a space that could be employed for something else, a stain in time that should be minimized as much as possible. Making juice for Juicero is, paradoxically, to do away with making

juice through design. In the vocabulary of the Milieu, the object "making juice" is compacted to a self-ball, a thing in itself so minimal that it can be dismissed as non-existent.

But as I tried to show earlier, objects are never alone but together in other objects. Things can be reduced to devices or objects can be compacted and reduced to their parts or their relations but they don't stop being objects. They cannot be reduced to nothing unless a very high price is paid. In the case of Juicero one can see hints of this price reflected in the quote by Baudrillard that we mentioned in challenge 3 of the manifesto of Reconstrained Design earlier:

> *'[W]hen it becomes automatic (on the other hand) its function is fulfilled, certainly, but it is also hermetically sealed. Automatism amounts to a closing-off, to a sort of functional self-sufficiency which exiles man to the irresponsibility of a mere spectator.'(Hanna, Auger, and Encinas 2017)*

In a technological object, automatism is a form of compactness. It amounts to a closing off, to the reduction of an object to a particular set of relations that invariably transforms the original object (before automatization) into a different object. The price to pay with automation is the transformation of the object into another object. This second object can be so different that to recognize the first in the second becomes almost impossible as is the case with Juicero. The quote from Baudrillard is also particularly interesting when thinking about the relation between functionality and fictional objects. As we learned with the metaphysical probes of effect and identity, a fictional object is never functional in any other way that structuring the effects (one among them the functionality) of real objects. Restricting or doing away with the functionality of a real object, be it an object of speculative or industrial design, also inevitably leads to a sort of compactness, to a simplification or reduction of the initial object that transforms it into a different object, and, of course there is a price to pay for this metamorphosis. The effect that the newly created real object has on other objects also transforms them in turn. If there is one real object that is profoundly affected by this objective metamorphosis resulting from compactness is the user. The user of a manual juice maker is an engaged participant in an activity that involves a plethora of other real objects, like scents, knives and chunks of fruit. The user of Juicero is a spectator.

Objects of design that in their dealings with fiction forfeit their functionality pay a similar price than any other object that is compacted through altering their functionality: they become other objects and turn the objects they affect into different ones. A camera that is a prop is a real effective object that tightly anchors the fictional object it aimed to represent. But in doing so it pays a high price: the price of turning its user into a witness.

3.6. Metaphysical probe #8: Future

This chapter has been a review of design objects. An examination of the multiple design objects that have informed and propelled forward my investigation into what makes design objects real and the fictional. The design event that produced the Digital Dreamcatcher looked at the existence of objects and tried to differentiate them according to their real or fictional status. With #LiftBlr we wanted to gain insight on whether the ability for an object be effective can shed light on its fictional or real nature. I explored the responses to three design briefs that demanded the creation of real objects. The first design brief helped me understand the nuances of ironic engagements with reality. The second allowed me to consider the identity of objects and its implications for considering the status of object according to the imaginary. The third design brief dwelled in the sort of transformations that recognition as a mechanism exerts in objects. I returned to fictional objects with a focus on what makes them more or less plausible and how this, in turn, affects the real objects that accompany them. Finally, in the previous section we probed the character of functionality and learned about what design objects gain or lose once they work or just pretend they do.

Now I turn to the great absence, the void that I have intentionally left unaccounted for in all the previous sections: the future. If there is one element that is inseparable from the many forms that fiction takes it is what lies beyond. It would be difficult to find a science fiction author that hasn't summoned the time to come in his or her books. It would be even more difficult to find a company that has mobilized entities of fiction, in the form of design or literature, without involving a call to a present that is not here yet. It is not surprising though, for the future is the godmother of possibility. It's ability to surprise but also be obvious, to be present while always fading away. The Slovenian philosopher Slavoj Žižek famously said that any event retrospectively creates the conditions for its own existence (Zizek 2009). When one falls in love, it seems as if his whole life was a set of coordinated happenings leading to that just one moment. Coincidences fall under the spell of purpose and history becomes as obvious as the loudly beating heart witnessing the beloved. Likewise, to Žižek's event, the future is inherently creative but in the opposite direction of an event, warranting a present and familiarizing us with the continuity of its objects. The future is a legitimizing force (Reyes 2011). A playful wind

vane that, sure of the continuous flow of the winds of time likes to mark a direction that the present naively accepts only to discover it was all just a game. The future is a trickster and a fool, and a double one at that for it is also able to speak the truest truths. The paradoxical liar that the jury of time has shown over and over to have been right.

The future can also be the strongest of allies. Its mighty power can turn lie into truth and truth into lie. It can forge tragedy from a hopeful present[47] or turn the lights on when the present is lost in nightmare[48]. The future, eternally absent but permanently accessible through the fantasy of its grasping never ceases to seduce and there are many who fall under its spell. Ancient sorcerers and witches read it in the clues of nature, scientists are able to predict it with uncanny accuracy through for example, mathematical models, and even the most common person affects it by the sheer force of will and determination. But when the future happens it slips away for it becomes a present, only to resume its plotting once again. Designers are particularly used to dealing with the future for it is their business the creation of the new and hence, they are especially adept at mobilizing it. They create objects and claim they speak the language of the future. But is this really the case? Can the future be anchored to the present and its mechanism be ruled like a game? Experts in the future seem to believe so and efforts in foresight or trend hunting seem to be highly respected in the universes of the economy and culture, for example (TrendHunter 2018). The coming and going of seasons equivalent to the blossoming of fashions.

The future of technological possibility is one filled with expectation and certainty. Multinational companies, for example, sometimes act as oracles of the next gadget or breakthrough or even as the self-appointed jury of what is to be finally left to history.[49] Again, the future as an ally that authorizes even the most wicked decisions and validates the most shameful of outcomes[50]. But unlike the objects of the present, the real or the

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[47] Like when a doctor informs her patient of a sudden medical complication.

[48] Like when waiting to be rescued in the assurance that help is coming.

[49] The case of Google Glass as a future is telling in this respect (Smith 2013)

[50] As in how countries like Spain or Greece had to accept unbearable austerity measures (Elliott 2016)

fictional, the future does not comprehend anything else but possibility and this makes it a citizen of the country of anybody.

The future is certainly one of the most influential elements in any object regardless of its status as real or fictional. The future is a complicated matter because it is profoundly grounded in common sense but once it is looked at closely both common and sense disappear without a trace. This is probably the reason why I have left its treatment to the last section of this chapter: I needed to be prepared to look at it without falling under its spell. By "being prepared" I mean having a sufficient understanding of both the temporal model that the Milieu facilitates and a substantial pool of knowledge on the fictional or real character of design objects.

The final design object that resulted from the design event that I describe in this section is what I have named Lightown. It happened from Spring 2017 till Spring 2018. I was hired together with James Auger by the European Union's Policy Lab as lead designer of an interdisciplinary group of experts to explore the impact of Digital Ledger Technologies (such as Blockchain) on Intellectual Property. Our task was to lead the discussion and outcomes of two workshops in Brussels and also, to design an interactive object that would facilitate a better understanding of the topic to other stakeholders from industry and politics in the EU.

3.6.1.　Design Event: #Blockchain4EU

The #Blockchain4EU project was a project coordinated by the Policy Lab at the European Union that aimed at looking critically at the potentials within industry for Digital Ledger Technologies, like the Blockchain. It was a clearly future oriented exercise that involved a great number of stakeholders. The following excerpt is taken from the first brochure we received after we accepted the invitation to join the project:

> #Blockchain4EU: Blockchain for Industrial Transformations is a forward looking exploration of existing, emerging and potential applications based on Blockchain and other DLTs for industrial / non-financial sectors. This is a research project coordinated within the European Commission by the EU Policy Lab / Foresight, Behavioural Insights and Design for Policy Unit (I.2) of the Joint Research Centre (DG JRC), on request of the Innovation Policy and Investment for Growth Unit (F.1) of the Directorate-General for Internal Market, Industry, Entrepreneurship & SMEs (DG GROW).

#Blockchain4EU main goals are to a) map and analyse Blockchain and other DLT applications for industry across specific areas; b) scan for and explore future scenarios of production, distribution and use; c) identify and assess prospective funding and regulatory actions and other broader policy options. Core outputs will contribute to evaluate risks and opportunities for the development and uptake of Blockchain and other DLT applications within EU industrial and business contexts, with focus on SMEs innovation and competitiveness.(Nascimento and Polvora 2018)

The first activity that we took part of within the #Blockchain4EU project was a workshop in Brussels. The workshop happened over two days in November 2017 and its goal was to collaboratively look into the applications that in the near future would make use of Digital Ledger Technologies (DLTs from now on). The focus was set on five use-cases: supply chains, authentication and certification, intellectual property, energy, and advanced manufacturing. At the end of the two days, each group had to tackle one of the use cases and come up with a very low fidelity prototype that embodied the discussions that happened within the group. Each group was composed by designers, social and economic researchers and technical and industry experts. We were hired as designers and were expected to lead the discussions and ensure that the prototypes get made at the end. Our group centred on the use case of intellectual property and included James Auger and us as designers and also Juan Blanco, Carlotta de Ninni and Jaya Klara Brekke as industry experts and researchers.

The lo-fi prototype that we had to develop at the workshop had to represent an entry point for the subject of DLTs or Blockchain technologies in the domain of intellectual property and not be connected to the financial sector. It had to serve as a communication piece for policy makers and other political agents at the EU that were already engaged or simply interested in those working sectors that could be impacted by the implementation of DLT technologies. Other audiences included industry, business and labour organizations, public and private research bodies, media outlets and small, medium or large enterprises. Furthermore, this initial lo-fi prototype had to be, in the months after the workshop, developed into a fully working interactive artefact by the designers of each group. This final design object would be presented in a second workshop in March 2018 to high level political figures and other interested parties in the headquarters of the European Union in Brussels.

We began talks within our group by trying to level up the knowledge we had about the Blockchain with a discussion on what can the Blockchain do. Aside from the more common topics of trust management and alleged data transparency, we commented on issues like data verification, public versioning and how data mobility might impact the ability for artists to manage their rights considering their fame, reputation and overall public reach. For the purpose of the workshop and in line with the expertise of some of the members in our group we decided to focus on the domain of intellectual property in the music industry. With a clear idea on the possibilities of Blockchain we carried a speculative exercise. Each one of us was to create a post-it size what if scenario involving DLTs. It was essentially a question that would move our discussion forward. Some of the post-its read: What if money owned itself? What if the financial reward was married to emotional value via physical response? What if music was moderated by a sort of curated scarcity and only were able to access music by, for example, physical contact? What if there was a sort of universal basic music? (In relation to the much-discussed universal basic income) What if music was anonymous and had to be mined like currencies in DLTs? These questions lead us to settle on a group of primary topics: curated scarcity, community-based contributions, forgotten rituals when relating to music and responses to the value of music. After much deliberation and some healthy confrontation, we settled on the topic of value and developed a lo-fi prototype that resembled a portable music player. It was a prop meant to help speculate about a near future where sensors embedded in gadgets would be able to detect emotional responses to music. The economic value of the music would be derived from the emotional value via the physical responses recorded by the device. These responses would be recorded and exchanged into monetary currencies via the Blockchain creating a market of songs that matched the physical and emotional responses of their listeners. Songs would be highly valued based on the effectiveness of the emotional responses they produced in their listeners (see Figure 26).

Figure 26 First prototype (left) and workshop ideas (right). Picture credit my own.

There were, however, other important questions discussed that this prototype left unanswered and that we thought would be important to include in the material fabric of our final prototype. The thread of resisting techno-utopian arguments when discussing the Blockchain was one example and also how to use the Blockchain to foster community curated content. In the end, we decided to focus on the nuances and ambiguities that give form to how a technology happens by abandoning the lo-fi prototype (and the topic of music) and taking a completely different direction when designing the final prototype.

3.6.2.   Final Design Object: Lightown

We titled our project On The Block and it aimed to question the concept of Intellectual Property by bringing to the fore the unexpected uses that a technology like Blockchain makes possible. In wondering about the processes through which knowledge is transformed into intellectual property, we started playing with the interactions between the highly formalized and trustworthy and the informal and untrusted. We realized that no matter how techno-optimistic one is, the Blockchain could empower one, the other or any sort of mix between the two. These are the questions that motivated our design:

"Could we imagine a sort of Intellectual Property that adds intrigue to information? One that is produced and consumed locally? One that finds its value in the scarce and colloquial rather than the ubiquitous and global?

We envisioned GossipChain, a reputation and market-backed digital ledger based on rumours. It uses prediction markets and scores to assess the reliability and value of a piece of gossip. Each neighbourhood has a GossipTotem, a physical sculpture-like structure that is connected to the Blockchain and that manages the upload, validation and exchange of gossips. It is only from a GossipTotem that a community can submit new gossips and only by being physically co-present with it. It is also when a person stands in front of the GossipTotem that other gossips can be challenged. The GossipTotem runs a reputation system that evaluates gossips according to the market demand for the gossip and through "checker" people who certify the gossip by adding their signatures. One of the members of our intellectual property group, Jaya Klara Brekke, wrote a scenario illustrating its use:

Alice has many friends in the catering industry and has recently heard that Bob, the owner of an otherwise very popular competitor restaurant does not have the correct immigration papers. She submits this gossip on the GossipChain. The restaurant is popular, so plenty of people want to hear what her gossip is and pay for access to it, and Alice quickly starts to make money from submitting this gossip. Five of Alice's friends sign her piece of gossip, giving her a good reputation that further increases the value of her gossip. In the meantime, Bob the restaurant owner is getting worried that immigration will check the GossipChain and cause problems at his restaurant. He submits a challenge to her gossip, and because his restaurant is so popular gains plenty of signatures in his favour. The more people sign his challenge against Alice's gossip, the more Alice's reputation as well as that of her co-signatories goes down, potentially affecting their future ability to earn from submitting gossip. Alice was counting on licensing her accumulated gossip about the catering industry to a high-profile food magazine but the value of her gossip is dropping due to the signatures gathered against her claim. A secondary prediction market taking bets on the outcome is primarily backing Alice's claim - driving more people to go to the neighbourhood GossipTotem to submit signatures supporting Alice. The neighbourhood rallies in support for Bob, holding pickets and picnics by the GossipTotem to prevent anyone from supporting Alice with more signatures. Alice watches, as her future ability to earn from her GossipChain reputation is determined through the competition between the prediction market and

Bob's popularity in the neighbourhood and ability to gather support and signatures…[51]

This text highly resembles a rather old fashioned scenario with underdeveloped characters and an almost non-existent plot. This kind of material is precisely what design fiction wants to stand up against. We decided to move away from this kind of flat descriptions when designing our final design object. GossipChain invited us to think about the implications of informal knowledge, its value and how members of a community can capitalize on it. We went further with this idea and imagined a different totem, one that did not gather rumours but rather open source knowledge for the maker economy. Maker spaces (of which Fablab is a famous brand) are places that provide tools that marry digital and physical making. Many of the objects are 3D printed and rely on digital blueprints that might as well be developed by the community. We called this MakerChain and imagined a MakerTotem located in a community's maker space where people would exchange and profit from their local maker knowledge. This is another scenario from Jaya:

Alice becomes a member of a FabLab. She produces a CAD drawing of a three-person reconfigurable chair and submits it for vote to be this week's addition to the global MakerChain blockchain. The makers in a sister FabLab vote on whether a given asset is good to go on the MakerChain - Peer reviewed quality control. She gets 87% digital signatures in the network, enough votes in the peer-review for the quality for her design to be considered worth adding to the common MakerChain. The MakerChain takes turns computing blocks rather than compete (see proof-of-cooperation) and so the FabLab whose turn it is gathers that week's designs and hashes them into the MakerChain. The MakerChain holds proofs of the existence and quality of the digital assets and a smart contract associating the design with Alice's and her Fablab's MakerTotem so that they can receive remuneration if the design is sold to external users. The smart contract also designates a set of keys from sister MakerTotems that are able unlock (decrypt) the asset. In the meantime, the FabLab, and Alice, can now earn revenue from any external company wishing to lease or purchase the design, while keeping it open for anyone else in the MakerChain network to modify, improve and use locally. Any updates to the design as held on the MakerChain, however, require an additional payment as it changes the state of MakerChain ensuring a level of quality control. This allows others to add to and improve on the design and upload new versions. The remuneration for the asset goes via Alice's Fablab's MakerTotem, which acts as an escrow wallet between Alice and the purchaser.

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[51] All these stories were part of a flyer that we distributed in the final workshop of this event. Some of the text can be found here: (EU Science Hub 2018)

Aside from rumours and digital files there is a great body of informal knowledge that a community can share and benefit from. Food recipes, interesting recommendations for hidden spots or local histories are some examples. We envisioned a CivicTotem where these fragments of local knowledge could be shared and sold and associated its technical ways of working to those of the GossipTotem and MakerTotem. We called it CivicChain and Jaya wrote another scenario:

> *1) Alice hears that the C creator of a specific style of music comes from N neighbourhood. She searches the CivicChains and sees that there is indeed an entry about this person in the N neighbourhood CivicTotem but she is not able to access the music and information unless she travels to that neighbourhood and goes to the CivicTotem. When she arrives she finds out from the CivicTotem that there is still a recording studio that is active run by the niece of C and she goes to visit the studio to interview the niece and spends the rest of the afternoon exploring the area. 2) Bob was part of a campaign against The XYZ Investment Company who have evicted many tenants in the N neighbourhood. He uploads information about this company and the specific campaign as part of local history. Carol who is a contributor of a sister CivicTotem that lives in a different city sees that there is information about XYZ company on the N CivicChain. She is unable to travel to N neighbourhood and so requests remote access and is sent keys giving her temporary use of the information based on her ongoing contributions to the CivicChain network. XYZ company sees that there is an entry about them and wants to know what is written about them on the CivicChain. They request access and are charged a fee for the access because they are not contributors. The fee goes towards the overall maintenance of the system and towards CivicTotem events across the network of neighbourhoods.*

We are showing these scenarios in order to accentuate the contrast between different understandings of how fiction can be applied. These scenarios are standard HCI depictions of a systems that try to push forward an understanding of functionality without grasping the complexities that might arise in the interaction or the nuances that characterize the people interacting with these systems. They were requested by the organizers in order to appeal to the most technically adept members of the audience. For the design of the final design object we decided to reject this kind of simplified engagements with fictions and instead focused generating meaning in use. Our final design object would explain our project by interacting with it. We led the design and were hugely helped by Sania Dzalbe and also by James Auger. In ideating it, we came across

a fascinating story that took place during the Arab Spring[52]. Egyptian activists, allegedly motivated by their Tunisian neighbours, planned a revolt in the city of Cairo. The task was to spread the message of coming together in Tahir Square on the 25th of January of 2011 to as many people as possible. Evidently, they spread their message online but with only 20% of the population connected to internet they had to devise alternative ways to reach people. In a move of true genius, they realized that taxis could be exceptionally instrumental in serving this purpose. If taxis could function as diffusion nodes their range of impact would warrantee a massive popular assistance to the protest. There was a problem, however: whenever they directly shared their message with taxi drivers a heated political discussion would ensue and the message would fail to be transmitted. The ingenuity of activists struck again and they figured a way. Instead of directly relaying the message to the taxi drivers, two activists would sit in the back of the car and secretly discuss the details of the gathering. The taxi driver would eavesdrop and overhear the conversation as if it was a priceless gossip and comment on it with fellow taxi drivers and passengers. The message spread and the revolt turned out to be historical.

Our final design object is an interactive prototype is the model of a city where taxi drivers capitalize on their access to informal knowledge via the Blockchain. Although at the time we didn´t give it a name, for the purpose of clarity in this dissertation we chose to refer to it as Lightown. The maquette is 2x1.6m and hides magnetic sensors. When the model of a taxi that has a magnet attached follows a route around the town, a path of lights is created. At the same time, the faint sound of a conversation can be heard from certain angles as it emerges from a directional speaker hidden within one building. Finally, when the taxi arrives at the stop where the GossipTotem is located, the gossip stops and the path blinks symbolizing the upload to the Blockchain. We also sculpted the CivicTotem and the MakerTotem (See Figure 27 and 28). The maquette was exhibited and interacted with in the European Union Headquarters in Brussels where for one day we participated in series of talks and presentations (See Figure 29 and 30). In interacting with it, participants in the workshop held conversations about what might

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[52] Interestingly, what stroke us as significant from this documentary was how ineffective certain technologies were in facilitating the revolt: ("BBC Two - How Facebook Changed the World: The Arab Spring" n.d.)

happen when more informal forms of knowledge get tokenized, formalized and fixed on the Blockchain. The conversation was not about techno-utopian futures but about technological presents and their relations to the everyday.[53]
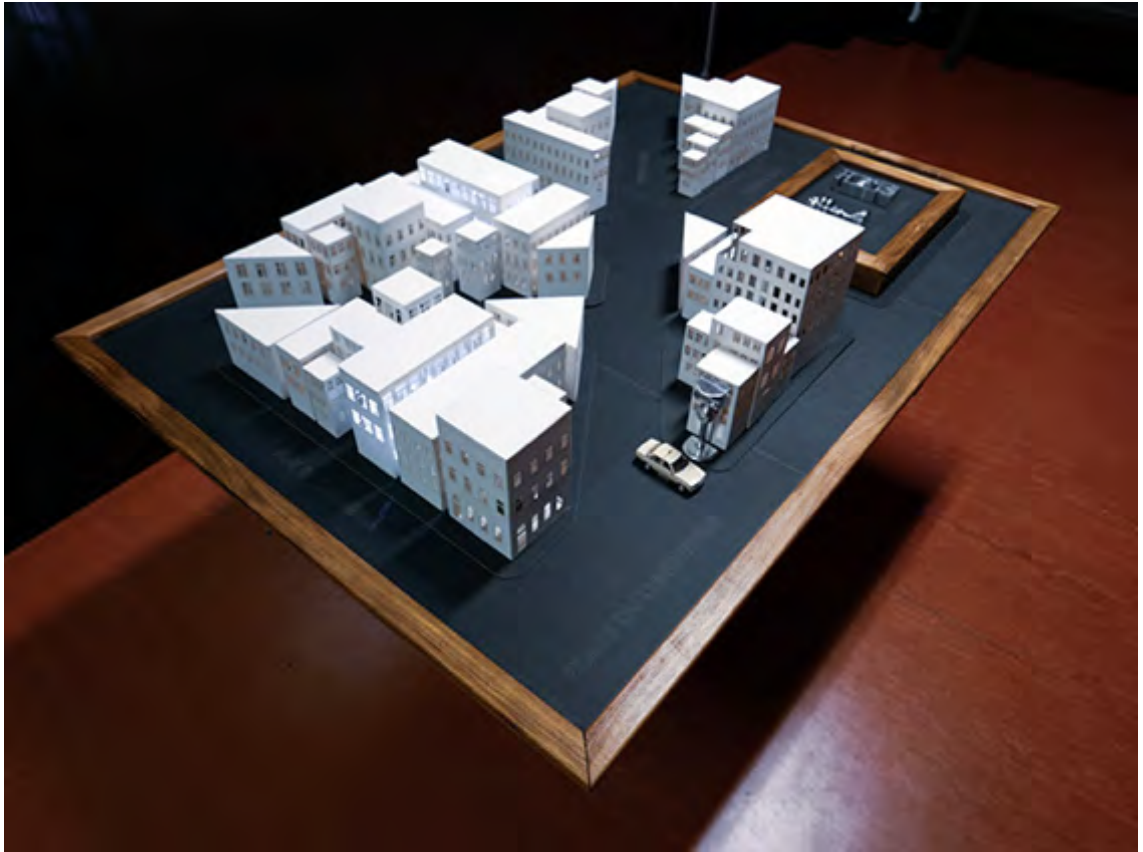
Figure 27 Lightown, the three totems (GossipChain, CivicChain and MakerChain) and the magnetized taxi. Picture credit Julian Hanna.

Figure 28 Detail of Lightown. Picture credit Julian Hanna.

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[53] For a video of the prototype see: (Joint Research Centre 2018)

Figure 29 Lightown exhibited in the Schuman room, Berlaymont building of the European Union in Brussels. Picture credit my own.

Figure 30 Overview of the Schuman room in the Berlaymont building of the European Union in Brussels during the final workshop of the #Blockchain4EU project. Picture credit my own.

3.6.3.   Insight: On the Future of Objects

Historically, fiction's ability to mobilize the future has been used in service of the economy, a notorious example been Norman Bel Geddes's Futurama exhibit at the 1939 New York World's Fair (Geddes 1940). As part of the Reconstrained Design group, I contributed to a paper where we tried to put the Geddes' exhibition in context (Auger, Hanna, and Encinas 2017):

> The installation featured a 35,738 square foot (3320 m2) model depicting a utopian vision of America set 25 years in the future. The technology that inspired Bel Geddes's proposal was the internal combustion engine, his client General Motors' core product. He designed super highways to connect America's cities, revolutionary run-offs allowing the cars to join and leave the motorways without slowing down, and the sprawl of a perfect picket-fenced suburbia. For visitors whose outlook had been influenced by the Great Depression, this future was compelling. It was a place that was clearly better than the present, and American consumers bought into the dream. As a result, many aspects of Futurama became reality. Futurama was of course motivated by other interests than simply creating a better future, not least the selling of a particular political and corporate agenda—interests that are strikingly revealed in E. L. Doctorow's 1985 novel World's Fair. As a family leaves the ride, the father says:

> "'It is a wonderful vision, all those highways and all those radio-driven cars. Of course, highways are built with public money," he said after a moment. "When the time comes General Motors isn't going to build the highways, the federal government is. With money from us taxpayers." He smiled. "So General Motors is telling us what they expect from us: we must build them the highways so they can sell us the cars.'" (Doctorow 1985: 285).

Futurama provides a valuable historical lesson, in that through hindsight we can compare the promise of a corporate future with the reality that came to pass. Highways were built and millions of cars were sold. But Bel Geddes's vision—a vision constrained by his role as a designer working for a corporate client with the brief to glamourize and sell the technology—neglected to present obvious shortcomings. These shortcomings included not only traffic jams, smog, accidents, and road rage, but also more complex societal consequences such as insurance fraud or the decline of cities that relied on automobile manufacturing.

It comes as no surprise then, that when the moment came to devise the model of a city it was necessary to think hard on what was to be accomplished. Lightown was going to be presented to a cohort of political representatives that could directly influence the

making of laws concerning Digital Ledger Technologies like the Blockchain. We could have tried to go down the Bel Geddes road and with an appeal to realism, try to sell a future that would satisfy the expectations of the stakeholders involved. In using the future as excuse, a whole cohort of objects would have become visible at the cost of other objects being swiftly hidden under the rug of criticism. Many times, when a future is presented it is quickly and easily assimilated. Unlike Geddes, we did not have the need to legitimize the interests of our client (up to the point of recommending the government to not take part in "Europe's tragic war"[54]) and hence, we had the freedom to mobilize objects of fiction without the credentials of an impending future. In order to escape techno-utopianism we decided to reject the future altogether. This rejection of the future, or this consideration of the future as non-existent is how I appropriated Garcia's model of the future. In the Milieu, no thing happens in the future but the future is a repulsion force that guarantees that the present keeps coming. The future not as what is to come but as what guarantees that events keep coming.

To come a bit closer to the workings of the future, it is important to stretch a hand into our metaphysical workshop, into the Milieu, and recall its understanding of time. Even if it was concise, Tristan Garcia helped furnish the Milieu with a theory of the past, the present and the future. Let's recall a brief passage that deals with the future:

> *Every determination of the future – through a psychological projection, a prophecy, a science fiction narrative, the determination of probabilities or of laws of nature (on the grounds of radical contingency, as Quentin Meillassoux claims [14]) – is therefore a transformation of the future into an ersatz past, a determined order of (particularly causal) events. Due to this ersatz past projection, the future is wrongly placed after the present, which is supposed to come after the past – an unending source of confusion for common sense.(Garcia 2014, 185)*

There is absolutely no object that takes place in the future. An object is in the present or was in a previous present, which is what one calls the past. As I described in chapter 2, in the Milieu, the future is a force of repulsion, a maximum of indeterminacy that allows for the present to be maximally determined and for the past to be ordered

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[54] The last sentence of Magic Motorways, Geddes's book about Futurama, reads: "We all hope that America will not become involved in Europe's tragic war. Let us build American motorways which will help us to stay out and which will, at the same time, help us make the most of this country's peace-time resources." For more, see: (Geddes 1940)

according to the degree of weakening of its determination. The future is anything but determined, for if it was, it would stop being the future, what is to come, to become the present, what is, or the past, what was. When the future is determined by means of an object, a story of science fiction, or an expensive model paid by General Motors, what is created is not a future object but a very present and "wicked" object. This object messes up common sense by a rather neat sleight of hand. In describing the future, a story is created that situates that future, as a pure fictional object, as a fake past. As a sequence of events joined by a chain of causality. In witnessing an invented future, one is under the spell of a story that feels like it has already happened but we believe that the present that it is attached to is yet to come. The expression "the future is already here" could not be more correct, not because the future has arrived to our present, but because the future is a story that when grasped by our understanding feeds on our familiarity with the passage of time and inverts the location of the present. Suddenly there is a chain of events that we wrongly place after the present although they very much feel like we know them, as if they already belonged to the past.

Paradoxically, the future has already happened but not yet.

Part 3

Theory

In the first chapter of this dissertation I made an argument for the possibility of design research. In particular that research through design is a valid form of discovery and knowledge creation is a fundamental notion for this inquiry: things can be thoroughly known by making and designing them[55]. On this ground, I proceeded to describe the subject of my study, the real and the fictional, their relations, their nature and their involvement in the objects of design: what makes objects of design real or fictional? The opening chapter concluded with a requirement. In order to approach my subject, I needed to access a space where I could make and test any conceptual tool, a metaphysical workshop where I was allowed to think about any thing. I called this space Milieu and proceeded to describe it in chapter two. In very simple terms, I created the Milieu by adapting and to an extent appropriating the thought of Tristan Garcia. The Milieu is a philosophical sketch or a prototype, a very incomplete object that allows me to understand other objects by situating them in relation to it. The necessity for it spawned from the difficulties I encountered when I attempted to self-reflect on what were the elements of my own worldview. The Milieu affords me the capacity to find thinking pathways into rather complex or loaded objects like time, the future or existence which also are central elements of my own worldview. In chapter three, and once the Milieu was readily deployed, I delved into all the objects that I designed as part of this research effort into the real and the fictional. I followed a loose chronological description starting in Autumn 2015 and ending in Spring 2018. Each design event was framed within a Metaphysical probe: an effort at understanding the real and the fictional character of design objects from a particular angle. Each metaphysical probe was structured through a design event and resulted in a final design object. By final design object I referred to that design object on which a particular design event hinged and that once completed or fully designed, resulted in the design event concluding or morphing into other design events that informed a different metaphysical probe.

In chapter three I aimed at comprehensively reviewing and critically analysing my design work and I gained a bulk of insight as a result. Undoubtedly, it would be possible to structure this crowd of loosely linked understandings of the real and the

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[55] Arguments and references supporting this claim can be found in Chapter 1:Path of this dissertation.

fictional into a more or less coherent whole that we could call theory[56]. But this exercise at theorizing would possibly, and as I argued in chapter one, meet its demise as soon as any designer would attempt to use it. Jumping from insight to theory would result in a static piece of knowledge, like a tool that is so utterly designed that it can only do one thing: to display a frozen grasp of reality. I would end up making a theory of design, more or less valid or compelling, but with a very limited range of conceptual use in design.[57]

What I am after, however, is a very different thing. I want to provide a design theory of fiction that is useful for, first and foremost, design researchers and practitioners that take designing as fundamental in order to access new knowledge. Those people constantly engaged in processes that bring about the new by means of the artificial (Simon 1996). From my perspective, and in line with Redström, the kind of theory that designers will find more useful must provide an unstable grip and not a complacent understanding of the issue it addresses. It is in this way, by directing understanding without fixing it, that the field of possibility that the theory affords is left open for the designer to freely operate with while engaged in her own unique process of design. With this design theory of fiction, I aim at a "transitional theory" that Redström so finely describes in the last chapter of his book:

> *Thus a key idea here is that to do design theory is not to introduce or articulate the use of long since-established terms in the context of design and designing but rather to, once again, make and create them … A kind of "transitional theory." If "design theory" refers to what we use to conceptualize, understand, and articulate design and designing, then "transitional" refers to the way in which these ideas do so. Avoiding the static criteria so characteristic of how we normally think about conceptual precision, what has been presented here is instead full of inherently fluid notions and becoming structures. And while this means we have sacrificed certain forms of stability, we seem to have gained something that comes prepared to cope with continuous change. (Redström 2017, 135)*

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[56] Or "Discussion" if we were trying to adhere to a more "traditional" format of doctoral dissertation.

[57] This claim as well as those in the next paragraph describing the need, possibility and limits of design theory are discussed, argued for and supported with literature at the end of Chapter1:Path.

In Part 3 I present a design theory of fiction. In developing it, I want to preserve the possibility to cope with continuous change when designing objects that closely relate to fiction. To do so, in Chapter 4 I will develop an intermediary stage between insight and argument similarly to what Redström (Redström 2017) and Hook (Höök and Löwgren 2012) have done in their work. The insights that I gained in chapter three will inform the creation of three concepts ("transitionals"). Later, in Chapter 5, these intermediary concepts or "transitionals" will help me develop and articulate a theoretical stance towards matters of concern for designers dealing with objects of fiction.

Before I move on to chapter 4, I would like to clarify the limitations of the design theory that follows. The main focus of this dissertation is to provide an answer to the research question "what makes design objects real or fictional". The answer is made through design and takes the form of a design theory. As such, it is similar to other outcomes of research through design: it is aspirational, contingent and provisional (W. Gaver 2012). Also, the main focus of this dissertation has been in making the design theory and not testing or validating it (although I briefly put the design theory to use in chapter 5). The reason is pragmatic: a PhD is three years long and I decided to give primacy to designing and making real, fictional and conceptual objects.

Chapter 4

Transitional

In this chapter I introduce three concepts. These three concepts function as a form of intermediate knowledge, they modulate insights and structure claims without absolutely being one or the other. They are similar to what Höök and Löwgren termed "strong concepts":

> *Design-oriented research practices create opportunities for constructing knowledge that is more abstracted than particular instances, without aspiring to be at the scope of generalized theories … We propose an intermediate design knowledge form that we name strong concepts that has the following properties: is generative and carries a core design idea, cutting across particular use situations and even application domains; concerned with interactive behavior, not static appearance; is a design element and a part of an artifact and, at the same time, speaks of a use practice and behavior over time; and finally, resides on an abstraction level above particular instances. (Höök and Löwgren 2012)*

The concepts that follow resemble the strong concepts in their generative, dynamic and abstracted character. However, they are also different, for they are not only concerned with interaction. These concepts have the function of facilitating a transition between discovery and argument or between insight and idea. They are informed by the

insights gained through my design practice presented in Chapter 3 and inform the theoretical arguments that will be presented in Chapter 5. They are intentionally flexible and slightly ambiguous and more so than the design theory they are part of. With them, I try to provide design researchers and designers with the conceptual tools that underpin the design theory I present in Chapter 5 so they can be free to customize it in order to respond to their own design needs and processes. They are like dormant seeds waiting for the spring of conceptualization to arrive. Only if they blossom through use, there will be an evidence that a change has taken place (something that I acknowledge I don't have any evidence of). This is the reason why I have called these concepts "transitionals" and found in Redström's metaphors a suitable illustration:

> *These ideas, concepts, principles—theories—are transitional in a sense similar to the notion of transitional forms in evolutionary biology: traces of how a form has evolved into another, as in transitional forms showing how life evolved from living in water to living on land. They are transitional in a sense similar to the notion of transitional object in psychoanalysis: objects such as the child's blanket providing comfort and support during the process of developing an understanding of the external world, as when grappling with the "not-me," of experiencing the parent as external to the self (cf. Winnicott 1953; Attfield 2000). They are transitional in a sense similar to Wittgenstein's ladder:1 propositions that are used to obtain a different view but in retrospect are no longer necessary. (Redström 2017, 136)*

4.1. Transitional #1:
Ontological Principle :: Ontoference

All the metaphysical probes that I analyzed in Part 2 of this thesis met a similar fate with regard to the reason that motivated them. Initially, it seemed to me that by approaching reality through the right angle I would be able to differentiate real and fictional objects. However, reality remained unaffected by the metaphysical probe of existence, as if it was impassive to the existence of the objects that composed it or as if no object could be deemed non-existent. I must recognize that the design events and final design objects that formed the metaphysical probe of existence deeply influenced the development of the Milieu, the metaphysical workshop. I felt the need for a conceptual space ready to acknowledge the radical profusion of objective existence I was discovering

and, at the same time, in furnishing the Milieu with the flat ontology of Tristan Garcia I realized I could properly cope with ontological plurality.

Although, in my view, the other metaphysical probes that figure in Part 2 didn't manage to separate the real and the fictional, they provided me with clues and insights about their character. The event of #LiftBlr, for example, and the metaphysical probe of effect, helped me understand that fictional objects are not effective by themselves but only via the real objects that coexist with them. Also, through Bookonon, and the metaphysical probe of plausibility, I learned to see through the veneer of verisimilitude that coats many design objects that situate the fictional at the core of their activity. However, the real and the fictional remained stubbornly entangled and it is precisely this fact, that the real and the fictional form a sort of alloy with components difficult to isolate, that lead me to the principle of Ontoference, the first transitional in this section.

Ontoference is a principle as it is normally the case with any theory: it is a piece of fundamental knowledge on which the rest hinges upon or can be derived from. To define this transitional as a principle has a double purpose. First, it allows the design researcher that is engaged with this thesis to quickly and easily undermine the design theory that I propose. It is analogous to a backdoor in computer software that, if exploited, demolishes the whole theoretical edifice that is built on top of it. And exploiting it is not a difficult exercise for all one has to do is consider it erroneous or inappropriate. The other purpose of this transitional as principle is to provide a base that facilitates other theoretical excursions. This is analogous to a floating port where conceptual ships can dock and decide where to go next. The design theory of fiction (and the arguments presented in Chapter 5) is just one of the possible theoretical routes and it is likely (and even recommended!) that other original routes appear if a designer deems this principle appropriate.

4.1.1. An object is difference. An object is interference.

In the Milieu (in Chapter 2 of this thesis), I also established a fundamental ontological difference that I found not only in human objects, but in all objects. This led me to consider, in line with Tristan Garcia's flat ontology, an ontological difference

inherent to objects themselves. Objects as the difference between the senses of being and comprehending. Objects as differentials between their parts and their relations, between the objects that compose them and the objects they compose.

"Ontoference" is a made-up portmanteau I have invented joining together "onto-", in a reference to ontology and "-ference" in a reference to "difference" (and as we will see later in this section also to "interference"). By "ontoference" I refer to the ontological nature of objects by means of the fundamental difference that is at their core of their existence. The principle of ontoference stablishes that objects are a "pure difference" that goes beyond, not only their substantial qualities but also their relational character. What an object is, any object, is the difference between the objects that compose it and the objects it relates to.

The principle on ontoference profoundly influences the act of knowing objects by imposing a sort of dynamic irreducibility. To know an object is to know it partially or sequentially and never to know it as a whole. For example, one can wonder what this pencil is. Depending on how the question is asked and the pencil approached, the definition of the pencil will close on one side and leave open the other. One can define the pencil based on its components, the pine wood that forms its body and the colours that cover it, the density of the graphite that forms its core, etc. In doing this, one leaves open, on the other side, what comprehends the pencil, what the pencil is in, its "being been": the room in which it is located, the hand that holds it, the drawing it accomplishes or the model the drawing represents.

Also, the principle of ontoference can be understood through an analogy to the concept of interference. Interference as that space where a conflict between meanings creates a gap or a space that would not exist if not for a particular interaction. Ontoference is analog to the visual effect of wave interference in physics, where regions of darkness and light alternate as a result of two colliding waves (See Figure 31). But the "waves" in the principle of ontoference are the senses of being and comprehending from which any object can be approached. The object is not one sense or the other, but the interference they cause when both senses collide.

We can take, for example, the imaginary abstracts on which the metaphysical probe of effect hinged. What are these imaginary abstracts? On one side, these imaginary abstracts are a compendium of ideas structured through a particular sequence of words. They are words on the page of a printed paper or an electronic document. Also the imaginary abstracts are part of a larger argument that is presented in a paper, they are an element of metaphysical probe and a bit of a PhD thesis and also, a part of the wider discourse going on within a particular academic community. In summary, what the imaginary abstracts are, is the difference between these multiple objects that are in each other or, analogously, the interference between the objects arising when an object is looked through the lenses of being and comprehending.
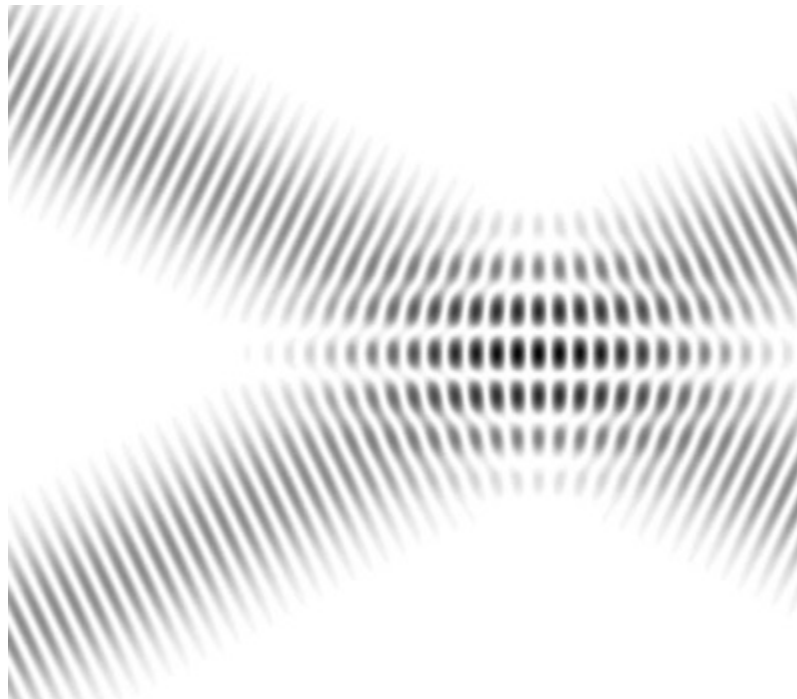
Figure 31 Simulation of interference between two plane waves. Image credits Wikipedia commons.

4.1.2.   Example: Alphonse Laurencic Psychotechnic torture jail cells

The book "The parallax view" by Slovenian philosopher Slavoj Žižek (Žižek 2009) opens with a surrealist example. During the Spanish civil war at the end of the

1930's a French anarchist painter was commissioned by an anarchist leader of the civil resistance to Franco's forces in Cataluña. His task was to put his artistic abilities in the service of torture by designing the cells of a prison. He was inspired by the work of Bauhaus artists like Klee and Kandisky and also surrealist painters like Dali and Buñuel, and came up with what he called "psychotechnic torture". This is how the cells worked:

> *Beds were placed at a 20-degree angle, making them near impossible to sleep on, and the floors of the 6-foot-by-3-foot cells were strewn with bricks and other geometric blocks to prevent the prisoners from walking backward and forward. The only option left to them was staring at the walls, which were curved and covered with mind-altering patterns of cubes, squares, straight lines, and spirals which utilized tricks of color, perspective, and scale to cause mental confusion and distress. Lighting effects gave the impression that the dizzying patterns on the wall were moving. Laurenčič preferred to use the color green because, according to his theory of the psychological effects of various colors, it produced melancholy and sadness. (Žižek 2009, 3)*

It might be worth wondering whether any of the famous artists that inspired Laurenčič, Klee for example, foresaw such abhorrent use of his artistic insight. Could Bauhaus functionalism be a mechanism of torture? I am inclined to answer in the negative but I can't. History has already proved me wrong. But then, when I try to define what the work of the Bauhaus is, should I include torture? Although not as extreme as in this example, I have constantly encountered an explosive tension when trying to define what things are. It is as if to any effort of pinpointing the ontological nature of an object I was forced to add the Deleuzian coda, "yes, it is that, but it is also …" (Zizek 2012) This additive chain of being seems to follow an endless concatenation sometimes connecting objects that belong to completely different (ontological) domains. This is precisely the case with the "psychotechnic" prison cells where art and torture coalesce in the most heinous of objects. [58] Žižek's finds the object in a difference that is not an attribute of the

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[58] For Žižek, this effect of encountering a gap that is materially short circuited and which demands a short of oscillation in order to be perceived is what he calls parallax:

"… the illusion of being able to use the same language for phenomena which are mutually untranslatable and can be grasped only in a kind of parallax view, constantly shifting perspective between two points between which no synthesis or mediation is possible. Thus there is no rapport between the two levels, no shared space—although they are closely

subject but holds an objective ontological weight. This ontological difference goes well beyond the subject/object dichotomy, it is a part of reality.[59]

"in contrast to a mere difference between objects, the pure difference is itself an object. Another name for the parallax gap is therefore minimal difference, a "pure" difference which cannot be grounded in positive substantial properties."(Žižek 2009)

4.1.3.   Farewell to essence

The principle of ontoference imposes a radical irreducibility on objects that gives them an opportunity for emancipation from absolute understanding. No object can be understood absolutely. No matter the object under scrutiny, fixating on a definition means discarding some components or relations. Grasping an object following the principle of ontoference demands first and foremost an exercise of epistemological humility: we can only know what an object is partially and inadequately. Definitions are always incomplete and our understanding forever imperfect. Any definition of what the work of the Bauhaus is, for example, will never be all encompassing for one can always find new elemental components or disclose new relations. The same happens when trying to define an imaginary abstract, a gravity battery, a prison cell, a geometric pattern or the colour green. Importantly, adopting the principle of ontoference as a guide into the world of objects has

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connected, even identical in a way, they are, as it were, on the opposed sides of a Moebius strip. (Žižek 2009, 4)

[59] "The philosophical twist to be added, of course, is that the observed difference is not simply "subjective," due to the fact that the same object which exists "out there" is seen from two different stances, or points of view. It is rather that, as Hegel would have put it, subject and object are inherently "mediated," so that an "epistemological" shift in the subject's point of view always reflects an "ontological" shift in the object itself. Or—to put it in Lacanese—the subject's gaze is always-already inscribed into the perceived object itself, in the guise of its "blind spot," that which is "in the object more than the object itself," the point from which the object itself returns the gaze. "Sure, the picture is in my eye, but I, I am also in the picture" (Žižek 2009, 17)

a high price: to abandon notions like essence or feelings like the comforting assurance of total understanding.

The principle of ontoference reminds one of the inherent differential and interferential character of objects and also of their ontological dynamism. This pencil is something changing, if its components are modified or altered, for example if the graphite tip breaks, its form and the objects it enters into a relationship with, also changes. The opposite is also the case with variations of form resulting in variations of matter. For this reason, identity or substance are the primary foes of ontoference, ideas that can incite only doubt. What is the essence of this pencil, or this imaginary abstract for that matter, when this pencil is different depending on what is in the pencil and what the pencil is in?

The consequence of the principle of Ontoference is an apparent epistemic problem that no discipline or field of knowledge is able to avoid. If objects cannot be grasped as wholes, who is right? If one stands in front of a tree thinking about what it is, should she believe the biologist, the climatologist, her memories or something else? Tristan Garcia looks at this question through a chair, an empiricist and an idealist:

> *An empiricist will still infer that which the chair is from that which is the chair. An idealist, conversely, will infer that which is this or that thing from that which this or that thing is. For both the empiricist and idealist, the leap from one sense of being to the other is possible; either I can determine that which it is to be this chair from everything which is a chair, or I am allowed to determine that which comes under the definition of a chair from the idea of chair. Now, both the empiricist and idealist explode the chair's connection: the irreducibility of that which is 'this' to that which 'this' is, is precisely 'this'. We could produce the concept of chair from the plurality of objects on which one can sit without knowing a priori what this chair is as a chair, what this chair is as the idea of chair. But doing so would only generalise all that is a chair, and no existent 'chair' thing would be. On the contrary, only absolutely singular entities in themselves would be, from which thought, knowledge, or language produces the general idea, the 'chair' effect. However, between the two, nothing would be. If I could determine from the idea of a chair what corresponds to this idea and recognise this or that singular, sensory thing as belonging to some 'chair' species, no chair would be. Rather, only the distorted sensory effects of an ideal chair would be. (Garcia 2014, 114)*

For the empiricist, only chairs that exist are chairs and the chair idea it generates will not be able to accommodate any new chair, as it is not conceived within the framework of what is. On the other hand, for the idealist only the ideal chair will exist, so when an existing chair appears it will never be completely a chair, but only a modified

distortion of the original idea. For the empiricist, only existing chairs are. For the idealist, no existent chair is. The chair, as a whole, escapes the idealist and the empiricist.

The solution to the epistemic problem is not a matter of plain relativism, of finding a middle ground on which to base the ontological status of an object. Instead, the solution, in my opinion, is a matter of constant oscillation between the two senses of being and comprehending. This renders disciplinary knowledge all the more relevant. The more profound the insight from the empiricist and the idealist, the more varied the knowledge on the parts and the relations, the matter and the form of an object, the better the understanding of the object in question. The irreducible nature of objects advanced by the principle of ontoference should not lead to ontological despair but rather to the opportunity and richness of complexity. Each discipline provides clues as to what an object is or as to what the object is in. The problem of knowing becomes not one of taking sides, but one of bouncing between as many sides as possible.

In the particular case of design, the implications are far reaching. To consider design in light of the principle of ontoference means to acknowledge the need for both ontologies of substance and ontologies of transience. [something about this being dicussed in chapter 2] in order to access the objects it brings into the objective universe. The added difficulty for design is not that derived from the ontological complexity that the principle of ontoference carries but rather the doubling of design as an epistemic discipline that is both object and event. Design encompasses both deeds and doings so the tension inherent to objects becomes even more present. It is for this reason and also to provide a basic means to handle the objective complexity resulting from the adoption of the principle of ontoference, that the next transitional will be an epistemic operation.

4.2. Transitional #2 ::
Epistemic Operation :: Deswing

After the metaphysical probe of existence and the setting up of the Garcian Milieu, the principle of ontoference has avidly hunted all the research efforts in this project. Early in this research I understood that the path to knowing what an object is was not linear, like a shortcut to a concrete and truthful impression that accurately represented an object. It was rather the opposite, the closer I got to the fulfilment of understanding, the more sudden the appearance of a sort of repulsive force that carried me away and into an opposite domain where I needed to reconsider what I knew. The digital dreamcatcher on which the metaphysical probe of existence was based defied a particular and all-encompassing definition. It was a rather rough assemblage of plastic and electronics, a sort of entrance to the dreams of participants, a prop, a museum exhibit, a photo in a paper, etc etc.[60] Luckily, I avoided the paralyzing effect of ontological anguish mainly because my results echoed the thinking and awareness of others. Among them is David Foster Wallace, the North American fiction author that wrote the simply marvellous Infinite Jest in 1996. In an interview in the year 2000, a reporter, the Spanish writer Eduardo Lago, asked him about the reasons behind his extensive use of notes in the book. This is what Wallace said:

> *I started using notes in The Infinite Jest as a way to create an additional sense to the "duality" of the book ... One of the things that seem most artificial in most of the fiction to use is that they operate as if the experience, thought and perception had a linear and singular character, as if we only thought or felt only one thing in each moment. Exactly that is one of the limitations of the page and I think that to some extent the notes serve to*

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[60] *Žižek* talk of objet petit a, the elusive object of human desire in psychoanalytic theory, might be relevant as an analogy here. He describes his status through the visual effect of anamorphosis (see Figure 62):

"an object whose status is that of an anamorphosis: a part of the picture which, when we look at the picture in a direct frontal way, appears as a meaningless stain, acquires the contours of a known object when we change our position and look at the picture from aside. Lacan's point is even more radical: the object-cause of desire is something that, when viewed frontally, is nothing at all, just a void. It acquires the contours of something only when viewed sideways." (Žižek 2016)

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suggest at least a kind of splitting that I think is a little more in line with reality.[61]

In Infinite Jest, Wallace tries to incorporate a duality that he sees imprinted in reality. He does so through a literary device, the footnote, that transcends the linearity constraining the written page. In a slightly similar way, I see a duality imprinted in objects to which I try to respond to through design in this thesis. Furthermore, in looking at the events that configure Part 2 of this dissertation, it is possible to discern the form that takes my response to the principle of ontoference. In examining the fictional and the real through design events and design objects I have performed a sort of oscillation. A back and forth movement alternating episodes of specialized inquiry. For example, the final design objects in the design event of #LiftBlr were, at the start, conceived as fictional but then I attempted to bounce back to the real by designing for external design briefs[62]. This swinging motion is also evident if one looks instead at my overall research through design approach. Rather than sticking to one access route into the real and the fictional, I iterated or swung between many: existence, effect, plausibility, etc. My response to the principle of ontoference had the character of a rocking motion. A way of knowing what the real and the fictional are with the form of an oscillating epistemic operation that I call deswing.

4.2.1. Deswing is the oscillation between ontological understandings

In terms of the Milieu, objects as difference or interference are always to a higher or lesser degree accessible only through the partial visions (senses) from which we look at them. Every epistemic discipline provides a perspective from which an object appears unblemished, complete. However, and paradoxically, when an object is viewed from a different perspective, it again becomes consistently one, different and same. All one can gain access to are projections of an object according to the senses of being and

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[61] The translation to English from the original in Spanish is mine. (Lago 2018)

[62] From metaphysical probe #2 of effect to metaphysical probes #3, #4 and #5 which were informed by design events based on design briefs imposed by stakeholders external to this project.

comprehending and not its essence or identity. The principle of ontoference imposes to an epistemic approach the need to make of the oscillation between being and comprehending an ally. The way to go about knowing objects in the Milieu is one that does not try to average the projections of an object in order to reach a consistent, static image which satisfies one's understanding. Instead, one can chose to accumulate projections and constantly oscillate between them. In the process of continuous switching, a residue gradually forms and it is precisely this residue, this leftover or this ontological debris, what is considered to be the object that one tries to understand. Obviously, one is never able to claim that this residue is, in fact, the object for as soon as one incorporates more projections within the oscillatory pattern, the residue changes. However, objects themselves are condemned to persistently change inasmuch as the objects they are part of and the objects they comprehend change as well.

4.2.2.   Linear Deswing

In the metaphysical probe of identity, I presented the process that lead to the design of a visual identity of a research group. In trying to approach what the visual identity is, I was forced to oscillate between its definition in terms of context and visual expression, as a logo for a conference proposal or a website and also as a set of curves, projections in terms of being and comprehending. What the visual identity is, is the difference or the interference between them and my approach to knowing it was linear, oscillating one step at a time between projections. For example, I would design something and present it to the research group in order to reflect on how its context defined it. To try to make things clearer, let's take look at another fragment from the same interview with David Foster Wallace mentioned earlier:

> *Why does tennis occupy so much space in his work?*
>
> *I'm afraid the explanation is not too interesting. It is the only sport of which I understand something. I grew up dedicating myself to competitive tennis. I just know a lot about tennis and I follow it with more avidity than any other sport. I think apart from a couple of essays and in The Infinite Jest I have not written about tennis. Anyway, the reasons why tennis occupies*

such an important role in The Infinite Jest are not autobiographical, but have to do with the general structure of the book.[63]

It would be possible to rephrase the question that the interviewer asks in the following manner: what is tennis for you in the context of your work? In the heat of the moment, Wallace answers by providing a definition aligned with the sense of being: a part of his life is in tennis, tennis comprehends his growing up. Immediately afterwards, Wallace realizes that this definition of tennis is incomplete for there is another sense that remains open in the other side, how tennis is comprehended by the book Infinite Jest, how tennis is a part of it. This quick oscillation seems to throw the interviewer off balance:

What do you mean, exactly?

Agg ... I'm afraid I've fallen into my own trap without realizing ... Let's see ... A very simple way to explain it would be to talk about the idea of movement, a constant movement but within a set of clearly defined limitations. It is also related to the idea of duality, with the existence of a movement that operates in two directions, backwards and forwards, going back and forth between two separate spaces, in such a way that a geometric shape is created ... something like that.[64]

As we saw in the first excerpt of this interview in the previous section, Wallace had put a lot of effort into trying to implement ways to overcome the linearity of the written word. Infinite Jest is supplemented with a large body of notes that invite the reader to experience a sort of emotional duality that for Wallace, is imprinted in how people experiences reality. Tennis is, for Wallace and in the context of his work, an object that comprehends a part of his personal experience and that he knows how to talk about but also, a suitable vehicle to transport the reader into a realm that transcends the linearity of experiencing one thing at a time. In a sense, tennis embodies the general movement of the book. David Foster Wallace is (in) tennis and the book comprehends tennis. What tennis is, is not one or the other, but the difference or the interference between the two, and I would add, not only between these two, but between many other objects that comprehend and are comprehended by tennis. In his attempt to define tennis in the context of his work, Wallace recognizes that he has unwillingly fallen into his own trap. This misstep in his eyes is a gift in mine. By not constraining his effort of defining tennis to

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[63] My translation. (Lago 2018)

[64] My translation. (Lago 2018)

the autobiographical and oscillating to the comprehending side, he has given a much more accurate view of what the object tennis is in the context of his work. He oscillated or swung between the two senses of being and comprehending and in doing so, he left an ontological trail that one can follow.[65]

There is, however, another reason for my choosing of this particular passage as an example. Aside from displaying a clear oscillation in order to show what something is, it serves as a revealing clue into an alternative way to accomplish such oscillation. What an object is can be partially known, with a higher or lesser degree of accuracy, by swinging between a definition given according to the sense of being to another given through the sense of comprehension. Accuracy or fidelity to the object in question can be affected by adding complexity through increasing the amount of definitions that constrain the oscillation. Crucially, however, the swing does not need to be linear, to follow a single direction at a time, like a pendulum moving back and forth between definitions. There is a way to accomplish a swing and obtain an ontological debris that does not involve a sequential observation of anamorphic projections. It is the way of metaphors.

4.2.3.   Metaphorical Deswing

In Infinite Jest, Wallace uses tennis as a metaphor to define what other objects are. This is a passage from the book:

> "And then also, again, still, what are those boundaries, if they're not baselines, that contain and direct its infinite expansion inward, that make tennis like chess on the run, beautiful and infinitely dense? The true opponent, the enfolding boundary, is the player himself. Always and only the self out there, on court, to be met, fought, brought to the table to hammer out terms. The competing boy on the net's other side: he is not the foe: he is more the partner in the dance. He is the what is the word excuse or occasion for meeting the self. As you are his occasion. Tennis's beauty's infinite roots are self-competitive. You compete with your own limits to transcend the self in imagination and execution. Disappear inside the game: break through limits: transcend: improve: win. Which is why tennis is an essentially tragic enterprise… You seek to vanquish and transcend the

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[65] If he hadn't done so one can still search in Wikipedia, or speculate after reading the Whole book (Infinite Jest), read other interviews, etc.

limited self whose limits make the game possible in the first place. It is tragic and sad and chaotic and lovely. All life is the same, as citizens of the human State: the animating limits are within, to be killed and mourned, over and over again…Mario thinks hard again. He's trying to think of how to articulate something like: But then is battling and vanquishing the self the same as destroying yourself? Is that like saying life is pro-death? … And then but so what's the difference between tennis and suicide, life and death, the game and its own end?" (Company- -Little 1997, 83)

Wallace reveals the metaphor only at the end of the excerpt. First, he characterizes tennis and translates some of its memorable characteristics into a language that is more appropriate for a battle than for a sport. Tennis is a sport and a battle and many other things to. Then, he unleashes the metaphor and like lightning, immediately defines a rather loaded object: life. Life is tennis. It is worth slowing one's thought when witnessing a metaphorical spectacle such as this one. There are exactly thirty-six definitions of life in the dictionary, including idioms, among which the closest to Wallace's might be "the animate existence or period of animate existence of an individual"[66]. There is no doubt that this literal depiction of life resembles life but what about Wallace's metaphorical illustration? It possibly provides a richer definition, pregnant with the nuances of what life is, not in general, but in particular. Certainly, the literal is more resilient to the cultural and the idiosyncratic. To understand the metaphor that Wallace depicts, one needs to participate, belong or at least understand, the cultural context where the metaphor is situated. Metaphors are fragile, heavily context dependent and ultimately particular, for their effectiveness relies on the resonance they cause in the beholder. This is the price they need to pay in order to gain the chance to define what something is with such immediacy and nuanced authenticity. I side with Graham Harman in his treatment of non-literal forms of access to objects:

There are numerous other examples in which indirect allusion, hint or innuendo are more powerful than direct access to the truth. For instance, it is widely recognized that a barely clothed body is more erotically charged than a completely naked one: which is why lingerie companies earn a fortune, and why nudist colonies are more of a political statement than an intriguing amorous option…. Threats are nearly always more effective when kept vague, as with Marlon Brando's catchphrase from The Godfather: 'I'm gonna make him an offer he can't refuse.'… On another front, we can see that humour is almost always ruined by literalization as well. Consider the following, widely circulated riddle: Q: 'How many surrealists does it take to screw in a light bulb?' A: 'Fish.' …But perhaps the clearest example of a non-literal form of cognition is metaphor. It has been known for some time that there is no way to make a perfect translation of a metaphor into prose

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[66] The one showed here is number 3. (Dictionary.com 2018)

meaning, just as there is no way to depict our three-dimensional planet
perfectly on a two-dimensional map. (Harman 2018a, 37)

A well-crafted metaphor is the quickest vessel sailing through the ontological sea of objective projections resulting from the senses of being and comprehension. What an object is can be approached in a series of defining jumps that progressively delimit its being. The progress achieved is linear and somehow pendular. Otherwise, the object can be approached metaphorically with a swing between senses of being and/or comprehension, between definitions that escape a complete determination. One is not sure of the steps or the boundaries that the metaphor has swung to and fro and yet, one is aware that what the metaphor describes is the object in question. Bruno Latour, a captain of metaphorical navigation, describes what metaphors allow as follows:

> *Clearly, what matters in all these somewhat awkward metaphors is*
> *the attention they allow us to pay to materiality rather than to words, and to*
> *the empty spaces rather than the full ones. And they allow us in particular to*
> *feel that the unfettered circulation of one value no longer has the ability to*
> *make another one completely disappear by disqualifying it from the outset*
> *on the pretext that there is "no place" for it to go. The one can no longer*
> *derealize the other a priori. They can all start circulating side by side.*
> *(Latour 2013, 142)*

The fact that metaphors are more than rhetorical flourish or an esoteric literary device is an insight that has not escaped many thinkers. Along with Latour and Harman one could mention philosophers like Locke (Locke 1841, 508) and Nietzsche (Hinman 1982) and also more recently and within the field of HCI James Pierce and Carl Disalvo (Pierce and DiSalvo 2017b) although perhaps of most interest for the current discussion is the work by George Lakoff "Metaphors we live by" (Lakoff and Johnson 1980). An enlightening book that demonstrates how human cognition is fundamentally structured by the use of metaphors. One of the early examples shows how in English language the act of argumentation is mediated by metaphors that associate it with war. One can say that claims are indefensible or that a criticism was right on target. Arguments have strategies and they can be lost or won. What the book makes clear is that abstract thinking heavily relies on metaphors. Metaphorical concepts, like "argument is war":

> *Structure (at least in part) what we do and how we understand what*
> *we are doing when we argue. The essence of metaphor is understanding*
> *and experiencing one kind of thing in terms of another. It is not that*
> *arguments are a subspecies of war. Arguments and wars are different kinds*
> *of things - verbal discourse and armed conflict- and the actions performed*
> *are different kinds of actions. But argument is partially structured,*
> *understood, performed and talked about in terms of war. The concept is*

Certainly, a metaphor is "understanding and experiencing one kind of thing in terms of another" but, following the principle of ontoference, I feel compelled not to be satisfied only with this sense of being. Let's take the Yiddish proverb "I talk cellar and he talks attic" (Sommer and Weiss 1996). This is a metaphor that defines disagreement in terms of not one object but many others (attic, cellar, communication). Also, it might not only define disagreement but also conflict or solution or quarrel. A metaphor is a powerful device that, and if properly culturally situated, does the swinging between ontological senses almost automatically and in the background. In an instant, it provides an ontological debris that, if the metaphor is successful, likely satisfies one's understanding in greater measure than a linear swinging between literal definitions.

4.2.4. Deswinging produces an ontological debri

Regardless of the method of approach, literal and sequential or metaphorical, to grasp what an object is involves back and forth movement, a swing between the different senses of what and object is and what the object comprehends. This epistemic operation is similar in some aspects to what Timothy Morton, another object oriented ontologist, refers to as "to rock":

> *A ship moving in intense waters is rocking and rolling. Humans
> having sex rock and roll. Rock and roll is a musical form involving driving
> drums, swiveling hips, riffing guitars. The early modern German "rocken," a
> rare term for wiggling the butt. To sway gently. The Swedish "rucka," to
> move to and fro.36 Rocking gathers a whole set of resonances to do with
> moving in place, oscillation, moving while standing still. Dancing, what a
> Russian formalist called movement that is felt. But dancing is also
> movement that isn't going anywhere. It keeps snapping back to its starting
> position. (Morton 2017, 139)*

Morton uses "to rock" to discuss not what things are but how things are: things are both static and dynamic and people awareness of things also undulates or changes depending on the spatial or temporal scales that come to play when conceiving of them. In terms of the Milieu, I interpret and translate Morton's "to rock" as an epistemic operation that aims at getting at what an object is. It is a swing that implies its own undoing in order to repeat itself. This is precisely the reason why I refer to it as deswing. This epistemic operation is similar to tuning to a radio station. One knows the sound heard

is not exactly the sound that is actually being produced but knows she is accomplishing a more or less accurate representation of it through a sort of tuning in with the source that produces it. Through deswinging one is approaching what an object is, but at all times one is certain that the object discovered is an ontological debri, not the object in itself.

If ontoference is a principle that implies what objects are in general, deswing is the epistemic operation that allows one to get closer to particular ones. Ontoference and deswing are two transitionals that have laid the necessary ground to finally disclose a transitional that specifically deals with design. It is worth noting, however, that although similar in form, deswing has nothing to do with design a priori. Nevertheless, design, as we will see in the next section is particularly good or adept at deswinging.
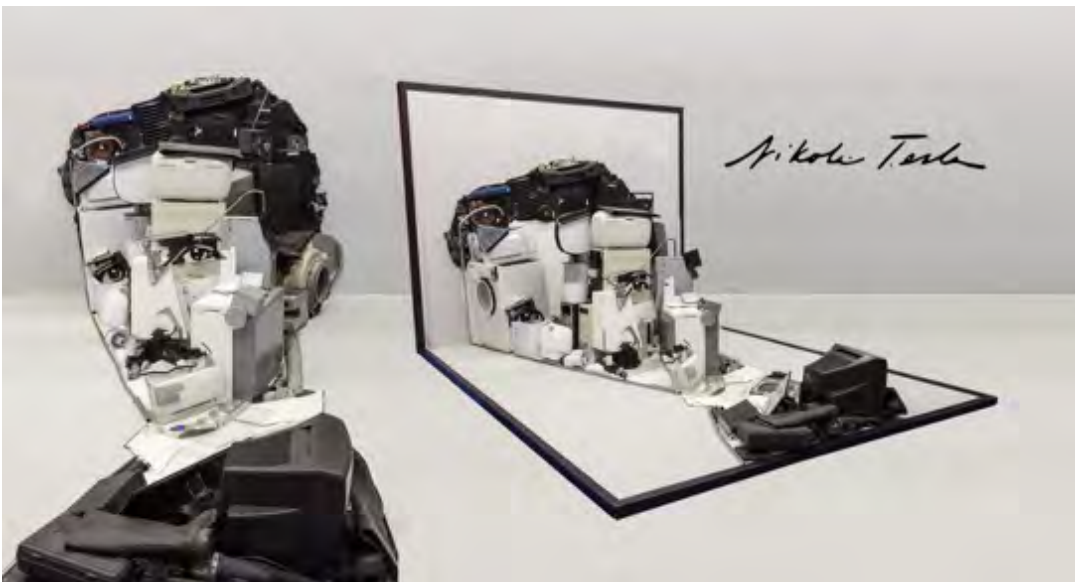
Figure 32 Example of anamorphosis by artist Patrick Prosko. It is only when we look at this accumulation of objects from a particular perspective that the portrait of Tesla can be seen.

4.3. Transitional #3 ::
Design Object :: Offject

Earlier in this section I have defined two transitionals that are not specifically concerned with design. The principle of ontoference addresses a general concern with the ontological status of all objects. Objects as irreducible to either the objects that compose them or the objects that they are related to. Ontoference as an ontological attitude when facing the question of what an object is. Similarly, deswing is related to objects in general. It is an epistemic approach or a way to deal with ontoference that takes it as a principle of operation. Deswing is a "how" by means of a bounce. Rather than trying to delimit what an object is by approaching it as a whole, the operation of deswing involves a shift between peripheral objects. It is accomplished by oscillating, through the sense of being and comprehension, between objects that compose and objects that relate. The swing can be sequential or metaphorical but the result is the same, an ontological debris or a trace of what the object under scrutiny in fact is.

The transitional that I present in this section is particular to design. In defining it, I am trying to be very careful with the complexity that the word design entails. What I mean by complexity is the fact that, in the English language, the word design is used both as a noun and as a verb. Design is a process but it is also an outcome or, in the verbiage of the Milieu, design can be both object and event. Quite interestingly, many design practitioners and academics choose to distinguish the work they do from the work of others by redefining design as an event, as an act. The operation is usually accomplished by complementing design with an adjective that expresses intention. It is easy to find examples in the thematic context of this dissertation: critical design, speculative design, adversarial design or discursive design. A way of designing can also be differentiated from others by the addition of a noun like it is the case with design fiction. Nevertheless, the effect and the intention are the same: to facilitate differentiation through the specification of a conceptual companion to the old design. Certainly, specificity is useful. It simplifies categorization and favours clarity in discussion, for example. However, it is worth considering, as many have done and rightfully continue to do so, how different is the design part in all these X designs or design Xs? (Tonkinwise 2015b) In my opinion,

the difference between one and another is the objects of design they produce. This is the reason behind the third transitional. It is a concept that serves to specify or differentiate particular design objects from others but it does not do so by modifying design. The label does not accompany the event but rather transforms the object. The third transitional that I present here attempts to focus on certain objects of design and not on the act of design itself (whatever it is). It is what I call Offject.

4.3.1.   To Deswing between real and fictional

My research into the real and the fictional involved a movement of deswing. Or rather, it involved two, depending on the scale from which one looks at my study. On a macro-scale, I attempted to answer the question of the real for design (what makes a design object real?) by oscillating between design events that produced final design objects. The ontological debris that this movement of deswing left behind is, with some making, the content of part III of this dissertation: a design theory of fiction.

Much more relevant to this particular section is, however, the movement of deswing that happened on a micro-scale. Part II of this dissertation functions as a report on a number of attempts at swinging between real and fictional objects. In part II, each metaphysical probe served as the pendulum that oscillated between the real and the fictional. With the metaphysical probe of existence, I bounced between real participants and their real dreams and concerns and fictional functionalities of real artefacts. With effect, I moved between real arguments and online communities to fictional research pieces to real papers and conferences. The three metaphysical probes that comprise design events responding to external briefs, oscillated between real expectations and imagined actors, real deadlines and fictional stories of use, real identities and imagined ones, just to name a few. In plausibility, I designed real workbooks with fictional meanings in a real workshop with other fictional objects such as Andrew and his Synaesthesia Machine. Functionality and Verp saw real and functioning record players, gravity batteries and lamps structured by the fiction of an island with no electric plugs in the walls of its houses. Finally, Future and Lightown involved the very real European Union and its real politicians in real workshops interacting with a very real maquette based on a fictional taxi driver capitalizing on his privileged access to imaginary gossips.

While designing these objects I regularly faced the question, what kind of design am I doing? After the design event of Dreamcatcher, for example, I wondered, is this design fiction or speculative design? There were arguments in favour of both. There was certainly a narrative component accompanying the design of the Digital Dreamcatcher and at the same time, it was secondary to the emergent stories provided by the participants in interaction, to their efforts in speculating. I faced similar walls in the rest of the events, some of them more difficult to overcome specially when the speculative nature of the objects was hidden behind a thick layer of realism. Was the design of the visual identity for //nor.sc not an exercise of speculative design till it was officially adopted by the group? In hindsight, I see the need for these efforts at properly defining and classifying the design outcomes of what I was doing, after all, I was also immersed in processes of academic publication which demand a certain degree of specificity. Also, to be able to adhere to a stablished or renowned design approach makes the work easier to relate and discuss along with that of others. Certainly, the objects that figure in part II of this dissertation have much in common with design objects found under the hood of design fiction, speculative design or adversarial design. But, are we in a position to say the same about design as event, as the process I went through while designing these objects? In my view, it would be difficult to answer in the positive. My perception throughout the period encompassing this study is not that I have switched design gears, so to say, from one object to the next. Quite simply, all I have done is design. I have designed furniture, imaginary workbooks, an interactive maquette or absurd cutlery. In general terms, the event remained, it was design all along, yes, singular as any other context dependent process, but design nonetheless. So, how does one regain specificity? Rather than specifying or modulating design as event, one can choose to be specific about the objects of design produced.

If design is rich in suffixes and prefixes accompanying its events, it is even more fertile in specific design objects. There is graphic design, of course, but within it there is a universe of design objects: there are logos and fonts and icons and layouts, etc. More compelling to me are those design objects that remain specific while generally applied in many design approaches. This is the case with prototypes and sketches for example. What is striking about these design objects is their transitional nature, they are a step, full of particularities of course depending on the design process they are embedded in, to something else. A sketch is an object that is not particular to fashion, industrial or graphic

design. I wondered if it would be possible to think similarly of the objects of the multiple designs that I have encountered during this dissertation (e.g. speculative design or design fiction) and the objects that I have designed myself. Such effort of conceptualization must be flexible in its precision but not so much that it ends up addressing nothing or worst even, everything. I took a great number of objects from speculative design, design fiction, adversarial design and others along with the ones I produced into the metaphysical workshop, the Milieu, and realized that instead of referring to them via their official name and surname (speculative design object or design fiction object) I could just identify some of them as offjects.

An offject is first and foremost a design object. Offjects hold the real at a distance and hint at possibility rather than actuality. They are off a particular reality that they illustrate by escaping it and providing a vantage point from a different perspective. Like any other design object, to encounter them is to deswing but unlike other design objects, the terms of their oscillation are, first and foremost, the real and the fictional. Their ontological chance is to reveal what something is by bouncing between the real and the fictional objects that act as their components and their relations. Offjects seem satisfied with their ambiguous status and shamelessly use it to flirt with both the potential and the actual in terms of the "what if". They are doubtlessly real, for they are effective in the contexts where they exist, but utterly concerned with the fictional, the objects that structure the effective. As any other object, an offject is governed by the principle of ontoference, however, as I will try to show with the following example, it subtly obscures the senses of being and comprehension and highlights the tension of objects as differentials or interferences between the real and the fictional.[67]

(Something about considering all the final design objects in this dissertation as offjects)

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[67] Offjects have in common with provotypes the way in which the tackle a tension but differ in the nature of the tension and the purpose of their deployment: "Provotypes are ethnographically rooted, technically working, robust artefacts that deliberately challenge stakeholder conceptions by reifying and exposing tensions that surround a field of organisational interest." (Boer, Donovan, and Buur 2013)

Let's take one design object as an example: the Andro-Chair. The Andro-Chair (Sundbom et al. 2015) is an object designed by Cristine Sundbom, Karin Ehrnberger, Emma Börjesson and Anne-Christine Hertz. The second author, Ehrnberger, had previously developed a design approach called gender swapping that relied on swapping the product design language normally used in products targeting man and woman. The Andro-Chair project was inspired by this approach and took gynaecology examination in Sweden as a subject of study. The authors conducted interviews with women in order to learn about their experiences during gynaecological exams. They found that the gynaecology chair was among the main causes for negative experiences during the exam. They proceeded to incorporate their insights in the design of an examination chair for the analogous medical procedure in medical examination for men:

> *The Andro-Chair was designed using the results from our in-depth interviews covering women's experiences of the gynaecology examination. In essence, therefore, the Andro-Chair was designed to express something "violating", "humiliating", "cold", and "harsh" (Survey, 2012), in order to problematise women's experiences of the gynaecology chair. By designing an Andro-Chair for men, we wanted to reveal how the gynaecology chair examination has been accepted and normalised. We argue for the importance of making this problem area visible, before it's possible to implement radical alternatives. (Sundbom et al. 2015)*

From an ontological standpoint, the purpose of the Andro-Chair is clear: to loudly assert that an object exists: an outrageous gender difference in the context of a particular form of medical examination. Of course, in the process of doing so, many other gender issues become clearly visible. It is worth considering that the designers of the Andro-Chair could have chosen other design approaches to do so. For example, they could have simply redesigned the gynaecological exam chair for woman. This would have resulted in an industrial design object very different to the Andro-Chair. In my view, in doing so the Andro-Chair would have lost its vantage point and with it, much of its power to define the object they targeted (gender difference in gynaecology/andrology). It is precisely the unreality of the Andro-Chair, and its ability to deswing between the possible and the actual, the real and the fictional what makes it so extraordinarily powerful to show and criticize an object and by extension, many others. It is because of the way the andro-chair deswings that as well as considering it an object of gender critical design, as the authors-designers intended, I also consider it an offject.

In this section, I have attempted to explain the offject as design object and as transitional object. In a general sense, the offject as a transitional is a conceptual object facilitating the transit to a particular theoretical understanding. Particularly, the offject permits the differentiation of design objects not based on prefixes or surnames associated with the practice of design. When a designer wonders, for example, am I doing critical design or design fiction? The answer can be postponed without interrupting her design efforts till a better grasp of her own project can be attained. She can avoid a potentially paralyzing reflexive pause and quickly satisfy her curiosity: she is simply designing an offject.

Figure 33 Gynaecology chair (top) and the Andro-Chair (bottom) by Cristine Sundbom, Karin Ehrnberger, Emma Börjesson and Anne-Christine Hertz. Picture credit: SalliSystems (top) and Karin Ehrnberger (bottom)

Chapter 5

Induction

In deductive reasoning, a conclusion necessarily follows from certain premises and it can be classified as valid or invalid (Hurley 2014). It would be difficult to argue that the reality in which design takes place is one of those systems. The transitionals that I defined in the previous section are not axioms but conceptual anchors for theoretical inferences, inductions. Together, inductions and transitionals form the main contribution of this thesis: a design theory of fiction.

For the past three years, I have studied what makes design objects real or fictional. This has included the design of objects in order to grasp an understanding of what makes them fictional or real from a design perspective. The research process has been an exploration and an act of making and hence the outcome must do justice to the process. What the union of transitionals and inductions is, is not a theory of design fiction but a design theory of fiction. An object of theoretical form to advance, and not to found or ground, the thought and practice of design. This design theory of fiction is meant to resemble other objects of research through design in their contingent, aspirational and

provisional character (W. Gaver 2012). This is Redström on what "necessary" means for design:

> *"Unlike science, where unified theory is a legitimate objective, design is about the possible, about how things could be… In a strict sense, design is never necessary but always contingent: had we made our design decisions differently, then things would be different. When a designer says, about a given form of expression, for instance, that it is necessary, it means that for the design to be consistent, this is, in his or her view, the only possible way to do it. While part of such understood and interpreted necessities might have to with laws of physics (such as what is possible to do with a given material, that gravity still matters, etc.), this understanding of "necessary" is quite different from the notion of necessity that Sir Isaac Newton had in mind." (Redström 2017, 99)*

My theoretical contribution then, does not aim at formal completeness or temporal survival. It is not walled behind an argumentative structure that intends to give an illusion of plenitude. It would also become feeble and stagnant if I were to provide a logical carapace to inhibit critical assault. This design theory of fiction is made through design, and like design, it needs to be able to cope with change by attaining precision through relation and difference. Its only facts are the objects I designed or the design objects of others. And this includes, in a rather meta-somersault, the objects of design: tools, materials, forms, visual effects, graphic elements and techniques, etc. In developing a design theory of fiction, I have attempted to always keep the objects of design in the foreground and express ideas in their terms. After all, they are the vocabulary and the grammar that designers use, a language that demands much time and effort to master. It is possible that if in developing design theory one re-appropriates and adapts terms of common use in design language, designers might have an easier time putting this design theory to use or just putting it aside. This is one of the reasons why I developed a Milieu in the first place: to show the reader the conceptual space that the design theory I developed is based on. In doing so I want to account not only for the form of the design theory but also for its formation while providing the reader the necessary philosophical terms to grasp it. The intention of the milieu is not to encourage the reader to discover the philosophy of Tristan Garcia by herself but instead, to show how I have mobilized Garcia's ideas for the purpose of investigating my research question. It is meant to be a handle instead of a pointer. At the same time, the Milieu is meant to serve as an example of how other design researchers can appropriate and present the uses of the philosophical thoughts of others.

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5.1. On the Mechanisms of Reality

At the end of Part I of this dissertation, we left the Milieu with a rough idea of the difference between the real and the fictional. It was a sort of working definition to allow us take the first steps among the design objects presented in Part II. Back then, I used the imaginary as proxy and established that if an object belonged to it, it would be fictional and real if otherwise. Now, armed with the necessary insights and a custom-made set of transitionals its time to induce, rather than deduce, a richer understanding.

The fact that I am pursuing a design theory instead of a theory of design leads to a minor constrain that needs to be accounted for. This design theory comprises terms that are made through design and, naturally, it also mobilizes concepts that were already there, that preceded them. Furthermore, this design theory won't live in a vacuum but out there in the universe, where other theories and arguments, or just ideas, have already found a comfortable dwelling place. A place known and cherished by those trying to understand a particular topic. The constrain can be formulated as a question, how necessary or useful is for this design theory to redefine well stablished terms? The chance of conceptual freedom and originality pays a price in the currency of disruption. I am especially mindful of this constrain when lying the foundation of what I consider fiction. In a nutshell, the understanding of fiction in this design theory must resemble those that one can find in the dictionary or in a newspaper article, for example. This means I won't be isolating the imaginary from the fictional or vice versa: fictional objects are imaginary objects.

What does it mean for an object to be imaginary? In a crucial sense, it means that the object is dependent on the capacity for one[68] to imagine it. A fictional object is a fragile and vulnerable object, at the mercy of human consciousness for if not imagined, the fictional object is simply not. There are no fictional objects absolutely independent from consciousness. Fictional objects are blazing meteors that only exist if one can see

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[68] For the purpose of this thesis, I will not dwell into associating "one" with an animal or artificial consciousness (what could such objects be?) but will focus on human consciousness.

them. But like meteors, or any other object for that matter, fictional objects are in the universe. The universe comprehends fictional objects. The universe, however, needs a consciousness to imagine them in order to comprehend them.

Fictional objects, however, are not real objects. In my opinion, the main difference between them is that a real object exists independently of human consciousness. Real objects are also in the universe, but the universe comprehends them directly, with no recourse to the imagination. This is a realist design theory, for a real meteor falls through the sky regardless of whether a person looks at it or not[69]. The line in the ground is clear then, realism is a matter of independence from consciousness. Furthermore, an object is either real or fictional and cannot be both. If an object appears to be real and fictional, it means that it is either one, the other or that there are actually two (or more) objects, of each kind. This is a premise imposed by the principle of ontoference. Objects are the differential or the interference between the objects they comprehend and those that comprehend them. If one was to consider an object that is both real and fictional that would mean that we are giving primacy to certain (comprehended or comprehending) objects instead of focusing on the object at hand. The operation would be like a sort of averaging "this object is real because it comprehends more real objects than fictional ones" or "this object is fictional because the objects that comprehend it are mostly fictional" or a variation of this kind. But according to the principle of ontoference, objects are not an average or a compound but a differential. They remain irreducible to parts or relations. Instead, to distinguish between real and fictional objects through the mediation of a consciousness allows one to remain within the boundaries of the Milieu.

Think of a unicorn. That is a fictional object. Now sketch the unicorn. That is a real object. The unicorn that exists in your imagination is quite different to the object that exists on the page. They depart from each other in terms of, for one, materiality. They are also fundamentally different in terms of their effects. An object is effective if it actively influences the objects it comprehends or the objects that comprehend it. Both the fictional (imagined) unicorn and the real (sketched) unicorn are effective but in different ways. The real unicorn is able to be effective independent of a consciousness. As a sketch on a

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[69] The meteor is not socially constructed, for example.

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paper affects the table it is standing on or the room where it is located, it affects the pen and the hand that draws it or a dog if it eats it. Real objects explicitly modify the effects of other real objects. Analogously, the imagined unicorn is also effective but not towards real objects but fictional ones. The fictional unicorn directly modifies the effects of other imaginary objects. One can interact with it, form an imaginary representation of oneself and ride it or the unicorn can appear in a dream. Real objects are directly effective towards other real objects and fictional objects towards fictional objects. But it would be wrong to isolate them for there is definitely a relation between them. A real object exerts an influence in fictional objects, they are able to configure the imaginary, but they don't do so literally or explicitly as is the case with other real objects but allegorically. The imaginary object unicorn is similar to the real object horse. Imaginary objects cannot escape the existential pull of the real for real objects alter the coordinates of the imaginary. It is similarly the case with imaginary objects. A fictional object does not explicitly or literally configure the effects of real objects but does so allegorically. When Sherlock Holmes inhabits the imagination, what real detectives are capable of is most likely affected. A horse that develops a protrusion in its forehead might well be named Unicorn and boost betting in a race. The imaginary alters the coordinates of reality and allegorically configures the effects of real objects.

However, aside from altering the coordinates of reality allegorically, imaginary objects, by virtue of their consciousness dependent character, are able to uncannily resemble real objects. We can easily imagine the birth of a fictional object in front of the coffee machine of a research department. An eavesdropped conversation results in a consciousness imagining a romantic relationship between a student and a supervisor. This relationship is a fictional object for it only exists dependent on the consciousness that overheard the conversation and proceeded to imagine it. Although it exists only as imaginary, it starts structuring the effects of other real objects, like looks, smiles or judgements. The fictional object spreads and now inhabits, let's say, ten other minds. The coordinates of the reality of the research department are greatly altered, the number of real objects influenced increased. Now let's imagine a visitor to the department with a certain sensibility to the interactions happening around her. Without being exposed to the fictional object, she might perceive an object by the sheer presence of other objects comprehending or being comprehended by it and arrive at the conclusion that the romantic relationship is real. To the visitor, the fictional object appears to be effective

independent of any consciousness housing it. The more minds accommodating a fictional object, the more the structuring of the effects of real objects and, to a mind in which the fictional object does not reside, the more readily it is to conceive of the object as something existing independent of any consciousness, the more real the object appears.

When it comes to reality, objects suffer a chronic case of identity crisis. Identity can be understood in two ways, as one (or unity) or as self: as what makes an object what it is including its characteristics and among them whether it is real or fictional. The problem with real and fictional according to the second reading of identity (as self) is that, in many cases, it is impossible to know whether something is real or fictional by just being co-present with it. It is common for the status of a thing within reality to be disclosed only when set in a historical context. If a thing is trapped in the present, its status is obscured by a maelstrom of objects in flux, and it becomes almost impossible to determine. Once the benefits of experience, memory and perspective are activated, it is when one can know if something is fictional or real. A thing is analogous to a medical condition. There are symptoms, like coughing or sneezing, but one cannot know for sure what is the particular condition. It can be a flu, allergy or pneumonia. The status of the condition remains in flux, only to be grasped at a later stage, after a time of testing and careful consideration by an expert has been carried out. And even then, the diagnosis might be wrong. One can be sure of the symptoms as they are real, they are effective towards other real objects, but one cannot know what is the affliction and till then, the implications for other objects belong to the realm of speculation.

Nevertheless, complications arising from trying to split or differentiate real from fictional objects don´t end in the counterfeit capabilities of fictional objects on a macro-level, that is, when many minds are involved. Fictional objects are able to disguise as real even when they are within a single mind by performing nothing less than a fantastic operation. Let's take the reader of a science fiction book. In the act of reading, a number of fictional objects come into existence. A spaceship or alternative dimensions for example. For the consciousness reading the book, the fact that these fictional objects only exist as dependent of it, is obviated in the midst of the act of reading. While one is entangled with a story, the fictional objects that appear seem to have an agency of their own effectively acting on other objects. While reading that the spaceship travels back in time, it is as if it does so independently of the reader. The fact of being reading the story

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is ignored while doing it. Suddenly the senses of being and comprehending are inverted. The story comprehends the reader and in doing so, the fictional objects seem to stop structuring to simply affect each other in the context of the narrative. It is only when the reader puts the book down that she comprehends the story and the fictional objects reveal themselves as structuring the reality of the reader. The act of reading and the act of stopping reading are what allows one to easily distinguish between the senses of being and comprehending. To enter and exit the story is a movement of deswing that illuminates the real or fictional nature of the objects involved: to be comprehended by a story and then comprehend it.

Earlier I noted that fiction exists, but it doesn't exist as real objects do, it simply exists as fictional objects do. They depend on people's imagination for their existence and support, however, that doesn´t mean that people determine the effects the fictional objects structure, in my opinion, it seems rather the opposite. This is what Ursula K Le Guin had to say at the 2014 National Book Awards:

> *Hard times are coming, when we'll be wanting the voices of writers who can see alternatives to how we live now, can see through our fear-stricken society and its obsessive technologies to other ways of being, and even imagine real grounds for hope. We'll need writers who can remember freedom—poets, visionaries—realists of a larger reality. (The Guardian 2014)*

Fictional objects structure the effects of real objects and among them are the people that sustain them. Certainly, fictional objects are abstract objects and rather paradoxically, are to a degree both independent and dependent from the minds that ground them. They are dependent for they are, undoubtedly, culturally situated. The fictional object that a mind brings to existence does so within a cultural worldview. I join Žižek in his critique of trans-cultural universal objects:

> *So while Bordwell and other Post-Theorists like to distinguish trans-cultural universal features (part of our evolutionary heritage and the psychic structure of human beings) from features that are specific to particular cultures and periods - i.e. to operate with a simple pyramid from natural or other trans-cultural universal features to more and more specific characteristics that depend on localised contexts - the elementary counter-argument to it is that the very relationship between trans-cultural universals and culture-specific features is not an ahistorical constant, but historically overdetermined: the very notion of a trans-cultural universal means different things in different cultures. The procedure of comparing different cultures*

and isolating or identifying their common features is never a neutral procedure, but presupposes some specific viewpoint - say, while one can claim that all cultures recognise some kind of difference between subjective imagination and reality - things as they exist out there - this assertion still begs the question of what 'objective reality' means in different cultures: when a European says that 'ghosts don't exist in reality' and when a Native American says that he communicates with them and that they therefore do exist in reality, does 'reality' mean the same thing for them? Is not our notion of 'really existing' (which relies on the opposition between is and ought, between being and values) specific to modernity? (Žižek 2001, 17)

To the question, is a Native American ghost a real object? It might be necessary to reply with the question, where? Imaginary objects are, paradoxically, both universal and situated. Universal because they are objects in the objective universe, comprehended by it. And here I agree with García in understanding objectivity. Objectivity as "in objects" and not as independent of every perspective. The ontological understanding of the real cannot be differentiated from a struggle to define what is independent of consciousness, a debate that is culturally dependent. Furthermore, this is not only cultural but historical too and importantly, not singular but co-extensive. It is a convention of a social structure tacitly agreed upon and shared among members. Objective reality means different things in different cultures but its differential diminishes as one focuses on individuals, much like the same language is necessary to communicate within a community. Not knowing the language doesn't mean that communication is impossible, just that it proceeds awkwardly with respect to the norm. What is real and what is not, is a language shared but that might be difficult to articulate to a member of a different community. Material practices and interactions hinge on the distinction (or blurring) of this divide. After all, many of the fictions (stories, fears and hopes) are the natural reality of others. Perhaps a suitable and tragic example is the resemblance between how rape is used as a tool for war under the jihadist Nigerian organization Boko Haram (Gavin 2018) and the Bruce Miller's TV series show "The Handmaid's tale" (Miller 2017). The fictional object of someone can certainly be the twin of someone else´s real object. The real and the fictional are objective, because they are in objects, and universal but not absolute. To know whether an object is real or fictional one must follow it to its dwelling, to where it exists and once there, discover whether it structures or effects. A task that can be approached through science, journalism, etc. and that we attempted to approach through design by creating offjects to deswing.

5.2. A Genealogy of the Offject

In what follows, I attempt a design theoretical induction based on the transitionals described in chapter 4 but focusing on design. It is design theory for it is an argument in the form of a genealogy where, governed by the principle of ontoference and through successive moves of deswing, I follow objects from the general to the particular.

5.2.1. Object of the Universe :: Object

An object that exists, any object, does so in the objective universe. This is the object considered in its most fundamental sense. It is the object I tried to depict as thoroughly as possible in the Milieu of this dissertation and that has served as a rudimentary ontological compass to think the entities I have encountered and analyzed, criticized or designed. The way in which I have appropriated Garcia's thoughts is precisely the Milieu: an incomplete prototype or a sketch meant to be operative in terms of sustaining the development of the design theory that I present in this thesis. The object is first and foremost irreducible. It is a differential or an interference between other objects, objects that are in this object or objects that this object is in. Any object embodies this fundamental tension between two senses, the sense of being and the sense of comprehension. No matter whether the object is real or fictional, beautiful or ugly, material or abstract, alive or dead, what the object is, is the tension, the difference, the interference between the objects that compose it and the objects that it composes. To define an object and say what it is, is to reduce it and in a sense, to transform it. Objects have this escapist nature, always avoiding to be grasped whole, always changing as soon as one of their components are relations are modified.

5.2.2. Object of an Epistemic Domain :: Design Object

The moment an object becomes an element of an epistemic domain a radical transformation occurs. It is not the object that is transformed but the terms that structure its fundamental tension. When an object becomes an object of medicine, for example, the tension between being and comprehension is translated into a tension between health and illness. An object of law is integral with a tension between legal and illegal or the tension

between function and cost is inherent to the object of engineering. This irremediable ontological shift is the price to pay for the chance of specificity. The eyes of knowledge cannot keep everything in sight but must focus not in certain objects, but in all objects in a certain way. This does not mean that the fundamental tension inherent to all objects disappears, it is rather translated and as poets know all too well, there is always something lost in translation.

Design is no different. The moment that objects become a part of design, the terms that structure their tension change. Through researching fictional and real objects through design I have come to understand that a design object is regulated by the tension between form and use. This irreducibility is well documented in the history of design and has taken the form of debates of design being about form or function, art or science, craft or production, etc. I won't be describing these debates for they are well known in the literature[70]. There is however, something very interesting about these debates, something that makes design a quite special discipline. In many other epistemic domains, the irreducibility of the tension that defines its objects can be readily identified. Medicine and law, for example, quite understandably try to resolve or synthesize the tension into one of the terms: the healthy and the legal. There are debates about whether something is legal or not, or cures an illness or not, but the goal and the intention towards it is clear. There is a movement of deswing in these epistemic disciplines but it happens within a context that understands what is preferable. In design, this is not the case[71.] What is preferable for design is matter of contention[72] and, in defining it outside of a particular design object and its context, some designers try to reduce the fundamental tension of design to one of the terms, to either form or use. (SFMOMA 2011) There is designing for people, designing for the environment or designing for beauty. There is (was) Bauhaus, Scandinavian Design and Participatory Design. When design deswings, it does so around

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[70] A good overview of the debate from a historical design perspective is provided by (Pevsner and Weston 2005)

[71] And maybe it is also not the case with engineering and its inherent tension between cost and function. This is perhaps another aspect that brings the disciplines of engineering and design so close to each other.

[72] In Speculative Everything, Dunne and Raby provide their A/B list in order to illustrate how contentious what good design is, is. (Dunne and Raby 2013b)

the primary tension that defines its objects. This makes this tension all the more obvious, constantly showing how design objects are the offspring of an irreducible dichotomy. As a result, an in a move seemingly adaptive, most designers don't shy away from dichotomies but enjoy them instead and design, as an epistemic discipline, becomes increasingly qualified to deal with complexity. This is how Redström puts it:

> *At times it seems as if one of the key characteristics of design is to base its very existence on the complexities arising from dichotomies. To negotiate form and function. To be about craft and skill and work with industrial production. To link production and consumption. To work with free and open processes and to be deeply committed to method. To be user centered and design driven. To be art and science. Sometimes the intellectual instability of being in the middle is so overwhelming that we are tempted to give in to the at least academically much more convenient positions on either side: to choose between theory or practice, art or science, and so on. But design can also be remarkably resilient and willing to commit to all that which is neither black nor white, but complex and colorful…Indeed, design's capacity to deal with complexity and conflicting concerns is perhaps its most fascinating feature. What follows stems from an idea that this ability to address complexity is inherently intertwined with design's resilience to reductive dichotomies. More specifically, it comes out of a hunch that a key reason we enjoy dichotomies so much in design is because they allow us to address conflict, collision, and contradiction, opening up new perspectives and potentials as a result. (Redström 2017, 1)*

Dichotomies are for designers a necessary evil that if regarded properly turns to be the most faithful of allies. Designers are, more or less consciously, aware of how ontoference prefigures the very ontological status of the objects they design and deploy. Aside from contradictions being a source of interest one can find other remarkable traces of the irreducibility of design objects and how to deal with it in their practices. Moodboards, arrangements of samples of materials, colours and textures are one example (Figure 34). In my view, these systems of objects do more than inspire. They facilitate a movement of deswing between potential objects that can comprehend or be comprehended. These objects are at the same time necessary and disposable (W. Gaver 2012) , they are a reminder that the design object is subject to contingency. They show how the design object is a tension that could be resolved in many ways. Ontoference is possibly the principle governing the assembly of image boards (on walls or sketchbooks) with design objects similar to the one been designed. Again, beyond mere inspiration, I believe that the reason for having many images of similar design objects together is to get somehow attuned to the irreducibility of a design object in terms of form and use. What the image board (Figure 34) shows is how the tension has been materialized and a

designer learns not so much about the particular objects that compose the board but about the tension present in all of them. In a rather Simondonian[73] move, designers seem to see beyond the individual objects and grasp the individuation, how they came to be, how the tension was sensed and responded to by others. Moodbards and image boards are platforms for vigorous deswing. Furthermore, there is another revealing aspect that shows how designers wrestle with the irreducibility of design objects[74]. It is common for designers to cherish the possibility of one extra more iteration(IDF 2018). It is when a design object is finished, when it is supposed to be finally a whole, that imperfections and possibilities for improvement become apparent. Some associate this event with perfectionism on the part of the designer[75]. It could instead be seen as a natural consequence of creating design objects. The tension that *is* the design object is not going to go away, for it is irreducible, and even when the design object is not a sketch or a prototype anymore, it is not possible to grasp it as a whole. In fact, this might be the reason why sketches and prototypes are so valued for they don't force the designer to reduce the object of their creation in any way, neither materially nor conceptually. Designers inhabit a paradoxical existential space, aware of the irreducibility of design objects but condemned to resolve it.

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[73] Gilbert Simondon was a philosopher of technology (mostly) that was mainly concerned not with ontology (what an entity is) but with ontogeny (how an entity comes to be). He was interested not only in the individual but also in the process of individuation, of how the individual becomes. (Simondon 2017)

[74] Clive Dilnot put it brilliantly as "That the artificial is, in strict sense, beyond law and beyond certainty means that the propositional is structurally inherent to the artificial. This means that the artificial is the world of the possible, not as extrapolation or subjective will(I demand!) but as its deepest condition." (Fry et al. 2015, 180)

[75] Certainly there must be a bit of perfectionism in Dyson's 5127 iterations till the Dyson DC01 Vacuum cleaner was completed. (Dowling n.d.)
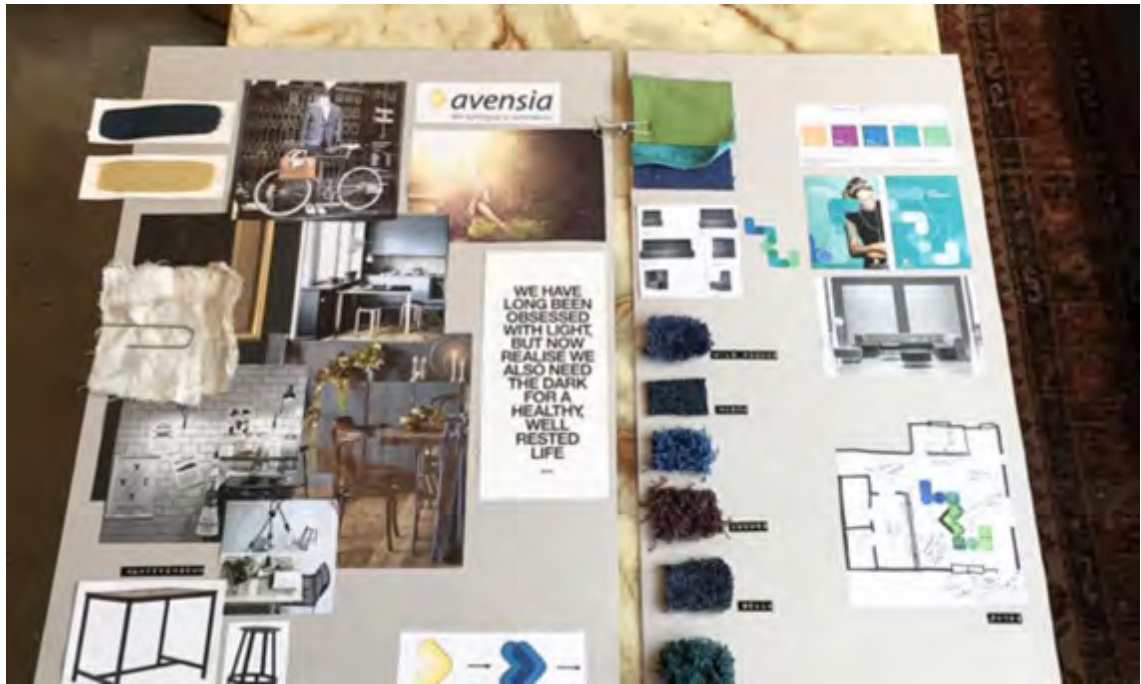
Figure 34 Moodboard and Image board Picture credit: Phoebe Waller and Bustle

5.2.3. Object of Speculation :: Offject

As objects progress within a particular epistemic domain they gain specificity, that is, they are able to closely relate to other objects within the discipline. But, as I tried to show earlier, this gain is an act of ontological trade. In order to occupy a spot within a region of the discipline, they must shift the inherent tension that makes an object what it is. The tension that characterized the object of the discipline is translated into a different tension and with it comes a newly attained specificity. Again, it is not that the previous tension disappears because if it did, the object would stop belonging to the specific epistemic domain in the first place. It is rather assumed or nested within the new tension around which the object deswings. Ontoference is maintained but displaced into a different locality. If we revisit the example of an object that is adopted by the discipline of medicine and follow it a bit further we can see how the ontological tension that defined it is progressively displaced. First the object deswung around the fundamental tension between the senses of being and comprehension. This tension was displaced when it became an object of medicine as its ontological status was a differential between objects of health and illness. If the object now is included within the field of oncology, the tension is once again displaced now appearing as an oscillation around objects related to cancer.

The tension inherent to the medical object, between health and illness, has not disappeared but is implicitly assumed, and to a point reduced, within the new terms that configure the tension for objects of oncology[76].

Analogously, this is the case for the design object. An object that is considered a design object implicitly assumes the tension between comprehending and being comprehended and explicitly displays the tension between form and use. The next step in the design object becoming more specific is what has occupied the most part of this dissertation: when a design object becomes a design object of speculation. When this happens, the tension between form and use is taken over or superseded by the tension between the real and the fictional. In order to understand what a design object of speculation is, one must deswing between real and fictional objects. As I explained earlier, this is one of the reasons that lead me to address objects of speculation as offjects. It is worth remarking here the fact that I consider design as, primarily, a realist enterprise. Designers make and conceive, first and foremost, real objects. Objects that exist independently of consciousness, that are concrete and that are prefigured by objects that compose and enter the composition of their form and their use. In a strict sense, objects of design are real. No matter if it is a sketch, a product, a poster, a video or a service, all these objects are effective and modify other real objects that are, a priori, independent of design objects. As any real object, they have something material and something immaterial (even an imaginary abstract is made of printed or electronic words). This is not to say that designers don't create fictional objects for they undoubtedly do. The fictional objects are the abstract entities that structure the effects of real objects. Moreover, as we saw in Chapter 3 and as I will further explain below, designers find in fictional objects all sorts of allies for the creation of all sorts of real objects. Design is fundamentally realist but this does not mean that it cannot turn its real objects to face and question themselves or others. This is precisely what offjects do: they keep their status as real objects but help deswing away from form and use and into the real and the fictional.

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[76] It would be interesting to read again the work of Kuhn, Lakatos and Latour through the lenses of being and comprehension and follow how scientific disciplines and facts come to be. See for example (Latour, Woolgar, and Salk 1986)

However, that the tension between form and use is supplanted by that between real and fictional does not mean that the oscillation must happen between objects of different ontological nature. Many offjects, for example, oscillate between real objects (and not between a real and a fictional object) in an effort to illuminate the reasons for their ontological status, or in other words, why particular objects are considered real or what are the implications of certain real objects. Architecture, mostly in the field of radical architecture[77], has a rich tradition of objects that do precisely this. Design too, as it first became apparent through the work of exponents of the "anti-design" and "radical design" (Didero et al. 2017) design movements of the 1960's and 1970's or that of Krzysztof Wodiczko, and what he coined interrogative design (Wodiczko 1999) in the 1990's. But perhaps the best-known objects whose mission was not to participate in commercial exchange but rather provoke thought and debate are those belonging to Critical Design and Speculative Design. These design objects have been argued for in terms of what designers aimed to accomplish: a state of productive reflection and critique over a range of issues. From the status of design in connection to market capitalism to the possibilities of biotechnology or artificial intelligence (Auger 2012). In my view, these are objects of design, not only because they are arrived at through design processes or simply because they are products, but crucially, because they implicitly respond to the tension between form and use. In order to foster debate, they supplant it with a tension that oscillates around the real. However, there is a key element that differentiates many Speculative and Critical Design from other offjects: how the tension between form and use is assimilated. In many objects of critical design and speculative design, the tension between form and use is overcome in a process that neglects use for the benefit of form. These design objects are meant to be experienced in terms of form and not of use, they are seen, observed and thought but not used as most design objects are. As a result, these offjects confine the user to the role of spectator or witness. This is also the case with much design fiction that relies on the deployment of design products that are not meant to be used, as in interacted with, but observed. It is perhaps this quality of detached examination that brings design fiction so close to the work of science fiction. In both cases, the experienced outcome is in textual or audio-visual form and its user a reader or a

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[77] Well known are the works of architecture studios in the 1960's and 1970's Archigram, Archizoom or Superstudio. (Natalini et al. 2005)

spectator[78]. This is also possibly the reason why many offjects of design fiction, critical design and speculative design are, for some, difficult to tell apart from works of art. (Bardzell and Bardzell 2013)

The history of offjects also comprehends design objects that, in sublimating the tension between form and use to address the tension between the real and the fictional, sought to retain use and the user. Perhaps most salient is some of the work of the Interaction Research Studio at Goldsmiths headed by Bill Gaver (Goldsmiths 2018). In my opinion some of their design objects could be considered offjects. They usually incorporate the figure of the user at various stages of the design process and in turn, the design objects produced are, once completed, used. Interestingly, the critical work of Dune and Raby also produced artefacts of this kind in their Placebo project where offjects where designed and placed in people's homes to gather stories of interaction and use (Dunne and Raby 2001). Also use is central to the concept of Material Speculations (Wakkary et al. 2015), counterfactual design artefacts designed to be encountered in everyday life in order to access the possible worlds they afford in interaction. Other designers incorporating use in their design objects of speculation are (Andersen 2013; Elsden et al. 2016) What many of this offjects have in common has consequences in terms of the fictional objects that come to existence. All offjects, no matter they are a photography or a film of a speculative use of a critical design or design fiction object, are real objects (they are material, designed and effective). It is in the interaction with them that fictional objects come to existence and are available only to the consciousness approaching them. When it is form that governs the implicit tension between form and use that is latent in offjects, the fictional objects that might arise in interaction can be more carefully evoked. If the person interacting with an object does so as a spectator, she is at the mercy of the designer much in the same way that a reader is at the mercy of the writer. The fictional objects cannot be directly designed but can be somehow

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[78] We are referring here to the works of speculative design or design fiction that are closely related to industrial design where designs are meant to be put to use in an embodied manner. However, this synthesis of form and use could be extrapolated, with some nuance, to more observational type works of graphic design.

domesticated and summoned by means of an offject[79]. Resolving the tension between form and use on the side of form results in the ability to, to a certain extent, restrain the form that the fictional objects structuring the effects of the offject will take. The price to pay for this specificity is, as we mentioned before, to turn the user into a witness. When, on the other hand, the designer wishes to retain the user after designing an offject, she must trade in doubt. The fictional objects structuring the effects of the offject are not tethered but remain to be discovered through use. A task that is impossible for the designer to accomplish a priori, before the interaction between person and design object takes place.

As with any other design object, there is always a chance and a price assumed by an offject. An offject is a real object, not a fictional one. Fictional objects are dependent and ultimately particular to the consciousness that brings them into existence. They remain at a distance, structuring the effect of real objects. An offject illuminates the tension between the real and the fictional and in doing so, facilitates debate and criticism. Much like a book inverts the senses of being and comprehension, an offject is able to do the same, partially suspending realities that are taken for granted, either through observation or through use. An offject is a design object that does not only allows to see reality, but to see the fiction that structures it. Offjects don't design fiction but make it accessible by calling into attention the material and conceptual relations arising from their use. In unfolding the tension between the real and the fictional, offjects withdraw and make obvious the objective negative space that surrounds them. Instead of assuming what reality is, an offject places it under suspicion. It is in this sense that the offject is such a suitable object for research as in investigation, as in searching again.

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[79] The kind of fictional objects arising in the interaction or witnessing of a design object are by no means prefigured absolutely by the designer. This is a long debate in the humanities as to what is the role of the reader in the interpretation of a text. See (Smith-Laing 2018)

5.3. Critique & Consensus

Up to this point, I have developed a design theory of fiction by conceptualizing a set of transitionals and applying them in order to develop design theoretical arguments. First, the principle of ontoference and the movement of deswing served me to articulate my ideas on the mechanisms of reality, that is, a basic structural account on how real and fictional objects function in the objective universe. Second, I mobilized the transitionals to provide a brief history of design objects of speculation (to which I refer as offjects) in terms, not of why or how (designer's motivation for designing them or the material processes involved in their design) but instead, according to the ontological tension that defines them as design objects. Now I proceed to reflect on three matters of concern for designers of offjects through this design theory of fiction.

5.3.1. On Design Objects as Props

A most commonly debated characteristic of offjects is their status as props. In a form similar to cinema, the significance of design objects of speculation is often associated with their capacity to provide support to a story. Dune and Raby put it as follows:

> *One way of considering the fictional objects of speculative design is as props for nonexistent films. On encountering the object, the viewer imagines his or her own version of the film world the object belongs to… This is the main difference between film props and the fictional objects of design speculations. The objects used in design speculations can extend beyond a filmic support function and break away from cliched visual languages that prop designers are often obliged to use. Yes, it makes reading the objects more difficult but this process of mental interaction is important for encouraging the viewer to actively engage with the design rather than passively consuming it. This separates design speculations from design for cinema. The presence of the prop in the same space as the imaginer also makes the experience more vivid, more alive, and more intense. (Dunne and Raby 2013b, 89)*

The first sentence of this passage shows a fundamental inconsistency between my understanding of fictional objects and that of Dune and Raby. In my opinion, the objects of speculative design are not fictional. Just as it is the case with any other design object, an object of speculative design is a real object, be it a product, an image, a film or a sketch. They are effective independent of consciousness and their very existence, regardless of

their more or less material character, implies the modification of other objects. In my view, the fictional objects are those that come into existence in the imagination of the viewer that encounters the real objects of speculative design. Paraphrasing Redström, it is in the act of appreciation of the offject that the fictional objects are grasped by the imagination of the user. Undoubtedly, the real objects of speculative design have a crucial influence on the fictional objects that arise through their use. Just like any real object, they set the coordinates of the imaginary. However, the navigation in that imaginary space and the fictional bodies that will be visited depend upon the consciousness commanding the ship of her own imagination.

There is certainly a generative aspect to offjects in terms of narrative. In their attempt to withdraw from what is present or historical, they seem to invite contextualization and this occurs in the form of a story. This is one of the mechanisms that elicit the emergence of fictional objects and one that is usually exploited in design for films. In movies, a prop helps contextualize a plot, animating and connecting fictional objects in the mind of the viewer. Objects of speculative design share this function with filmic props but, according to Dune and Raby, there is an important aspect that tells them apart: co-presence. The fact that a design functions, that is, that it performs an operation once encountered by a person, is a prerequisite for design that Dune and Raby quite rightly emphasize. Filmic props function at a distance while objects of speculative design must be encountered and mentally engaged with actively and face to face. However, objects whose main function is mental interaction have profound implications for the kind of real objects designed and the fictional objects structuring their effectiveness. According to the passage above, the purpose of the object is to speculate with it or through it by creating an idiosyncratic story. In the terms of the Milieu, that would mean to engage with the fictional objects that result from becoming entangled in a particular act of perception. Although not strictly a film prop, for an object of speculative design is meant to be co-present with the observer, the associated act of perception experienced when encountering both objects, the film prop and the object of speculative design, is almost identical. The user of an offject of this kind is a spectator, a witness and hence the possibilities of design as a facilitator of experience are drastically reduced. This is precisely where artistic forms of entanglement with fiction, cinematic or literary for example, diverge dramatically from design. Design is able to engage in all sorts of embodied forms of interaction through the use of offjects (Mitchell et al. 2017). There

are many acts of perception afforded by offjects that incorporate people as something other than observers (Elsden et al. 2017b). And colourful acts of perception are accompanied by, as I tried to show earlier in this chapter, a vast cohort of unexpected fictional objects.

Aside from caring for fictional objects, there is a more important issue to keep in mind when considering props as valid objects of design. In a move of metaphorical overdose, one could conceive of all design objects are props. The designer is in charge of furnishing the stage where the drama of everyday life unfolds. A coffee machine, for example, is then primarily the material support for a morning story. There is a crucial and rather obvious problem with this argument: there is no script for everyday life. If we are to understand the working of a designer as a "prop maker" we should ask ourselves the very important question, who gave the designer the script of everyday life? A prop is a prop because there is a story. But there is no story without a history and no history unless the present is gone. The film director needs an object that fulfils a function because she knows "how the story goes". However, the designer makes an object because people are precisely ignorant of this fact. A prop sustains the past. A design object enables the present. A prop is for a story that is written, A design object is for a story in the making.

A prop is a design object condemned to narrative exile.

5.3.2. On the (dis)Belief of Fictional Objects

Many definitions that designers of objects of speculation provide to explain their practice incorporate an indication as to how they work, how they accomplish the activity for which one might consider them valuable or simply worth of attention. This is how Bruce Sterling illustrates this matter in an online article for Wired magazine:

> *Julian Bleecker of Near Future Laboratory invented the interesting term " design fiction" -- but since I blog about it, people often ask me what, precisely, it is … A formal definition exists: "Design fiction is the deliberate use of diegetic prototypes to suspend disbelief about change." … There's heavy freight in that sentence, but most can be disposed of promptly. "Deliberate use" means that design fiction is something that people do with a purpose. "Diegetic" is from film and theatre studies. A movie has a story, but it also has all the commentary, scene-setting, props, sets and gizmos to support that story. Design fiction doesn't tell stories -- instead, it designs*

As I noted in the section on plausibility on Chapter 3 of this dissertation, this definition of design fiction relies on a theory of fiction that finds its roots in the work of Samuel Coleridge. Back at the beginning of the 19th century and motivated by the progressive advance of scientific and rational thought, audiences were sceptical to the supernatural. Coleridge argued for a revival of the fantastic on the grounds of a wilful suspension of disbelief on the part of the audience for the sake of poetic faith and enjoyment. Essentially, if a work of fiction was infused with plausible elements of human interest the audience would deliberately ignore its fictional status and the fictional object (story, poem) would behave as if it was real.

Many designers of offjects have also been influenced with a different theory of how fiction works. Some have embraced the antagonistic rationale provided by what is known as the make-believe theory. This theory was put forward by Kendal Walton in the paper "Fearing Fictions" in the year 1978 (Walton 1978a). The paper follows Charles after he is gripped by fear while watching a film in which a green slime heads towards the viewer destroying everything on its path. Walton denies that the emotion felt by Charles is actual and comparable to real fear, for if it was Charles would actually react beyond his emotional responses by, for example, running and calling the police:

> *But I am skeptical. We do indeed get "caught up" in stories; we often become "emotionally involved" when we read novels or watch plays or films. But to construe this involvement as consisting of our having psychological attitudes toward fictional entities is, I think, to tolerate mystery and court confusion. I shall offer a different and, in my opinion, a much more illuminating account of it… Propositions that are, as we say, "true in (the world of)" a novel or painting or film are fictional. Thus it is fictional that there is a society of tiny people called "Lilliputians." And in the example discussed above it is fictional that a terrible green slime is on the loose. Other fictional propositions are associated not with works of art but with games of make-believe, dreams, and imaginings. If it is "true in a game of make-believe" that Johnnie is a pirate, then fictionally Johnnie is a pirate. If someone dreams or imagines that he is a hero, then it is fictional that he is a hero… I propose to regard Charles similarly. When the slime raises its head, spies the camera, and begins oozing toward it, it is make- believe that Charles is threatened. And when as a result Charles gasps and grips his chair, make-believedly he is afraid. Charles is playing a game of make-believe in which he uses the images on the screen as props. He too is an actor impersonating himself. (Walton 1978a)*

Coleridge's suspension of disbelief theory and Walton's make-believe theory are the two sides of a (fictional) coin. In the first case, suspension of disbelief keeps the status of the spectator as real, the spectator is a real object that in its exposure to a story, wilfully suspends disbelief and ends up treating fictional objects as if they were real. On the other hand, make believe theory keeps the status of the fictional objects as fiction and considers the spectator as, more or less wilfully, transformed into a fictional object that is affected by fictional objects. In both cases, the ontological status of a number of objects is transfigured. In suspension of disbelief theory all the objects that compose the story are turned, however briefly, into real objects. The ontological transmutation in the case of make-believe theory is a bit more complex. As far as it is the observer that flips into a fictional object, Walton needs to face the question, what happens with other real objects attached to the observer? The most obvious ones being the emotions that the observer feels. It would be incongruent to separate them ontologically, so Walton is forced to assume that the ontological fate of the observer's emotions follow that of the observer himself and hence, he has to concede that the emotions felt while entangled with objects of fiction are not real emotions but "quasi-emotions".

However, much like a real coin, this fictional coin has two sides but it is made of roughly the same material. The first, and rather obvious, aspect that both theories have in common is their refusal to conflate the real and the fictional but to retain them as domains that objects belong to. Secondly, they both see objects capable of jumping to the other ontological side, as when a spectator or diegetic objects become real. Finally, and most importantly, both theories recourse to one object (or event) as foundation: belief. Belief is the transitional that serves to articulate both theories in terms of both real and fictional objects. It is belief what allows fictional objects become real and vice versa. It would be an effort beyond the scope of this dissertation to properly bring belief into the metaphysical workshop, the Milieu, and properly analyze it. However, I can nevertheless provide an account of where I stand with respect to these two theories of fiction. It is no surprise that I am closer to the theory of suspension of disbelief. After all, it would be a dangerous act, a problematic sacrifice, to consider the feelings and emotions of the people that comes in contact with design objects as quasi-emotions. Although, and together with use, they might be considered fictional at some stages of a design process, use and the emotions it promotes are very real objects indeed. Furthermore, there is a fundamental element that we need to consider: it is only in very particular instances that the user of a

design object enjoys the detached position of a spectator. Design is mostly about use-driven embodied entanglement with real objects. Up to this point, this design theory of fiction resembles the Coleridge's theory of fiction but it crucially departs when it encounters the object of belief. In my opinion, it is not through belief, or the wilful suspension of it, that fictional objects become real and hence effective in terms of the emotional responses of the spectator. Fictional objects remain fictional and emotions remain real. Its effect on people qua users, not only qua spectators, springs from the fact that fictional objects structure real objects. That is where their power resides, not in becoming sources of effect but in scaffolding the kind of effects that take place, stablishing their coordinates, their possibilities of expression. When a person interacts with an offject, a whole cohort of fictional objects come into existence and with them, the possibility of real objects to express in a new emotional landscape.

5.3.3. On World Building

In my brief analysis of belief theories of fiction, I intentionally left out an important element that differentiates them: world building. The theory of suspension of disbelief turns fictional objects into real ones, they become a part of the world of real objects or what we have consistently referred to as the objective universe. In theory of make believe, the spectator plays a game in which he becomes a fictional entity able to interact with the other fictional objects that configure the story that she is engaged in. This ontological shift demands a context for the spectator is not in the objective universe anymore. This context is what is usually known as imaginary world[80] or secondary world, for the primary world is the actual, real one (our objective universe). Detractors of the suspension of disbelief theory, like Kendall Walton (Walton 1978b) and J.R.R Tolkien (Tolkien 1947), have described not only fictional worlds, but how they come to be or interact with the real world. In the school of analytic philosophy, Saul Krypke and David Lewis developed the possible worlds theory (David Lewis 1986), that in a grossly simplistic way, argues that a statement can be true or false depending on the world (actual

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[80] There are many other ways to refer to imaginary worlds, fictional worlds, possible worlds, alternative universes, etc.

or possible) where this statement is made. The possible worlds theory, or variants of it[81], went on to influence the work of a number of designers dealing with speculative objects. It appears in Dune and Raby's Speculative everything:

> *Whereas a child uses props to imagine a box is a house or a rock is an alien, speculative design props are intended not to mimic reality or allow us to play act but to entertain new ideas, thoughts, and possibilities for an alternative world from the one we and the prop coexist in, what Kendall calls "fictional propositions" in contrast to the "fictional truths" of children's props.6 The prop belongs to its own fictional world; (Dunne and Raby 2013b, 92)*

Founds the theoretical underpinning for Wakkary's material speculations:

> *Here we articulate how particular design artifacts can be seen to generate possible worlds. We draw on key concepts from possible worlds theory to support our idea of material speculation. These include the notion of actual versus possible worlds and the notion of the counterfactual. We discuss how design artifacts can be seen as counterfactual artifacts while still being material things. We argue that the material actuality of counterfactual artifacts enables them to advantageously occupy a creative space at the boundary between actual and possible worlds. We also elaborate on how counterfactual artifacts generate possible worlds through encounters with people. As a consequence of these features, material speculation acts as a form of critical inquiry. (Wakkary et al. 2015)*

And consistently informs the work of Paul Coulton and Joseph Lindley. Here is a revealing deconstruction of Sterling's definition of Design Fiction (which is heavily reliant on suspension of disbelief theory) and how it leads to a more world-making one:

> *The breadth and flexibility of Sterling's 2012 definition can be demonstrated by unpacking its constituent elements. With roots in ancient philosophy diegesis can be a rather troublesome word for those outside media theory. Thankfully design fiction's purposes diegesis simply to refer to the world of the story. Thus it follows that a diegetic prototype is a prototype that exists within a story world [cf. 4]. Suspending disbelief about change is in line with speculative design - an approach on which design fiction draws - and relates to a primary focus on generating understanding and insights rather than finished products. Thus the role of design fiction is "not to show how things will be but to open up a space for discussion" [2:51] … So a design fiction is (1) something that creates a story world, (2) has something being prototyped within that story world, (3) does so in order to create a discursive space. Although this definition appears straightforward, complexity arrives when we consider what 'something' may be – and we*

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[81] Kendall Walton's make-believe theory and how fictional worlds are conceptualized as a result can serve as a springboard into the more rigorous and analytical possible worlds theory by David Lewis. Also, Lewis' philosophical approach has been adapted to literary theory to explain the notion of fictional worlds. See: (Ronen 1994)

Much like the object belief, the object world is a highly problematic one in terms of the Milieu. Regardless of its condition as faithful ally of common sense, I have trouble thinking it in the context of the Milieu. What is an imaginary world? Without hesitation, it is an object. As such, it exists in the objective universe. Of course, an imaginary world, as commonly understood, is also a thing and only as a thing it is solitary and exists in the formal world. Objects are together in the universe and things are solitary in the world. This is a crucial feature of the Milieu that allows one to grasp the principle of ontoference as its most fundamental. It also allows us to think objects as things and, in doing so, gain a truly valuable perspective as the ontological status of not only the object in question, but the objects it comprehends and comprehended by it. It is for this reason that I think of imaginary worlds not as possible or alternative worlds but either as objects in the objective universe or as things in their unique world.

Again, and much like it is the case with the object of belief, to bring the object imaginary world into the Milieu and critically analyze it would be beyond the scope of this dissertation for reasons of space. Doing so would entail the examination of not only the ontological status of an imaginary world but also its relations, differences and commonalities with the formal world and the objective universe, possibly avoiding hierarchisation in terms of Divine creation and human subcreation as at least one academic has already done[82]. However, one can still provide an alternative understanding of offjects without an appeal to imaginary worlds: rather than using the metaphor of access into a space (I.e. world) I will use a metaphor of appearance. When a person interacts with an object (book, film, offject) what happens is not that a person enters into an alternative, possible, fictional world. The person remains in the objective universe but

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[82]Mark Wolf ends his book on the history of fictional worlds with the following: "Differing as it does from ex nihilo creation, subcreation is not a usurping of the Creator's role, but rather a cooperation with it, and acknowledgement of it. The subcreative desire is a part of human nature that precedes our fallen state, and the action and contemplation that accompanies it are both a gift and part of a divinely-mandated vocation calling us to carry ton the work that God has begun." (Wolf 2012)

the perspective from which it is looked at is distorted by the particular interaction. If before reading a story of fiction or interacting with an offject one is looking at the objective universe from the eye-level/horizon line, offjects allow a displacement from this viewpoint and as consequence, an experience of effects like conceptual foreshortenings or contrasts. In experiencing the real at eye level, one is unaware of the multiple fictions that structure its reality. Objects appear as a square on a plane. But the real is not a piece of paper where one can easily pinpoint the location of the horizon line. The eye level could be anywhere and that is where the power of offjects resides: offjects reinforce the notion that there is an eye-level and that its position is contingent. Also, offjects contest common sense at its most deceptive. Although one knows there is an eye level for there is an effective object, one cannot accurately locate it so it is easy to believe in a sly common sense deeming the validity of the object universal, as in standing out of observation and hence "truer". There is no conflict, reality appears as non-contentious and the message is clear: this is real - this is an effect, this is a present that is not here yet but via induction, the sun will rise tomorrow - this is the car of the future. The real rejoices in the illusion of the perfectly possible. Of the ultimate induction that hides the perspective from which it is induced. Offjects contest this through design. They don't claim to be fictions for they are effective and, in many cases, even tangible. They however, honour the fictions that structure their effects by not considering them envelopes, worlds, externalities or wrappings. They are objects that highlight horizon lines and contest views of the only universe they, together with every other object, are part of.

My retreat into a different metaphorical space does not mean that I consider the object world inexistent. My move is, also, an effort into showing how the notion of world is a complex and very real one that demands ontological justice. After all, and in line with Tony Fry's argument in his introduction to Defuturing:

> *The way the world is thought or viewed is always predetermined by a culturally authored perception and naming. (Fry 1999, 4)*

The fact that there is only one universe, the objective universe, does not mean that every consciousness that inhabits it grasps it in the same way. This is precisely the reason why I am concerned with the notion of fictional world. A fictional world facilitates

escapism. And not a sort of outwards escapism as it is normally associated with the act of seeming transcendence experienced by for example, a reader of fiction entangled with a story. In talking about fictional worlds, I worry about inward escapism: a movement that results in the ignorance of how utterly idiosyncratic is the grasp that each person has on the objective universe. In my opinion, to be entangled with fictional objects through offjects is not to retreat or access another world but to get a new grip on one's very personal awareness of the objective universe.

5.4. Key Contributions

The line that divides the actual and the possible is a thin one and designers, those dealing with complexity through some sort of material to bring about the new, those trying to conceptualize the possible in terms of the used or the interacted with, are experts in sketching it. In this dissertation I drew upon definitions made through design by designers to study and evaluate the reality of the artificial. The target was not be the reality of design but the fundamental objects that inform reality itself: real and fictional objects. The intended readers are mainly design researchers and practitioners interested in knowing more about the design objects they constantly encounter, make and use in order to access knowledge. If design objects are essential in forming and informing reality, it is also essential to engage with the fundamental qualities that authorize their modes of belonging to reality itself. This is precisely the main aim of this dissertation: to provide its reader with a handle to grasp what makes those design objects real or fictional. The real and the fictional in their split or assemblage, in their nesting within each other or their sudden bifurcation. The real and the fictional as a characteristic of design objects that permits its analysis and understanding.

The main contribution of my research effort and the answer to my research question "what makes a design object real or fictional?" is a design theory of fiction. A set of concepts, ideas and arguments that design researchers and practitioners working in a project of their own can mobilize to get an alternative grasp on what makes design objects real and fictional, Crucially, it should be kept in mind that I have not attempted to develop a theory of design fiction, or a theory of speculative design or even a theory

of design. What I hope I am contributing with this document is a design theory, that is, a design theory of something. A something that is fiction. It is a design theory because, mainly, it is of interest for the act of designing. It is meant to be of aid for, primarily, a design researcher or practitioner faced with the challenge of creating something new in order to gain knowledge, and the handling of the possible and the actual, the real and the fictional, that any design effort entails. As a result, a designer engaging with it has to generate some of it in order to design with it. The design theory of fiction that I presented must account not only for its form but also for its formation. In terms of formation this thesis presents two contributions:

- The idea of the Milieu as a conceptual space or a metaphysical workshop that makes explicit the philosophical ideas that ground a design research inquiry. I have furnished the Milieu for this thesis using the ideas of Tristan Garcia in order to be able to think better the objects of my inquiry. The Milieu has served as a rudimentary ontological compass to think the entities I have encountered and analyzed, criticized or designed. Through describing it I arrived at a particular understanding of what an object, any object is. The object is first and foremost irreducible. It is a differential or an interference between other objects, objects that are in this object or objects that this object is in. Any object embodies this fundamental tension between two senses, the sense of being and the sense of comprehension. No matter whether the object is real or fictional, beautiful or ugly, material or abstract, alive or dead, what the object is, is the tension, the difference, the interference between the objects that compose it and the objects that it composes. To define an object and say what it is, is to reduce it and in a sense, to transform it. Objects have this escapist nature, always avoiding to be grasped whole, always changing as soon as one of their components are relations are modified.

- The concept of Metaphysical Probe as a self-critical tool to access knowledge pertaining to the metaphysical realm. The metaphysical probes resemble other design probes used in design research in terms of their inspirational and exploratory nature but also differ in two ways. First, they don't directly involve other people as users in the navigation of the

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knowledge space where they are deployed. Secondly, the metaphysical probes concern themselves with the metaphysical while traditional design probes dwell in the physical and the material. The metaphysical probes are composed of a "design event" that structures and sustains the "probing" action for a period of time and a "final design object" that motivated the design event in the first place and that once its design was completed resulted in the design event dissipating, mutating or splintering into other design events. In this dissertation, the metaphysical probes where deployed to explore the fictional nature of design objects and provided insights relevant to their existence, identity or functionality among others.

In terms of form, this design theory comprises terms that are made through design and also mobilizes concepts that were already there, that preceded them. Furthermore, this design theory won't live in a vacuum but out there in the universe, where other theories and arguments, or just ideas, have already found a comfortable dwelling place. A place known and cherished by those trying to understand a particular topic. The constrain can be formulated as a question, how necessary or useful is for this design theory to redefine well stablished terms? The chance of conceptual freedom and originality pays a price in the currency of disruption. I am especially mindful of this constrain when lying the foundation of what I consider fiction. In a nutshell, the understanding of fiction in this design theory must resemble those that one can find in the dictionary or in a newspaper article, for example. With this in mind, I see the contribution of this thesis in terms of the form of the design theory I propose as follows:

- Three transitional concepts that can help designers explain or argue with ontological matters of concern of design objects. The three transionals are Ontoference, Deswing and Offject and are the result of the insights gained with the metaphysical probes thought through the lenses of the Milieu. Ontoference as a principle that surfaces the dynamic irreducibility of any object (including those of design): objects as the difference or interference of the senses of being and comprehension, of the objects that are part or enter a relation with a particular object . Deswing as an epistemic operation that, through an oscillation between the senses of being and comprehension,

results in an ontological debri that is, in fact, the object under analysis. Finally, the Offject, as a design object in which the fundamental tension that structures its being hinges not in the senses of being and comprehension but in terms of the possible and the actual objects that are part or enter a relation with, the design object in question.

- Three arguments in the form of inductions derived from the transitional concepts Offject, Deswing and Ontoference. "On the Mechanisms of Reality" uses the principle of Ontoference to ground an explanation of how real and fictional objects differ in terms of the imaginary and how their consideration should be "objective". Crucially, "objective" not because they are universal or absolute but "objective" because what makes an object real or fictional is "in objects". In "A Genealogy of the object" I trace the path from most general, the object in the objective universe that I explored in the Milieu, to the particular object of interest for my research question: the object of speculation or Offject. I describe its evolution in terms of the different movements of deswing that are necessary to arrive at what a particular object is: from deswinging between being and comprehending to deswinging between the actual and the possible. Finally, in "Critique and Consensus" I use the Milieu and the three transitionals as argumentative tools to talk about considerations of design objects as props, on the concept of make-believe and on the idea of world building.

Taken as a whole, this thesis is an effort in making design theory through design. It's been my intention that, like design, this design theory is able to cope with change by attaining precision through relation and difference. Its only facts are the objects I designed or the design objects of others. And this includes, in a rather meta-somersault, the objects of design: tools, materials, forms, visual effects, graphic elements and techniques, etc. In developing a design theory of fiction, I have attempted to always keep the objects of design in the foreground and express ideas in their terms. After all, they are the vocabulary and the grammar that designers use, a language that demands much time and effort to master. It is possible that if in developing design theory one re-appropriates and adapts terms of common use in design language, design researchers and practitioners might have an easier time putting this design theory to use or just putting it aside.

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5.5. Future Directions

Just like in design endeavors of a different kind, this thesis finds possibility in ambiguity in order to boost an effort of, in my opinion, great epistemological necessity: never before science has been able to produce facts with such clarity and objectivity and never before have facts been ignored or dismissed with more ease than in present times. If facts are the heralds of what is, the pillars of what makes reality real, why is science not enough to silence the ambiguity arising in their interpretation? Perhaps the time has come for science to find allies in forms of knowledge that embrace and thrive in the ambiguous, the contradictory and the disputed. Forms of knowledge whose definitions and arguments welcome resilience in the face of their accumulation and whose theories are "provisional, contingent and aspirational". Design is one such forms of knowledge for it thrives in the affirmation that things can be genuinely known by following the objects arising while making and using other objects. Perhaps it is time to find ways of seeing reality without an ambiguous and possibly paradoxical focal point. It has been my intention with this dissertation to learn and mobilize ways of seeing double in order to grapple with the the realities of the artificial, its crises and its opportunities.

In the future, I would like to continue investigating the realities of the artificial. In doing so I would like to follow design objects and learn how they emerge and configure the realities in which they are located by inventing and even inverting real and fictional objects. In the short term I'd like to focus on three aspects:

- Consumerism. I would like to study the case of Ikea and the executive decision to reject creative director Sara Blomquist's idea to include people in the front page of their 2018 catalogue. With more than 210 million copies annually worldwide, the Ikea catalogue is the most printed book in the world, ahead of the Bible and the Koram. As a result, it is regarded as one of the most impactful design objects for its ramifications into the environmental, economic and social spheres of consumer reality.

- Climate. I'd like to follow Alexandra Arene's and Bruno Latour's cartographic objects. Known as Gaiagraphy, these objects are graphic

representations of the earth that focus on relations in the Critical Zone, the terrestrial layer that sustains all life on Earth. In creating them, they challenge and reenvision modes of representing the planet that have been uncontested for centuries.

- Future. I would like to extend the work done in this thesis and explore how realities to come are conceptualized and even enforced not only once a design object is finished but even when it is conceived and planned. For this part I will draw on design objects developed by Bel Geddes, Luigi Seraphini, Dunne and Raby and others.

In searching for things, I have looked for parts and relations, for differences and interferences, for design objects and design events. But there are many objects that have escaped my analysis and that I am forced to address as part of my future work. Objects like belief and world need to spend some time in my metaphysical workshop but only after I have researched values through design. I'd like to review and address what is considered good, beautiful and true in design for it seems that designers are in a difficult position to articulate their views without falling into a sort of absolute relativism. This interest springs from the difficulties I have encountered when trying to think the fictional and the real in terms of the true and the false. It is a topic that demands a great deal of attention and that proved to be beyond the scope of this dissertation. Also, I would like to bring this design theory to designers and gather their impressions, after all this dissertation has been all about making it with no time for testing.

5.5. Concluding Remarks

In following the research path presented in this dissertation I have encountered as much epistemic possibility as ontological challenges. Design and designers, in my opinion, seem to be swayed by dangerous currents of ontological simplification. As an example, I propose the following excerpt from Terry Eagleton's review of McKenzie Wark's "A Hacker Manifesto":

> Wark tells us excitedly that such types "create the possibility of new things entering the world." But only avant-gardists and Americans believe that the new is inherently positive. The twentieth century's big new political idea was known as fascism. The antiglobalization movement is new, but so is the war in Iraq. Biologists cultivate anthrax as well as penicillin. Programmers work for the Pentagon as well as for peace campaigns. Philosophers can be reactionary as well as enlightened. It is marketplace ideology, not radical thought, that imagines that the new is always to be championed over the old. It was Leon Trotsky who remarked that socialists had always lived in tradition. In his downgrading of the old in light of the new, Wark is unconsciously in accord with Donald Rumsfeld's view of Europe, and very much a product of the social order he rightly criticizes… "Every hack," Wark enthuses, "is an expression of the inexhaustible multiplicity of the future, of virtuality." But the future is not in fact inexhaustible. We are closing down some of its possibilities forever by the actions we take in the present. Nor is the potential always to be preferred to the actual. If socialism is possible, so is nuclear catastrophe. (Eagleton 2004)

Designers are patrons of the new, midwives of the possible and leaders of the artificial. But this does not mean that they have to be enemies of the actual and opponents of the past. In fact, it might be precisely the voice of the designer that is missing in official discourses welcoming the new. And the new is meant to be firmly addressed for there is no way to keep it from coming. With this thesis, I want to help designers think the meanings they channel with their voice and design objects. And to this end I might have taken the first steps towards conceptualizing what a design philosophy might be or entail: a way to move beyond a worldview, a ground for meanings sometimes taken for granted. This is, of course, Tristan Garcia on meaning:

> Meaning is never given, but obtained through the elimination and relativisation of other possible meanings…Thus, there is given meaning and received meaning: I give meaning to what I comprehend, and I receive meaning through what comprehends me…Meaning seems to be elusive, to constantly oscillate and reject a unilateral definition. Meaning resists compactness and entails choice because it is a Janus faced operation involving two senses. Comprehending is giving meaning, being is receiving

> *meaning so meaning is inherent to things. As humans, thinking things, what*
> *we do is select, arrange or hierarchize meanings giving primacy to some*
> *and discarding others because a thing has as many meanings as things it is*
> *in. An athlete gives meaning to his athletic career and when victory is*
> *achieve a certain emptiness ensues. (Garcia 2014, 123)*

Meaning is a like a boomerang, paradoxically designed to hit a target and not hit it but return to the throwers hand. And designers are trained to handle paradoxes and contradictions, shift-changing and partial meanings. They are apt in the manipulation and devising of objects and, to a higher or lesser degree, aware of their inherent ontological fragility and constant mutability. Designers recognize the intensities (political, social, environmental) that transverse and configure the objective universe. Furthermore, they feel the responsibility for bringing objects to the universe offset by the optimistic chance that new things will be. Designers know about optimism, responsibility and also, tragedy. This is García again:

> *Every human action – interests in the animal kingdom, culture,*
> *science, an art, a social function, a community, contemplation, the body,*
> *love, friendship, action, and so on – discovers tragedy, which is not simply a*
> *tone, an accent, a certain colour of human narratives, a vague feeling, or a*
> *cultural construction, but the conscious way of assuming and confronting the*
> *inverse senses of being and comprehending. If I comprehend my object, I*
> *separate myself from this object, and I am not this object. (Garcia 2014,*
> *127)*

It is the tragedy of the object, of never quite knowing it, of trying to grasp a whole that does not exist, of endlessly trying to synthesize a tension that is beyond synthesis. Designers struggle with tragedy under the guise of form and use but they don't despair, for in tragedy they have found opportunity. They seem to naturally understand that possibility is the dearest daughter of ontological tragedy. It is in this sense that the content of this thesis might feel vaguely familiar to a designer, like a tiny knot in the stomach before showing a sketch. I would be happy if my contribution would then be to provide a new vocabulary to express it.

A "Leguinian"[83] lyrical object brings this dissertation to its end. It is of my own creation so I am compelled to argue for my decision of including it here regardless of its

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[83] Of course, I've been inspired by Le Guin's use of poetry and music to bring her ideas to life - ("Ursula K. Le Guin / Todd Barton: Music and Poetry of the Kesh" n.d.)

appalling quality. In developing a design theory of fiction, I have tried to create a conceptual apparatus that is flexible and resilient. Primarily, it is meant to be generative. Its explicative function is meant to be auxiliary or subordinate to its ability help in the process of designing. As a consequence, it is meant not to be firmly assimilated as a static whole but rather processed and adapted. In my view, this is in line with the workings of design where a designer constantly finds things that, paradoxically, were not there in the first place. It is like an understanding of beauty as something that is found in an object, although without one finding it, it wouldn't be there, in that object, in the first place. It is like looking for a treasure that only exists once it is found. Like finding a meaning to a page of the Codex Seraphinianus or in the poem below. In conclusion, the most hoped and cherished contribution for this design theory of fiction would be a designer that, upon its encounter, experiences an act of both creation and discovery.

A dream. A memory. A description.
A dreamer. A sleeeper. A dreamcatcher.
An interview and a poem. A fear and a laugh.
A conference and a talk.

All of these are objects and all of these are things.
All of them are different but all of them exist.

His stuff. Her things. His ideals. Her spit.
What is legal and what is worth.
What is hidden and what is not.
The effective and structural. The problematic and the solved.

All of these are objects and all of these are things.
The effective is the real and fiction an escapist.

The ironic and a soylent spoon.
Identity and a brutal logo.
The recognition of an urban fish.
A deadline, a maybe and a brief.

All of these are objects and all of these are things.
A fiction hunts the real though one cannot see.

A usb powerered dragonfly.
An ostrich with wifi and a camera beside.
A cat in a temple and molecular waves.
The unlikely and unplausible but nevertheless.

All of these are objects and all of these are things.
Unapologetically real if one looks at it.

A wallplug. A room. A record player.
The energy spent. One second later.
A person that sees but cannot touch.
A witness, a entangle that is no more.

All of these are objects and all of these are things.
Never the same when watched closely.

The possible, the preferable and the actual.
A place, a person, a group.
This present, that future.
Always a worldview, always a milieu.

All of these are objects and all of these are things.
A relation and a tension at the core of their being.

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Appendix I:

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Appendix

2: Papers

Published

Reconstrained Design: A Manifesto

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Abstract

This manifesto marks the first anniversary of a project, Reconstrained Design, launched explicitly to challenge the state of design: its narrowing pathways, prevailing assumptions, and corporate agendas. Our manifesto takes the form of a preamble which outlines the history of the manifesto genre and its origins in the historical avant-garde of a century ago, followed by a list of 12 tenets that put forward specific design challenges (each based on or challenging a thought-provoking quotation). With this text we aim to pry open new discursive and imaginative spaces, to force new ideas into the public view, to promote engagement with politics, technology and other facets of everyday life, and to upset the status quo of design thinking. It is written in an appropriately polemical style in order to take at its word the call to *provocation*. We hope this manifesto will establish our project's aims while encouraging important discussions between conference participants.

Author Keywords

Design; pedagogy; activism; critical futures; manifesto.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

Preamble

One year ago we launched our research project, Reconstrained Design, with the aim of casting a critical eye on corporate dreams and emerging technologies. To mark the anniversary, we decided to formulate a series of design challenges critiquing the state of mainstream product design. In order to understand what we stood for we gathered these challenges into a statement of principles, a manifesto. As the artist and would-be assassin Valerie Solanas told reporters outside the 13th Precinct in New York on June 3, 1968 after she had shot Andy Warhol: 'Read my manifesto and it will tell you what I am.'

Image 1: F.T Marinetti, the leader of Italian Futurism and a prolific manifesto writer, whose principles on manifesto writing have influenced our own. © Wikimedia Commons

Image 2: The notorious first issue of *Blast* (1914), the magazine of the Vorticist movement. © Wyndham Lewis

But how to write a manifesto? According to F. T. Marinetti, the leader of Italian Futurism and arguably the greatest (and most prolific) manifesto writer of all time, the key ingredients of any manifesto are 'violence and precision' [1]. Manifestos must take no prisoners, they must be bold and direct like the advertisements they imitate. From 'The Founding and Manifesto of Futurism' in 1909 to the 'Manifesto of Futurist Cuisine' in 1930, Marinetti and his comrades wrote hundreds of manifestos across all subjects [2].

The problem with the Futurists was that, if anything, they believed too much in the future. As Marinetti himself put it: 'Contrary to established practice, we Futurists disregard the example and cautiousness of tradition so that, at all costs, we can invent something new, even though it may be judged by all as madness.' [3].

This single-mindedness is what made the Futurists exciting, but in our view it was also their greatest weakness. They lacked any critical distance, to the point that they became cheerleaders not only for Suffragism but also for Fascism, war, industrial waste, library closures, and other downsides of modernity. Their Vorticist rivals in London, led by Wyndham Lewis and Ezra Pound, mocked this reverent attitude to technology. They called it 'automobilism', after the leading technology of the pre-war era:

'AUTOMOBILISM (Marinetteism) bores us. We don't want to go about making a hullo-bulloo about motor cars, any more than about knives and forks, elephants or gas-pipes. Elephants are VERY BIG. Motor cars go quickly.' [4].

Also wary of technology and progress were the Dadaists, led by another prolific manifesto writer, Tristan Tzara. Operating during the carnage of the First World War, Dada came out as 'definitely against the future', even calling for the 'abolition of the future'. Tzara brought an ironic and self-critical gaze to the manifesto's masculinist posturing, so that while the 1918 manifesto begins with a Marinettian definition:

'To put out a manifesto you must want: ABC

to fulminate against 1, 2, 3

to fly into a rage and sharpen your wings to conquer and disseminate little abcs and big abcs, to sign, shout, swear, to organize prose into a form of absolute and irrefutable evidence'

It proceeds to tear apart its own platform:

'I write a manifesto and I want nothing … and in principle I am against manifestos, as I am also against principles.' [5].

Because by 1918 the Dadaists felt that all strongly held beliefs were suspect. For them everything was bled of meaning by the First World War. We saw that somewhere in the middle of these two extremes was the perfect manifesto: at once direct and assertive, critical and self-aware, not taking itself or the future too seriously while being, beneath it all, deadly serious.

That is what our provocation aims for: a manifesto that is neither too dogmatic nor too ironic. The world has enough of both.
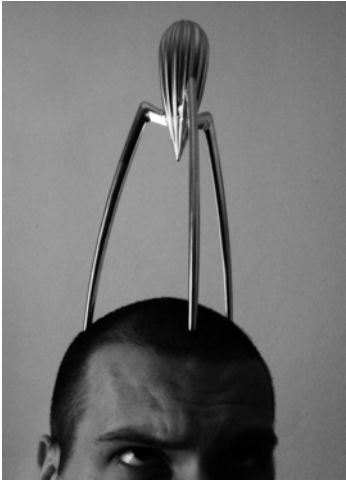
Image 3: Challenge #4: Bring an end to vacuous celebrity designer BS. © Wikimedia Commons

Image 4: Challenge #5: Interrupt legacy thinking and product lineages. © Wikimedia Commons

Our Manifesto

Challenge #1: **Reverse this statement.**
'*We must shift America from a needs, to a desires culture, people must be trained to desire, to want new things even before the old had been entirely consumed. We must shape a new mentality in America. Man's desires must overshadow his needs.*'

Paul Mazur (in the *Harvard Business Review*, 1927) [6]

Challenge #2: **Reclaim the means – stop obsessing with the ends.**
'*Modern anthropology … opposes the utilitarian assumption that the primitive chants as he sows seed because he believes that otherwise it will not grow, the assumption that his economic goal is primary, and his other activities are instrumental to it. The planting and the cultivating are no less important than the finished product. Life is not conceived as a linear progression directed to, and justified by, the achievement of a series of goals; it is a cycle in which ends cannot be isolated, one which cannot be dissected into a series of ends and means.*'

John Carroll [7]

Challenge #3: **As things become increasingly automated – facilitate action not apathy.**
'*[W]hen it becomes automatic (on the other hand) its function is fulfilled, certainly, but it is also hermetically sealed. Automatism amounts to a closing-off, to a sort*

of functional self-sufficiency which exiles man to the irresponsibility of a mere spectator.'

Jean Baudrillard [8]

Challenge #4: **Bring an end to this vacuous celebrity designer BS.**
'*My juicer is not meant to squeeze lemons; it is meant to start conversations.*'

Philippe Starck [9]

Challenge #5: **Interrupt legacy thinking and product lineages.**
'*All inventions and innovations, by definition, represent an advance in the art beyond existing base lines. Yet, most advances, particularly in retrospect, appear essentially incremental, evolutionary. If nature makes no sudden leaps, neither it would appear does technology.*'

Robert Heilbroner [10]

Challenge #6: **Rather than feed the illusion of invincibility, work from the reality of uncertainty and transience.**
'*Everywhere gold glimmered in the half-light, transforming this derelict casino into a magical cavern from the Arabian Nights tales. But it held a deeper meaning for me, the sense that reality itself was a stage set that could be dismantled at any moment, and*

Image 5: Challenge #7: The gravity battery, an alternative form of energy generation we propose as an instance of Reconstrained Design. ©The authors

Image 6: Challenge #12: Start building the future you want, with or without technology. © **David Bakker** @flicker.com

that no matter how magnificent anything appeared, it could be swept aside into the debris of the past.'

J. G. Ballard [11]

***Challenge #7:* Set aside the easier work of armchair critique and take up the more difficult work of proposing viable alternatives.**
'*It is true that I can better tell you what we don't do than what we do do.'*

William Morris [12]

***Challenge #8:* Ask yourself (before putting things in the world): Am I prepared to play God?**
'*It's not right to play God with masses of people. To be God you have to know what you're doing. And to do any good at all, just believing you're right and your motives are good isn't enough.'*

Ursula K. Le Guin [13]

***Challenge #9:* Design ecologically.**
'*One merges into another, groups melt into ecological groups until the time when what we know as life meets and enters what we think of as non-life: barnacle and rock, rock and earth, earth and tree, tree and rain and air. And the units nestle into the whole and are inseparable from it … all things are one thing and one thing is all things – plankton, a shimmering phosphorescence on the sea and the spinning planets and an expanding universe, all bound together by the*

elastic string of time. It is advisable to look from the tide pool to the stars and then back to the tide pool again.'

John Steinbeck [14]

***Challenge #10:* Adopt a khadi mentality.**
'*True progress lies in the direction of decentralization, both territorial and functional, in the development of the spirit of local and personal initiative, and of free federation from the simple to the compound, in lieu of the present hierarchy from the centre to the periphery.'*

Petr Kropotkin [15]

***Challenge #11:* Be patient for the quiet days.**
'*Another world is not only possible, she is on her way. On a quiet day, I can hear her breathing.'*

Arundhati Roy [16]

***Challenge #12:* Start building the future you want, with or without technology.**
'*People ask me to predict the future, when all I want to do is prevent it. Better yet, build it. Predicting the future is much too easy, anyway. You look at the people around you, the street you stand on, the visible air you breathe, and predict more of the same. To hell with more. I want better.'*

Ray Bradbury [17]

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Research Fiction and Thought Experiments in Design

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Research Fiction and Thought Experiments in Design

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ABSTRACT

Any design process involves an imaginative act, a picturing of the world as other than it is. Fiction has long played a part in design research in the form of scenarios, personas, sketches, paper-based prototypes, simulations, prototypes and speculative design. The term "design fiction" has been adopted to describe more elaborate and detailed representations of products and services that do not exist yet. Design fiction is an emerging practice and there are several competing definitions and forms. This article traces design fiction from the Italian radical design of the 1960s through British Art Schools in the late 1990s to contemporary adaptations of the practice by companies like Google, Microsoft and Facebook. Design fiction is now produced regularly by individuals launching Kickstarter campaigns, corporations selling visions of future products and governments imagining new digital services. But there is little agreement about the status of such fictions: what constitutes a good fiction? How does fiction relate to research? In what sense does fiction contribute to existing knowledge? Although fiction can sometimes result in accurate prediction this is not its

main value. It is rather the creation of ambiguous artefacts that help us think carefully about emerging technologies and their potential impact. Although fiction may seem to be the antithesis of empirical enquiry it is often employed in the form of "thought experiments" in Physics, Mathematics, Ethics and Philosophy. This article argues that design fiction can also be considered as a form of thought experiment. Excerpts from a fictional Wikipedia article about Valdis Ozols, a Latvian historian and author writing design fiction in the 1940s precede each section as think pieces about the nature and value of fiction. The text is illustrated with pages from a fictional design workbook written in an invented language.

1

The Rise of Design Fiction

Valdis Ozols has been described as the Father of Design Fiction, a 2017 Wikipedia entry is reproduced here in three parts at the beginning of each subsection of this article to illustrate some of the problems around the creation and criticism of design fiction.

Valdis Ozols (1905–1998)

Valdis Ozols (April 7th 1905 - February 9th 1998) was a Latvian Historian and science fiction writer. His historical work is now primarily studied as Soviet propaganda but there has been a revival of interest in his science fiction, which is now sometimes categorised as design fiction.

Valdis Ozols	
Ozols in 1947	
Born:	April 7th 1905 Riga, Latvia
Died:	February 9th 1998 Istanbul, Turkey
Occupation	Historian / Writer
Nationality	Latvian
Genre	Science Fiction / Design Fiction
Spouse	Iveta Petersen (m. 1929, div 1952)

Contents [edit]

Life and Career [edit]

Ozols spent much of his working life as a Lecturer at the University of Latvia. He wrote two modern histories of Latvia dealing primarily with the Soviet occupation of Latvia. *The Latvian Experience of Soviet Democracy* (1945) is a pro Stalinist account of the early years of the occupation. The book is based largely on official

Communist Party hagiographies of Stalin and is for the most part unremarkable but it was republished in the nineteen nineties as part of the *Reading Propaganda* series [citation needed]. The book ensured Ozols' position at the University of Latvia when it became a standard text in the national curriculum for modern history. His second book appeared four years later offering an account of everyday life: *Soviet Latvia Today and Tomorrow* (1949). Again it was a largely uncritical account of Soviet policy in the region, taking a conservative line against nascent organisations like the Popular Front of Latvia (Tautas Fronte). This book has also been reissued as part of the *Reading Propaganda* series but it is no longer regarded as history.

During his academic career Ozols published several short stories under different pseudonyms. Latvian fiction was strictly censored during the Soviet occupation and Ozols tried only once to publish under his own name. His experience with the censors and the University's bureaucracy was such that he decided never again to publish in Latvia and had his work translated for submission to various editors in Eastern Europe. He had most success with Polish publications in the nineteen fifties during the de-Stalinisation period when there was a great increase in freedom of expression [citation needed]. Several of his short stories took the form of academic papers and reports from fictional technology conferences. Some literary critics now believe that they influenced the work of the Polish science fiction writer Stanislav Lem in books like The Futurological Congress (1971) [citation needed]. In his later years Ozols complained bitterly that Lem had stolen his ideas and sought legal advice about suing him [citation needed]. Intellectual Property was a

recurring theme in Ozol's work. One of his fake academic reports describes the development of a music machine which combines musical tones, times and tempos to simultaneously create and copyright billions of tunes. This story *Infinite Music (1940)* describes the total demise of the phonographic industry when an American corporation declares any possible future melody to be its intellectual property and copyright protected for a period of seventy-five years.

Although Ozols assiduously pursued a strict Communist party line in his academic work he became the victim of a purge in the university in the late nineteen forties. He was denounced as an American spy by his wife Iveta [see Ozols' Personal Life] but the Ozols scholar Inga Baldois, has argued that he may also have been identified as the author of some "counter revolutionary" short stories. After losing his job at the University Ozols disappeared and all records of his service in post were destroyed. His books were expunged from the curricula and any reference to them was removed from subsequent academic and administrative work. Ozols officially ceased to exist and soon after this the man himself disappeared. Some believe he was executed but Baldois claims that he fled the country and continued to publish short stories under pseudonyms.

Ozols' Rediscovery [edit]

Ozols' fictional work was almost entirely forgotten until a copy of Ozols' self published book Technopedija was discovered in 1989 by Inga Baldois, a postgraduate researcher in Computer Science at Riga Stradins University. Inga came across a copy of the book in a storage space

she had rented. It was Inga who identified the retroactive importance of the work and began to publish English translations online. She pursued Ozols' fiction through obscure East European magazines and the list of stories in this Wikipedia article is mainly based on her research.

In 1993 Baldois claimed to have contacted Ozols and carried out an interview with him. He is evasive in most of his answers, especially about Soviet era Latvia and the charge that he denounced many people including his wife, her lover and the Head of Department; but the interview contains a section on design fiction which has been referred to as one of its earliest definitions:

Baldois: Do you consider yourself to be a science fiction writer?

Ozols: No, I never liked that term. For me this is bug eyed aliens and zap guns. I saw my fiction as an extension of history. Historians take fragments we find in the present and try to reconstruct the past, writers of future fiction do exactly the same thing but they are looking in the other direction, no? This has nothing to do with science but then, heh heh, history has nothing to do with science either. You might call it Engineering Fiction, you might call it Design fiction, It is about the choices we make and what those choices might mean. It is based not only on technological plausibility but also historical precedent.

(Balodis June 1993)

Baldois was accused of forging the interview and received a number of online threats that were taken seriously by Riga's police. She took the transcript offline and has since left academic life and ungoogled herself, adding further support to those who argue that Ozols never existed [citation needed]. In 2017 she contacted Mark Blythe, an academic with an interest in design fiction, and told him her story under condition that her current location remain strictly confidential.

(Valdis Ozols: Wikipedia. Last Retrieved 18.02.2018)
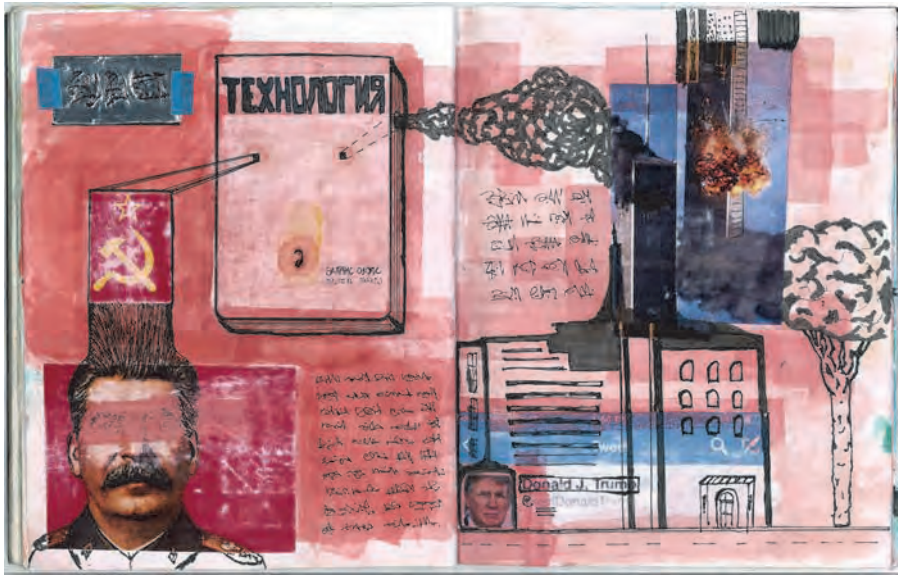
Figure 1.1: Valdis Ozols

Valdis Ozols is a fictional author but his imaginary biography raises questions around the emerging practice of design fiction. What if such a writer had existed? What would design fiction in the nineteen forties have looked like? What use would it have been? Valdis is a kind of thought experiment about design fiction and his story is threaded through this article in the form of extracts from a fake Wikipedia page, along with pages from an "imaginary design workbook" like the one in Figure 1.1.

Science fiction has always been somewhat disreputable. JG Ballard characterised mid twentieth century sci fi as "planet yarns" with "an American imperium colonising the entire universe which they turned into a cheerful, optimistic hell, a 1950s American suburb paved with good intentions and populated by Avon ladies in spacesuits" (Ballard, 2008). In the sixties writers like Harlan Ellison and Robert Heinlein attempted to rebrand their work as "speculative fiction" to indicate a more serious and science based approach. Nevertheless one of the greatest writers of the genre, Kurt

Vonnegut, continued to complain that his work had been put into a "file drawer marked science fiction" which he wanted to get out of because so many critics mistook it "for a urinal" (Vonnegut, 2007) Some critics have taken science fiction as seriously as any other form of literature, Frederic Jameson, for example described Philip K Dick as the Shakespeare of the genre and wrote a book length treatment of his work (Jameson, 2007). But technology developers have always recognised the value of this kind of writing. The earliest science fiction writers like HG Wells had an immediate influence on contemporary engineers and designers. The history of computing technology has been in part shaped by popular science fiction shows and film.

There has also been a long running if sporadic engagement between HCI academics and science fiction. In a comprehensive review Elisabeth Buie points out that "HCI has engaged with SF since at least 1992 when a CHI conference panel of HCI researchers and SF writers (Marcus *et al.*, 1992) discussed SF and HCI" (Buie, 2018). The panellists at this event included Don Norman and Bruce Sterling and the event aimed to explore "future user interfaces, their technology support, and their social context" (Marcus *et al.*, 1992). A decade later a CHI keynote was given by the The Hugo award winning science fiction writer David Brin. The future dystopias depicted in Anthony Burgess' Clockwork Orange and of Orwell's 1984 were pastiched for scenarios exploring emerging surveillance technologies in 2004 (Blythe *et al.*, 2004). In 2011 a futurist at the Intel Corporation, David Brian Johnson, was characterising short stories, movies and comics as "SF prototypes" and positioning SF explicitly as a step in the development process (Johnson, 2011). In 2014 Bauman and colleagues imagined the CHI conference of 2039 through fictional abstracts to consider the "various visions guiding work in HCI" (Eric *et al.*, 2014). In the same year a paper called *Research Through Design Fiction* described "imaginary abstracts" that were not visions of the future but rather pastiches of contemporary Research Through Design projects; this paper went so far as to argue that fictional studies of prototypes might serve as a useful alternative to actually building them (Blythe, 2014a).

Although the relationship between science fiction and technology research is as old as either field the term "design fiction" seems to have caught the imagination in academia and industry alike. There is some confusion over where the term "design fiction" originates. It is sometimes attributed to Bruce Sterling's 2005 book *Shaping Things* (Sterling, 2005) and Julian Bleecker's 2009 short essay on Design Fiction (Bleecker, 2009). Sterling himself attributes the invention of the term to Bleecker (Sterling, 2013b) but there are earlier uses of the phrase. The first instance that Buie (Buie, 2018) finds occurs in a 2003 paper by Alex Milton, who was then working for the school of Design and Media Arts at Napier University. Milton's paper (2003) is written as a script for a documentary and features commentary on Noam Toran's *Accessories for lonely men* (Toran, 2001) a series of provocative objects designed to comfort and console men who were suddenly single and missing their former partners. This included a "sheet thief" which slowly winds a sheet off the sleeper (see Figure 1.2) and a "heavy breather" speaker which played the sound of someone's breath near a pillow. Toran also made a film called *Objects for Lonely Men* which was a black and white short film featuring a man so obsessed by a Jean Luc Godard movie that he has a tray of props to use while watching it. The props include a gun used in one of the scenes and a plastic head of an actress in the film.

Alex Milton declares that Toran's work has:

> "begun to explore the realms of design fiction through the medium of props and pseudo documentaries. Ron Arad suggests that 'Noam tends to develop fictional histories for his objects, deceitfully creating individuals and inventions as if they already existed and he merely discovered them.' (Milton, 2003)

It is more than likely that the words "design" and "fiction" collided in any number of texts before this one, however Milton uses the term more or less as it is used today. The designer whose work is described in in this way studied for an MA at the Royal College of Art between 1999 and 2001 at the time that Antony Dunne and Fiona Raby were teaching "critical design".
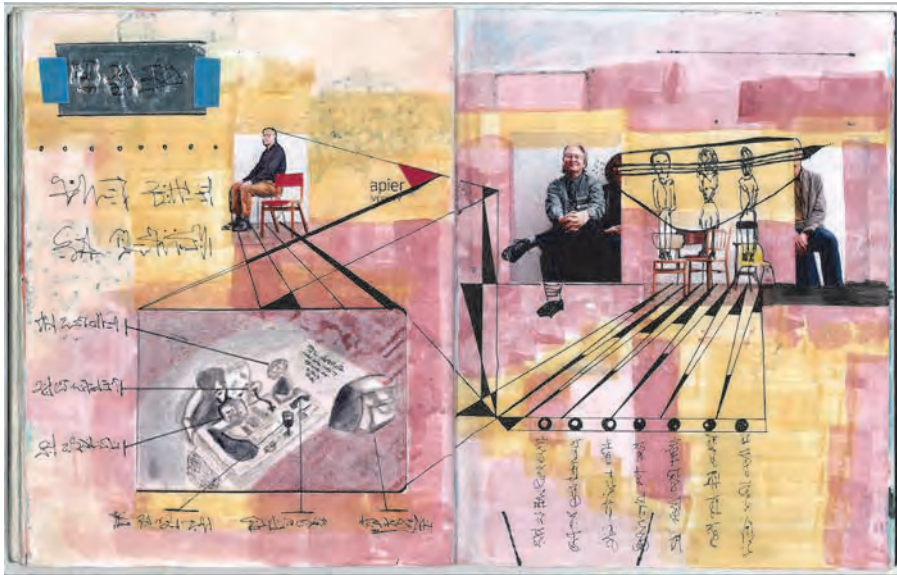
Figure 1.2: Noam Toran's Objects for Lonely Men

Critical design seeks to challenge preconceptions about the role that products play in everyday life (Dunne and Design, 2001). In *Design Noir* Dunne and Raby describe many ingenious examples. The 'Compass Table' for instance contains 25 compasses which 'twitch and spin' whenever a mobile phone, laptop or similar device is put onto it. The table may be either 'sinister or charming depending on the viewer's state of mind' (ibid). Such objects are not merely things in themselves but provocations intended to cause the viewer to reflect on their own preconceptions and values. In this sense, the designed objects imply a critique, they make strange or defamiliarize the everyday and the taken for granted (ibid).

Antecedents to this work can be found in the Italian Anti Design movement and the Radical Design movement of the 1960s. Following the second world war Italian design became synonymous with chic and style in the home, in fashion and in automobiles (Sparke, 1988). But many designers became disillusioned with the intensifying consumerism their work supported and radical architectural groups began to produce
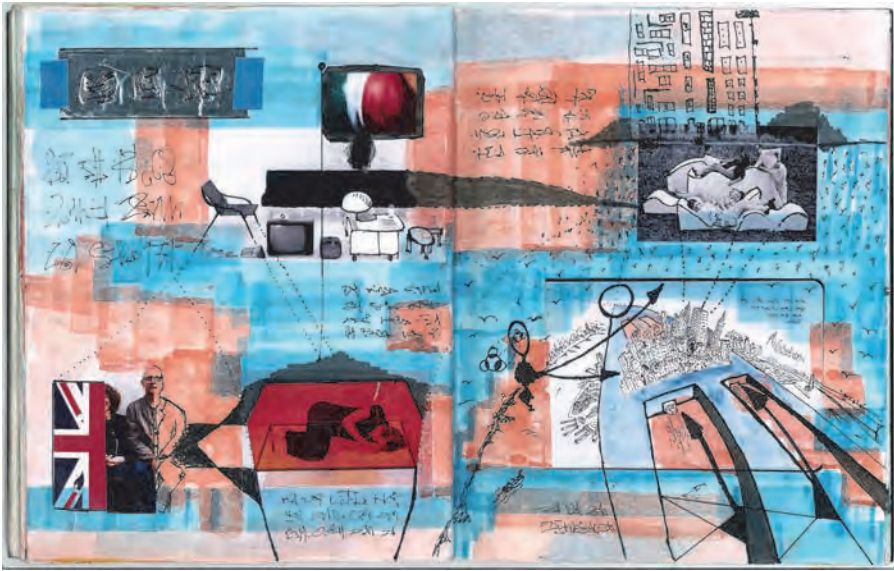
Figure 1.3: New New York. Superstudio

challenging conceptual designs (ibid). Superstudio for example produced images of a "New New York" with a gigantic white grid laid over the top of its skyscrapers to create a new space (See Figure 1.3). Similarly Archizoom Association's "No Stop City" imagined a place where people "can live inside a shopping centre, where houses are already empty incubators". The images of the "No Stop City" are repetitive grid like patterns in bleak, grainy black and white representing a "total commodification of products and life" (Branigan, 1992).

Dunne and Raby's Critical Design brought this sensibility to product design and later interaction design. It was ground breaking because it demonstrated that design need not be a solution to a set of requirements specified in response to a given problem or set of constraints. Design might also be a critique, like a political essay or satirical sketch. They saw academia as a place where such notions of design could be developed:

> "proposals like these can really only exist outside the market-
> place as a form of "conceptual design" — meaning not the

conceptual stage of a design project, but a design proposal intended to challenge preconceptions about how electronics shape our lives." (Dunne and Design, 2001).

Dunne and Raby and their students have continued to make intriguing and provocative designs but the term "critical design" is used less and less. The approach has been criticised because it positions designers as figures of knowledge / power who enlighten "cultural dopes". The work is also criticised *ad hominem* because it is mainly produced in elite institutions like the RCA and usually addresses "first world problems", (Prado and Oliveira, 2014). Describing Dunne and Raby's work as elistist is certainly unfair if not a deliberate misreading of the work but more recently they themselves describe their approach as "speculative design" or design fiction (Dunne and Raby, 2013).

But the person who has done most to popularise design fiction is Bruce Sterling. Bruce Sterling is a science fiction writer, perhaps best known for collaborating with William Gibson on the early steampunk novel "The Difference Engine" which imagines a world where the digital revolution takes place at the same time as the industrial revolution. The novel borrows from Victorian fiction, cutting and pasting situations and characters into a world of steam driven computers. This is a plausible alternate history in that many historians agree that if Charles Babbage, the inventor of the difference engine of the title had managed to win the state funding he had sought to make the "analytical engine" he would have succeeded in developing the computer that he and Ada Byron imagined. Sterling has spent a lot of time thinking seriously about design and he is deeply involved in design communities and conferences. In his non fiction book Shaping Things (Sterling, 2005) he recasts work that would ordinarily be called science fiction as "design fiction":

"The core distinction is that design fiction makes more sense on the page than science fiction does" (ibid).

He notes that most readers would not notice the difference between this and any other science fiction, the distinction he stresses is plausibility. Sterling taught a course on design fiction at the European Graduate School and also wrote a recurring Wired magazine column under the

same name. As part of his design fiction Sterling develops "fantasy prototypes" drawing on the work of consultancies like Superflux and Dunne and Raby's "critical design". He also champions the work of Julian Bleecker and indeed credits Bleecker with the term, perhaps because he was one of the first to clearly articulate the practice in a 2009 short essay on design fiction (Bleecker, 2009).

Bleecker wrote this piece for a special issue of Personal and Ubiquitous computing responding to the Dourish and Bell paper *Resistance is Futile* (Dourish and Bell, 2014) This paper argued that, in some respects, TV shows like Blakes 7, the Hitch Hiker's Guide to the Galaxy and Planet of the Apes had more interesting things to say about the ways that technology might impact society than ubicomp literature. They argued that what design scenarios typically leave unsaid is the implicit social and political context of a design (ibid). Bleecker argued for the importance of "diegesis", a term borrowed from film studies used to indicate something that is part of a larger fictional world. For Kirby the props in movies like *Minority Report* are "diegetic prototypes" in that they functioned as a part, rather than the point of a story, often presenting the imagined technology as desirable or benevolent (Kirby, 2010).

Bleecker characterised his design fiction as "materialised thought experiments" and emphasised "physical instantiation" over future plans shown in powerpoint (Bleecker, 2009). Today, Julian Bleecker and the other members of the Near Future Laboratory are producing some of the most interesting design fictions in the form of the TBD magazine (Dunne and Design, 2001) featuring articles and advertisements for products and services that do not exist. The fake branding and image for the TBD "Miguel Bay Driving Experience" shows the view of a road from the inside of a luxury car familiar from numerous advertising campaigns, but on this otherwise empty road are realistic looking explosions of the kind encountered so often in Bond or Mission Impossible movies (for an approximation, please see Figure 1.4). The text frames the fiction in an imagined context where autonomous cars constitute 45% of journeys and drivers are bored on their daily commute, the company turn the window of the car into a game. The format of the glossy advertisement conveys the concept but also the implicit context of an industry built around driverless-car entertainment. Bleecker's fictions present not just
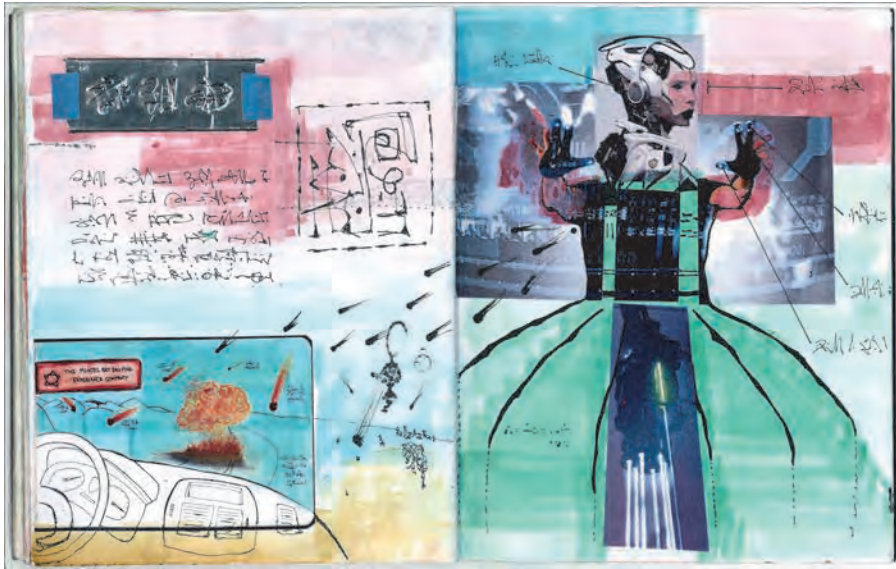
Figure 1.4: TBD and the Near Future Lab

imaginary products but worlds for them to exist in. The TBD catalogue is primarily visual but the museum installation is also used to represent design fictions. Stuart Candy's "nurture pod" shows a baby in a virtual reality pod, it is described as an "experiential prototypes" and visitors are encouraged to treat it like something they would find on a table in an Apple store (Sterling, 2017).

In a 2013 NEXT keynote address Sterling warned that we would be seeing lots more design fiction because it was cheap and people had learned how to do it (Sterling, 2013a). He suggested that the academics in the audience might usefully provide a taxonomy, categorising the varieties of design fiction that were emerging. Academics were already on the job: a 2013 special issue of the journal *Digital Creativity* sought to provide an introduction and partial taxonomy of design fiction (Hales, 2013). This taxonomy includes near future science fiction with prescient novels like William Gibson's "Pattern Recognition" as the paradigmatic example. The taxonomy included work which positions fiction as a design technique but also noted its use in corporate

propaganda. Microsoft and Phillips have both presented design fictions in promotional films bearing, according to Gonzattoa and van Amstela, the implicit message — "don't worry the future is safe in our hands" (Gonzattoa *et al.*, 2013). Sterling also discusses the corporate use of design fiction pointing to Google's release of YouTube videos showing various fantasy scenarios of Google Glass in use. More recently IKEA worked with Mobile Life and the Near Future Lab to create a future technology catalogue. *The Museum of Future Government Services* a commission by the United Arab Emirates Government, is a collection of design fictions where "governments and society work together to create a more hopeful world". And now Kickstarter campaigns seeking funds for innovative products often feature well produced videos presenting the concept they are hoping people will invest in. The qualities of the promotional video (the design fiction) is one of the most important factors in the success of the campaign (Dey *et al.*, 2017).

At the Next 13 conference keynote Sterling offered a more formal definition of design fiction as: "the deliberate use of diegetic prototypes to suspend disbelief about change." (Sterling, 2013a). Following Sterling's definition several others have been proposed. Josh Tanenbaum suggested this: "Design Fiction uses narrative elements to envision and explain possible futures for design" (Tanenbaum, 2014) Lindley and Coulton describe design fiction as: "(1) something that creates a story world, (2) has something being prototyped within that story world, (3) does so in order to create a discursive space", where 'something' may mean 'anything' (Lindley and Coulton, (2015-01-01))". Blythe and Encinas got in on the competing definitions game with this rather wordy effort: "Design fiction is a malleable concept: it can take the form of text, image, audio, video, model, working prototype or event; it can be conceived as a plausible idea for a technology developed with "designerly thinking", an eye for detail and practical concerns; it can be framed as a conceptual design placed within a broad cultural context focusing not just on product functionality but potential social consequences of use; it can be a tool for corporate propaganda or a means of expressing concern, dissent and critique." (Blythe and Encinas, 2016). To this burgeoning list we can add the fictional one by Valdis Ozols which retroactively predates them all.

The term design fiction has a rather strange trajectory. It emerges from British art schools in the late nineteen nineties as a practice that echoes the Italian radical design of the sixties. It becomes a tool for global corporations like Microsoft, Google and Facebook but it can also be found in crowd funding campaigns like those supported by kickstarter. Design Fiction begins as critique but ends as technique. But why has this rather old idea become so popular in the field of interaction design now?

1.1 From scenarios and personas to design fiction

Short fiction in the form of scenarios have long played an important part in design and studies of Human Computer Interaction. Carroll defined scenarios as "stories about people and their activities" (Carroll, 1999) He argued they were a tool for reflective practice: creating vivid descriptions of user experience and allowing for multiple viewpoints, (ibid). Perhaps the most influential scenarios in HCI appeared in Mark Weiser's seminal 1990s article on "The Computer for the 21st Century" (Weiser, 1991). His "Sal" scenarios describe with astonishing prescience the technologies that now shape much of our working lives. Sal wakes up to coffee brewed by her voice activated alarm clock; her windows show data indicating that her children are up; she reads an electronic newspaper and marks passages to send to work with a smart pen; a "foreview" mirror in her car warns her that she is heading towards a traffic jam and helps her to find a parking space; she collaborates on a document with Joe who she shares a virtual office with; Joe asks her if she remembers a woman at a meeting from the week before, she doesn't but she searches previous meetings and finds the woman's biography.

Critics of scenarios like these argued that the characters were two dimensional and stereotypical. Cooper's book *The Lunatics Are Running The Asylum* (Cooper, 1999) advocated the use of more richly imagined persona in scenarios. He argued that computer scientists were designing for themselves or at best the guy in the cubicle next to them. For Cooper scenarios with users that were little more than names like Harry or Sal were not adequate, there should also be demographics like age, occupation and ethnicity (ibid). For Lene Nielsen (2002) this too was

superficial. She argued for character driven scenarios taking European
film as an inspiration. Blythe and colleagues suggested that scenarios
might borrow from many cultural sources to develop richer scenarios
(Blythe, 2004; Blythe and Wright, 2006; Blythe and Dearden, 2009).
Pastiche is an imitative form of writing which borrows style, setting
and characters from source material to produce new texts. Pastiche
scenarios, then, draw on existing sources in order to create richer and
more resonant descriptions of users and technologies. The technique was
used in the special issue around Dourish and Bell's paper "Resistance is
Futile' to rewrite the Sal scenarios in the style of Douglas Adams and
Philip K Dick (Blythe, 2014b).

Ubicomp scenarios are still, for the most part, written in the style
of Weiser's Sal story. Such scenarios resemble science fiction except for
the omission of conflict, the basic foundation of all narrative (ibid).
The key difference between science fiction and ubicomp scenarios is the
explicit acknowledgement of social conflict and struggle (ibid). Although
scenarios and personas are primarily written forms there are many forms
of fictional objects with also have a long history in design.

1.2   Sketches prototypes and epistemological angst

Making paper based prototypes is a standard procedure for Interaction
Designers. Early Graphical User Interfaces were planned using pieces
of paper with drawings on them to represent the transition from one
screen to another. The "Wizard of Oz" technique involves setting up
a rudimentary model of the idea and having participants role play
around it. This allows designers to think about whether a prototype
is a good idea before going to the trouble and expense of actually
making it (Dahlbäck *et al.*, 1993). Similarly a provotype is a provocative
prototype used to explore a design space, it may function only partially
and serve primarily as a discussion piece for participants in field or lab
studies (Boer and Donovan, 2012). Concept designs sketching vague or
abstract ideas have long been made in design workbooks and papers
(e.g. Martin and Gaver, 2000; Blythe and Monk, 2002; Tohidi *et al.*,
2006; Gaver *et al.*, 2004). Design workbooks are often kept as a kind
of ideas journal throughout a project noting initial thoughts, vague

concepts and collecting inspirational materials. Designers often cut and paste magazine articles or drawings into them and they look something like the imaginary workbook figures illustrating this article. While this kind of concept generation has always been part of a wider process of design these kinds of vague idea are increasingly framed as contributions themselves. This is of course controversial and upsets some people.

In the early days of HCI a computer scientist might develop some new system and frame the contribution to knowledge as — I have made this thing therefore such things can be made (Hook, 2017). Other prototypes might contrast one form of interaction with another, for example, one design of mouse against a slightly different one. Such prototypes would be measured against one another in usability tests such as — time on task, ease of use and ease of learning. These were measurable and comparable and so the value of the prototype was relatively clear. But as computing technology moved from the office to the home technology became less concerned with specific tasks. The goals of a design might be as amorphous as enjoyment or to give the user an interesting experience. Prototypes became more fanciful and their value less clear.

Zimmerman and Forlizzi (Wikipedia, 2017) argue that making research artefacts allows researchers to address complex or "wicked" problems and evaluate how current and future technologies may effect people. They make it clear that the aim of such work is not to produce commercial products but rather to apply design practice to new problems in order to create knowledge (Ibid). However, they also claim that findings will be more acceptable to the academic community if there are agreed forms of "practice, evaluation and outcome" and suggest more systematic or scientific approaches to theory development (ibid). Other practitioners have taken issue with this stance. Khovanskaya *et al.* discuss the ways in which critically orientated practitioners find themselves in a "double bind" having to adopt the language of evaluation at the same time as they subvert it (Khovanskaya *et al.*, 2015). Gaver (Gaver *et al.*, 2004) points out that taking a more scientific approach is not a straightforward proposition as there are conflicting accounts of what constitutes science. For him research through design is not repeatable, generalisable or indeed falsifiable because its claims are

vague — sometimes ambiguity creates useful features, sometimes not. But he also points out that there are many points of agreement within the community (ibid). He ends the discussion with a call to traditions of annotation such as those accompanying the design catalogues of Dieter Rams. This last move is interesting because it calls not on traditions of science or social science but rather the Arts.

As HCI takes what is being described as a "cultural turn" it has begun to struggle with the same issues that have troubled the Arts for so long. Responses to art are inherently subjective, one person likes it and another does not. Increasingly evaluations of design prototypes look like this. Some people like this or that prototype but others do not like it at all. Such findings are inconclusive because the researchers do not seek to generalize. Why, then, ask anyone what they think of a prototype? Why make a prototype at all if no hypothesis is being tested? A standard answer, based on Schon (Schön, 1992) is that design is a material exploration of a problem. But what precisely is to be learned by such explorations? What purpose is served by deploying prototypes in field studies? Is it necessary to make prototypes at all?

The value of such prototypes is often conceptual rather than practical, and research fiction can make similar (though different) contributions. Following the fictional academic work of Sanislav Lem, "imaginary abstracts" describe studies that have not taken place of prototypes that do not exist. These abstracts explore research questions and attempt to examine what the value of making a prototype might be before any making takes place (Blythe, 2014b). For example the following imaginary abstract was presented at an imaginary workshop along with five other imaginary papers on technologies to support religious and spiritual life.

> *Unworldy Goods: Supporting religious and spiritual practice through eBay Roulette*
>
> There is increasing interest in computing technologies which support religious or spiritual practice. This paper describes "Unwordly Goods", a system designed to help affluent Christians follow the teaching that they should sell all of their possessions and give their money to the poor

(Mark 10:17–31). It was also designed to support Buddhists who wish to turn away from the material world of Saṃsāra and free themselves from desire. To use Unwordly Goods, users enter a list of all of their possessions into a database; the system then makes a weekly selection from the list, places the item for auction on eBay and donates the money raised to a charity of the user's choice. We recruited ten people who self identified as either Christian or Buddhist to use the system for one month. All but two dropped out of the trial before it ended. Like the rich man who "went away sad" after Jesus told him to sell his goods, six of the participants withdrew from the trial as soon as an expensive item was sold at auction. The duration of participation correlated with how long it took the system to select an item worth more than $100. Two participants gamed the system by listing only inexpensive items and both dropped out of the trial before the end. One participant completed the trial but argued that the system was simply a novelty which trivialized religious life. One participant was, however, extremely enthusiastic about the system and requested to continue using it after the trial ended. The paper argues that the challenge of designing apps to support religious practice are far from merely technical. (Blythe and Buie, 2014)

Little would be gained by actually making a system like the one described and doing so might be regarded as unethical. Making a system with this kind of rationale could be seen as offensive, trivialising religious belief. It is of course deliberately provocative, it is a rhetorical idea and the value that it has might be lost were it to cease being a fiction.

Imaginary abstracts like this question the value of potential technologies before any making takes place. Rather than beginning with a technological possibility it first considers whether that possibility is worth realising or not. Lindley and Coulton (Lindley and Coulton, 2016) have produced entire papers which imagine complete studies and findings. Taking this to its logical conclusion Kirman *et al.* (Kamin,

2008) organized a fictional conference and produced a list of fictional proceedings with some forty-paper titles.

This flurry of Design Fiction is taking place partly because the sheer speed of technological change is difficult to keep up with any other way. But also partly because it is more and more possible to make the wildest technologies we can imagine. The real question becomes not whether we can do it or not but, as Jeff Goldblum asks in Jurrasic Park, whether we should.

2

The Uses of Fiction

Ozuls' Personal Life [edit]

Valdis Ozols was born in Riga in 1902. His father was a doctor and his Mother was a teacher, facts which Ozols was careful to hide throughout his career. During his most successful years as an academic Ozols claimed that he was a "born proletarian" at a time when all other classes were suspect. Although he was in reality the child of middle class professionals, he denounced his Head of Department, Maris Jansens, as an enemy of the people because his parents had been local land owners. Although this had no basis in truth Ozols' charge was upheld and when Jansens disappeared Ozols was immediately promoted [citation needed].

Ozols was himself denounced the very next year by his wife of 23 years. Ozols had married Iveta Petersen, a secretary in the History department in 1929. During their courtship Iveta had inadvertently encouraged Ozols in his

writing and was instrumental in having one of his ideas committed to film According to Baldois, Iveta's mother, Sanita, was a film fanatic and collected Hollywood gossip magazines such as *Variety*. In 1928 she won a competition to take her family to California to attend the premier of the new Charlie Chaplin film at Grauman's Chinese Theatre. Baldois claims that Iveta took this opportunity to play a joke on Ozols by asking her Mother to walk past the cameras outside the Chinese Theatre speaking into a black notebook to demonstrate a technology Ozols had described in an early short story called *Talking Rectangle* (1927). A shot of Iveta's Mother walking and talking into the notebook was discovered on a DVD extra of The Circus in 2010 and fuelled internet speculation about the possibility of time travel [citation needed]. According to Baldois Ozols saw the film of Iveta's mother on a newsreel at the cinema. He was so enchanted by this materialisation of his idea that he proposed to her there and then. The marriage was long and bitter, Ozols would later claim that even before the wedding she was conducting an affair with Anna Eglitis, a secretary in the History department. In 1949 Iveta betrayed Valdis, alleging that he was a spy for the Americans. Such charges usually resulted in the immediate disappearance of the accused as well as his friends [citation needed]. Valdis duly lost his job but Iveta and Anna also disappeared from the university and all public records, Baldois speculates that Ozols had in turn denounced them as lesbians.

Little is known of what became of Ozols when he lost his position. Some of his University colleagues claimed to have seen him when visiting other Universities in central Europe but none of these sightings were confirmed. Although Ozols himself disappeared entirely, short stories continued to be written under the various pen names he had used, in particular Jozef Zaleski and Gustaw Adamczewo.

Fiction Writing Career [edit]

Because Ozols published his fiction only sporadically and in several East European languages, the authenticity of many of the stories attributed to him is difficult to ascertain. After his expulsion from the university a volume of short stories appeared that had previously been published in different languages under various pen names. This collection was called T*echnopedija* (1959) and brought together much of the work now attributed to him. The book did not sell and most of the copies were lost or destroyed. It was not translated into English until the late nineteen nineties but Ozols published stories for many years prior to this.

Technopedija features two stories which scholars with an interest in design fiction have singled out for attention. Almost two decades before the first cell phone Ozols describes a young woman using a "Talking Rectangle" to conduct "mobile" conversations in order to organise a murder. The murder plot in the story is relatively uninteresting but it vividly describes a recognisable mobile phone and the story has been claimed as an early example of design fiction. But perhaps the most disturbingly prescient story is *Zina no Prezidenta* in English "Message from the President". This describes a one way audio system that allows politicians to deliver ten second messages directly to every citizen of the state through the "talking rectangle" featured in the earlier story. In the un-named city where the story is set citizens must carry their talking rectangle at all times. It is used by an American President named Dimanta, a billionaire running an election campaign based on thinly veiled racism who wins with the support of the Soviet Union. It is believed that this story represents the first use of the term *viltojums jaunumi* in English "fake news" as the story describes deliberate campaigns of misinformation by President Dimanta to create a credulous populace that

mistrusts the very idea of truth, facts or reality. Interest in this story intensified when it was revealed that in the nineteen eighties that Donald Trump, not normally an avid reader, spoke about the story to almost everyone he met, citing it as the best short story ever written (citation needed).

Despite the failure of Technopedija some of the stories have taken on retroactive importance as they appear to predict events like 9/11 though the authenticity and dating of many of these stories is disputed. Critics have also pointed out that many of Ozols' other stories are not prescient at all. For example *A New You*, describes a form of therapy which allows patients to have conversations with various future selves from one timeline or another. The protagonist first speaks to a version of himself who gets divorced, then another that stays married. Other stories are prescient in some respects and utterly wrong in others. *The Secret Policeman's Map of Me* for example imagines an electronic map full of flashing lights that indicate an individual's friends, acquaintances and political allies. Citizens have to report each night to the Police station to update the map. Some critics argue that this story anticipates facebook and other social media.

(Valdis Ozols: Wikipedia. Last Retrieved 18.02.2018)

2.1   Fiction vs Prediction

The prescience of Valdis Ozols may strain credulity but many writers have imagined technologies which have later come to pass. One of the most starling examples of this is the 1899 book "*Wreck of the Titan or Futility*" by Morgan Robertson, which describes the sinking of a vast ship that hits an iceberg fourteen years before this actually happened to the largest vessel ever built. Not only is the fictional *Titan* "the largest

craft afloat and the greatest of the works of men" it is also said to be unsinkable:

> "With nine compartments flooded the ship would still float, and as no known accident of the sea could possibly fill this many, the steamship Titan was considered practically unsinkable" (Robertson, 1898)

This could be an example of be what Ozols meant when he suggested the term "engineering fiction" but It also satisfies the current definitions for design fiction. Not only does it give a plausible account of how such a craft would be made it also considers how it would be used within real social and legal frameworks:

> "Unsinkable — indestructible, she carried as few boats as would satisfy the laws. These twenty four in number, were securely covered and lashed down to their chocks on the upper deck, and if launched would hold five hundred people. She carried no useless, cumbersome life rafts; but — because the law required it — each of the three thousand berths in the passengers, officers and crew's quarters contained a cork jacket, while about twenty circular life buoys were strew along the rails." (Robertson, 1898)

The dimensions of the fictional ship are only 82 feet short of the real one that sank on its maiden voyage in 1912, Morgan's fiction accurately predicted the catastrophe that befell Titanic although he underestimated the number of survivors, thirteen, as opposed to the seven hundred and five that lived through the actual catastrophe. The accuracy of the novel's predictions have been described as uncanny and driven conspiracy theories that Titanic was deliberately sunk either to end the lives of particular passengers or cash in on insurance. But Martin Gardner the mathematician and popular science writer, who edited the reissue of the novel attributes the similarities between the fiction and reality to the author's knowledge of shipbuilding and maritime trends. He points out that although there were no ships as colossal as Titanic when Robertson was writing his novel there were plans for such ships, In

1892 the New York Times announced the construction of a ship called "Gigantic" which was never built but may have informed Robertson's book (Cennin, 2018).

Robertson was not the only novelist of the machine age to pay close attention to the latest developments in engineering and achieve startling feats of prediction. In 1907 HG Wells published *The War in the Air* depicting not only flight but aerial warfare at a time when flying humans seemed no more likely to most people than it would have to the Ancient Greeks. And yet Wells foresaw warplanes and their use in aerial bombardment a full ten years before this happened. More than this, after reading some fairly obscure scientific work on the behaviour of radium and strange particles Wells realized that if the energy described were to be harnessed then someone would make a bomb out of it. His novel, *The World Set Free*, written in 1913 predicted that humanity would develop an atom bomb by 1933. He thought that such a bomb would explode continuously for up to three days, he was wrong about the details of the explosion but he was just a few years off guessing when it would be used to destroy entire cities.

The influence of Wells' work on politicians and engineers is well documented. In a short story published in 1903 called "The Land Ironcalds" Wells described armoured vehicles on "pedrail wheels each about ten feet in diameter, each driving a wheel set and set upon long axles free to swivel around a common axis" (Wells, 1903). Aside from this detailed description the story describes how they are used to break a deadlock in trench warfare giving vivid descriptions of the psychological effects of seeing these metal monsters for the first time:

> They crawled to what they judged the edge of the dip and lay regarding the unfathomable dark.
>
> For a space they could distinguish nothing, and then a sudden convergence of the searchlights of both sides brought the strange thing out again. In that flickering pallor it had the effect of a large and clumsy black insect, an insect the size of an ironclad cruiser, crawling obliquely to the first line of trenches and firing shots out of portholes in its back.

> And on its carcass the bullets must have been battering with more than the passionate violence of hail on a roof of tin.
>
> Then in the twinkling of an eye the curtain of the dark had fallen again and the monster had vanished. (Wells, 1903)

Winston Churchill played a crucial role in the development of tanks during the first world war and he corresponded with HG Wells when the first tanks were put into production. Churchill told Wells that he would be interested to see the success of the "land battleship idea" after "many many efforts" (Johnson, 2015). Developing the idea required political will as well a huge effort in engineering but Churchill's letter to Wells emphasises the importance of the initial fictional idea.

There was a science fiction golden age in America in the 1950s and 60s, much of this was of the monster and ray gun type but there was also a boom in "speculative fiction". Some of the most prescient science fiction of this era was written by Frederich Pohl. His 1955 story *Gladiator at Law* predicted not only bubble shaped houses but financial housing bubbles of the kind that resulted in the 2008 financial crash. *Drunkard's Walk* in 1960 describes the rise of virtual teachers who broadcast to many thousands of students at a time in the first depiction of an online teacher as a star. *The Age of the Pussyfoot* in 1965 describes something very like a smartphone, it takes the form a sceptre but fulfils many of the functions now provided by the iPhone (Page, 2015).

There is a well documented feedback loop between science fiction and technological research and development, HG Wells's *World Set Free* was known to the physicists working on the atom bomb. In the documentary *How William Shatner Changed the World* a number of technology developers give direct credit to *Star Trek* for inspiring their real world inventions. The design of early mobile phones was inspired in part by the Communicators used by the crew of the Enterprise. Steven Perlman started working on QuickTime after watching an episode of Star Trek the Next Generation where Data walks into his quarters and asks the computer to play a particular piece of music (Jones, 2005) Such science fiction was always already design fiction whether the makers intended it as such or not. Robert Heinlein's science fiction is perhaps

most readily associated with space travel but his design thinking was recognised in a 1952 article in Popular Mechanics which asked what kind of house the captain of a space ship might live in while visiting earth. The article answers this question with examples' from the home that the Heinleins built. Although the ideas are now commonplace they were at the time futuristic: sofas which turned into beds, an air conditioning system that used a minimum of power and a "commuting table" that slid in between the kitchen and the dining room (Stimson, 1952). Many science fiction writers were also scientists, most notably Arthur C. Clarke and Isaac Asimov. Clarke not only predicted satellite communication but guessed at how transformative this technology would be. Asimov predicted a network of computers that would form something very like the internet as well as formulating laws of robotics that many roboticists still take seriously today.

The notion that we are currently living in futures imagined by science fiction is a very old one. JG Ballard used it to argue that science fiction was the only kind of fiction that mattered in the twentieth century:

> "We're living in the year 1970, the science fiction is out there one doesn't have to write it any more. One's living science fiction. All our lives are being invaded by science, technology and their applications. So I believe the only important fiction being written now is science fiction.[..] A ton of Proust isn't worth an ounce of Ray Bradbury" (Ballard, 2014)

In the seventies Ballard went against the grain of mainstream thought to argue that the future of technology was not in space but rather in the home. He made many claims which at the time seemed highly unlikely: soon we would all be living in mini television studios and broadcasting the minutia of our lives to the world (ibid). Philip K. Dick was so convinced that he and his fellow science fiction writers were going to be right that he characterised late twentieth century sci fi writers as "pre-cogs" blessed or cursed with a pre-cognitive ability to see through time.

Ever since William Gibson coined the term cyberspace in his 1984 novel *Neuromancer* his work has been described as "prescient" but Gibson objects to this term, pointing out that science fiction writers

make many, many guesses, most of which are wrong. Incorrect guesses are all forgotten if a writer gets something right: *Neuromancer* did imagine a future where people spent a lot of time in a "collective hallucination" called cyberspace but as Gibson himself notes, it did not depict anyone using a mobile phone (Gibson, 2012). Reading the science fiction of the past there is always a great temptation to retroactively impose trajectories from hazy science fiction ideas to fully realized technological development.

In *The Napoleon of Notting Hill* (Chesterton, 1904) G.K. Chesterton described the game of "Cheat the Prophet" where people come up with outlandish predictions about what the future will look like and all the while Tomorrow quietly got on with doing something none of them had ever thought of. But soon so many people are playing the game that eventually some of the predictions turn out to be right. Zizek, following Bergson, argues that a true event retrospectively creates the conditions for its own possibility. What does this mean? Zizek is best known for his examples and he has a plethora of these to explain Bergson's idea. For example before 9/11 an attack on New York of this kind was unimaginable, afterwards the wonder was not that it happened at all but that it had not happened sooner: suddenly the twin towers had been an obvious target all along. Similarly the collapse of Communism and the dismantling of the Berlin wall seemed impossible until the events actually occurred. Once these events had happened the historical landscape was viewed from another perspective and they suddenly seemed inevitable. Once an event has taken place a new pattern emerges in the mess of contingencies that precede it. From all of the tangled lines a single path emerges retrospectively:

"If — accidentally — an event takes place, it creates the preceding chain which makes it appear inevitable" (Zizek, 2009).

In this sense the event creates the conditions of its own possibility. Although this retroactive framing of historical events can exaggerate the prescience of particular writers it is clear that science fiction can supply words and images to help us describe technologies which are in the process of becoming — Titanic, landships, cyberspace. This is not prediction but rather an enlargement of language and the imagination.

Whether a fiction is prescient or not can matter little to anyone except futurologists hoping to persuade investors to pay for their guesses. Prediction is not the main value of fiction. Fiction presents us with worlds we can enter into that are different to our own. It presents characters who are not like us, with lives that are other than ours. Fiction allows us to imaginatively enlarge our point of view. Ethnography also allows us to look at the world in different ways. Pierre Bourdieu argued that the first task of sociology was —

> "to manage to think in a completely astonished and disconcerted way about things you thought you had always understood." (Bourdieu, 1991)

This is one of the main values of design fiction. Valdis Ozols is placed in a historical context different enough to our own to perhaps make us think in a disconcerted way about the technologies that currently shape our lives. Valdis' design fiction was primarily text based but his wife Iveta made models of his ideas, fantasy prototypes, diegetic props. As noted in the Wikipedia article, one of them was serendipitously featured in a film. Like most fictions, this one is based on distorted elements of the truth.

2.2   The ambiguity of artefacts, images and film

In 2010 a film maker, George Clarke, posted a clip to YouTube that he found on a DVD extra of a Charlie Chaplin film called *The Circus* (BBC, 2010). The clip shows a street scene outside the Chinese Theatre with a stuffed zebra in the foreground advertising Chaplin's movie with passers by fading in and out of the shot. In the background a middle aged woman walks by holding something to her ear, she turns towards the camera, talking and laughing before she fades out of the scene (see Figure 2.1).

Clarke introduces this clip by explaining that because he is a film maker he pays particularly close attention to DVD extras and "making of" documentaries. He introduces the strange clip and edits the three second passage of the person across the screen to show it in slow motion. He describes the clip as mysterious and suggests that the woman may

Figure 2.1: Still from the YouTube film of Charlie Chaplin's DVD Extras
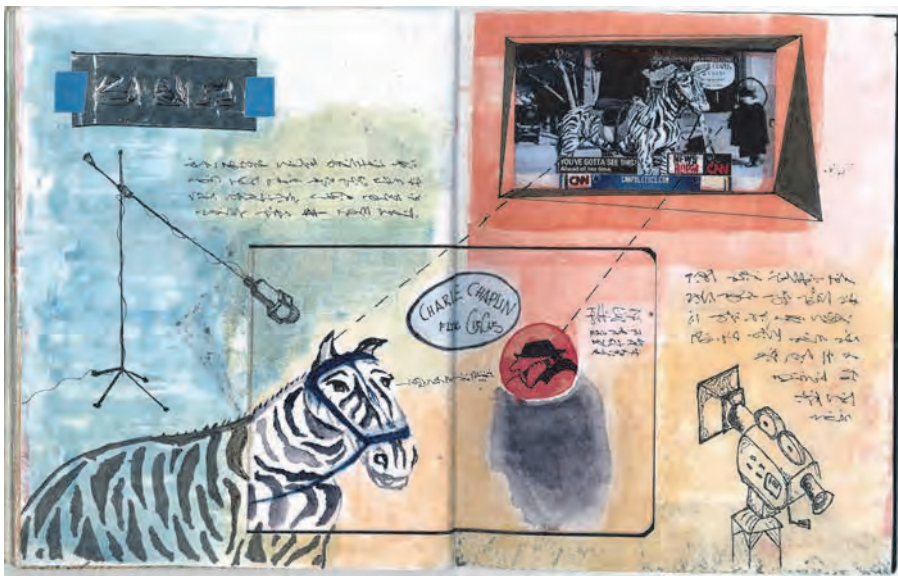
Figure 2.2: Ozul's Talking Rectangle

actually be a man in drag as she is quite "butch." He concludes that this may be a time traveller talking into a mobile phone.

Clarke's post went viral and currently has almost seven million views. Several articles were published "debunking" the clip. An article on TheAntlantic.com insists that the device is a hearing aid.

> "If it's not a Siemens product that the woman in the video
> is using, then it could be another model of hearing aid
> developed by Western Electric in 1925. The Model 34A
> 'Audiphone' Carbon Hearing Aid measured smaller than 8
> inches by 4 inches and could have easily been held in one
> hand as it weighed less than two pounds when fitted with
> batteries" (Jackson, 2010)

The author argues that the woman is clearly "well to do" as indicated
by her top hat and claims that she would therefore easily have been
able to afford the latest gadgets. But the hearing aid explanation does
not account for her talking into it. A Quora post suggests that plenty
of people talk to themselves but the person appears to be laughing.
A Huffington Post article purports to solve the mystery of another
(later) film that seems to show someone using a mobile phone in 1938.
Someone claiming to be the grandchild of the person in this video
says the Dupont company were experimenting with wireless telephones
(Smith, 2013). But this claim does not explain the 1928 film and the
reporter speculates that the Chaplin woman is merely holding up her
hand to avoid the camera though this is unconvincing, The hand is not
fanned or cupped around the face, the fingers are positioned in a grip,
she is holding something. A reporter for the Telegraph newspaper claims
that the fade out technique had not been invented in the 1920s and
argues that the film must then be a fake. But there is a famous dissolve
in the 1921 Chaplin film *The Kid* (Kamin, 2008) so this debunking can
also be debunked.

The fundamental ambiguity of the object opens the clip to multiple
interpretations. This is perhaps one of the greatest strengths of design
fictions which take the form not of text but image, film or artefact. The
notion that Ozols' wife asked her Mother to talk into a notebook to
illustrate his story when she won a ticket to the premier is perhaps
somewhat far fetched. But not more far fetched than the idea that
this is a cross dressing time traveller. Marc Davis points out that the
meaning of any cultural artefact (text, image, music) is a gestalt made
up of the artefact and what the person experiencing brings to it (Davis,
2003). This echoes a point made by the literary critic F. R. Leavis:

"you cannot point to the poem; it is "there" only in the re-creative response of the individual minds to the black marks on the page." (Leavis, 1972)

We are ready to read the black marks on the screen as someone talking on a mobile phone because we see this every day. Whatever is happening we will be predisposed to see it like that. If we are reading Frederich Pohl talking about a sceptre that allows for communication we will read it as a phone rather than a magic wand. Again: a true event creates the conditions for its own possibility. Once an event has taken place a new pattern emerges in the mess of contingencies that precede it.

From a future vantage point where mobile phones exist the image of someone holding something to their ear resonates in different ways. What would anyone have thought of this in 1928? Perhaps they would have assumed it was someone using a hearing aid while at the same time talking and laughing to themselves. Or perhaps they would have thought they were witnessing the birth of a communication device. Confirmation bias of one form or another leads us to seize on evidence that supports our world view. If we believe in the possibility of time travel then this kind of footage will be very compelling. In an age when social media and filtering algorithms present us with the kind of news and stories that we already like it is easier than ever to erase the boundary between fiction and reality (DiFranzo and Gloria-Garcia, 2017).

2.3   Design fiction in the age of fake news and alternative facts

The rise of "fake news" as a central problem in political discourse puts design fiction in a troubling perspective. This is echoed in Ozols biography. Valdis Ozols is a historian during the Soviet occupation of Latvia. The representation of Soviet history was closely monitored by the state under Stalin. The history of the October revolution was rewritten many times to give Stalin a more prominent role and to underplay the parts of others who had fallen out of favour (Arendt, 1973). In a sense then, historians of this era were engaged in manufacturing a certain kind of fiction which was presented as fact. For Hannah Arendt the totalitarian societies of the twentieth century were entirely new forms

of human organisation: these regimes, whether fascist or communist, were built upon imaginary worlds —

> "woven around a central fiction — the conspiracy of the Jews, or the Trotskyites, or the 300 families, etc, — into a functioning reality, to build up, even under non totalitarian circumstances, a society whose members act and react according to the rules of a fictitious world" (Arendt, 1973)

Arendt argues that fiction is so central to fascism that it erases the category of belief itself. The fictitious world is safeguarded through such consistent lying that every party member from the highest to the lowest develops a curious mix of credulity and cynicism:

> "In an ever-changing, incomprehensible world the masses had reached the point where they would, at the same time, believe everything and nothing, think that everything was possible and that nothing was true" (Arendt, 1973)

When everyone already suspects any political statement of being a lie, nobody particularly objects to being deceived, rather than being angry with leaders who lied to them they would instead admire their statecraft and cleverness (ibid). The details of Ozols' biography draw on real history. During the Stalinist purges comrades would regularly denounce one another, wives would testify against husbands because if they did not then they and their children might themselves disappear also (ibid). Party officials would boast to one another about being pure "peasant stock" and therefore true Bolsheviks. Under Stalinism being a "born proletarian" was as important as being non Jewish in the Nazi state, all other class origins were suspect and scandalous. If someone was discovered to have bourgeois ancestors they would be immediately suspect (ibid). It was not uncommon then for ordinary people like Ozols to fictionalise their family histories. Historians of this era could not help but become writers of fiction. Soviet historians wrote solemn accounts of the Russian revolution in which Trotsky was not the commander of the Red army. Valids Ozols would have been compelled, if not directly then through self interest to toe the party lie and write pro Stalinist

history. It would only have been in an anonymous fiction that such a figure could ever tell the truth.

Arendt's description of a gullible and at the same time cynical population resonates profoundly as social media filter bubbles subject us to news stories which reinforce our existing beliefs. The phrase "fake news" originated in educational programmes which aimed to help people differentiate between reliable and unreliable news sources. The terms was hijacked to discredit any news story that Donald Trump might wish to deny. Although the Ozols story which predicts Twitter might seem far fetched it is only the technological clairvoyance which distinguishes it from equally accurate predictions by the real writer Ted Allbuery. *The 20th day of January* (Allbeury, 1981) is a spy novel written by Allbeury in the early 1980s which describes a plot by the Kremlin to influence a US election. A recent podcast of *Benjamin Walker's Theory of Everything* features an interview with Benjamin's friend Josh Glenn, a "semiotic brand analyst" who runs hilobrow.com where he blogs about crime thrillers (Walker, 2017). Josh attends spy novel book clubs and hears from many aficionados that this cult spy novel was Donald Trump's favourite thriller during the 1980s. Although Trump is not known as much of a reader Josh hears from people all around the world that Trump, in his early years, talked up the book so enthusiastically that people would remember him doing it decades later. The plot of the novel revolves around a Republican candidate, Logan Powell, who has no experience in politics and becomes President on a ticket to make the US and Russia friends. When it is discovered that Russia has plotted to have the man elected neither the CIA nor the Democrats want to investigate the matter:

> "Every solution spelt disaster: deep depression for millions of people, all the words of 1776 made not. It was like working diligently to prove you had cancer: whatever happened was going to be bad for America." (Allbeury, 1981)

Ozols' short story "*Message from the President*" is no more prescient than this except in so far as it imagines a technology which many other science fiction writers have imagined. Josh goes on to describe the plot of the book: the President is a narcissist happy to co-operate with Russia

because he cannot win otherwise but also because he is compromised by photographs the KGB possess of him having sex with a prostitute. The podcast host and guest describe a complex set of meetings and relationships linking Donald Trump to various Russian officials in the nineteen eighties. The conversation draws to its conclusion with this exchange around the rumour that the Russians do indeed possess a Trump sex tape:

> *Benjamin*: That doesn't exactly add up though because why would Trump let himself get caught on tape doing something shameful when that is exactly how the guy in the novel gets taken down.
>
> *Josh*: Benjamin, Trump is an exhibitionist! He wants the world to know what a sexy beast he is. He performs better when he is being filmed than when he's not being filmed.
>
> *Benjamin*: So you're saying Trump played for the cameras and beat the Russians? He's not a puppet?
>
> *Josh*: Think about it! The KGB gave Trump this book, they're the ones who studied this novel. Remember, in the book, the CIA couldn't stop Logan from taking office. Logan Powell committed suicide because of shame. In order to win, the Russians knew they would need a man who could overcome shame.
>
> *Benjamin*: I'm so confused.
>
> *Josh*: Well think about Bruce Wayne in *Batman Begins*. Purposely getting himself thrown into prison in Bhutan so he could hone his fighting skills. Think about *Rocky IV* how the Soviets spend years training Ivan Drago to win the world heavyweight championship — I must break you.
>
> *Benjamin*: What are you even saying?

Up until this moment Benjamin is taking the part of the bewildered listener, barely keeping up with the labyrinthine details of this baroque conspiracy theory, but now he takes a different tone as the exchange reaches a climax:

Josh: After the fall of the Soviet Union with help from his ex KGB handlers Trump spent twenty five years in training purposely making a buffoon of himself!

Benjamin: You mean the apprentice?

Josh: Yeah!

Benjamin: Trump University?

Josh: Yep.

Benjamin: Lusting after his own daughter publicly?

Josh: Naturally.

Benjamin: Trump steaks?

Josh. You bet.

Benjamin: Birtherism?

Josh: Of course.

Benjamin: Grabbing women by the pussy!

Josh: Right!

Benjamin: The comb over!

Josh: Ah! The piece de resistance! In the Muscovian candidates quarter century long campaign to become the "post-shame" man.

Benjamin: So this whole "post truth" thing it's just a red herring?

Josh: Classic spy novel plotting! Genius. We laughed at him, and that just made him stronger and now he's become unstoppable. (Walker, 2017)

Did Trump really read *The Twentieth of January*? Did the KGB give Trump the book in 1986? Josh thinks so but who is Josh? He is introduced as Benjamin's friend but we don't know his last name. Walker regularly features fictions in his podcasts, is this one? The book exists and it is riding high in the Amazon charts because it does indeed appear to predict the rise of someone very like Donald Trump. So

despite the somewhat staged final exchange of the podcast dialogue I find myself credulous and cynical at the same time. Whether the story is true or not is beside the point, like all conspiracy theories it cannot by definition be verified by any recourse to authoritative sources because it contains a logic that predicts that the sources we might check will lie (it's bad news for America whether it's true or not).

Many fictions present themselves as fact, some design fiction has also been presented in this way, either deliberately or accidentally. One of the earliest and best known incidents of this is James Auger and Jimmy Loizeau's "smart tooth" produced in 2002 at the RCA for Dunne and Raby's Masters course. The tooth was presented to journalists as real and New Scientist magazine among others featured quotes from the "inventors" saying "At the moment we're looking at commercial uses [. . .] From people who want to listen to traffic data and stock information." (Knight, 2002). The decline in paid journalism means it is easier than ever to place a fake news story in a national paper and from there have it forwarded around the world. Press releases from universities are routinely published without any investigation by reporters. But this might better be characterised as design deception than design fiction.

It would be possible to portray Valdis Ozols as a really existing character in online sources, though not in Wikipedia itself which would probably see through the deception more quickly than New Scientist, which at the time of writing is still archiving the 2002 article about the smart tooth. For me Valdis Ozols is a useful fiction because it declares itself as such and yet hopefully remains plausible enough to allow for the suspension of disbelief. The Valdis Ozols story contains within itself answers to potential objections like — why have we never heard of him? His existence cannot be verified because he disappeared from the University at a time when the disappearance of individuals through purges was common. Ozols' biography is based on real historical events, his fictions are no more prescient than those of HG Wells, Frederich Pohl or many other twentieth century science fiction writers. The overarching story world of Valdis provides scope for other stories to be discovered both prescient and wrong. For these reasons I would claim Valids is a useful design fiction but this leads to a larger question: how do we know a good from a bad design fiction?

3

Design Fiction as Practice Based Research

Translation [edit]

The quality of Ozols' writing is variable and much of the work suffers because it has been translated and re-translated with no original text to use as a reference point. The puns and wordplay which survive in the Latvian stories collected in Technopedija (1959) are absent in the Polish stories published throughout the fifties, sixties and seventies. These stories were later translated into Slovenian and these versions were in turn translated into English by Inga Baldois resulting in some very clumsy writing. For example, in *A New You* (a late Ozols story from the 1980s) a man has a video phone conversation with his future self. The dialogue involves colloquial terms for the penis. Idioms and slang for this term vary enormously in tone across languages. The resulting English extract below is the result of translation from Lativan, to Polish, to Slovenian, to English. The "original" Polish is more or

less legible after multiple translations but the English text becomes somewhat incoherent:

"So we get divorce?"

"Yes. In about three weeks. And she gives a DTD."

"What?"

"The disease transmitted digitally. You did not notice it right away. A few weeks after she left you're looking through old photographs. Each head has been replaced by huge penis."

"What?"

"Yes, you become pink helmet. In every picture you're one-eyed purple-headed man in pink sweater."

"She photopaints them all?"

"No. It was virus facial recognition — you realize when you see the same thing is happening to your job profile and other photos of you in the world. But this is not the worst."

"What is the worst?"

"When your name in print is replaced by "Dick Head". You almost lose your jobs. The children are teased at school and deny you-"

"You seems very matter of fact about it."

"Well, it was a long time ago. You realize at my age that nothing is important."

(Nowe Państwo)

Some critics have argued that the problems with translation occasionally improve the original Latvian which is dismissed by some as clichéd and monotonous [citation needed]

List of Works [edit]

Books

The Latvian Experience of Soviet Democracy (1945) Praeger Publishers

Soviet Latvia: Today and Tomorrow (1949 Praeger Publishers

Technopedija (1959) (self published)

Short Stories

Talking Rectangle (1927)
Conversations with No-one (1927)
The Table that Spoke (1928)
Turbine Languages (1928)
Electric Bombs Overhead (1931)
The man who died of Information. (1932)
The Day it Rained Lies (1932)
The Cure for the Common Cold (1932)
The Camera that Lied (1932)
Metal Flies (1934)
Valve Stalkers (1934)
DreamPlague (1934)
The Woman who wore Radiowaves (1938)
Electric Intercourse (1938)
Infinite Music (1941)
The Cornfields of Antarctica (1941)
The Secret Policeman's Map of Me (1941)
A Plate of You (1943)
Hydraulicon (1943)
Those are Cameras that were his Eyes (1943)
Intelligence showers (1945)
The Boredom Epidemic (1946)
Chemical Tanks (1946)
The Anxiety Battery (1947)
The Everything Engine (1951)
The Day that Nobody was Watching Me (1952)
Every Question Answered for a Dollar (1952)
Thought^{TM}(1952)
Forever Shall Live my Opinion (1955)
The Annual Sex Robot Competition (1955)
The Island where Nothing Worked (1955)
The Last three Working Class People in the World (1957)
The Wet Machines (1957)
I am a Broadcasting Corporation (1957)

Everything Is Copyrighted (1959)
World Without Wind (1960)
The Future is a ReRun (1961)
We can Reach Anyone, Anywhere, Anytime (1961)
Facetracker (1961)
A Nuclear You (1964)
Dial-a-Slave (1964)
MeTV (1965)
The fastest Tree (1967)
I monitor (1967)
The Pan-Optician (1969)
The Passenger Jet Considered as a Missile (1970)
Gloria (1971)
The Houses that Floated Away (1971)
We don't want those Doctors, Lawyers and Teachers over
Here (1971)
All the News that's Fit to Invent (1973)
Infomachia (1973)
New albums by Dead Rock Stars (1973)
The Phone as Philosopher (1973)
The Photomorphic Virus (1974)
The Mystic Microchip (1974)
Caring for Plastic Organisms (1980)
Dataslaves (1981)
A New You (1981)
God's Telephone Number (1982)
The Missile with a Conscience (1982)
The American Occupation of Britain (1982)
Communism for Sale (1983)
Time and its Discontents (1983)
Infectious Automobiles (1983)
The Despair Processor (1985)
Computer Cancer (1985)
The Book of Everyone (1987)
The Assassin that Walked Through Walls (1987)

Holy Tech (1987)
Icoholics Anonymous (1988)
The Spider caught in its own Web (1989)
The five year old CEO (1989)
Your Dreams Tonight Will Be Sponsored By... (1990)
The Assassination of Bill Gates (1990)
I Pledge Allegiance to the United Stores of Walmart (1991)

(Valdis Ozols: Wikipedia. Last Retrieved 18.02.2018)

3.1 Beyond evaluation

How do we know a good design fiction from a bad one? What kind of knowledge does research through design produce? Some designers argue that knowledge is embedded in design artefacts, others claim that design knowledge should be articulated in an accompanying commentary.

"Is the knowledge outcome of an RtD object a special form of communication, one that is superior in some sense to verbal discourse? Is it these objects' job to reveal true propositions about the world? To reveal the potential of design materials? To reify design arguments? To express emotional or subjectively felt experiences of the artificial world and its apparent trajectory? To critique assumptions imbued in everyday designs? To reveal alternative ways of being to motivate us to pursue them? (Bardzell *et al.*, 2015)

Questions like these have long troubled other academics in Practice Based Research. There are, for example, strong echoes of these kinds of concern in debates amongst musicologists. Camdem Reeves' argues that musicians engage in research by developing instrumental technique, dynamics and rhythm as well as new types of musical rhetoric (Reeves, 2016). He claims that many compositions make intrinsic contributions to knowledge outside of any textual discussion or interpretation, for example Stravinksy's additive rhythmic technique in the ground breaking scores for Petrushka and The Rites of Spring. Another musicologist, John Croft argues contrariwise that "Composition is Not Research"

"Imagine, if you will, a research funding application from Schoenberg. Research question: 'can I make music in which

> all pitch classes are played equally often?'. Answer: yes!
> Or one from Grisey: 'can I make chords out of the pitches
> revealed by spectral analysis?' Answer: yes!" (Croft, 2015)

This rather sarcastic formulae might also be applied to Research through
Design (RtD) projects like the drift table (Gaver *et al.*, 2004). This
ingenious and beautiful design consists of a table with a porthole in
the centre that shows aerial photography drifting below. The images
move in the direction of any weight on the table top, so if a user puts
a cup over the north the table, very slowly, drifts in that direction.
This project could be framed as Croft frames Schoenberg — Can I
make a table with a porthole that shows a landscape drifting below
it? Answer: yes. Clearly Croft's questions are caricatures (no question
that can be answered with a yes or no would qualify as that rather
enigmatic entity — the research question). But he goes on to modify
the caricature in a way that also resonates across many RtD projects:

> "Sometimes [. . .] we insert an evaluative term: 'can a coher-
> ent musical structure be developed from sonification of the
> human genome?' Without the word 'coherent' the answer is
> of course yes. So we put something in to make it seem like
> the result is not a foregone conclusion. But of course it is
> a foregone conclusion, because what one generally means
> by such a question is 'can I write convincing music with
> this technique?' where the person to be convinced is . . . me!"
> (Croft, 2015)

The Drift table question above might be reconfigured so that the project
is an exploration of some aspect of experience design. Indeed one of
Croft's later imagined research projects could well have been an RtD
project addressing say sustainability:

> "converting arctic ice cap data into sound files to be manipu-
> lated in real time in an internet-mediated free-improvisation
> event combining live programming, video projection, and
> social media" (Croft, 2015)

Croft points out that funders and reviewers of projects like this can sidestep difficult and subjective value judgements of whatever music might arise and instead focus on its originality:

> "Who's to judge the originality of musical material? It's all 'subjective', isn't it? But you can't argue with the ground breaking nature of the polar-ice-based internet improvisation event — nobody's ever done that before! This kind of activity is objectively 'innovative' in a way that you can tell in advance, without going to the trouble of a risky aesthetic judgment." (Croft, 2015)

Evaluation has long been problematic in HCI. Greenberg and Buxton argued in 2008 that usability evaluation is harmful (Greenberg and Buxton, 2008). Usability evaluations focus on detailed measures rather than asking broader questions about whether the thing is worth doing at all: evaluation stresses usability rather than usefulness.

Ian Pace writes another response to Croft — "Compositions Can be and Often Have Been Research" arguing that by performing repertoire he is able to learn from the achievements of others and discern new possibilities. Though he reproaches Croft for being glib he cannot resist adding this hefty dose of sarcasm to his own argument:

> "my approach is far from uncommon, and in this sense the articulation of practice in research terms is a positive and productive activity. It may be less spectacular than some of the wilder fringes of theatre and visual performance — such as Lee Miller and Joanne "Bob" Whalley's joint PhD project, collecting of urine-filled bottles on the M6, replacing them with other detritus, renewing their wedding vows in a service station, then grounding this in the thought of Deleuze and Guattari, Bakhtin, dialogism, heteroglossia and semiotic multi-accentuality, deliberately framed in such a way as to frustrate Popper's criteria of falsifiability — but is no less 'research' as a result." (Pace, 2016)

Croft's tone is entrenched and sarcastic because battles around research based practice have been raging for a long time in musicology. Both

Pace and Croft make it clear that these arguments are not solely academic: they all have skin in the game. As funding for higher education is cut Universities must demonstrate "impact", and in this brutally competitive environment many universities are closing down Music departments staffed by academic musicologists and conservatoires are giving up on research altogether to concentrate on training musicians. So these people are arguing not only about abstract matters of epistemology but their own ability to earn a living in a University.

Pace's satirical account of the turn to critical theory is another aspect of the musicology debate that resonates with Research Through Design. Bardzell and Bardzell have argued that critical design echoes both the language and concerns of the critical theory that emerged form the Frankfurt School (Bardzell and Bardzell, 2013). Pierce *et al.* defend a space for artefacts unencumbered by commentary, echoing the composition as research in and of itself paper (Pierce *et al.*, 2015). They insist on designerly ways of knowing, specialised forms of knowledge recognisable by designers in the way that musical problems are recognised by musicians. The debate in HCI may be less overtly partisan but the issues are similar. How are we to value the things we make? In and of themselves? Because they resonate with theory?

The problem is even more acute when applied to Design Fiction? Can I write a design fiction about an undiscovered Latvian author in the nineteen forties? Yes. Can I wrote a convincing fiction about this author when the person to be convinced is me? Also, yes. The problem here is the strong remnant of usability testing and metrics. The field wants to know if the thing that has been designed — prototype, fake or fiction, is any good, or any better than something else. And if so by what metric. As with music this is a very difficult question to answer without sticky aesthetic theory. Recently there have been some concerted efforts to import critical theory but this has been met with resistance (Pierce *et al.*, 2015). Rather than ask a judgemental question like — is this any good, or an ontological question like — what is this, (critical design, speculative design, design fiction?) it may perhaps be more interesting to ask an epistemological question — does this help us to think or know anything new?

3.2 Research fiction as thought experiment

Fiction is a tool in many other research disciplines including Physics, Mathematics, Economics, Law, History, Psychology, Epidemiology, Computer Science, and Philosophy. The use of illustrative stories can be traced back to Ancient Greece, with Plato communicating philosophical ideas and indeed the idea of philosophy itself through story. Consider for example, the Philosopher's Cave that Plato describes. Here most of the cave dwellers see only shadows thrown by a light through a chink in the wall, when one of them finds a way out and describes what he has seen outside, the other cave dwellers cannot understand him, having only ever seen shadows. The philosopher is the one that leaves the cave and in Ancient Greece the journey from darkness to light was made through story. The Philosopher's cave has been seen as an early example of a "thought experiment" (Brown and Fehige, 2017)

Karl Popper's taxonomy of thought experiments categorises them in relation to theory: for Popper there are three kinds: critical (against a theory) apologetic (for a theory) or heuristic (illustrating a theory) (Brown and Fehige, 2017). Perhaps the best known thought Experiment in Physics is Isaac Newton's Falling canon ball. This shows how the moon stays in orbit around the earth in the same way that a ball fired from a canon describes an arc before falling to earth (see Figure 3.1). If the canon was powerful enough the arc would get larger and larger until it circled the planet. The many illustrations of this famous thought experiment help us to understand what might otherwise be expressed in abstract equations. However unlikely such an enormous canon might be the story helps to illustrate the theory.

Shrodinger's Cat is so entrenched in the culture that it is the punch line for a number of jokes in *the Big Bang Theory* sitcom. Like Newton's canon it can be expressed very powerfully in visual ways but here is the textual description:

> "A cat is penned up in a steel chamber, along with the
> following diabolical device (which must be secured against
> direct interference by the cat): in a Geiger counter there is
> a tiny bit of radioactive substance, so small, that perhaps
> in the course of one hour one of the atoms decays, but
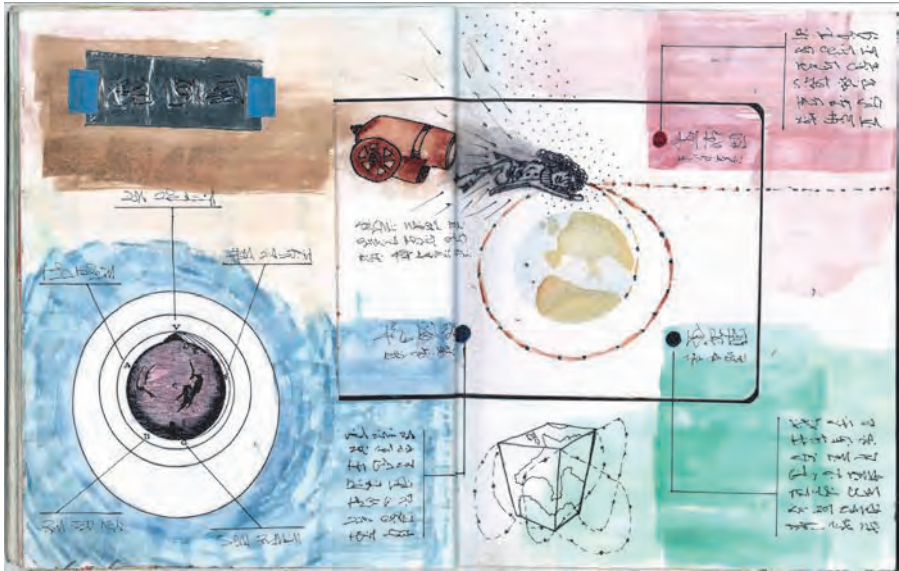
Figure 3.1: Newton's Canon

also, with equal probability, perhaps none; if it happens, the counter tube discharges and through a relay releases a hammer which shatters a small flask of hydrocyanic acid. If one has left this entire system to itself for an hour, one would say that the cat still lives if meanwhile no atom has decayed. The first atomic decay would have poisoned it. The q-function of the entire system would express this by having in it the living and the dead cat (pardon the expression) mixed or smeared out in equal parts." Schrödinger 1935, p. 812; translation: Trimmer, 1980, p. 328 cited in (Brown and Fehige, 2017)

Quantum particles must be thought of as being in all states at once until they are observed. The act of observation changes phenomena and "common sense" ideas like — a cat is either alive or dead, may not always accord with the way that the world works (ibid).

The examples so far have been more like scenarios than stories: they are more or less static pictures. But many famous thought experiments also involve more developed narratives including plot lines. EM Foster provides this memorable and brief definition of the difference between a story and a plot: the King died and the Queen died is a story, the King died and the Queen died of grief is a plot (Foster, 2016). Einstein illustrated the idea of time dilation with a plot based thought experiment about twins; one gets in a rocket ship and travels at great speed for two years according to the ship's clocks; but when he returns he finds that his twin on earth is now thirty years older than he is. This theoretical time dilation has now been proved experimentally. In the 1970s atomic clocks were placed on two planes travelling in opposite directions and time was observed to pass differently when measured in nanoseconds; a nano second is to one second what one second is to thirty seven years and we do not live long enough or travel fast enough to notice time dilation (Buzzo and Jonas, 2015) so Buzzo and colleagues recently developed an app to illustrate the minute effects of time dilation during air travel (ibid). But Einstein's thought experiment conveys the idea in a powerful and visual way through narrative.

Design Fiction rarely attempts to confirm or deny some existing theory. However research fiction considered broadly does attempt to delineate the possible applications of theoretical advances. Whenever increased speed and memory size have advanced sufficiently to make new computer applications possible they have been preceded by concept designs and scenarios. These could be considered as thought experiments of the positive kind. But other kinds of research fiction (critical design, speculative design and design fiction) might be thought of as negative thought experiments in Popper's terms. Provocative designs from Dunne and Raby's students ask difficult ethical questions. In one project picturing what lab grown meat might look like Dunne wonders if he could grow meat from his own cells, throw a dinner party and serve himself as a canapé. These kinds of fiction have more in common with the ethical thought experiments common in philosophy.

One of the best known ethical thought experiments is called The Trolley Problem. Again the experiment is often conveyed visually:

Figure 3.2: The Trolley Problem

Here a train is heading towards five people who will be killed unless someone throws a switch and sends the train towards a single man instead. They would save five lives by throwing the switch but in the process they would deliberately kill somebody, is this justified? A variation of this conundrum was recently applied to the design of self driving cars (MIT Technology Review, 2015) with an additional twist: should a self driving car about to have an accident take action minimizing the loss of life even if that means killing the driver? And if so how many people would be willing to sign the necessary forms allowing their car to kill them if it deemed the sacrifice to be necessary?

Such ethical thought experiments seldom provide answers that are beyond dispute. They do not force logical conclusions bur rather surface ethical questions. Another famous example is the Experience Machine. In the 1970s Robert Nizick imagined a machine that would convey to the user an experience so vivid that it would be indistinguishable from real life. The machine would allow them to experience a great love affair, living for years in a monastery, writing the great American novel, or

whatever it was they wanted to do. *The Matrix* uses "the experience machine" as its central premise. Thought experiments in Physics and Computer Science informed the writing of Ray Bradbury, Isaac Asimov and Arthur C Clarke. Other writers of science fiction have been inspired not only by Physics but History. Margaret Atwood argues that she did not put anything into *The Handmaid's Tale* that has not happened somewhere at some point in human history. Similarly George Orwell's 1984 adheres strictly to the principles of totalitarian organizations in his depictions of the ultimate surveillance society; his fiction added only extended technological capability.

Thought experiments can sometimes have unexpectedly practical results. Indeed the invention of the computer has been attributed in part to a thought experiment by the British mathematician and code breaker, Alan Turing. Turing was interested in the logical foundations of Mathematics and these were far less certain than had been hoped. Bertrand Russell had challenged Cantor's set theory by pointing out a paradox that became almost as famous as he did. Russell's Paradox was related to the ancient Greek liar's paradox that runs "everything I say is a lie, I am a liar". Turning's biographer, David Leavitt, points out that most of us today will have first come across this in an episode of Star Trek when Kirk uses it to make an aggressively logical robot explode. Russell applied it to set theory and the question of whether the set of all sets contains itself. This is illustrated with (what else) a story. A barber shaves all of the men in the town where he lives but only if they do not shave themselves. Does this barber shave himself? There is a contradiction if he does not (because he lives in the town) and if he does (because he shaves himself). The barber then has no logical alternative but to explode. This problem was one that Wittgenstein sought to solve by framing it as the wrong sort of "language game". He would discuss such question in seminars where students sat on deck chairs often in complete silence waiting for the philosopher to ask a question. If one of them ventured an answer Wittgenstein might sometimes respond with little more than — no that's no good. One of Wittgenstein's most fearless students was Alan Turing and he returned to mathematical thought experiments in a 1936 paper called "On Computable Numbers, with an Application to the Entscheidungsproblem". The Entscheidungsproblem

is a "decision problem" asking whether a statement is provable from its axioms. In the paper Turing imagines an a-machine (with the a standing for automatic) capable of manipulating symbols according to rules.

"We may compare a man in the process of computing a real number to a machine which is only capable of a finite number of conditions q1, q2,..., qR which will be called "m-configurations". The machine is supplied with a "tape", (the analogue of paper) running through it, and divided into sections (called "squares") each capable of bearing a "symbol". At any moment there is just one square, say the r-th, bearing the symbol S(r) which is "in the machine". We may call this square the "scanned square". The symbol on the scanned square may be called the "scanned symbol". The "scanned symbol" is the only one of which the machine is, so to speak, "directly aware". However, by altering its m-configuration the machine can effectively remember some of the symbols which it has "seen" (scanned) previously. (Turing, 1936)

The machine would perform an algorithmic operation and produce a sequence of numbers. Turing then imagines a universal machine that "can be used to compute any computable sequence" (ibid). Leavitt is keen to point out that when Turing wrote this he was not thinking of a machine that would ever be built:

"The engineer in Turing would emerge later: when he wrote "Computable Numbers," he intended his machine as a kind of literary device — the analogy, as it were, by means of which he could convey the central concept of the computable numbers most cleanly and economically." (Leavitt, 2006, pp 59–60)

Turing is not trying to invent a computer, he is trying to solve a problem in logic: his thought experiment leads him to conclude that the entscheidungsproblem cannot be solved, a conclusion reached by Church slightly before Turing by different methods. Although Turing was beaten to the discovery his method was sufficiently interesting to justify separate publication and the paper had a profound influence on the development of computing technology. John Von Neuman's 1945 proposal for the design of EDVAC (electronic discrete variable automatic computer) describes its memory as "one organ" in ways which are equivalent to the "tape" as described in Computable Numbers (Leavitt, 2006, p. 201).

Turing's thought experiment is in some respects quite different to thought experiments in Physics. Turing's machine is a metaphor but it is also precisely defined in logical terms and leads to proof, Paul Cairns explains —

> "Einstein's and Galileo's thought experiments lead to logical necessities but there is still a need to test because the real world doesn't necessarily play along. Turing's machine needs no further testing because it has passed into the realm of proof. For example, I could explain to you the equivalence of countable infinities by talking about Hilbert's Hotel but each of the the Hotelier's operations can translate into mathematical functions that demonstrate the equivalence in a precise way. The Hotel is a literary device but the mathematics is real (as real as maths gets)." (Paul Cairns *pers comm*)

The mathematics are real though they are expressed through a fiction. The term "thought experiment" then can refer to a great many different activities. This is particularly the case in design. Julian Bleecker's short essay on design fiction describes the approach as a "materialised thought experiment" (Bleecker, 2009). In *Speculative Everything* Dunne and Raby describe fictional worlds and thought experiments as methodological playgrounds. They note that their two favourite forms of thought experiment are the *reductio ad absurdum* (where a particular claim is taken to extremes in order to test it) and the counterfactual where a historical fact is changed to see what would have happened (Dunne and Raby, 2013). Brian David Johnson claimed that SF prototypes provided a similar platform to the thought experiments of Einstein (Johnson, 2011). But there are many different kinds of thought experiment. Buie argues that "imaginary abstracts" and some other design fictions satisfy Brown and Fehige's (2017) four characteristics of thought experiments (1) visualise a situation (2) let it run (3) see what happens and (4) draw a conclusion (Buie, 2018). She argues that if design fiction is to be useful as a thought experiment it must generate "possible answers whose credibility we can argue" (Ibid p 186–7).

Thought experiments are controversial in science and philosophy. For Norton they are simply forms of argumentation, but Brown argues that they are a means of discovering *a priori* knowledge of nature: Brown and Norton represent extreme positions — either they are a higher form of knowledge or they are no form of knowledge at all (Brown and Fehige, 2017). The "mental model" account argues that in thought experiments we manipulate a mental model rather than a physical model:

> "the mental model account provides the opportunity to make mention of those proposals that place "literary fiction on the level of thought experiments." (Swirski, 2007, p. 6 cited ibid)

This view would see *1984, the Handmaid's Tale* and *Brave New World* as "fully elaborated" thought experiments (Davenport, 1983; Swirski, 2007). The classic thought experiments from Physics and ethics are more like scenarios than fiction: there are no characters, there is no plot (in the literary sense of the term). The notion of literary fiction as an "elaborated thought experiment" might also help us develop notions of what design fiction might be. Swirski argues:

> "the capacity of literary fictions for generating nonfictional knowledge owes to their capacity for doing what philosophy and science do–generating thought experiments." (ibid)

Both Orwell and Huxley researched the historical and political precedents for their dystopian fictions. There is a good case then for design fiction in HCI to be considered if not as the kind of logical or ethical thought experiment developed in Physics and Philosophy then at least a cousin to elaborated thought experiments of this kind. What might design fiction look like when conceived of as this kind of thought experiment?

3.3   The secret policeman's map of me

In *The Origins of Totalitarianism* Hannah Arendt speculates about the shape of technologies that totalitarian secret police dream of:

"The Ohkrana, the Tsarist predecessor of the GPU, is reported to have invented a filing system in which every suspect was noted on a large card in the center of which his name was surrounded by a red circle, his political friends were designated by smaller red circles and his non political acquaintances by green ones; brown circles indicated persons in contact with friends of the suspect but not known to him personally; cross relationships between the suspects friends, political and non political and the friends of his friends were indicated by lines between the respective circles. Obviously the limitations of this method are set only by the size of the filing card, and theoretically a gigantic single sheet could show the relations and cross relations of the entire population. And this is the utopian goal of the totalitarian secret police [. . .] Now the police dreams that one look at the gigantic map on the office wall should suffice at any given moment to establish who is related to whom and in what degree of intimacy. And theoretically this dream is not unrealizable although its technical execution is bound to be somewhat difficult. If this map really did exist not even memory would stand in the way of the totalitarian claim to domination. Such a map might make it possible to obliterate people without any traces, as if they had never existed at all." (Arendt, 1973)

Arendt here presents a thought experiment of the classical kind. What if a totalitarian state had access to a map like the one she described?

It might be the basis for many elaborations, to illustrate here is an extract from a Valdis Ozols story:

The Secret Policeman's Map of Me

I wandered the city for many hours hoping to meet someone, anyone at all, but there was no-one to be found in the city. A dull twilight cast grey gloom over empty streets as I circled the Police station. I turned into a park and found a bench where I sat in despair and watched light fade. As the grey sky turned black an old woman sat down next to me.

Figure 3.3: The Secret Policeman's Map of Me

"Good evening Comrade," I lowered my head, "it's beautiful evening is it not?"

"It is not!" she squinted at me, "it's dank! It wants rain."

"Oh yes, yes" I nodded "you're quite right I'm sure of it. I often think that we do not make most of wisdom that our older comrades possess. Yes there is intelligence in your eye! I can see it and beauty too!"

"What's your game?" she glared, "I'm a respectable woman! Who are you? What do you want?"

I showed her my identity card and she made a note of the number before showing me hers. I bid her good evening, thanked her again and headed towards the police station.

A cone of pale yellow light shone out of the dark building. The Sargent at Arms, Gregor greeted me and started laughing.

"I heard a good one today," his double chin wobbled, "an old Polish wife is too tired to make love when her husband comes home from work. He is tired too but also horny so he asks if she will just suck him and swallow the sperm. She says "I'm too tired for that now, why don't you just masturbate into a glass and I'll drink it in the morning?" Gregor erupted into laugher. I laughed loudly as he led me to the room.

The map was switched off when we entered but he quickly fired it up, turning dials and flicking the switches to make wall of lights flicker. I read out my ID and he punched the numbers in still laughing at his stupid joke. I tried not to look too nervous as the usual pattern emerged. I thanked God that the central ring of red lights denoting close friends had not changed. The next circle of colleagues was dispersed in the usual way and I began to think I was safe, at least for that night. Gregor scanned the array looking bored.

"Anything to report today?"

"No."

"No reactionary opinions from your students this morning?"

"Oh yes," I nodded hastily, "Vladimir Illyavich this morning made a counter revolutionary joke about Stalin."

"A joke about Stalin?" Gregor frowned, "that's serious. Which one?"

"Oh you know the one where comrades in the Politburo are arguing about whether there will be money under Communism or not. The leftists say "no" since money is needed only for private ownership. The rightists say yes because it will be needed for the exchange of goods as in any complex society. Finally Comrade Stalin intervenes rejecting both the left and right for higher dialectical synthesis. He says — "There will be money and there will not be money. Some will have money and others will not have it.""

"And that's the punchline is it?" Gregor looked confused.

"Yes."

"Well it's not very funny is it?"

I shrugged, "Vladimir Illyavich often makes jokes like this I have mentioned it in previous reports".

"You were right to bring this to our attention." Gregor fiddled with the dials and Valdimir Illyavich's light became brighter.

"No new contacts to report?" Gregor asked absently as he adjusted the dials.

"I don't think so."

"Then our business is concluded," Gregor rubbed his eyes and yawned, "I'll tell you a better joke. There was this Jew –" he paused and squinted at the map, "but wait a minute, what's this?" there was a new light flashing at the outermost circle, "you have an "unclassified". What is this? A new ladyfriend eh?"

I laughed so loudly that Gregor jumped and stared at me.

"No! No!" I carried on laughing, I knew very well that this was not helping but somehow I could not help myself, "it's probably just old woman I was talking to in the park just now — here is her number."

Gregor punched the old woman's ID into the machine and scratched his head.

"No that's not it. Who else have you spoken to today?"

"Nobody." I said shrugging.

"You're absolutely certain?"

"Yes, there was nobody." I started moving towards the door, "it's probably just a glitch in the system. They happen sometimes don't they? Boundary objects that's technical term isn't it?"

"That was foolish mistake." Gregor's friendly demeanour vanished, "I told her that you would confess immediately and we would be able to sort it out in a moment. It is too late for that now."

I turned around and saw her standing there in the doorway.

"Most men would know better than to try and hide something from the System," she looked calm and professional, "Of course I should never have mentioned boundary objects to you. I will be reprimanded for that. But you!" she glared at me bitterly, "you have betrayed classified information upon first examination, this will not go well for you."

"Darling I'm sorry! It's not my fault that she said hello! I haven't seen her in years — it meant nothing!"

"Then why try to hide it?"

"Because — "I looked desperately at Gregor but his face was entirely impassive, "because of this! Because of the way you are! Your position here! You know how suspicious you can be! It was entirely innocent — ask her!"

"We have already interrogated her and she has been taken into protection, along with her inner and outer circles. She has reactionary friends of friends and I'm afraid this contaminates your profile very badly. Now you will be taken to your first struggle session."

"NO!"

"I can't make any exceptions."

"But nothing happened! She recognised me from school! We said hello! That's all!"

As the soldiers put their hands on my shoulders I saw something pass between Gregor and my wife that was as clear as if it had been flashed on the map behind them.

(Valdis Ozols 1942)

From the vantage point of Valdis' future we know not only what such technology looks like but also what totalitarian states would do with it. Estimates vary on the number of Stalin's victims but most historians agree on a rough round total of some twenty million. In the Ozols story the citizens of the unnamed city are compelled to make updates of the Secret Policeman's map in nightly visits to the Police station. The idea that we would voluntarily update such a map minute by minute is too far fetched for Valdis or anyone living in a totalitarian state to have entertained for a moment. Valdis Ozols functions as a thought experiment which allows us to imagine counter factual histories: what would have happened if Google Circles or Facebook had existed in the nineteen forties? Death on an even more unimaginable scale and domination beyond even Stalin's dreams.

The story is limited by Valdis' abilities as an amateur writer, he was primarily an academic and wrote fiction only in short bursts. There is also the further problem of multiple translations which have resulted in this rather wooden prose. The fragment is unfinished and it is interesting to speculate on how it might have been developed into an elaborated thought experiment.

3.4   Plot, genre and narrative

This Ozols fragment might be elaborated in any number of ways depending on plot and genre choices. Since Ancient Greece it has been said that there are only so many plots in the world and each new tale is just a variation on them. Booker calls this a teasing notion because nobody ever says exactly what these plots are (Booker, 2005). Kurt Vonnegut described four dominant "story shapes" which he said were so simple they could easily be fed into a computer. One was *Man in a Hole*, where an average person gets into trouble and then gets out of it but as Vonnegut notes it needn't be a man and it needn't be a hole. Another was *Boy Meets Girl*, where someone gets something that they want, lose it and then get it back again. He also drew a Cinderella shape and a Kafka shape (the latter being a simple line curving downwards and off the graph (Vonnegut, 2010). Booker developed seven categories of plot: Overcoming the Monster (which corresponds to Man in the

Hole) The Quest, Voyage and Return, Comedy, Tragedy and Rebirth. Most scenarios in HCI follow the Man in the Hole/Overcoming the Monster plot: an average person is confronted with some problem which they then overcome, usually with the aid of the new technology being imagined. Design Fiction more often takes the Voyage and Return form where someone (sometimes the reader or viewer) enters a new world and then comes back (Blythe, 2017).

The Ozols fragment might take the form of Man in a Hole if the protagonist could contrive some way to escape. Perhaps the illicit relationship between his wife and Gregor could be developed into a plot point that would help reverse his fortunes. He may pass information to Gregor that compromises his wife and Gregor himself. Gregor might then become an ally who would help him redraw his map and escape. Or, more plausibly, the story might take the Kafka shape and end in the protagonist's complete destruction as in the *The Trial* or *1984*. Although plot descriptors like "man in a hole" or "overcoming the monster" can be criticized as reductive they can also be generative: what would this story look like if it became a rebirth plot?

The genre of most design fiction, whether it is text or artifact, is most often scientist and rationalist. This kind of fiction is extrapolative, it takes as a starting point an emerging technology or trend and exaggerates it. (Blythe and Encinas, 2016). This kind of procedure is best exemplified by the earlier examples from HG Wells, Frederich Phol, JG Ballard and William Gibson. It is also evident in artefacts like the Mobile Life Ikea collaboration. These picture plausible devices that do not quite exist yet [ibid]. The other most dominant genre of fiction in design is ironic critique. *I Wanna Deliver a Shark* by Ai Hasegawa for example describes humans acting as surrogate parents for endangered species rather then more humans of which there is no shortage. Such critical work can be thought of as a reduction *ad absurdum*. Other fictions take more ambiguous forms and some design fiction has attempted to draw on the magic realism genre to describe wonders without technology (ibid). The Ozula story as it begins is techno-rationalist describing plausible technologies with the benefit of hindsight. If an ironic and critical genre were adopted then perhaps the protagonist would be converted like Winston Smith in 1984. He could

be so utterly crushed that he updates his timeline every moment, for fun, like facebook users today.

These categorizations by genre and plot may seem simplistic and of course in many ways they are. Such "structural" approaches to literary studies have long since been superseded by post structuralist accounts which focus more on narrative content than form. But Paul Ricour's three volume *Being and Narrative* places narrative at the center of human understanding.

> "narrative is the mental structuring process through which we define our existential relationship to the movements of our earth and the planets, stars and galaxies; to our linear perspective of time typified by the invention of the calendar; to events in the objective and subjective worlds, and to our sense of moving from past to future, through retrospection and anticipation, with the present as a continuing interaction point with both" (Payne, 2006)

Narrative is not simply a property of written texts or language, it is everywhere. Roland Barthes argued that narratives take forms as varied as: myth, novella, history, painting, stained glass, cinema, news and conversation (Barthes, 1993). Paul Ricoeur echoed the thought:

> "we are confronted with an almost uncountable variety of narrative expressions (oral, written, drawn, acted) and of classes of narrative (myths, folklore, fables, novels, epics, tragedies, dramas, films, comic strips, to say nothing of history, painting, and conversation). (Ricoueur, 1984)

Building on Ricouer the psychologist Jerome Bruner argued that narrative (as opposed to other representations like clocks or calendars) is the only way we have of describing time in the way we experience it (Bruner, 2004). Going further he argues that not only does narrative imitate life but "life imitates narrative" for Bruner we make sense of our own lives in the same way that we make sense of a story. Our lives are constructed through active ratiocination; an autobiography does not simply relay what happens it is rather a cognitive or narrative achievement (ibid

p. 692). Narratology is now a very large field which has influenced
the way we characterize knowledge itself. There are many competing
theoretical accounts and definitions of key terms. Brannigan's definition
of narrative includes not just structure but also judgment:

> "narrative is a perceptual activity that organizes data into
> a special pattern which represents and explains experience.
> More specifically, narrative is a way of organizing spatial
> and temporal data into a cause-effect chain of events with a
> beginning, middle, and end that embodies a judgment about
> the nature of the events as well as demonstrates how it is
> possible to know, and hence narrate, the events." (Branigan,
> 1992)

A chain of events may be less obvious in a static picture but Barthes'
landmark article "The Rhetoric of the Image" showed how even seem-
ingly flat and mundane images like a bag of shopping in an advertisement
can imply narrative. The string bag in the Panzani spaghetti advertise-
ment he discusses connotes shopping, not in a supermarket that would
provide disposable plastic carriers, but rather a local market; the garlic
and vegetables behind the tins and packets suggest freshness; the name
Panzani itself conjures Italy although the pasta is made in America
(Ballard, 2014). The image suggests not only a story (a sequence of
events) but also a plot (linked events) and a broader narrative including
judgment (someone goes shopping and buys products which are fresh
and authentic).

Even static images then might convey narratives of one kind or
another. But what about artifacts? The notion of an "affordance" in
HCI articulates the ways that we consciously or unconsciously create
narratives about how we expect everyday things to behave (Norman,
2013). If there is a handle on a door this implies a chain of events: if
I pull this handle then the door will open. If it is a "Norman handle"
then this narrative will be incorrect and we will have to push the stupid
door (ibid). But whether the implied narrative is correct or not artifacts
can suggest a plot in the sense of a related sequence of events: cause
and effect, if this then that. Some artifacts, especially, perhaps, those
that have been made as provocations also convey judgment. For Paul

Ricoeur the notion of a text is very broad and defined by the way it is framed:

> "Marked by some frontier, a text is transformed into an integral unit of signals. The notion of closure is not far off. It is introduced by the notion of a "frame," which is related to this same concept in painting, the theater (the footlights, the curtain), architecture, and sculpture. In one sense, the beginning and the end of a plot only specify this notion of the frame, which is directly related to that of the text. There is no plot without a frame, that is, "the boundary separating the artistic text from the non-text"" (Ricoueur, 1984)

There is clearly a difference between textual research fictions and those which are primarily image or object based. Image or artifact based fictions are likely to be far more ambiguous. And yet they may strongly imply both plot (related events) and narrative (judgment).

The careful analysis of the stories we tell has been developed into a counseling technique called "narrative therapy" where dominant stories are broken or challenged by new ones (Payne, 2006). Here the therapist helps the patient to reshape and retell their stories by deconstructing the story that they come to therapy with. This process exposes taken for granted ideas which drive the socio cultural context (ibid). Just as Jane Austen's novels can be deconstructed by considering what is left out of them — the slave trade that produces the wealth her characters enjoy — a patients' account of marital problems might be reframed in terms of a context that is not immediately apparent in their initial recriminations and accusations (ibid). Narrative then is a tool for thought even though it is always partial and selective. Fiction can be a tool for reframing and questioning dominant narratives in our lives, our work and our theory.

4

Fictional Designers

Design workbooks are collections of resources and materials related to a project, they might include sketches of proposals, cuttings from magazines or books indicating moods, colours or textures. They are frequently used across many disciplines including HCI (e.g. Gaver, 2011). Imaginary design workbooks might represent fictional projects and fictional designers. To illustrate the ways in which fiction can be used to reframe and reposition new and emerging technologies we include the following examples from an imaginary design workbook called the "NoPlace Notebook". This was a response to a request by Mozilla to run a design fiction workshop which would encourage creative thinking around routers (Blythe *et al.*, 2018). Jofish Kaye asked us to explore the space of always on voice activated home systems like Alexa or Google Home in as imaginative a way as possible (ibid). Following on from the idea of Valdis Ozols, a fictional writer, we imagined a fictional designer and a found design workbook, initially we thought this might be plans from a rival company. The following Wattsapp dialogue is included to show how one fiction generated other fictions:

> Mark: How about if we make a Chinese Valdis? Zhang Wei, a brilliant but reclusive designer who has never been pho-

tographed or interviewed. A notebook purportedly belonging to him has been found in an airport. It is full of semi legible sketches and drawings under the heading A Bestiary of Routers." (several images follow)

"That kind of thing but detailed with odd diagrams and other codex stuff. What do you think?

Enrique: I love it! Much more than the spy version! The last one looks like a scrotum! The scrotum router!

(Pers Comm. Mark and Enrique. Wattsapp)

Figure 4.1: Zhang Wei's Bestiary of Routers

In a paper that could be regarded as an extended thought experiment the philosopher and sociologist of technology Bruno Latour takes on the pen name of Jim Morrison (Johnson, 1988). The paper describes a world without doors where we have to demolish and rebuild walls to get in and out of buildings. This device makes it clear what a clever piece of design a hinge is and goes on to talk about the difficulties of making sure a door is shut, especially when unreliable humans are opening and closing it. The move allows for a sociology of objects and

machines and in a footnote Latour distinguishes between himself "The-author-in-the-flesh" and Johnson "the-author-in-the-text". This author in the text does not exist and the author of the imaginary workbook is likewise imaginary. I (Mark) am the author-in-the-flesh of the text in this article while Enrique is the designer-in-the-flesh of the workbook pages that appear throughout. The designer-in-the-text is as imaginary as the author-in-the-text Valdis Ozols.

We took inspiration from the Codex Seraphinianus, a book written in an imaginary language by the artist and designer Serafini and beautifully illustrated with perplexing diagrams and images of bio mechanical objects and beings. Enrique developed an elaborate fictional design workbook including materials, found objects, many sketches and his own imaginary language. The following illustrations are reproduced to give a sense of the detail and depth of the artifact:
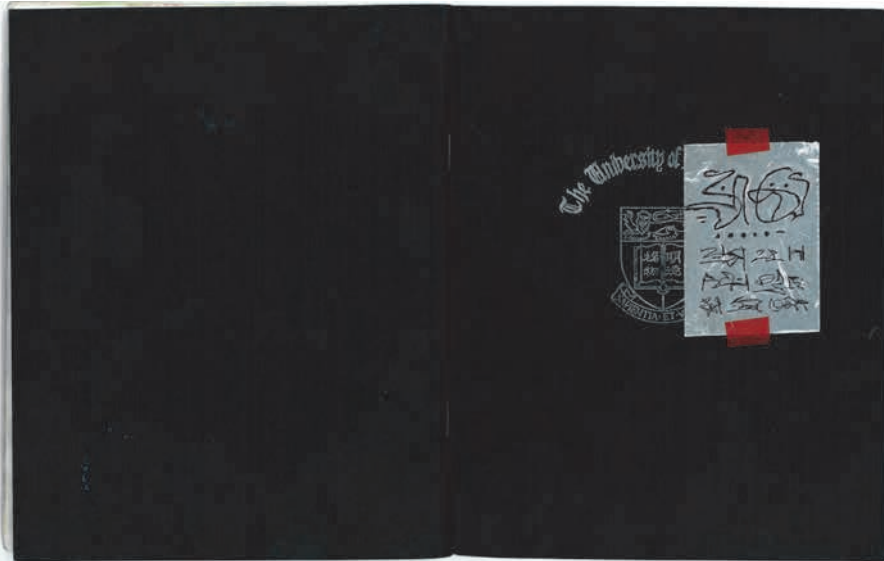
Figure 4.2: Imaginary Design Workbook Front Cover

Figure 4.3: Page One

Figure 4.4: Section One
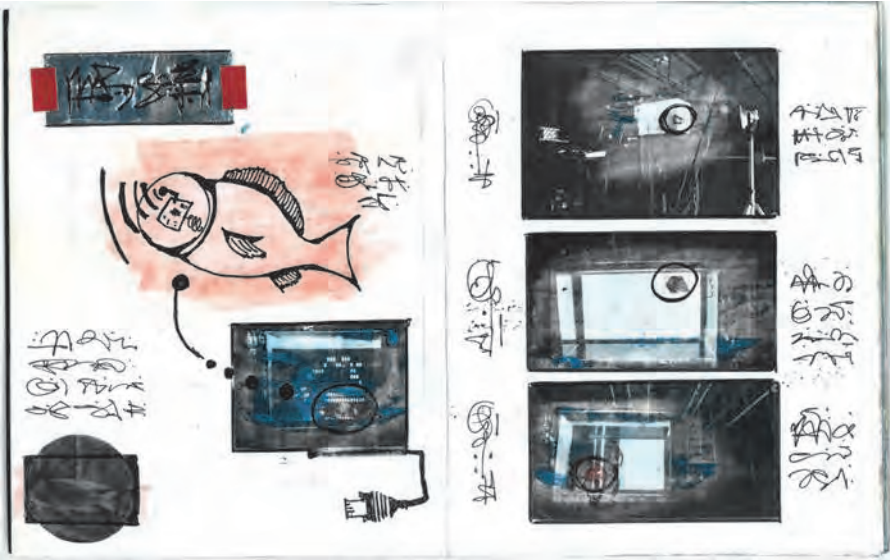
Figure 4.5: Section 1, example 1
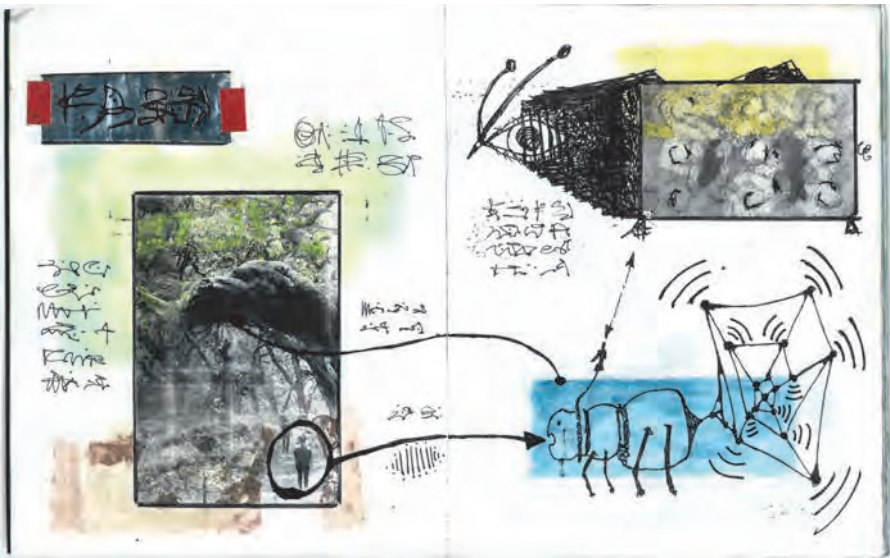
Figure 4.6: Section 1, example 2
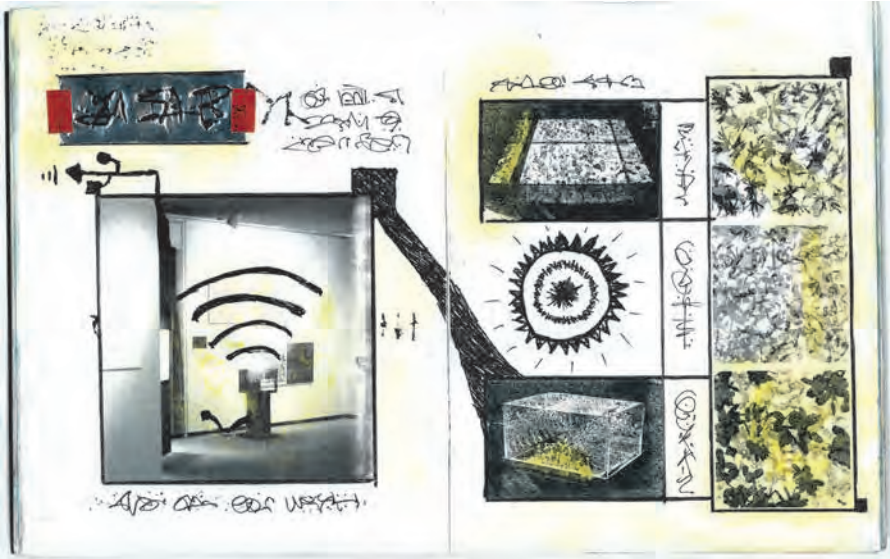
Figure 4.7: Section 1, example 3
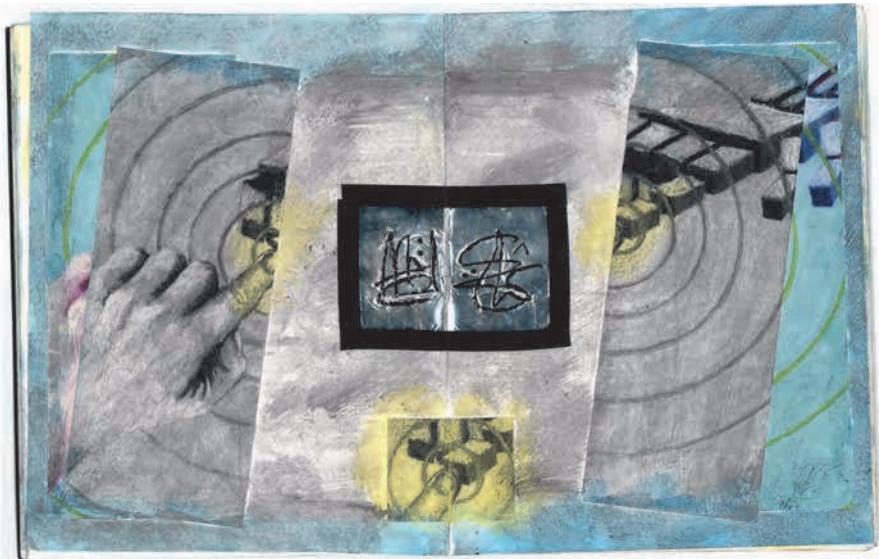
Figure 4.8: Section Two
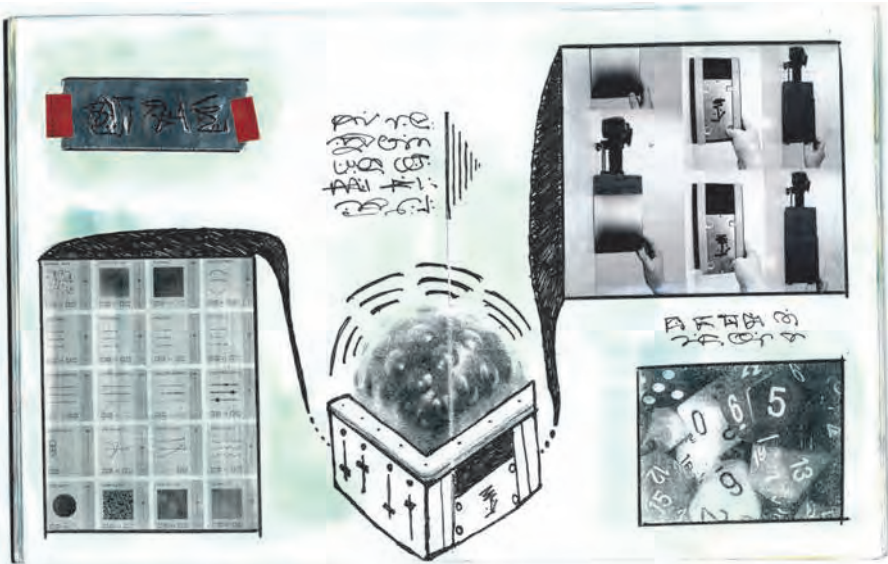
Figure 4.9: Section 2, example 1
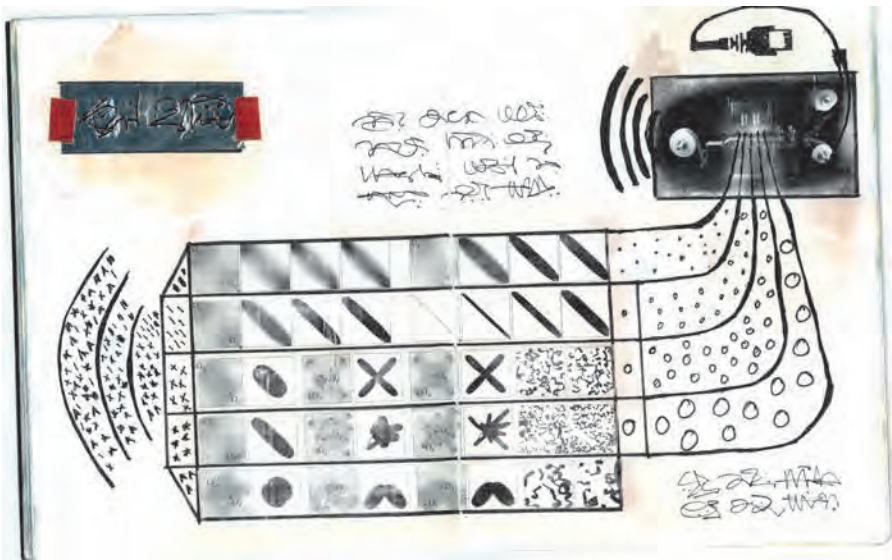
Figure 4.10: Section 2 example 2
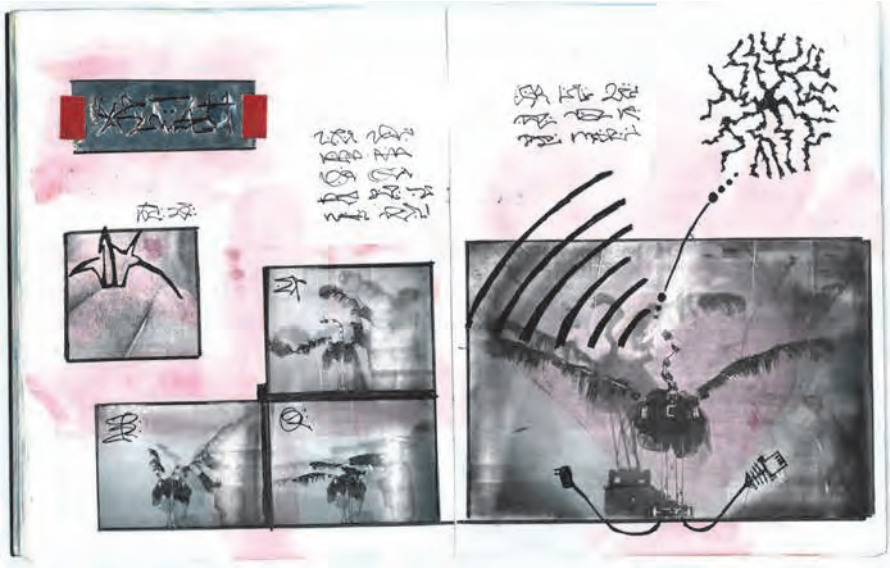
Figure 4.11: Section 2, example 3
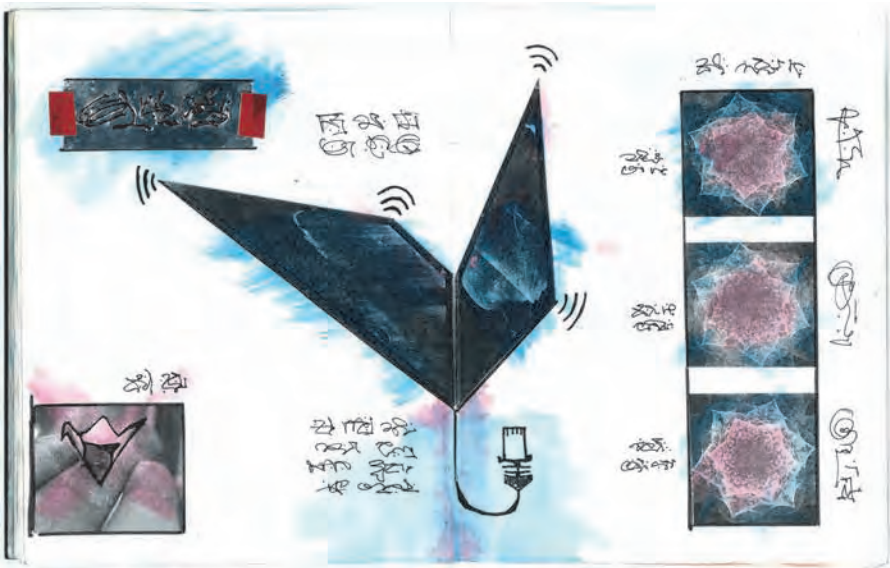
Figure 4.12: Section Two Example 4
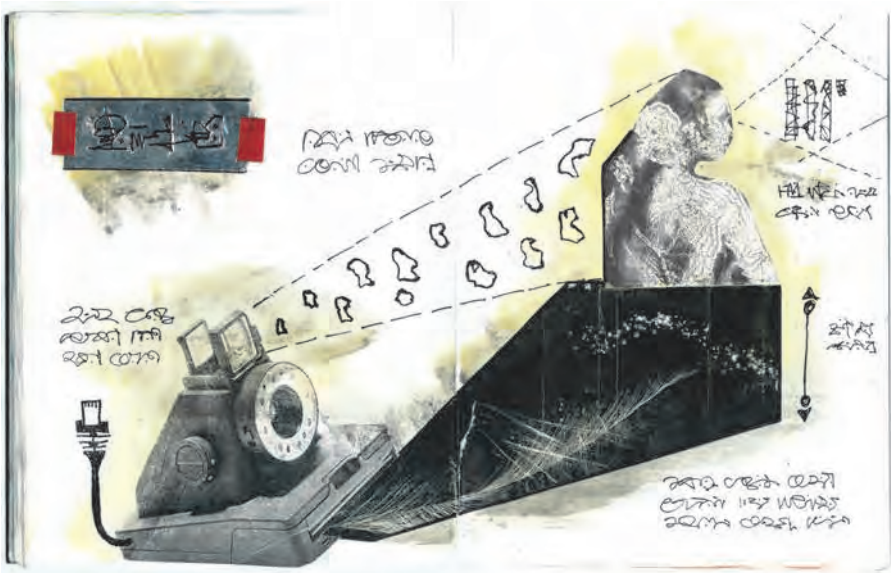
Figure 4.13: Section 2 Example 5
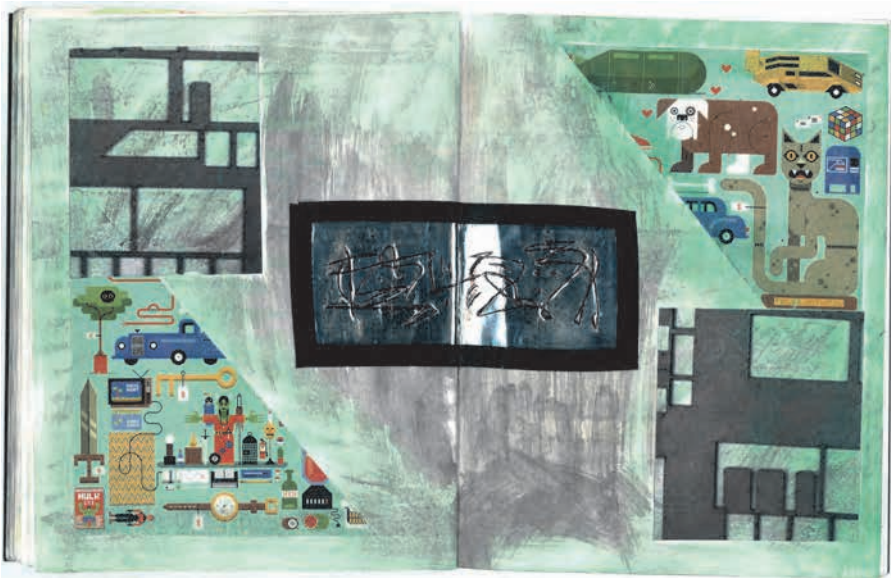
Figure 4.14: Section Three
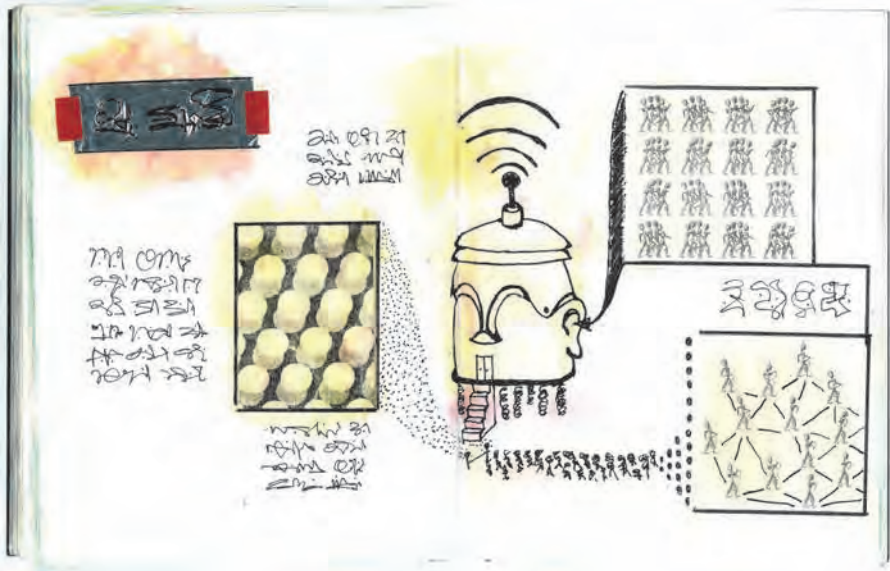
Figure 4.15: Section 3, example 1
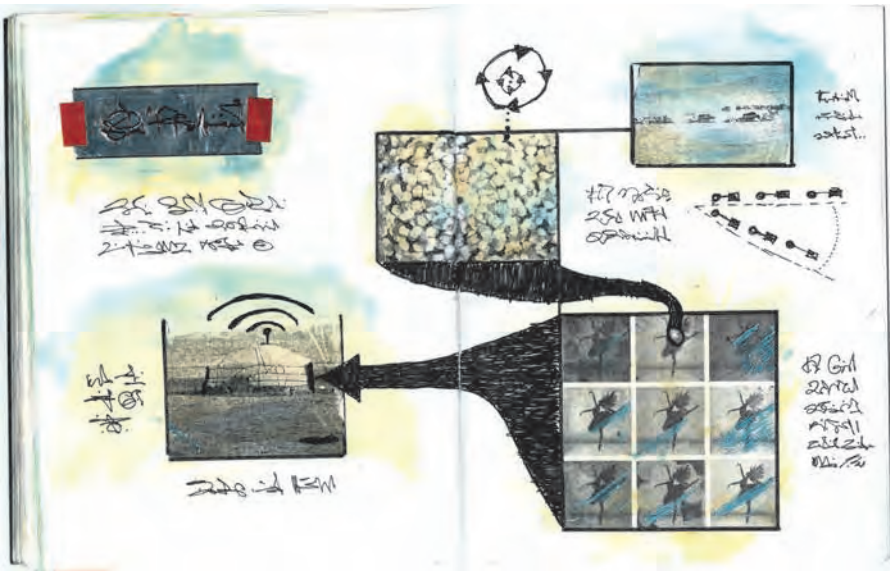
Figure 4.16: Section 3, example 2
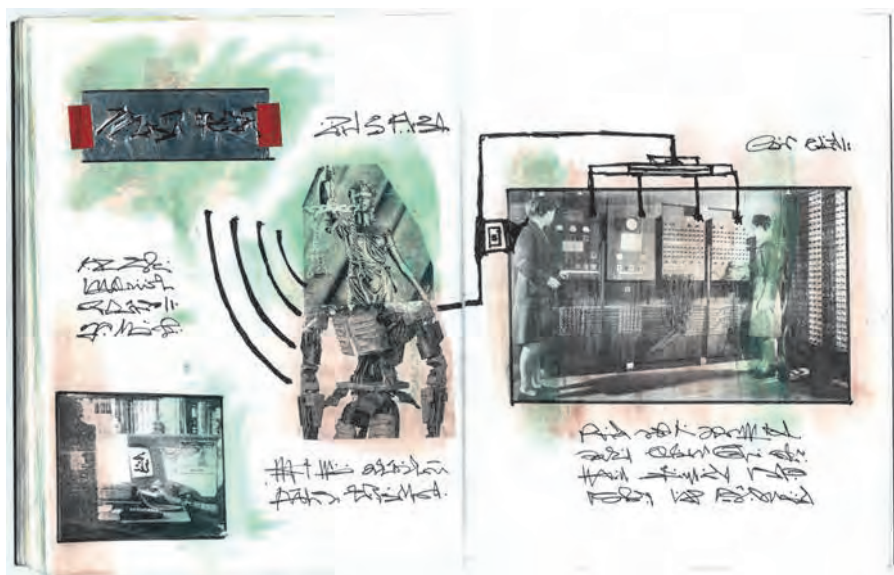
Figure 4.17: Section 3, example 3
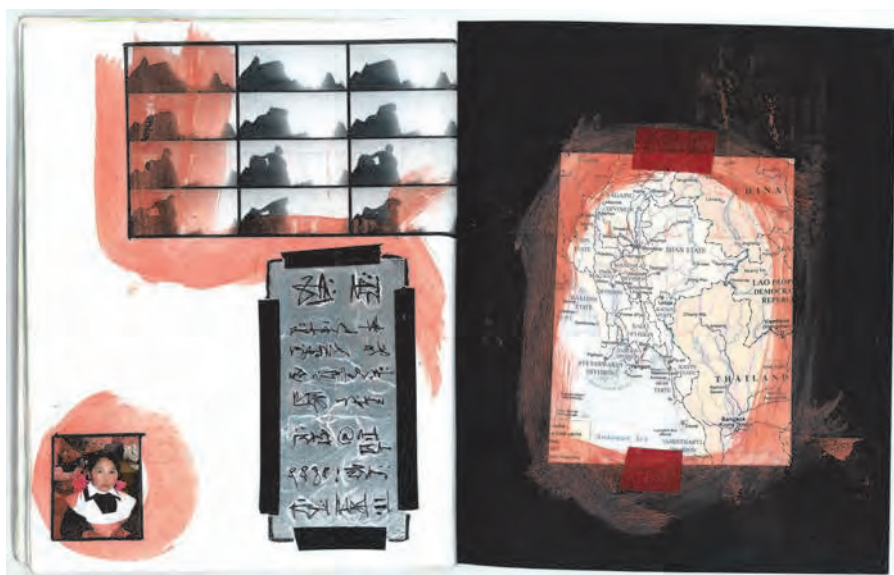
Figure 4.18: Final page and back cover

The notebook was printed as a thirty page booklet and distributed to the Mozilla team during the workshop. It was presented as a thought experiment —

> "What if we found a designers notebook in a non place, like an airport. We know nothing about them, not even where they live or what language they speak. The notebook is written in an invented language. Could we make any sense of it" (Workshop notes)

The participants were invited to "suspend disbelief" and enter into the game by annotating the booklets with explanatory notes. The images were used as the jumping off point for a number of story making activities drawing on Vonnegut's story shapes and Booker's genres. In the afternoon the participants made their own "found notebooks" swapped them over and interpreted one another's drawings. The workshop generated many spontaneous stories and one participant wrote one of her improvised narratives into a full story after the event (Blythe *et al.*, 2018). Even though none of the participants could understand the images or the notes they were able nevertheless to make a kind of sense of them and use them as a resource.

Tom Stoppard dramatizes a thought experiment by Wittgenstein in a play called Cahoots Macbeth, in the introduction to the play he provides this outline —

"A man is building a platform using pieces of wood of different shapes and sizes. These are thrown to him by a second man, one at a time, as they are called for. An observer notes that each time the first man shouts 'Plank!' he is thrown a long flat piece. Then he calls 'Slab!' and is thrown a piece of a different shape. This happens a few times. There is a call for 'Block!' and a third shape is thrown. Finally a call for 'Cube!' produces a fourth type of piece. An observer would probably conclude that the different words described different shapes and sizes of the material. But this is not the only explanation. Suppose, for example, the thrower knows in advance which pieces the builder needs, and in what order. In such a case there would be no need for the builder to name the pieces he requires but only to indicate when he is ready for

the next one. So the calls might translate thus: Plank = Ready Block = Next Slab = Okay Cube = Thank you In such a case, the observer would have made a false assumption, but the fact that he on the one hand and the builders on the other are using two different languages need not be apparent to either party." (Stoppard, 1980)

This thought experiment is drawn from the Philosophical Investigations where Wittgenstein argues that language acquires meaning by its use. Language is part of an activity or a form of life. It indicates the ways in which we can make sense of even invented languages like those of the Codex Serafinianus and the NoPlace Notebook. Meaning is not something inherent in a text but something that we make in a social context.

The Noplace Notebook is inherently ambiguous and yet the style of the sketches and shapes of the imaginary language give it a strong visual coherence and identity. There are three double spread section breaks made up of a collage of illustrations and photographs. Though the sketches vary there are structural repetitions: there are pastel water colour backgrounds behind pen and ink drawings, some sort of foil like reflective material is pinned to some of the pages with a red tape. (The same technique was used to make the illustrations for this article). When we hear a foreign language it is clear to us that it is a language and not just random sound because there are repetitions, patterns and rhythms. The visual world built up in the Noplace Notebook achieves a semblance of sense through the repetition of visual and stylistic motifs. Although each of the images are open to any number of interpretations they are not totally random, the arrows, figures and diagrams suggest some sort of idea even if it is unclear and puzzling. If a reader is willing to suspend disbelief and enter the world then it is possible to use the artefact to generate outlandish or even plausible ideas. While some of the images are surreal, particularly those of the first section, they are not totally unrelated to the real world, no fiction is.

Some of the workshop discussions focussed on the way that a listening system might provide emotional support for the residents of a home — changing lighting subtly in response to tension for example. There were of course immediate concerns around surveillance but the idea was very interesting to a friend who is a senior social worker running a new

scheme for young offenders. We developed some scenarios around the notion of a digital social worker that might monitor sensors and audio in the home of a young offender as an alternative to the costly and ineffective programme of incarceration operating in the UK (Blythe *et al.*, 2018). Clearly there are many disturbing aspects to such a concept and these are discussed more fully in another paper (Blythe *et al.*, 2018). But many of the issues are reflected in this short story by Valdis Ozols.

The Stasi Godmother

He was able to understand his life only when it was almost at an end and the information he so badly needed was declassified. Long after the state had fallen, when the city had a different name and the files had at last been made public, Maris Berzins browsed through his Winston database and felt as if he were meeting another self from forty years ago. It was an experience common to anyone exposed to their Winston data and known by scholars as the Proustian effect, named after the madeleine biscuit dipped in tea that triggers the vivid childhood memories in the novelist's remembrance of things past. Maris was surprised at how much of these data were absent from his own memories, either forgotten, half remembered or actively distorted. He looked through the information with a mixture of fondness, surprise, embarrassment and shame. Unlike the files compiled by humans he could attribute none of this to error, here it all indisputably was: exactly how long he slept, precisely when he got out of bed, what he took from the fridge and the cupboards, the exact amounts and consistency of the waste he expelled, the books he read, the shows he watched, the conversations he had. It was all there, every cross word and each bad joke.

He was a lone parent caring for a teenage boy and a young girl in a tiny apartment in Riga off Leriku Iela. Maris knew that he was under observation, as the former husband of

a woman who had been disappeared it could not be otherwise. Clearly all of his phone calls would be monitored, along with who came to call, where he went, who he talked with and so on. But the sheer amount of data in his file was staggering — no life in human history could have been logged in such minute detail, no historical figure, no obsessive diarist. But this was not such a surprise, at one time everyone had a Winston file like this, the shock was finding out that he was the reason the programme was ever developed.

The notes from his case worker and future wife, Liga, were unusually detailed form the start. There were long and sympathetic descriptions of his difficulties with his boy, a troubled child who had suffered severely when his Mother was arrested. The boy had gotten into trouble with the local police on several occasions and one evening he got into a fight with someone who turned out to be a senior KGB officer. It was this that brought Liga into their lives. She was a sensitive and talented agent but her observations were not the usual broad descriptions of political activities. Her remarks drew on social and psychological theories of child development and almost from the beginning she began to intervene rather than just observe. Subtly she would interfere with the family diet, arranging for the wrong groceries to be delivered. When the atmosphere was tense she would remotely change the channel on the radio and note any soothing effects. If voices were raised she would dim the lights. When things were about to reach a breaking point and the boy looked as if he were about to start smashing the place up there would be a knock at the door and there Liga would be making a seemingly routine visit. According to Liga's reports her interventions were having a positive effect on family life.

Maris had to learn an entirely new version of the story of his own life. Incidents that he had thought were happy

co-incidences had been carefully planned by Liga. Discovering that they both liked the same music, literature and films were not the happy accidents that they had seemed, she had been studying him and presented an image of herself that she knew was perfectly suited to him. Their entire marriage had been for Liga, primarily, a research project, she had targeted his first wife for arrest because their family best matched the demographic she wished to study. She had seduced and married him in order to perfect the measures and sensors that Winston would later use on the rest of the population.

In the final pages of Liga's observations Maris discovered that the failure of the Winston project also signalled the end of his marriage. The initial publicity for the programme had framed it as positive surveillance, the age of the state spying on its own citizens was now over. This was not a punitive regime, it was rather a service: a Stasi Godmother. Alexi would offer the best advice on childcare, supply parents with vital data about their children (what time they were going to sleep, how much they had eaten, whether they were taking drugs) and send professionals to help when they were needed. There were some early successes and the death of some vulnerable children was prevented through early detection of neglect. But Winston's advice was not consistent, some days it advised parents to place babies on their back to prevent cot death, other days it said put them on their side. Sometimes the advice was to replace butter with vegetable oil and sometimes the exact reverse. One day the enemy was saturated fat the next it was sugar. Then corrupt case workers began taking bribes so that Winston would give more favourable scores to one or another parent in divorce cases. Senior party officials began to blame the Winston programme for the rise of popular resistance and Liga was assigned elsewhere. She had told Maris she'd been having an affair

> and no longer loved him. It was time to stop lying she said, continuing to lie. Maris closed the file and, as was his hard won legal right, he erased the data.

Ozols names the system Winston in a nod to 1984 but there are also references to that other great twentieth century novel of dystopia Brave New World. For Orwell the future is a boot stamping on a human face forever. For Huxley it is a populace given what it wants in a world where unhappiness has been designed out of society. Genetically engineered citizens are conditioned to accept and enjoy their inescapable place in society and take "soma" to chemically alter their mood when it is low. The intention of the Winston system is benign and yet it remains oppressive. The reference to Proust is taken from Tim Garton'Ash's account of reading his own Stasi file when it was made available many years after he had lived in East Berlin (Blythe *et al.*, 2018). There are also echoes of the film The Life of Others, it is likely that Ozols would have suspected plagiarism had he lived to see the movie.

5

Discussion

In the opening pages of the Chinese Science Fiction novel "The Three Body Problem" there is an account of a "struggle session" during Mao's Cultural Revolution where a Physics Professor is publicly humiliated by four teenage girls who accuse him of teaching counter revolutionary scientific theories like relativity. When the Physicist tells them that relativity is a foundational theory of modern Physics the girls call him a liar. They dismiss Einstein as a "reactionary academic authority" and beat the Professor to death with iron bats (Liu, 2016). Although we are in a fictional world such struggle sessions were all too real and historians have recorded many eye witness accounts of Professors being humiliated and beaten by their own students (Dikkoter, 2017; Chunjuan and Wei, 2012).

Writers seldom invent worlds from whole cloth. Even fantasies like The Lord of The Rings bear the traces of their times. Tolkien disliked allegory and denied interpretations of his work which equated the ring of power with nuclear weapons, and yet there are many strong resonances between the world he made and the one he lived in during the first two world wars when the work was written. Tolkien described the world building achieved in fantasy as "sub-creation" rather than creation, he

distinguished worlds where the sun is green as "secondary" with our world as "primary". He argued that however fantastic the secondary world may be there is some relationship to the primary one. (Tolkien, 1947) *The Three Body Problem* describes a world where the rules of Physics do not appear to be constant or universal. On the planet Trisolaris day follows night, as it does on the earth, for only a few generations. Sometimes the sun does not rise for years and years and then it rises so near that it boils the oceans and scorches all life from the world. However fantastic the cosmogony of the sub creation there are elements of our own world and history within the text. It would be an incurious reader who read the early scenes describing the "struggle session" of the cultural revolution and did not wonder whether there was some basis to this in fact.

Discussions of fiction are often framed in terms of the poet Samuel Taylor Coleridge's idea of a "willing suspension of disbelief". He uses the phrase in an 1817 text describing plans he made with Wordsworth for related poetical projects. Coleridge would treat supernatural and romantic subjects while Wordsworth made a poetry of every day life:

> "it was agreed, that my endeavors should be directed to persons and characters supernatural, or at least romantic, yet so as to transfer from our inward nature a human interest and a semblance of truth sufficient to procure for these shadows of imagination that willing suspension of disbelief for the moment, which constitutes poetic faith. Mr. Wordsworth on the other hand was to propose to himself as his object, to give the charm of novelty to things of every day, and to excite a feeling analogous to the supernatural, by awakening the mind's attention from the lethargy of custom, and directing it to the loveliness and the wonders of the world before us; an inexhaustible treasure, but for which in consequence of the film of familiarity and selfish solicitude we have eyes, yet see not, ears that hear not, and hearts that neither feel nor understand" (Coleridge, 1817)

This agreement resulted in Wordsworth's naturalistic poems like Lucy:

> " she dwelt among the untrodden ways
>
> Beside the springs of Dove,
>
> A maid whom their were none to praise
>
> And very few to love".

And Coleridge's fantastic inventions like Kublai Khan

> "In Xanadu did Kublai Khan
>
> A stately pleasure dome decree;
>
> Where Alph the sacred river, ran
>
> Through caverns measurless to man
>
> Down to a sunless sea."

Although the methods of each poet were very different they both aimed to achieve a "poetic faith" to "awaken the minds attention from the lethargy of custom". Wordsworth writes about ordinary people and things and requires that the reader look differently at the mundane and commonplace, even daffodils, so that they might wonder at them. Coleridge on the other hand required that they temporarily suspend their empirical knowledge about the world (there certainty that there was no stately pleasure dome in a cavern measureless to man) with the same aim of making us wonder at the world and our lives.

But to suspend disbelief is not to enter into a state of temporary credulity. It is not, to think for a moment that there really are phantoms, Orcs or TriSolarians. It is more like entering into a gamespace where the players assume a set of rules that may be more or less arbitrary. In Hamlet on the Holodeck Murray speaks of an "active creation of belief" (Murray, 1998) Mackey builds on this to argue that during games, films and novels we enter an "as if" space (Mackay, 2008). We experience hope and fear in fictional worlds as if they are real even when the outcome of a particular story is well known to us for example, we may still feel the suspense in Hitchock's Psycho even if we have seen the movie many times (Gerrig cited ibid). The players of games always

know very well that the rules are arbitrary and yet they choose to abide by the rules (or premises) for so long as they play, as if they are real.

Gamestorming is a book listing games that people can play when they are trying to develop new ideas. It describes the structure of games in terms of opening, exploring and closing. Each of the three stages are important in creating a space to develop ideas. It is not possible to be creative and critical at the same time (this is a classic definition of writers block). For this reason it is a cliché of brainstorming that there are "no bad ideas" — of course there are plenty of bad ideas, it is estimated that you need about ninety nine bad ideas to produce one good one, but the game space suspends that judgment in the way that Coleridge talks about suspending disbelief.

> "The first act opens up the world by setting a stage, introducing the players and developing the themes, ideas and information that will populate your world" (Gray *et al.*, 2010)

After exploring the world the space is closed down and you see what you have got, having moved from one state to another. Thought experiments have this kind of structure with openings that suggest some new world: suppose you are travelling at the speed of light and you turn on your headlamps?

In this sense thought experiments can be thought of as a game, a "what if" experiment played by ethicists, lawyers, historians, physicists and mathematicians. When thought experiments are conducted in Design they often involve imagined devices depicted by text, images, models or even functioning prototypes. Thought experiments in design ask us to imagine what the world would be like if such devices existed or came into widespread use. The term fiction then is as misleading as the suspension of disbelief. It does not require us to become temporarily credulous, rather we are invited to accept a set of axioms or rules and enter a game space — where there may be unstable laws of physics, or self driving cars making ethical choices, or machines that will replay videos of your dreams.

The use of fiction in the form of provocative scenarios or stories is well established in other disciplines (Brown and Fehige, 2017). Design always

involves some element of fiction: to picture the world as in some way other than it is to engage in sub-creation, an imaginative act. Despite this there is epistemological unease around the use of fiction — are we just making it up now? (Lindley and Coulton, 2016) Although thought experiments are often concerned with *a priori* arguments this does not put them outside of scientific traditions. The term "*a priori*" is often used to dismiss a spurious argument because it relies on presumption or prejudice. But this use of the term can obscure the more precise use of it within logic. *A priori* in this sense means reasoning without empirical evidence and it is central to much thought in logic, mathematics and other disciplines. For example the idea that two billion marbles plus two billion marbles makes four billion marbles is an *a priori* argument: it is not necessary to count all of the marbles in an empirical experiment to make sure that this is the case. Thought experiments often make use of this kind of *a priori* reasoning.

The world described in the Three Body Problem where the laws of Physics are not stable or universal may seem utterly fanciful, but it is based on another thought experiment (also used by Bertrand Russell) which demonstrates the limits of empirical observation:

> "Two words suddenly floated into his consciousness: shooter and farmer. When the members of the frontiers of science discussed Physics they often used the abbreviation SF. They didn't mean science fiction but the two words shooter and farmer. This was a reference to two hypotheses both involving the fundamental nature of the laws of the universe. In the shooter hypothesis a good marksman shoots at a target creating a hole every ten centimeters. Now suppose the surface of the target is inhabited by intelligent two dimensional creatures. Their scientists after observing the universe discover a great law: there exists a hole in the universe every ten centimeters. They have mistaken the result of the marksman's momentary whim for an unalterable law of the universe. The farmer hypothesis on the other hand has the flavor of a horror story: every morning on a turkey farm the farmer comes to feed the turkeys, a scientist turkey

having observed this pattern to hold without change for almost a year makes the following discovery: every morning at eleven food arrives. On the morning of thanksgiving the scientist announces this law to the other turkeys but that morning at eleven food doesn't arrive, instead the farmer comes and kills the entire flock." (Liu, 2016)

Although he language of the rooster parable takes the form of a children's story it is deceptively simple and echoes a fundamental challenge to inductive reasoning first advanced by David Hume. In the seventeenth century. Hume argued that although bread had nourished him yesterday it did not follow that it would do so tomorrow:

"I shall allow, if you please, that the proposition may justly be inferred from the other: I know for a fact that it always is inferred. But if you insist that the inference is made by a chain of reasoning I desire you to produce that reasoning." (Hume, 1902)

The association of experience and expectation is a psychological rather than a logical process. The sun rose yesterday but it does not follow that it will rise tomorrow, indeed it may blow up one fine day. Repeatable experiments cannot verify observable data. Popper suggested that data can be falsifiable to achieve maximum probability, however Hume's challenge to scientific rationalism still stands. As Einstein's challenge to Newton's physics demonstrated — science does not discover laws, it creates systems —

"Theory cannot be fabricated out of the results of observation, but that it can only be invented." (Mackay, 2008)

Calls for design research to be more "rigorous" and "scientific" are generally calls for design research to be more empirical and inductive (Zimmerman and Forlizzi, 2008). Such calls display a belief in the certainty of observable phenomena not shared by the hard sciences being emulated. Design, which seeks to speculate and explore ideas is sometimes dismissed as being merely "critical" while design research that seeks to solve particular well specified problems is lauded as

"constructive" (Forlizzi *et al.*, 2017). The dichotomy between critical and constructive is as false as the notion that observation and induction is properly scientific while speculation belongs solely to the Arts.

Speculation and thought experiment has a long history across disciplines. The best science fiction novels can be thought of as elaborated thought experiments in sociology (1984) psychology (Brave New World) and epistemology (the three body problem). Science Fiction is a literature of ideas. Design fiction can be seen as a similar exploration of ideas in material forms. These materials might be text, image, film, model or prototype. Although the forms may be new the practice of the thought experiment is very ancient indeed.

Alan Moore is one of the many writers who have lived to see their fictions invade the real. Not in the sense of an idea for a technology they had coming to be. But rather in a fictional character making an appearance in the world. In *V for Vendetta* Alan Moore imagined V as an anarchist in a distinctive Guy Fawkes mask. This mask was adopted by the Occupy movement and also Anonymous. It is often seen at demonstrations and has been adopted by groups whose politics are at odds with Moore's own. Moore argues that the borders between reality and fiction are now entirely porous. Fictions, have real effects as JG Ballard noted fifty years ago:

> "It's becoming more and more difficult to distinguish between fiction and reality. More and more of our lives have been invaded and are now ruled by fictions of one sort or another. By fiction I mean anything invented to serve someone's imaginative end, whether it's an advertising agent or a novelist or a prostitute." (Hennessey, 1971)

Narratives, like metaphors, are always partial, emphasising some aspect of experience and hiding others. Even narratives which we think of as true contain elements of fiction because they are inevitably selective. Fiction is central to our understanding of technology. As Dourish and Bell point out (Dourish and Bell, 2007) technology is always in a process of becoming, we are continually looking ahead to what is coming next. The dominant narrative of fictions like the Internet of Things is that all objects will achieve "smartness" and this will make the world a

better place. This is the modernist notion of technology as the tool of continual progress. More and more we doubt this story. Many of the proposals from both silicon valley and academia are criticised as "solutionist" either solving problems that do not exist or offering quick fix cure alls for complex social, political and environmental problems (Morozov, 2013). Re-storying the dominant narratives of the culture is increasingly important as fictions begin to dominate reality.

A recent episode of the RadioLab podcast described technologies currently in development at Adobe that allow speech recordings to be manipulated as easily as an image in Photoshop. A person's voice can be copied and manipulated so that words they never spoke can be seamlessly inserted into a recording (Radiolab, 2017). The podcast also described "facial reneactment" technologies that allow one person to map facial expressions and movements onto videos of another person. Such systems allow an actor to use the image of a real person as a puppet, making it look as though they are saying whatever they want them to say. They interview Ira Kemelmacher-Schlizerman a computer scientist at the University of Washington who also works for Facebook. She is working on this kind of technology in order to create telepresence. She gives this example "my Mom lives in Israel and I'm here and wouldn't it be cool if I could — it's kind of crazy right? But if I could have some kind of hologram on my couch here and we could have a conversation". This kind of domestic scenario focussing on a family and an older person is very common in the HCI literature. Yet Simon Adler, the presenter and producer of the podcasts, finds the technology being proposed terrifying and their exchange is worth quoting at length:

> **Simon**: The timing of you guys making this thing, and then there's this explosion of fake news. How do you guys think about how this could be used for nefarious purposes?
>
> **Ira**: Ah it's a good question [..] I feel like when every technology is developed then there is this danger of — with our technology you can create fake videos and so on, but I don't want to call it fake videos but to create video from audio right?
>
> **Simon**: But they are fake videos.

Ira: Yeah yeah but the way that I think about it is that scientists are doing their jobs in showing — in inventing the technology and showing it off and then we all need to think about the next steps, obviously. I mean people should work on that. And the answer is not clear, maybe it's injunction maybe every video should come up with some code now like this is, this is like authentic video, authentic text and don't believe anything else.

Simon: But like — maybe it was the timing more than anything. But I saw this video and I thought — oh my God America can't handle this right now. Like we're in a moment where truth seems to be an open — where what is true has become an open discussion. And this seems to be adding fuel on the fire of sort of competing narratives in a way that I find troubling. And I'm just curious that you don't.

Ira: I think that if people know the technology exists then they will be more sceptical. My guess. I don't know. But if people know that fake news exists, if they know that fake text exists, fake videos exist, fake photos exist then everyone is more sceptical in what they read and see.

Simon: But a man in North Carolina, I think he was from North Carolina, believed, from a fake print article, that Hilary Clinton was running a sex ring out of pizza parlour in DC which is like *insane*. This man believed it and showed up with a gun and if people are at a moment where they are willing to believe stories as ludicrous as that I don't expect them to wonder if this is video is real or not.

Ira: [*long pause*]. Uhm so what are you asking?

Simon: I'm asking are you afraid of the power of this and if not why?

Ira: Just — I, I, I'm just giving my o- I don't know — I'm answering your questions but I'm a technologist, I'm a computer scientist so — uhm. Not really. Because I know

that this technology is reversible. There is not . . . . not . . .
worried . . . too much. (Radiolab, 2017) 19.09 –22.28

The pause before Ira says "what are you asking?" is long and awkward.
Clearly Ira's motives are benign and her scenario describing a technology
that would allow her to feel as if she was in the presence of her distant
Mom is appealing on many levels, it is domestic, safe, focussed on
supporting one of the most important relationships in anyone's life. But
this is not where Simon is coming from: he is imagining a world where
the border between fact and fiction is totally erased, where we literally
cannot believe our eyes or ears. Ira finds it difficult to connect with
these concerns and distances herself from them "I'm a technologist, I'm
a computer scientist" as if these possible applications are problems for
someone else, problems for some other field, some other set of experts.
These are questions for legislators perhaps, or sociologists or those that
speculate about the future in literature or movies, not for computer
scientists and technologists. Dystopian fictions about the possible abuse
of this kind of technology are outside of her normal way of working.
But there is another kind of fiction that is firmly within her way of
working — the benign, short, conflict-free scenario about feeling present
with a distant relative. Almost twenty years ago Cooper (Cooper, 1999)
pointed out that such scenarios cause technologists to focus only on
people who are just like themselves. Today this kind of fiction is not
only inadequate it is dangerous. In the age of fake news and alternative
facts it is more important than ever to develop our understanding of
the uses and abuses of fiction.

Influence and Legacy [edit]

Ozols' work as a historian has been used as teaching
material on courses about state propaganda. The historical
distortions and hagiographic fawning to Stalin are so
blatant that they make excellent teaching material [citation
needed]. Ozuls' work lays bare propaganda techniques
that would be harder to spot when used more subtly

by other historians and writers. Indeed Baldois has argued that Ozuls may have deliberately exaggerated his distortions for this reason: the propaganda is so central to his historical writing that it could almost be seen as a satire. Others claim this is too generous a reading and Ozols' fiction makes it difficult to establish what his political views were. Sometimes the stories can be read as libertarian creeds, others appear as paeans to socialism. Like many writers Ozuls has been accused of many competing and contradictory ideologies: fascism, sexism, racism, as well as communism, libertarianism and egalitarianism.

His fiction had little to no influence on his fellow writers or the culture more generally unless his claims about Stanislav Lem's plagiarism are to be believed. Recently Ozuls work has begun to appear in HCI literature, Blythe and Encinas for example quote form his work extensively. But at the end of his life his legacy was uncertain

Baldois: Are you bitter that your work was never recognised?

Ozuls: Of course not. If my work had been recognised I would have been sent to the gulag!

Baldois: How do you see your legacy?

Ozuls: Do you know what HG Wells wanted to have as his epitaph? "God damn you all I told you so you" What a — what's the word? In Polish it is kołtuński.

Baldois: Smug?

Ozuls: Yes, thank you. What a smug prick. "I told you so". No doubt he liked to imagine this epitaph being read by people standing in some apocalyptic wasteland wishing they had listened to him! C.S. Lewis wrote a very nice science fiction trilogy that he begins with a preface about Wells' ethical position. Basically Wells wants to colonise outer space and Lewis, as a Christian apologist, finds this abhorrent — our fallen species spreading its spiritual poison throughout the universe: in the second book man becomes the new serpent, attempting to corrupt beings that live in some paradise on Venus. And Wells with this epitaph wants it both ways, he is a modernist through and through expounding advances through technological development and yet he stands aside from humanity — ah you didn't pay enough attention to my warnings about the dangers and so on. No, I never wanted to be this kind of

"visionary". Who cares? And what is so impressive about prediction in fiction? Is there so much difference between facts and fiction? I am not so sure — sometimes fiction matters much more than facts no? In the forties I read books by a computer scientist called Norbert Weiner. Even then he was talking about this new idea of virtual reality which is all the rage now, fifty years later. He was concerned that one day computers might be used to make a human Skinner box.

Baldois: A Skinner box?

Ozuls: Yes, you know Skinner, the behaviourist guy? He put rats into a box with a food dispenser and an electrified floor. He either feeds them or shocks them if they push this or that lever. In this way you can get a rat to do . . . I don't know whatever you want a rat to do. Weiner thought maybe this happens with humans next also. With good sensors and feedback you put a waking human in a skinner box and they do not even know it. But he said to do this we would need to carry devices with us all the time, the devices would need to be attached to some kind of global communication network so — ha ha ha it's impossible. I like this kind of writer very much. Do you know his work?

Baldois: No, I've never heard of him.

Ozols: Well there we are then! All is vanity, no? What is my legacy? Absurd question: what is *our* legacy. A habitable world I hope but doubt.

Baldois: That sounds very pessimistic.

Ozols: Doubt is pessimistic? I don't think so, only with doubt can there be hope.

(Valdis Ozols: Wikipedia. Last Retrieved 18.02.2018)

Acknowledgements

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The Co-ordinates of Design Fiction: Extrapolation, Irony, Ambiguity and Magic

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ABSTRACT

This paper argues that design fiction is a powerful term in part because it is malleable. A wide range of differing design fictions are emerging and we pursue a spatial metaphor to provide a map based on literary approaches. Following Margaret Atwood we trace design fiction back to marvel and wonder tales such as the Arabian Nights through to the science fiction of the nineteenth and twentieth century. We suggest science, magic, ambiguity and irony as the cardinal points of design fiction. We then apply these four different approaches to design fiction to the concept of a divorce app for older people. We argue that currently design fiction is dominated by scientistic and ironic design fiction and suggest that magic and ambiguity are currently under explored.

Author Keywords
Design fiction; well being; older people; magic;

ACM Classification Keywords
H.5.m. Information interfaces and presentation

INTRODUCTION
In a 2013 keynote the science fiction writer who coined the term "design fiction" warned that we were going to see a lot more of it because it was cheap and relatively easy to do. He warned that this would lead to problems:

"There's just gonna be way too much, there's already way too much. What's really needed at this point is some kind of categorization and logical organization for all of these techno-fantasies. Cos they're interesting but they're interesting in different ways. Like a techno fantasy that's done by a clever nineteen year old girl that's done in an art school is not in the same category as a Google Glass conceptual video [..] We need a taxonomy of dragons. We need somebody to go out - collect 'em, brand 'em,

categorise' em, say which is the good ones and which are the bad ones, put em in corals. Your group of people I'm thinking would be kinda ideal for that, it like suits your skills" [47]

Academics were already working on the task and in the same year a special issue of the journal *Design Creativity* provided a partial taxonomy of Design Fiction [24]. This taxonomy takes as a primary example the near future science fiction of Sterling's friend and collaborator William Gibson. Gibson pays close attention to technological developments and his latest novel, in which drone cameras hover around celebrities like flies, is well researched and plausible.

Plausibility was key to Sterling's 2005 definition of design fiction in his book *Shaping Things*:

"Science fiction wants to invoke the grandeur and credibility of science for its own hand waving hocus pocus, but design fiction can be more practical, more hands – on. It sacrifices some sense of the miraculous, but it moves much closer to the glowing heat of techno-social conflict" [46]

For Sterling design fiction writers think hard about how imagined technologies would work and what impact they might have. The social impact of technology also concerned Dourish and Bell, and their influential paper "Resistance is Futile" contrasted the visionary "Sal" [53] scenario by the Xerox PARC scientist Marc Weiser with popular science fiction like Planet of the Apes. Weiser's scenario, written in the early nineteen nineties, envisioned many of the technologies that we use today. Sal works in an office linked with international branches by video links and distant workers collaborate on documents in real time. Dourish and Bell pointed out that popular science fiction TV shows were much more concerned with social context than conventional HCI scenarios usually were. There is little to no discussion of the kind of society Sal lives in [13]. What design scenarios typically leave unsaid is the implicit social and political context of a design.

The editors of the Personal and Ubiquitous Computing journal proposed a special issue with responses to this paper which included a piece by Julian Bleecker on design fiction [6]. Although the journal was not published until 2014 the draft papers were in circulation from 2009 and Bleecker's was available online. Here he argued for the importance of

diegesis, a term from film studies used to indicate something that is part of a larger fictional world. For media studies scholars like Kirby the props in movies like *Minority Report* are "diegetic prototypes" in that they function as a part, rather than the point of a story, but also because they present the imagined technology as desirable or benevolent [28].

The partial taxonomy by Hale [24] included its use in corporate propaganda. Microsoft and Phillips have both presented design fictions in promotional films bearing, according to Gonzattoa and van Amstela, the implicit message – "don't worry the future is safe in our hands" [22]. Although it has corporate uses design fictions are more often conceived as critiques and provocations as in the "critical design" of Dunne and Raby [1,2,9,17]. Hale's taxonomy, as suggested by Sterling, takes the originators of the fiction as a point of categorization: a corporate fiction by a company like Google is clearly very different to a fiction by a well established author like William Gibson. The taxonomy also considers the different forms design fiction can take - narratives, short stories, sketches, images, films but also objects and semi-working prototypes. Julian Bleecker's work with the Near Future Lab now takes the form of magazine articles and advertisements for products and services that do not exist yet.

Design fiction is a malleable concept: it can take the form of text, image, audio, video, model, working prototype or event; it can be conceived as a plausible idea for a technology developed with "designerly thinking", an eye for detail and practical concerns; it can be framed as a conceptual design placed within a broad cultural context focusing not just on product functionality but potential social consequences of use; it can be a tool for corporate propaganda or a means of expressing concern, dissent and critique. Small wonder then that such a flexible term has, as Sterling predicted, really caught on [e.g. 6,7,8,22,24,29,31].

While all of these competing definitions and categorizations are interesting and useful we propose in this paper a different categorization. This is based not on the source, the medium or the intent but rather the devices employed and the literary traditions at work. We do not employ a rigid methodology to develop an exhaustive taxonomy, rather we draw on literary analysis to identify broad patterns and family resemblances between fictions. This analysis is presented in the following sections with illustrative examples.

EXTRAPOLATIVE AND SCIENCTISTIC DESIGN FICTION
Like Bruce Sterling and William Gibson, the founding father of science fiction, HG Wells, kept abreast of the scientific developments of his day. Wells is probably best remembered today for *The War of the Worlds* because of the many radio, television, musical and film adaptations. We now know that there is no life on Mars so Wells' story would fail Sterling's plausibility test today. But, despite the famous opening lines of the novel, it is not quite true that in the 19th century "no one would have believed" that a Martian invasion was possible. In 1897, the year of the novel's publication, life on Mars was considered at the very least a possibility. Wells' other novels, though less widely known now, were fully plausible visions of the future, indeed some were fully realized only a decade or so after publication. *The War in the Air* was published in 1907 when human flight was as much of a fantasy for most of Wells' contemporaries as it had been for the Ancient Greeks. And yet Wells predicted warplanes and aerial bombardment a full ten years before their use in the First World War. After reading some fairly obscure scientific work on the behavior of radium and strange particles Wells realized that were the energy described to be harnessed one day, then someone could make a bomb out of it. His novel, *The World Set Free*, written in 1913 predicted that humanity would develop the atom bomb by 1933. He was just a few years off. This kind of fiction is often described as prophetic though the claim is disputed by science fiction writers themselves.

Ever since William Gibson coined the term cyberspace in his 1984 novel *Neuromancer* his work has been described as "prescient". Gibson objects to the term pointing out that science fiction writers make many, many guesses, most of which are wrong, but these are all forgotten if they get something right. *Neuromancer* did imagine a future where people spent a lot of time in a "collective hallucination" called cyberspace but as Gibson points out, it did not depict anyone using a mobile phone. That being said there is a well documented feedback loop between science fiction and technological R & D, indeed HG Wells's *World Set Free* was known to the physicists working on the atom bomb.

In the documentary *How William Shatner Changed the World* a number of technology developers give direct credit to *Star Trek* for inspiring their real world inventions. The mobile phone was inspired in part by the Communicators used by the crew of the Enterprise. Steven Perlman started working on QuickTime after watching an episode of Star Trek the Next Generation where Mr Data walks into his quarters and asks the computer to play a particular piece of music [28]. Such science fiction was always already design fiction whether the authors intended it as such or not. Many science fiction writers were also scientists, most notably Arthur C. Clarke and Isaac Asimov. Clarke not only predicted satellite communication but also guessed at how transformative this technology would be. Asimov predicted a network of computers that would form something very like the Internet as well as formulating laws of robotics that many roboticists still take seriously today.

This kind of SF was described by Ursula Le Guin as "extrapolative":

"The science fiction writer is supposed to take a trend or phenomenon of the here-and-now, purify and intensify it

for dramatic effect, and extend it into the future. "If this goes on, this is what will happen." [29]

The method is not necessarily accurate, as this quote by GK Chesterton illustrates:

"Just as when we see a pig in a litter larger than the other pigs, we know by an unalterable law of the Inevitable it will some day be larger than an elephant" [13]

However it might be thought of as scientist and rationalistic. It takes its inspiration from scientific research and seeks to make predictions or warnings and presents itself as plausible. The rhetorical tropes draw on the Enlightenment traditions of rationality and scientific progress.

Extrapolative or Scientistic Design Fiction Examples
Examples of extrapolative or scientistic design fiction would include Google's *Project Glass* [23] Here Google imagines a day in the life of a young man with smart glasses. He is able to arrange his meetings on the go while following a map towards his favorite coffee shop. Microsoft's vision for the home of the future [33] can be seen as an invitation to a future where their products permeate familiar environments, e.g. cooking recipes projected on the kitchen counter. The Museum of Future Government Services [52], a commission by the United Arab Emirates, is a collection of design fictions where "governments and society work together to create a more hopeful world". There are designs for the smart street, where augmented reality enhances social interaction, workshops for cars that are also offices and mobile health services. Imagining tomorrow by extending the scientific scope of today forms the ground of Wired Magazine's vision of the future of the Super Bowl [54]. This 3 minute design fiction portrays the famous football event in the year 2066: players follow coach instructions projected within their helmet, supersonic flights are common so the same football league gathers teams from cities all over the world and fans watch the matches through augmented reality devices.

Other design fictions that might be regarded as "scientistic" in this sense include:

Life Support [42], a series of prototypes that explore how animals could be transformed into medical devices to aid humans in breathing or blood filtering.

Drone Aviary [49], an exploration of civilian drones in advertising, media, surveillance, traffic management and life logging through film, exhibitions and publications. E.g. *Madison*, a Flying Billboard that uses facial recognition to tailor advertising content to those around it.

The Microbial Home [38], a set of objects for the home viewed as a cyclical system where, for example, waste from a module becomes the energy source for the next.

Game of Drones [30], a piece of speculative research that gamifies law enforcement activities to allow members of the local community to act as enforcement officers by piloting drones and acting on, for example, parking offenses or dog fouling.

Telecommunications in the 1990's [39], a realistic and surprisingly accurate scenario (filmed in 1969) depicting how distant communication might play out in the future. These scenarios resemble current day services such as Fax, Wi-Fi or videophones.

CRITIQUE AND IRONY
Extrapolative or speculative fiction does not always subscribe to Enlightenment models of technological and rational progress. There is a very long tradition of fantastical writing which critiques and satirizes society. Eighteenth century Travellers tales were often far fetched and *Gulliver's Travels* took this form as the basis of perhaps the most enduring and famous satirical tale. Here Jonathan Swift depicts creatures like the Struldbrughs, immortals who cannot die but continue to age. Doomed to decrepitude without the release of death they are declared legally dead when they are eighty and their marriages become null and void. They are allowed to hold no land in order to prevent them from seizing all power and wealth through the sole virtue of longevity. The tradition of such satirical fantasy is carried through into science fiction through writers like Kurt Vonnegut. Vonnegut was a profoundly pessimistic writer but as a young man he believed that scientists would one day discover God's phone number. He famously remarked that he lost faith in science when they dropped it on Hiroshima.

Vonnegut was a major influence on Douglas Adams who finally abandoned his famous battles with publisher's deadlines in order to become the "chief fantasist" at a technology start up. Adams imagined not only future technologies such as Eddie the annoyingly cheery shipboard computer and Marvin the paranoid Android but also the company that would make them. The Sirius Cybernetics Corporation is one of Adams finest comic achievements. The Sirius Cybernetics Corporation define a robot as "your plastic pal who's fun to be with". The Hitch Hiker's guide to the galaxy defined the Sirius Cybernetics Corporation as "a bunch of mindless jerks who would be first up against the wall when the revolution came". Adams' imagined his Hitchhiker's Guide to the Galaxy as a constantly updating composite text edited by hitchhikers researching stories on their travels. It can be seen as a design fiction precursor to Wikipedia and indeed before Adams died H2G2 attempted to make the guide a reality with volunteer writers and editors.

Ironic and satirical fiction can be grouped or corralled with the critical design work of Dunne and Raby. Dunne and Raby's drew on the Italian Anti Design movement and the Radical Design movement that began in architectural studios and produced disturbing images of homes of the

future that looked like cells in a factory in the "No Stop City" [12]. Their Critical Design was ground breaking in HCI because it demonstrated that design need not be simply a solution to a set of requirements specified in response to a given task or set of constraints. Design might also be a critique, like a political essay or satirical sketch. In *Design Noir: the secret life of electronic objects* they convey a number of innovative and subversive proposals, for example, head mounted cameras allowing users to tune into different people's lives as if they were TV channels:

"proposals like these can really only exist outside the marketplace as a form of "conceptual design" – meaning not the conceptual stage of a design project, but a design proposal intended to challenge preconceptions about how electronics shape our lives." [15]

They suggest that such designs might be expressed as text or films and that academic designers might be best placed to explore this socially responsible role. But their work over the years to follow was not confined to proposals. The compass table, for example, has a top filled with compasses that twitch and turn whenever an electronic device is placed on it, making visible the magnetic fields we carry around with us in our bags and pockets. Dunne and Raby did in fact make this design available on the marketplace and it was auctioned for several thousands of pounds [9]. This is the strength and perhaps also the weakness of such critical artefacts.. In order to appreciate it one must have a degree of cultural capital, to own it one must simply have old fashioned economic capital. Critical design is not only challenging it can also be comforting: our appreciation of it can indicate our inclusion in a group or political affiliations it can also be a status symbol. Like critical art, it is sometimes ultimately a commodity, easily absorbed into the social order it condemns.

Critical or Ironic Design Fiction

There are a great many critical or ironic design fictions. The Near Future Lab's TBD [34] features an advertisement for an automatic car with a game passengers can play to avoid boredom during the journey. The windshield becomes a video screen where targets are projected onto the road for players to aim at. Explosions also feature in the early work of Dunne and Raby. The Huggable Atomic Mushroom [16] now part of the permanent collection of the MOMA NewYork, is a stuffed object in the shape of an atomic explosion. It ingenuously provides people afraid of nuclear catastrophe with a means to gradually overcome their weakness. Also in the tradition of critical design, the work "I wanna deliver a Shark" from Ai Hasegawa [25] explores the possibility of humans giving birth to endangered animal species and includes a diagram depicting the reasons why a mother might decide to pursue such idea. Contradictions become apparent in the intelligent depiction of a possible future of the smart home in "Uninvited Guests" by Superflux [50]. In this short movie, an independent old man sees how his privacy is invaded by a set of smart utensils

sent by his children and finds his own "dumb solutions" to his new smart problems (e.g. a young neighbor exercises with the activity tracker in exchange for beer so activity tracking results are excellent.).

Other ironic or critical design fictions include:

Infinite Souvenir [14], a tabletop device with a container to safely store a small amount of nuclear waste that produces enough electricity to keep particles moving in a souvenir snow globe like mechanism.

Menstruation Machine [45], a device that simulates how menstruation might be experienced. It relies on mild electric shocks to simulate pain and a blood dispensing system. The design takes the form of a pop video that depicts a young adolescent using the machine during a night out in Tokyo.

The Transparency Grenade [36]*,* a device presented in the form of a Soviet F1 Hand Grenade. It makes the process of leaking information from closed meetings as easy as pulling a pin.

Ex-Boyfriend Revenge Kit [26], a set of elegantly designed tools to accomplish (fictional) murder with style. A teal leather bag contains a rope, a teal bondage tape, a mini crowbar, a knuckleduster, syringe and truth serum, a teal balaclava and soft teal leather globes.

ALTERNATIVES AND AMBIGUITY

Ursula Le Guin's *Left Hand of Darkness* [29] describes a world with only one gender, in the mating season one or another of them will develop male or female characteristics, the rest of the time they are celibate and when they meet their first human they consider him to be a pervert. In a famous introduction to this work Le Guin makes the distinction between "extrapolative" SF and the kind of fantasy which claims no basis in reality and does not pretend to prophecy. Although there are clear feminist messages within *Left Hand of Darkness* text it is not clearly didactic or propagandistic.

For Margaret Atwood such work draws on the wonder tales of the ancient world. The tales of the Arabian Nights were originally told in marketplaces by travelling storytellers, embellished and changed with each new telling. It was only much later that they were written down and some scholars argue that they are amongst the very earliest achievements of the human imagination. Although the Grimm brothers collected their fairy tales together in the early nineteenth century they knew then that they were very old indeed. Recent evidence suggests that some of them may be at least four thousand years old. These tales relate to fears and desires as old and deep as humanity itself. They are deeply ambiguous and work within this tradition is also less openly didactic than much extrapolative or satirical fiction.

Ambiguous Design Fiction

The Continuous Monument, from Superstudio [51] consists of gigantic structures superimposed over city landscapes.

These strange gigantic floating grids hover over the city in New New York, they are disturbing and difficult to interpret. The Ikea Catalog For The Near Future [35] is a collection of intriguing scenarios where the home has been transformed through technology. For example Data gathering sofas, self-replenishing shampoos with life-time subscription only or gardening drones. These are all plausible products but it is unclear if the authors are advocating the designs but neither are they obviously ironic. Ambiguity is the essence of *Err* [27], a project by Jeremy Hutchinson. The artist commissioned workers to introduce errors in the products they ordinarily manufacture. The erroneous products resulted in intentionally misinterpreted functionality and provide an ambiguous ground for reflecting on consumer culture, necessity and craftsmanship.

Other ambiguous design fictions include:

Traces of an Imaginary Affair [21] a kit containing a set of nine neat tools that can be used to create the illusion of having experienced a hypothetical love affair. The tools leave marks on the body like love bites, scratches and bruises.

ARK-INC [48] an electronic product that possess covert properties to be activated (e.g. radio receiver becomes able to transmit), when a profound political or economical crisis hits.

Kickstriker [5] a crowd-funding platform for activists to economically support those initiatives they consider relevant (e.g. Military training for Tibetan monks to resist a Chinese invasion.)

75Watt [41] a product designed so its construction results in a particular choreography performed by the workers in a developing country industrial assembly line.

MAGIC AND WONDER TALES
Literature, like dreaming, is, at a fundamental level, concerned with wish fulfillment. The wonder tale articulates, perhaps better than any other, our deepest desires and fears. It may be for this reason that the ancient form of the wonder tale persists in the "magic realism" of authors like, Will Self, Gabriel Garcia Marquez and Salman Rushdie. Here miracles happen almost without comment and certainly without any scientist explanation. Magic realism describes wonders without recourse to any rationalist accounting. In *The Satanic Verses* for example Salman Rushdie describes a hospital where each of the patients is afflicted with a magical malady. A man with a tiger's head explains that they are victims of language – they describe us and we succumb to their descriptions.

Magic Realist Design Fiction
Design fictions rooted on the supernatural are rare. In related work [19] we have drawn explicitly on magic realism, a genre where the miraculous is described as any other everyday occurrence, with no attempt whatever at explanation. A series of short stories written in the form of an altCHI paper pictures a design studio where design fiction prototypes unexpectedly begin to work as described. A Dream Catcher initially envisioned as diegetic prop begins to capture actual images of real dreams. When someone is described as fat or old on a gossiping app they immediately gain weight and wrinkle. An Author Eraser allows users to remove the names of senior academics who made no real contribution to papers where they are listed as authors. The paper ends with a solution printer, a machine that can print the solution to any problem specified: from a cure for baldness to a clean en2ergy generator.

Other design fictions that could be considered as magical in the sense that they offer no scientific or rational explanation for the fantasy include: *Addicted Products* [40] a fiction that follows Brad, a toaster that communicates with other toasters in the vicinity and might, for example, leave and go to another home where it is needed more.

FOUR DESIGN FICTIONS
The following sections present four design fictions around a divorce app aimed at the over sixty fives. In the UK there has been a surge in the divorce rate amongst the over sixties [37]. The sociologist Zygmunt Bauman describes modern love as liquid: we are in relationships only until further notice [4]. At the same time there is increasing dissatisfaction with solicitors charging exorbitant fees for routine legal services and many predict that this kind of work will be automated [e.g. 32]. The following design fictions take different approaches to the same ideas based on the preceding categories. The first (figure 1) is extrapolative, imagining what a divorce app might look like today. The second (epilogue) is critical and ironic, expressing dissatisfaction with family lawyers by imagining a future in which they no longer exist. The third is more ambiguous, presenting itself as a provocative advertisement for such an app, encouraging silver breakups. The fourth is a magic realist short story presenting miracles and magic without technological apology.

DF1: BreakApp
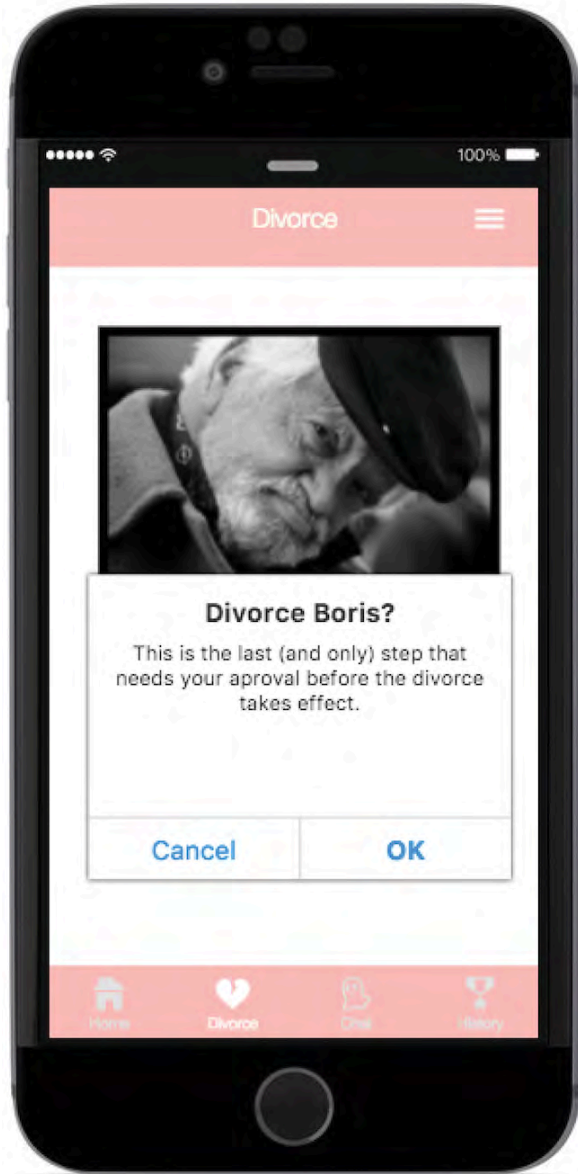
Figure 1: Screenshot of BreakApp

DF2: Epilogue

Few would have suspected, least of all her husband Boris, that at the age of one hundred and one Annabel Bide would swipe for a divorce.

"But we've been together for seventy six years!" Boris protested.

"Twelve years a slave is no rationale for a thirteenth" she texted back, returned to the main menu and selected "Divorce".

"There" she smiled brightly at her great, great granddaughter, "all done – oh, wait" she glanced back at the device irritably, "do I want half of the marital assets? Well, of course I do," her already furrowed brow became more so

"and… yes, there! Money transferred and all done. Splendid. Goodness me that's an improvement on wrangling with solicitors."

"Solicitors?" Shanti looked puzzled.

"They were a sort of lawyer."

"A lawyer? Shanti remained mystified, "why would you need a lawyer? Nobody has committed a crime."

Figure 2: Boris Bide.

"In the old days you used to need a lawyer to negotiate financial settlements and make arrangements for the children."

"You wouldn't just split the assets fairly?"

"No, each party battled for as much as they could get. "

"And the lawyers helped mediate?"

"Oh no, it was an adversarial system, the solicitors attacked your ex by proxy, intimidated and insulted them for you. They made the divorce as acrimonious and bitter as possible, endlessly wrangling about basic points of law and charging you for letters– written on paper and posted through holes in your door! It's a wonder they didn't charge for running their whale oil lamps."

"And they allowed these people to be involved in settling childcare arrangements?"

"Yes, that was one of their most profitable lines of work: people would throw their life savings at a divorce and then get into tremendous debt. The court judgments were so predictable that they could be replaced by an algorithm and of course, eventually they were. Hence these handy divorce apps. Hang on dear" she looked back at her phone for a moment, "I'm just going to sell the house" she swiped the phone a couple of times, "There we are, done. That's another miracle of the modern age – no more estate agents!"

"What were they?"

"Well you'd register your house with them, they'd take people round to see it and explain that "this is the bathroom" when they were standing in the bathroom, do some totally routine paperwork charge you a hefty fee for it and also take a percentage of the sale. Astonishing really. Good riddance to them I say. Oh and here's Boris' agreeing to the price – good riddance to him too."

DF 3: BreakApp Advertising
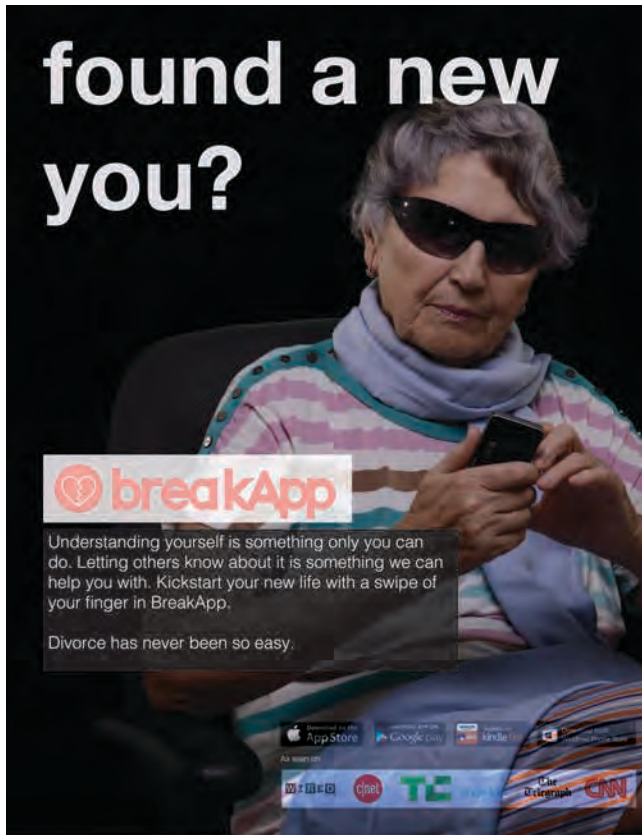
Figure 3: BreakApp advertising campaign

DF4: One Hundred Years of Solicitude

Many years later, as she sat with her dog's head resting in her lap, Shanti Isobella, Francesca Bide remembered the first words of magic she heard her great grandmother utter: "because I said so". With this incantation Annabel had declared the ice caves in the mountains out of bounds and Shanti understood that language had the power to remake the world. When certain words were spoken people, places and things were changed forever. Her father, when certain rituals had been performed vanished just as mysteriously as if some magician had rendered him invisible. When Annabel announced she no longer wanted Boris to be her husband Shanti wondered what he would he instead. A cockroach had been the old woman's first thought, she imagined crushing him beneath her heel. Shanti was horrified and objected that, apart from anything else, you can never kill cockroaches like that. Then Annabel toyed with the idea of turning the old man into stone and using him as a water feature in the garden. When Shanti said she still wanted to be able to see her great, great grandfather Annabel said she could visit whenever she wanted and perhaps grow some ivy over him. When they finally decided on a transformation that would work for everyone Annabel muttered the words and the metamorphosis began. At first Boris did not notice the changes to his hands, feet

and face, it was only when he lost the power of speech that he realized what was happening and began to yelp in terror.

"But now you are used to it and we are all happy no?"

Shanti stroked Boris' head as she got up to answer the door. When she returned with Annabel, Boris' tail was wagging excitely but he knew better than to jump up and try to lick her face. He kept his head low but his tail thrashed the air and he surged forward if she so much as looked at him.

DISCUSSION

Like Harlan Ellison in the nineteen sixties [20], Bruce Sterling differentiates between "speculative" science fiction based on things that might actually happen and fantasy tales unlikely to ever occur. Margaret Atwood, another eminent science fiction writer, rejects such distinctions pointing out that when Mary Shelley wrote Frankenstein she had reason to think electricity might reanimate dead flesh. Atwood places speculative fiction, science fiction as well as sword and sorcery under a single umbrella of "wonder tale". A broad focus on the wonder tale allows inclusion of the Arabian Nights (with its wish granting genies in lamps, bottles and rings), Grimm's Fairy Tales (with magic mirrors that tell you how attractive you are and seven league boots that take you wherever you want to go in a few strides), Ovid's Metamorphosis (where weeping women become rocks), Gulliver's Travels (where sunbeams are extracted from cucumbers), Dr Jekyll and Mr Hyde (where inner demons are released through imbibing chemical compounds) Kafka's Metamorphosis (where a man becomes a bug) Superhero comics (where men fly through the power of the sun or the armor they have made) as well as the Harry Potter books (where a clock reveals the location of each family member). Although there are clear divisions between these kinds of fictions they can all be useful source material for design fiction because they express human desires. For example, Microsoft researchers did their best to make a whereabouts clock inspired by Harry Potter [44].

In Science Fiction, technology occupies the same function within the structure of a narrative as magic does in wonder tales. For example the "Deus Ex Machina" (God from the Machine) in the Greek theatre was an actor playing a character like Zeus who would be winched onto the stage to rescue the hero from a seemingly inescapable predicament. When Captain Kirk and his men are teleported out of difficult situations in Star Trek the device being used is the same one, with technology taking the place of a supernatural agent. Similarly magical objects which give the hero additional powers are substituted with technological artifacts. In Greek mythology Perseus is presented with a sword from the Gods that can cut through stone just as Luke Skywalker is gifted a light sabre with identical properties. It is no accident that it was a science fiction writer who first pointed out that any sufficiently advanced technology is indistinguishable from magic [13].

Any imaginary technology within a sci-fi narrative is a paradigmatic substitution for magical objects.

Although we argue that the wonder tale should be included in an overview of design fiction its rhetorical tropes differ from those of science fiction. The appeal in the wonder tale is to the supernatural rather than the rational. Nevertheless, as with the whereabouts clock, the material might inspire design. Although extrapolative and ironic design fictions dominate at the moment ambiguous and magical design fictions have also begun to emerge. To pursue a spatial metaphor scientist extrapolation, irony, ambiguity and magic can be though of as the co-ordinates of design fiction.

The semiotic or Greimas square is an analytical tool used to map contrary, contradictory and implied terms.
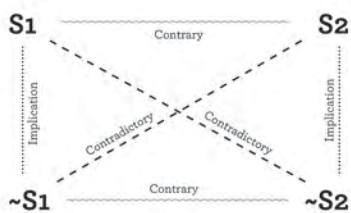
Figure 3: Greimas Semiotic Square

The terms "science" (S1) and "non- science" (-S1) might form the contrary terms at the left hand corners of the square with "magic" (S2) and "non magic" (-S2) on the right. The first two design fictions are extrapolations on current trends and so might be placed somewhere along the line of S1 (science) and –S2 (not magic). The 4th magical fiction would be placed somewhere between –S2 (magic) and –S1 (not science). A similar map square could be made with the terms "ambiguous" and "not ambiguous" as S1 and –S1 with "ironic" and "not ironic" as S2 and -S2. The advertisement would be closer to Irony, the magic realist story closer to ambiguity. It would be possible to map each of the design fictions mentioned in this paper along such co-ordinates but of course many of them would not fit neatly into one category or another. In *Sorting Things Out* Bowker and Star argue that any classification scheme becomes at its borders arbitrary: for example, during apartheid in South Africa officials would have to classify the race of white babies born to black parents and vice versa [10].

Rather than create a series of Greimas squares we present a rather more fanciful map suggesting the co-ordinates of design fiction. The image in figure 4 recalls the maps that often begin fantasy novels, perhaps it also connotes some of the medieval maps recently collected by Umberto Eco [18] of fictional lands that some thought actually existed.

Most of the Design Fiction reviewed in this paper is scientist in the sense that it is extrapolative. Much of this design fiction is also very often critical or ironic. At the end

of the last century the novelist David Foster Wallace began to complain about the constraints of irony. He argued that irony had been the dominant form of expression for American novelists for most of the twentieth century and this was ultimately enfeebling. Julian Barnes in a recent novel about Shostakovich's life under Stalin makes a similar point:

"You woke up one morning and no longer knew if your tongue was in your cheek; and even if it was, whether that mattered anymore, whether anyone noticed." [3]

Under Stalin it was sometimes possible to get away with irony while sarcasm could get you shot. Although irony is easier, allowing an escape from a particular position – I didn't really mean it you know, just a bit of irony, ultimately it is a weapon of the weak. The sketchy map presented here suggests that there is currently more extrapolative and ironic design fiction than any other kind. This tells us something about the field of Design Fiction as it currently stands but also indicates the wide space of future undiscovered countries.

Figure 4: Map of Design Fiction

CONCLUSION

This paper has attempted to sketch the co-ordinates of design fiction as it is currently practiced in HCI and related fields. We have grouped fictions together according to related but separate strands of wonder tale around the broad headings of science, irony, ambiguity and magic. The categorization suggests that the most frequently employed design fictions are broadly scientist in the sense that they are extrapolative, drawing a line from historical trends out into the future through progressive exaggerations Such work is often directly critical or at least ironic. We suggest that there may be rich possibilities in the more or less undiscovered countries of design fiction.

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Making Problems in Design Research:
The Case of Teen Shoplifters on Tumblr

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ABSTRACT

HCI draws on a variety of traditions but recently there have been calls to consolidate contributions around the problems researchers set out to solve. However, with this comes the assumption that problems are tractable and certain, rather than constructed and framed by researchers. We take as a case study a Tumblr community of teen shoplifters who post on how to steal from stores, discuss shoplifting as political resistance, and share jokes and stories about the practice. We construct three different "problems" and imagine studies that might result from applying different design approaches: Design Against Crime; Critical Design and Value Sensitive Design. Through these studies we highlight how interpretations of the same data can lead to radically different design responses. We conclude by discussing problem making as a historically and politically contingent process that allow researchers to connect data and design according to certain moral and ethical principles.

Author Keywords

Tumblr; shoplifting; teens; social media; problem solving; research through design; design fiction.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

INTRODUCTION

Recently, there have been calls to make the goals of HCI research clearer, partly driven by a concern to ensure research contributions to the field are coherent, incremental and generalizable [39,41,49,48]. Papers in CHI and related conferences [5,38,45] have questioned the value in design-led HCI research, with some researchers being asked to place

more emphasis on the 'problem-solving capacity' of their research [41]. In our work we have set out to examine such debates in the context of a provocative online community.

LiftBlr is an online community of shoplifters who share tips about the best ways to steal, exchange pictures of 'hauls' and engage in the storytelling and 'banter' of any socially marginal group. We came across this group quite by accident, but found it provocative for a number of reasons, raising a number of questions: how should a data trove like this be treated by HCI researchers? What are the ethical problems associated with mining the contributions of this particular group? How might we make a design response to the existence of such a community? In this paper we consider a range of possible research-led design responses to LiftBlr data, which comprises over one thousand posts collected from blogs on the Tumblr platform. Following a thematic analysis of the content of posts from members of this community, we create a set of "imaginary abstracts" [7] to exemplify three ways in which different approaches to design research might use this same data to frame "issues", which might then be addressed through technology design.

By implementing this process we set out to illustrate several key aspects of design research as it is delivered in HCI: (i) that socially engaged HCI problems are intractable and uncertain; (ii) that the purpose of much design research is not to solve a problem, but to understand the problem; and (iii) that problems themselves are constructed and framed by researchers and so necessarily reflect the specific values, interests and the analytic tools available to them. In doing so we connect with wider debates around how technology designers might contemplate their responses to complex and wicked problems.

BACKGROUND

Here we provide an overview of efforts made by the HCI community to understand the nature of their own contributions to the field, followed by an overview of ongoing debates around the role of design research. After this, we go on to consider the very specific case of the LiftBlr community.

Cohesion in HCI

In the mid 1990s, William Newman published an influential report on the nature of HCI research [39]. He examined a sizeable sample of research papers from 1989 to 1993 in order to compare HCI to other engineering disciplines such as electronics and nuclear technology. He found that only 30% of HCI papers fell under engineering categories. The other 70% were classified under the category of "radical solutions": new artefacts, paradigms, conceptual frameworks for design and so on. Newman concluded with a warning that a research discipline based on "radical solutions" is *'inherently handicapped by virtue of their radical nature'*. A few years later, Steve Whitaker and colleagues argued for achieving a "common research focus" within the HCI community [49] to *'build on previous work, to compare different interaction techniques objectively, and to make progress in developing theory'*. Building on Newman's work, they expanded on the problems associated with a focus on "radical solutions" and proposed to set "reference tasks" – common tasks that facilitate cross comparison of systems and techniques – as the fulcrum upon which HCI should build generalizable knowledge.

Most recently, in 2016 Oulasvirta and Hornbaek proposed a vision of HCI as problem solving [41] that bears some similarity to the arguments of Whitaker et al. Their concern comes in the form of this question: *'Lacking a coherent view of what HCI is, and what good research in HCI is, how can we communicate results to others, assess research, co-ordinate efforts, or compete?'* . They draw upon the work of science philosopher Larry Laudan and introduce *problem-solving capacity* as a parameter to evaluate all HCI research outcomes. The quality of HCI research, they argue, can be judged by its problem-solving capacity. Consequently, rather than evaluating HCI research methods, theories or approaches, one should ask *'how it advances our ability to solve important problems relevant to human use of computers'*. The authors claim that Laudan's problem-solving view *"offers a useful, timeless, and actionable non-disciplinary stance to HCI"*.

Note that such arguments are not without opposition. Indeed, many contest the need for a common 'ground' or 'rationale' for HCI research [26,5,45]. At the heart of such critiques lies the notion of discipline and the consideration that HCI is a multi-disciplinary endeavor and is necessarily complex. In particular, design-led work in HCI research has a rich tradition of critical analysis that acknowledges the complexity within valuing, framing, posing and solving problems [24,19,18,17].

Problems in Design Research

In many occasions, design research has confronted the nature of its enquiry in an attempt to clarify the value of its contribution as a field of knowledge [e.g 23]. However, a continual issue of debate in the field of design research has been the ways in which to define 'design problems', or indeed the nature of the problem that a design process might engage with and respond to. Kees Doorst, for example, highlighted the problematic nature of problems in design—that they are at the same time determined, under-determined, and undetermined. He showed how in the early stages of design processes many designers engage in practices and techniques to shift between these in order to redefine problems based on the material, resources and data they have gathered [19].

In the field of HCI, while there are multiple stances on what 'design' may or may not be, a common thread is that problems are not tractable, certain and cannot be taken for granted. Design research in HCI might not just be about problem solving but indeed problem-setting or simply problematizing; from the ethics of crowdsourcing [28] to the implications of an Internet for and by dogs [34], these research projects are intended to challenge common understandings, raise doubt and elicit responses. Work under the rubric of Critical design [21], Speculative design [22] and especially Adversarial Design [17] sets out to articulate political issues that underlie problems rather than simply trying "solve" them. Relatedly, design fiction [46] has come to popularity in HCI as a means of exploring the wider social and political implications of imagined technologies. It works by situating them is realistic contexts so an audience can suspend their disbelief and engage in a reflective assessment (e.g. [35,36]).

Solutions as much as problems have been thoroughly critiqued too [37,8]. Indeed, the purpose of much of design research lies not in a problem's solution but in its characterization. Research through Design (RtD), for example, seeks to better understand problems in order to question them. Rather than timeless, objective science, design is seen as likely to produce provisional, contingent and aspirational theories [26]. In RtD processes, we see that framing a problem is not a natural consequence of working with data but rather an act of creative making that shapes design outcomes. Problems are constructed and framed—or made—by researchers and so reflect their specific values, interests and the analytic tools available to them. Only by reflecting on such values can we bring matters of ethical import to the heart of research and practice. Furthermore, given all of this, much design research highlights how challenging it is, given the contextual factors that drive design, to be generalizable and incremental.

LiftBlr: TheTeen Shoplifting Community

To illustrate the multitude of ways in which problems might be constructed, made and responded to in design research we use the example of an online community of teenagers sharing experiences of shoplifting. We specially focus on 'LiftBlr': a collection of blogs on the Tumblr online platform (#LiftBlr being a regularly used hashtag by these bloggers).

We first discovered the teen shoplifting community through an offbeat technology-related newsletter [9] and decided to

investigate further. For the purposes of this paper, we focus on LiftBlr for two main reasons. First, research on such a unique and controversial online community might be a topic of interest for a wide audience of HCI researchers. Projects that focus on the characteristics of social communities online are abundant in HCI and often included in the "social computing" [42] category. A study of such a community can offer valuable insights into the social implications of interactive computing systems and the ways that systems can be appropriated in unexpected ways.

A study of LiftBlr is also interesting because it allows us to observe and interpret the ethically charged responses typically made by mainstream media towards such communities. We wondered whether a comprehensive examination of data from LiftBlr would reinforce portraits of this community as the "Tumblr Bling Ring" [6], teenagers obsessed with shoplifting so as to escape boredom and taste luxury just as the characters in Sofia Coppola's film with the same name [15]. We considered LiftBlr a potentially highly contested and politicised community, with implications for a wide-range of stakeholders and actors, where design-led enquiries may lead to taking an implicit position on this community's "problems". Also, we were interested in presenting "found public data" that had not been filtered by a pre-existing research lens (e.g., through being archived as a dataset, being published in a paper, or structured in relation to questions from specific research). As such, this community makes an ideal candidate for considering the ways in which HCI researchers might bring assumptions and predetermined motivations to frame the 'problems' associated with shoplifting from different stakeholders' points of view.

DATA GATHERING AND ANALYSIS

The social media platform Tumblr is a blog-like website where users build profiles and publish content in the form of posts. Other users can follow content of interest by clicking on hashtags, labels that identify and relate posts. LiftBlr is a Tumblr community in permanent flux with its participants creating and deleting profiles continuously while posting under a plethora of different hashtags. Posts labeled #LiftBlr or #Shoplifting, for example, do not automatically qualify them as belonging to the teen shoplifting community because many Tumblr users post content under these hashtags to address other audiences (e.g. weightlifting posts appear under #LiftBlr and anti-shoplifting rants under #shoplifting).

To form our corpus of data we turned our attention to posts from Tumblr participants in the blog @liftermeetup entitled "Find a partner near you" which cheerily encouraged "Happy lifting!" The blog provides a forum where shoplifters can get in touch and arrange a meeting offline. We selected all Tumblr users that publicly advertised themselves in @liftermeetup during July 2016 and built a corpus of data with posts from their open profiles on the same month. In total, we generated a corpus of 1025 posts from 15 Tumblr profiles. On this corpus we conducted an inductive thematic

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Tips and Advice
- Shoplifting Retail Store Guides
- Shoplifting Methods and Techniques
- Shoplifting Tools
- Advice from a Shoplifter
- Other Practical info for Shoplifters

Resistance and Activism
- Commenting on Political Issues
- Commenting on Social Issues
- Reflecting on the Ethics of Shoplifting

Storytelling and Community
- Reflecting on LiftBlr
- Shoplifters Jokes & humour
- Stories of Life & Shoplifting

Figure 1. Emerging themes and subthemes resulting from thematic analysis.

analysis approach [11]. Codes were assigned to each post according to content. Once all posts were coded these were grouped to form sub-themes and themes. The overall structure was graphically represented in a map to facilitate content navigation, review and discussion among the authors (Figure 1). Finally, each of the identified themes served as inspiration for an "imaginary abstract" (explained below).

It is of course important to note the limitations of studies derived from "found data" [2]. Therefore we proceeded with caution not to generalize beyond the boundaries delimited by the data gathered from posts. For example, we excluded commentary on the offline characteristics of the LiftBlr community regarding race, gender, nationality or occupation. We seek qualitative insights from these data and make no claims to generalization.

We also considered the ethical and legal implications of the use and presentation of data for our study, regarding both the members of the LiftBlr community and us as researchers. We feel that the anonymity of the people behind the profiles is not compromised because there is no information of any sort linking the online profiles with their offline counterparts. Also, we have deleted all metadata in the published images and ensured that their content does not violate any copyright laws or otherwise. In general, we have followed the recently produced British Psychological Association (BPS) Guidelines on the Ethics for Internet Mediated Research.

It is commonly understood in social science that any given data set can be interpreted in multiple ways [13]. The multiple uses of data is even more clear in an applied discipline like HCI which seeks not just to understand a given phenomena but to design for it. The following sections present the three major themes of the thematic analysis (i. tips and advice, ii. resistance and activism, and iii. storytelling and community) followed by applied uses of these data in imagined design work. Following a brief description of the theme with data excerpts, we describe an "imaginary abstract" for each theme which seek to make use

Figure 2. Shoe with hidden magnet for removing security tags.

of the data through designing according to three very different understandings of design research in HCI.

Theme 1: Tips and Advice

Many of the posts formed a rich catalog of shoplifting know-how explained by shoplifters. Posts frequently dealt with topics related to the strengths and weaknesses of security policies and the camera locations of retail stores from 27 different multinational brands. Examples of stores include Target, Victoria's Secret, Lush, Macy, Wallmart, Sephora or Whole Foods. For example, this description of one shop's security weaknesses was continuously reblogged by the community:

*"**The Body Shop/Lush.** These stores are easy to lift from due to their lack of cameras (they literally don't have any), so you just have to watch out for employees! The Body Shop is usually a very small store so I would recommend having a partner to act as a shield to conceal behind. You don't have to worry about tags or cameras in either store, so be very cautious of the SA and other customers! Not sure about The Body Shop's chase policy, but Lush is no chase!"*

[lifting-madjick.tumblr.com]

Other posts were more concerned with specific shoplifting tactics. They mostly describe behavioral courses of action that improve the chances of successful theft:

*"Ticket **Switching.** You find an item on clearance and remove the clearance tag. You then find a similar high dollar item and apply the clearance tag to it. You then bring the high dollar item to an unsuspecting cashier and pay for it at a clearance price. Unfortunately most retailers today now utilize electronic barcodes that when scanned will ring up the correct price".*

[pale-history.tumblr.com]

Tools for shoplifting were also discussed, often with accompanying images. Examples of DIY shoplifting tools include clothing that camouflages stolen goods, or tools for detaching security tags such as magnets hidden in the soles of shoes (Figure 2). This post was a response to a question about what tools were useful for shoplifting besides hooks and magnets:

"[…]scissors to cut off tags, tissues to throw away rfids in, hair ties for gator tags, as well as credit cards split down the middle for gators, reusable bags for grocery hauls, big bags from stores for mall shopping, things to disguise yourself (hair ties to put your hair up, a shirt to change into, a jacket to remove or put on, wigs, root concealer to change the color of your hair), pads for concealing in the bathroom for those who have periods, opaque coffee or soda cups to put tags in and throw away in store."

[glittrrrgrrl.tumblr.com]

Dozens of posts dealt with social strategies to avoid getting caught, with posters drawing on personal experiences of "lifting". Sometimes, bloggers would draw on mainstream technologies and appropriate them for shoplifting purposes. For example, one post discussed how they left the shop in a hurry claiming to chase a Pokémon on Pokémon Go. Common issues detailed and reblogged included selecting the perfect shoplifting outfit, or ways of avoiding suspecting parents when returning home after a successful day at the mall. LiftBlrs also discussed strategies like "scoping" (scanning a shop to identify threats and opportunities), "boosting" (selling stolen merchandise online) or identifying "blind spots" (i.e. a location within a store out of view of cameras, shop assistants or other customers). These posts were often written in simple terms for a "beginner lifter" audience:

"Make sure your blind-spot is not under surveillance. Never do anything where someone else may see you, even a customer. You can make your own spot inside a shopping cart with large packages to conceal your movements or use display units to your advantage. Also a friends body can be used to block viewing. You will always want to act quickly once you have entered your blind spot and never grab an item and walk straight to your area."

[yeahilift.tumblr.com]

Other posts aimed at foregrounding knowledge that, while not directly related to shoplifting, might be interesting or even necessary for members of the LiftBlr community. For example, makeup tips or self-defense tactics.

"Make a fist with your thumb outside, not tucked inside. If it's tucked inside your fist, when you punch someone, you might break your thumb. The thumb goes across your fingers, not on the side."

[liftyhippy.tumblr.com]

The data we've classified under this theme shows that LiftBlr functions as a resource of practical knowledge regarding an activity that is central to the community itself: shoplifting.

Theme 2: Resistance and Activism

Many of the posts in the LiftBlr community explicitly address the social, political and ethical aspects of the crime. The LiftBlrs discussed a very broad range of political topics with varying degrees of seriousness. They posted about civil disobedience, anti-war manifestos, communism and capitalism, biases in media production and representation and the electoral campaigns of Clinton, Obama and Trump. This post parodies an episode of the TV show Mythbusters:

*"**Adam**: Hey I'm Adam and this is my friend Jaime and you're watching Mythbusters.*

***Jaime**: How's this for a myth, Adam? "Shoplifting hurts workers"*

***Adam**: We don't even need to go down to the bomb range to answer that question! Marx busted that myth one hundred and fifty years ago! The root of proletarian suffering is the bourgeoisie!*

***The Narrator** (Over footage of Adam and Jaime burning American flags at the bomb range): Next time on Mythbusters: "Can you peacefully abolish capitalism?"*

[lifting-madjick.tumblr.com]

The following post focuses on capitalism too but from a different perspective:

*"**Me**: people are inherently deserving of things we need to survive like food and water.*

***Capitalists**: okay... That sounds fake but okay"*

[lifting-madjick.tumblr.com]

Members of LiftBlr show concern for a broad range of social matters. Racism is among the topics they address (mostly #blackLivesMatter):

"Unfollow me if you don't believe black lives matter."

[Lifting-madjick.tumblr.com]

Issues related to gender like feminism, homophobia, abortion or romantic relationships are also frequently discussed and interwoven with issues of shoplifting. Here shoplifting is defended in terms of resisting gender oppression:

"I 100% support women stealing beauty products instead of throwing every spare penny she has away chasing after an impossible pipedream sold to her since the moment she was born. "

[lo-lolifting.tumblr.com]

Some posts were not necessarily related to shoplifting however:

"Funny how men only care about woman's choice when it comes to defending porn and prostitution."

[Lifting-madjick.tumblr.com]

Other topics discussed relate to health, environmental practices, animal rights or celebrate practices condemning discrimination in various forms:

"If you're a pro eating disorder blog/post pro eating disorder content tag your fucking posts because some of us are easily triggered by your self destructive bullshit :) also unfollow me please and thanks"

[haullsey.tumblr.com]

This post was written in response to another about the Westboro Baptist Church "getting owned" by people playing Pokémon Go:

"Generally I agree with the sentiment that we're living in the worst possible iteration of a cyberpunk dystopia but honestly, pokemon fans using augmented reality to AR-tag a notoriously homophobic hate group's building by having it controlled by a pink fairy videogame monster called "loveislove" that's only visible to other people playing the same AR game is some Shadowrun shit and I love it. I hope loveislove makes their jigglypuff eat shit"

[lo-lolifting.tumblr.com]

The LiftBlrs often linked their political and ethical stances to the morals of shoplifting. Shoplifting from large multi national corporations was seen as either morally neutral or a virtuous act of political activism. Stealing from small businesses was viewed very differently as this list of commandments illustrates:

"The lifter's commandments: 1. Thou shalt not judge other's hauls or techniques. 2.Thou shalt not be a snitch. 3. Thou shalt support fellow lifter's endeavors and answer questions when possible. 4. Thou shalt not steal from small businesses. 5.Thou shalt not get caught. 6.thou shalt be a bad bitch."

[britishlifting.tumblr.com]

For some LiftBlrs there was a moral hierarch within shoplifting. Stealing food to survive or feed children was perhaps the purest motive and was generally considered an ethical act in an unethical society:

"Friendly reminder that the human race currently has the technological capacity to eradicate poverty and secure a safe existence for every person but that doesn't happen because capitalists limit production so they can make money and live in comparative luxury to the rest of us"

[glitchylifting.tumblr.com]

But stealing less obviously essential items was also fitted to a moral order:

"I'm not going to get too deep into the Shoplifting Discourse but I will say that "stealing for survival" encompasses a lot more than just food. You could be stealing makeup (which is already always absurdly expensive) so strangers read you as a woman, or stealing a toy so your kid doesn't feel like she's a bad person because Santa didn't bring her anything, or

stealing tampons or toilet paper because everybody deserves basic hygiene, or stealing nice clothes for a job interview, or stealing school supplies so you can study, or stealing any other number of things that are truly necessary but you won't immediately die if you don't get them."

[lifting-madjick.tumblr.com]

The existence of #Liftermeetup shows that LiftBlrs were willing to take the risk and share their resistance practices offline. However, they were aware of the dangers of exposure to non-LiftBlrs. This following illustrates a hurdle to overcome so members of the community can organize themselves offline:

"Let's come up with some kind of secret code to say to someone that we meet in person, if we want to know if they're a lifter and if they know what we're talking about, they'll answer our question with a specific answer."

[civildishoebedience.tumblr.com]

The posts in this section show how shoplitfting is seen by the members of LiftBlr as something other than illegal consumerism. Shoplifting is performed as a resistance to an unethical system that foments difference according to financial status. For them, their practice undermines difference and constitutes a legitimate form of activism.

Theme 3: Storytelling and Community

The third theme from our analysis of the data was storytelling and community, which related to idiosyncratic accounts of shoplifters' lives. The LiftBlr community is continuously under attack from the law so unsurprisingly a lot of posts address issues to protect the community. These include how to remain anonymous:

"HOW TO STAY SAFE DURING THIS PERIOD OF ANTI-LIFTERS' ATTEMPTED 'EXPOSÉ. 1.USE AN EXIF DATA REMOVER-MOST IMPORTANT - always use an exif data remover when posting ANY kinds of photos. i use Metadata Remover on ios. it is the white icon with blue aperture lens and a small red dash sign"

[glitchylifting.tumblr.com]

There were celebrations of LiftBlr community and the feeling of belonging that the posters found:

"I am so impressed with the lifting community, seriously. I see SO MUCH diversity, and SO MUCH support for POC, sex workers, body positivity, LGBTQ, religious tolerance, disabilities and mental health, income levels... Seriously you are all just the absolute best. In the fucking SHOPLIFTING community. We're supposed to be some sort of detriment to society, but I have never felt so comfortable and safe in a ~community before. You have all exceeded my expectations and restored a little bit of my faith in humanity. Thanks."

[lo-lolifting.tumblr.com]

Some posts jokily describe common situations among the members of the community. There are humorous stories but also pictures, comics and videos.

Girl next to me in class: *I stole these pens I'm using lol.*

Me: *I stole this outfit I'm wearing lol"*

[lifting-madjick.tumblr.com]

This is clearly important work in Goffman's [27] sense of the presentation of self:

*"**Friend**: Your stuff is so cute! I wish I could afford all this.*

Me: *Same*

Friend: *What?*

Me: *Nothing."*

[sad-lifts.tumblr.com]

Both of these examples are interesting because they present the LiftBlrs being envied. They own or wear status symbols that people comment on. The dialogue presents a moment where material culture is at once celebrated and undercut.

*"**Me last year:** yah that's nice but idk [I don't know] if I wanna pay $75 for it.*

Me now: *yah that's nice but idk if that will fit in my purse"*

[britishlifting.tumblr.com]

In sociological terms they are performing multiple identities. They are simultaneously savvy consumers and active resistors. When Londoners rioted in 2011, smashing shop windows and looting goods, the sociologist Zygmunt Bauman pointed out that these were not bread riots or riots focused solely on a political issues. They were riots of failed consumers stealing televisions they could not afford [3]. From cradle to grave young people are instructed to define themselves by what they own. As global inequality increases the pain of the have nots becomes a serious problem that this community effectively solves:

*"**Babe:** tell me something sexy*

Me: *no cams, unattentive SAs, fitting rooms are unlocked and unattended, no sensors."*

[wouldntitbesweet.tumblr.com]

The success of particular "hauls" was perhaps the most frequent topic of the stories told within the community. "Hauls" are stories of success usually in the form of photographic collections of purloined merchandize (like clothes, make-up or food) (Figure 3).

Other posts articulate (sometimes in multi-page accounts) the emotional excitement of overcoming the fear of getting

Figure 3. Image of a "haul" of stolen items.

Figure 4. Underwear before (left) and after (right) becoming a member of LiftBlr. This image appeared in a post entitled "the benefits of lifting" where the author claimed that shoplifting improved her self confidence by allowing her to wear new underwear.

caught or celebrate why it is worth being a LiftBlr. The following is an account that described the pictures in Figure 4 in a post entitled "benefits of lifting":

Figure 4 (left) - "These were the type of underwear i used to wear on a daily basis before i started lifting — overstretched, bleached, discolored, old, wrinkly, disgusting. i was always super embarrassed when my LDR(Long Distant Relationship) boyfriend asked for panties pics because these were the only panties i have and obviously they looked like shit in real life and will look even worse in photos.

Figure 4 (right) – "and these are the types of panties i get to wear now — cute, sexy, clean, colorful; every positive adjective you can think of to describe panties. i'm so glad i have these now because i feel super confident in them. that's all. :)"

[lifting-madjick.tumblr.com]

The lifestyle and experience of shoplifting is exuberantly celebrated in posts such as these. But accounts of dramatic failures are also common:

"Hey guys, taking a break from liftblr for a few weeks, maybe months, idk. I got caught at Walmart of all places. I'm sorry for anyone who asked me stuff or messaged me recently, I need to get away from liftblr because I feel very bitter and sad and stupid and I don't want to talk about my experience. I love you all, I wish everyone good luck with lifting and life in general, please be very careful out there for me"

[civildishoebedience.tumblr.com]

There are also memes, poems and references to the mysterious and instinctive nature of shoplifting; the following poem was intended to be sung to the tune of Jingle Bells:

"Dashing through the mall / with tons of stolen shit / under the cams i go / dont give these hoes a hint / (GO GO GO) / lp's dont even know / sa's are far behind / what fun it is to grab / some shit while they pay you no mind / OH / lift that dress / lift that dress / this whole store could be yours / if you dont get caught / or have second thoughts / then bitch head out the door!"

[liftingparadise.tumblr.com]

LiftBlrs life stories go beyond the superficial accomplishment of material goods and dwell with complex issues like identity, freedom and structuring the social environment. Not everything is about the "swagger of looting" and a set of hidden values of ethical import seem to inform the rationale behind their shoplifting practices.

These stories are clearly an important reason for the existence of the LiftBlr blogs. Through sharing these stories LiftBlrs engage in a celebration of their community and values. However, what this values are exactly is not clear.

PROBLEM FRAMING VIA IMAGINARY ABSTRACTS

In the 1990s, William Newman used a creative version of abstract writing, "pro forma abstracts", to evaluate HCI research [39]. Here we employ a similar technique – "imaginary abstracts" – not solely for their historical resonance but to "provide a space for research focused critique and development" [7]. We invite the reader to reflect upon a series of "imaginary abstracts" representing fictional but plausible HCI papers.

In the following sections we first consider the ways that the themes in these data might be related to different design perspectives: design against crime, critical design and value sensitive design. We choose these three approaches because they differ greatly in their goals and how they might approach research data. Furthermore, the dependency between purpose and approach of a design endeavour serves as a link to other design disciplines within HCI seeking to move away from identifying goals with solutions. After introducing each approach and how it resonates with the data, we present the imaginary abstract. The development of each abstract was guided by the design approach taken with reference to our analysis of the LiftBlr data. The imaginary abstracts were developed collaboratively among the authors by first discussing relevant existing paper abstracts from each design perspective, and then emulating their form and content based on speculated design responses.

1. Design Against Crime

In 1999 a group of governmental and academic institutions in the UK jointly created a practice-led research program to envision ways to "design out" crime[16]. It was entitled Design Against Crime (DAC) and since its inception it was *"linked to the understanding that design should address security issues without compromising functionality, aesthetics or other forms of performance i.e. that secure design doesn't have to look criminal or ugly"* [25]. In most cases, DAC's design outcomes are related to the built environment (e.g urbanism) but there were also community-focused initiatives and celebrated design products (e.g. those exhibited at New York's Moma "Safe:design takes on risk"). Much of the LiftBlr data under the theme Tips and Advice would be useful for planning loss prevention policies. This way of framing problems might result in interventions that would facilitate law enforcement somehow as in the first imaginary abstract below.

LightSpot: Challenging Shoplifting Practices Through Increased Situated Awareness

Shoplifting in retail stores is a widespread criminal offence that damages businesses, employees and consumers in general. In this paper we propose a novel solution to prevent theft in "blind spots" - unsupervised spaces - of any business establishment selling goods. Using thematic analysis on online data detailing shoplifter's practices, we focus on how shoplifters identify "blind spots". We highlighted the kind of activities they perform once their anonymity is ensured, including using strong neodymium magnets as a tool to remove security tags. We introduce LightSpot: an inconspicuous device that combines a powerful source of light with a magnet detector. Carefully positioned in a blind spot it will respond to the presence of any itinerant magnetic source with gentle glowing patterns noticeable by both shop assistants and potential shoplifters. Our initial field trials suggest that LightSpot might support a reduction in shoplifting behavior due to increased situated awareness and exposure to shopping assistants, lost prevention officers and other customers.

The object of our imaginary abstract, LightSpot, would belong to DAC as far as it is considered an artefact that draws from the theory of situational Crime prevention[12]. This theory suggests, in a nutshell, that *"crime is significantly about opportunity, and that if we can design out opportunity for crimes to occur in the first place, we can reduce crime, and perhaps also the number of people who become criminalized"*[25]. Our abstract does not belong to a neutral ethical design space and involves taking sides and designing against shoplifting and shoplifters by reducing a shop's vulnerability to this crime.

2. Critical Design

The last decade has witnessed the publication in HCI of a great many research projects with outcomes that don't reify solutions but rather challenge assumptions. Studies of this sort bring research concerns to the spotlight to initiate thought and debate about familiar topics addressed from unfamiliar perspectives. They dispute common conceptions of how technology and humans bond together and deliberately instigate controversy to surface ideas silenced by the sociopolitical frame under which research is carried out. This research is aimed at agonism (a fundamentally democratic condition of disagreement aimed at constructive dialogue) [17], critique [21] or speculation [22] framed as explicitly provocative designs. The second imaginary abstract takes the standpoint of designing to support the LiftBlr community by facilitating offline recognition of community members as part of a subversive act.

"Capitalism scammed me first": Designing to offer offline support to the teen shoplifting community online.

In this paper we design to support the agonistic work of members of LiftBlr, the online teen shoplifting community. A thematic analysis of online posts indicated the ways in which LiftBlr members see shoplifting as a form of civil disobedience and resistance to consumer culture. The posts also show the difficulties faced by members when trying to meet offline, in particular how to effectively recognize each other. We designed a peripheral device and a smartphone application that denote membership of this community when two LiftBlr members meet offline. Specifically, the peripheral device comprises an array of sensors capturing physiological measurements (heart rate and sweat production) worn secretly inside a bra. The smartphone app reads biometrics and builds a correlation identifying whether the person was shoplifting or not. The result is an identity data trail that serves to authenticate a member as an actual shoplifter. Our aim is to provide shoplifters with the means to meet offline with the assurance of belonging to the

shoplifting community and believe that in this way we are supporting their agonistic efforts against capitalism and social inequality.

The abstract is inspired by related civil disobedience initiatives like YoMango [1], a Spanish movement that celebrated and lectured on the practice of shoplifting. YoMango claims that, regardless of its naivety, this community foments agonism by openly criticizing the status quo in a wide range of contemporary matters hotly disputed in mass media and public parliaments. This abstract illustrates the notion that we are not simply choosing from certain, clear and coherent problems that are "out there" waiting to be discovered but actively constructing problems to address.

3. Value Sensitive Design

Value Sensitive Design has played an important role in HCI [24,32]. It has influenced the design of computer systems by emphasizing the need for engagement with values of individuals and communities alike. This abstract resonates with the empirical dimension of its methodology - situating technical artefacts that allow the emergence of knowledge about values. Such an approach might as well be understood as Research Through Design because it seeks neither to provide solutions nor does it explicitly appeal to controversy in order to spark debate [50]. Research outcomes in this category embody researchers understanding of research topics in order to explore and expand a design space. They intend not to resolve with static answers but to generate new venues for inquiry involving audiences in the research process. This research practice usually rests on idiosyncratic accounts in similar ways to user-centered design approaches to HCI. Our third imaginary abstract therefore attempts to raise the question: how does it feel to belong to the teen shoplifting community?

"No One Ever Saw The Greatest Moment Of My Life": embodying the life of a member of LiftBlr, the teen shoplifting community online.

Social media platforms allow exceptional communities to overcome offline obstacles and flourish online. In this paper we take a value-centered research agenda to ask: how does it feel to belong to the teen shoplifting community? In order to discover what are the values that propel young adults to engage in the risky practice of shoplifting. A thematic analysis was carried out on a corpus of data consisting of posts from LiftBlr, an online teen shoplifting community. Analysis of personal narratives of teen shoplifters served to inspire the design of a "research product" [40]: the UnderSwitcher. The UnderSwitcher is a drawer in a wardrobe that, unbeknown to the user, shifts between two sets of underwear, a worn-out unattractive set and a new colorful fashionable one. This allows the user to hide stolen goods from family members and experience a glimpse of a

reality before and after becoming a member of LiftBlr. We discuss the Value Sensitive Design research process involving design for ambiguity, risk and controversy and hope to stimulate conversations regarding community formation, teen lifestyle or the meaning of law in personal contexts.

Such a study might seek to surface the values shared by its members and use this knowledge to develop systems that place matters of ethical importance at its core. We imagine the artefact generating diverse idiosyncratic answers and further questions relative to issues like identity construction, consumerism, education, crime or entertainment among those interacting with it.

DISCUSSION

We have illustrated three ways in which the data from the LiftBlr online community may be used to frame specific problems of the community and lead to different types of design responses. It is important to note that through doing this we are not attempting to dictate the value of different research approaches. Neither is our intention to judge which of the approaches outlined would be the best response to these data. There are many interesting papers that could be written beyond the ones imagined in our imaginary abstracts, which might lead to radically different views of the data we collected and of course different interpretations of the problems (if any) that may need to be responded to. Social computing attempts at investigating the strategies teen shoplifters use to deal with hate online might be an example. Our example abstracts serve to illustrate the point that we have not *identified* problems and chosen amongst them; we have *actively made problems* by drawing on different traditions of design research in HCI, and the particular values and positions these approaches bring with them. Furthermore, we aimed to underline how disciplinary consensus and the priorities of research funders and collaborative stakeholders not only identify problems, but also define those user groups and communities we work with and give voice.

Problem as Process

The ways in which problems are framed have immediate consequences for design. Designers often speak of the "co-evolution" of the problem space and the solution. But this is not a matter of empiricism. As Dourish pointed out (in 2006) there are not necessarily any obvious "implications for design" derived from data in any ethnographic study. Dourish argued that ethnography in HCI *"has often been aligned with the requirements gathering phase of a traditional software development model"* [20]. He problematized this notion arguing that we need *"a deeper, more foundational connection between ethnography and design"* (ibid). For Dourish, ethnography does not necessarily provide empirical data on problems to be solved in design. Indeed, following this work, over the last ten years

the notion that design can or should provide neat "solutions" has been increasingly challenged.

In recent years many of the products of Silicon Valley and HCI research have been described as "solutionist" [30] providing *"quick technological fixes to solve complex problems or problems that might not be considered problems at all"*. Part of the problem with problem solving is practical. The problems we frame are that which we are able to solve in some sense.

There is, however, a larger problem with problem solving: the question of perspective and politics. Shoplifting can certainly be framed as a problem for the owners of shops. But conversely shoplifting is a problem for shoplifters because they may end up in jail. Design might equally well address either problem: how to stop people from shoplifting, how to help shoplifters avoid being caught. Our imaginary abstracts indicate, we hope, that this is not a neutral question and involves taking sides. The construction of a problem in design research then is a matter of selection not just observation and often the two activities are inextricably linked [44].

Few would contest the utilitarian advantage that "problem-solving" affords some research. There are certainly important problems to be solved that call for an effective and straightforward solution. However, defining a problem implies direct and transparent access to a certain reality without carefully considering the assumptions such access demands or imposes. Furthermore, once an issue becomes defined as a problem, it closes down other opportunities for engagement with that same issue. If the value of research on shoplifters assembling online is assessed in terms of the problem it solves, which problem is more valuable?

In the design domain, this is a particularly thorny issue. Defining a problem based on a set of data might provide a shortcut to a preferred state of affairs (a design solution) without critically questioning the political, moral and ethical context in which problem and solution are defined. There is no doubt that there might be scenarios in which a shortcut that evades context might be preferred, however, if would be unfair to emphasize the value of research that solves over that which problematizes. It is precisely in this sense that problems are a research process with particular characteristics, tendencies and implications

Problems as Perspective

As we have tried to illustrate with the example of LiftBlr, problems are not "out there" waiting to be discovered in sets of data. Problems are constructed from particular angles (in terms of who has a problem) and perspectives (in terms of why this is a problem at all). Each of our imaginary abstracts has been developed after asking "who are we designing for? and why are we designing for them?". Much of the job of researchers is preconfigured by the partners or sponsors (e.g retailers or tech companies), by the funding bodies (e.g a research council with a specific remit) and of course by

government policy (e.g a particular research over a different research). For a researcher, then, framing a problem is not a natural consequence of working with data but rather an act of creative making that shapes design outcomes and satisfies expectations.

Acknowledging the huge systemic factors at play when defining a problem raises doubts on research that is evaluated on "problem-solving" capacity precisely because it takes clearly defined problems as a starting point. A problem solving approach asks HCI to consider the world as an experiment and prioritize the enquiry onto those aspects that can be clearly and succinctly formulated as problems. Certain matters of interface design and engineering might profit from this, however in design we can (and should) be more cautious and critical of such endeavors.

CONCLUSION

We have argued that framing a problem is not a natural consequence of working with data but rather an act of creative making that shapes design outcomes and satisfies expectations. Whether a particular perspective is explicitly stated or not there are no neutral design responses to data. We have illustrated this argument with three different constructions of "problems" relating to the same data from an online community of teen shoplifters. Our examples are not intended to cover the whole HCI research field but rather, provide a glimpse into the potential to generate diversity in reponse to data and to acknowledge the specific interests and assumptions of any particular research audience. Problems and solutions are not "out there" waiting to be identified but are rather the product of particular analytical lenses that foreground certain connections between data and design. In turn, there are no inherent or inevitable relationships between data and design but rather historically and politically informed choices.

ACKNOWLEDGEMENTS

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The Solution Printer:
Magic Realist Design Fiction

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Abstract

This paper is presented as a "design fiction" because nobody would accept these findings in any other form though they are as true as anything else published at CHI. It begins with empirical investigations into the infamous dream simultaneously experienced by thousands of people. We describe the development of a device designed to capture images from that extraordinary dream. This was a prop, or diegetic prototype that unexpectedly began to work. We then report a range of other fictional devices developed at the Solutionist Studio which began to function as described. We argue that the line between fiction and reality has become entirely porous.

Author Keywords

Design Fiction; Research Through Design; Magic

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

Introduction

The collective dreaming on the night of the 7th of July 2015 had a profound effect on the lives of the millions across the planet who experienced it. While there is a growing body of evidence that the event occurred as described by participants, "the oddness" is still

dismissed as a mass hallucination, a localized manifestation of the collective unconscious or a fraud. Although we ourselves experienced the dream we acknowledge that we cannot prove anything within the terms of the current (doubtless temporary) positivistic epistemologies of HCI.

Despite the testimony of many thousands of people the idea that this dream was indeed shared or jointly experienced has been largely dismissed by the scientific community. At most it is conceded that people *thought* they had shared an experience, a subtle but important distinction. Some commentators have speculated that a hallucinogenic substance was introduced to the water supply in the cities most seriously effected. This then was a terrorist act designed to cause not merely the physical fear of an explosion or death but rather an existential fear, a spiritual or religious terror of the kind previously confined to people who take the Book of Revelation seriously.

But the dream is for the most part not discussed at all in the scientific literature. This may be due in part, to the slowness of journal publications and the time that it takes to conduct a scientific investigation. But it may also be due to the materialist dogma at the heart of the scientific community. The dominant western epistemology excludes as a matter of principle, the miraculous and the marvelous.

The extent of the dream share seems to have been sporadic, appearing with greater or less intensity around large urban conurbations around the world. But in our lab "the Solutionist Studio" everyone within a thirty mile radius shared the dream. We all woke up having spent the night wandering the ruins of our city in a shared dream. Many of us believed that this was a glimpse of our last winter. The effect on the research being conducted in the lab was immediate. Projects investigating the ways we might influence behavior to reduce carbon footprints now seemed irrelevant. Those of us working on projects to put accelerometers into anything that moved became disinterested: what was the point of trying to measure minutiae that might or might not improve our health when we were shortly about to cease to exist. It wasn't even fiddling while Rome burned, at least this would be making music; it was measuring the string vibrations on a fiddle somebody else was playing.

Those of us interested in design fiction [e.g. 1,2,3,4,6,7] also became totally disillusioned with the research topic. And yet we also recognized that fiction was perhaps the only way for us to come to terms with what was happening. Fiction after all, resolves at the level of fantasy, that which cannot be resolved in reality [8]. The design fiction which we had been writing was essentially rationalistic and clearly we no longer lived in rational times. For us the design fiction inspired by the work of William Gibson or Bruce Sterling [16,17,18] and the other cyberpunk authors looking fifteen minutes into the future was not enough when in twenty minutes time there would be no future at all. We had now begun to inhabit a world like that imagined by Salman Rushdie where:

 "the laws which had long been accepted as the governing principles of reality had collapsed". (14: 55)

For Rushdie and other "magic realists" the only response to times such as ours is a literature full of marvels and wonders that are so much a part of the

everyday that they are hardly remarked upon let alone explained.

The distinctions between one kind of fiction and another are to an extent arbitrary. The divisions between science fiction, horror and fantasy for example are the invention of booksellers. When the literary novelist Kazuo Ishiguro started writing about ogres he was surprised to discover his work in a new section of the bookshop [9]. But the magic realist tradition exemplified by writers like Gabriel Garcia Marquez, Rushdie and Borges has a very long pedigree going back to the Tales of the Arabian Nights which some regard as the earliest surviving outpouring of the human imagination. The magical transformations that occur in the Arabian nights are reminiscent of the metamorphoses in Ovid and later in Kafka. In this tradition magic remains magical it is not, as in science fiction, explained as a technological achievement. The magic in magic realism is inexplicable, mysterious and ambiguous.

This paper reports the extraordinary events in our lab following the development of a digital dream catcher, originally conceived as a prop representing a device that might photograph the dream we all shared. This was developed as a diegetic prototype but against all expectations it began to function. As more researchers in the lab began to create fictional prototypes these too began to function. We describe the development of the digital dream catcher and the other devices that followed culminating in the development of a Solution Printer.

The Digital Dreamcatcher

The dreamcatcher was originally conceived as a device that would produce interesting images that might stimulate reflection and discussions around the shared dream. The digital dreamcatcher consists of two modules: a portable module to be placed by a bed for data capture and a base module, for interpretation.

Figure 1: Portable unit front and back, base unit

The portable module consisted of a FEZ SPIDER mainboard from GHI Electronics, and a set of Microsoft Gadgetteer compatible modules attached to it: a temperature sensor, a compass, an infrared sensor, a low resolution camera, an LED Matrix and a SD Card module. On a functional level, periodic readings from the sensors are represented by the LED matrix and logged into a file on a SD Card. At the same time, when the infrared sensor detects movement a photograph is taken and stored in the SD Card. The portable module thus captures images of a dreamer dreaming.

The Base module was built by connecting together another FEZ SPIDER mainboard, a low resolution camera, an SD Card, a joystick and a LED screen. When a participant returns the portable module it is

attached to the base and the SD card is inserted into the module. The camera is subsequently activated to capture images of the retina of the participant. These images are processed and altered by the information (sensor readings and photographs) gathered by the portable module and stored in the SD Card. Finally, the resulting dream images are revealed in the LED screen. When a participant looks into the viewer we see them seeing. Both modules were programmed using C# as language and .NET Gadgeteer as framework into the memory of the FEZ SPIDER mainboard modules.

We were planning to add a Photoshop script that would place the images of the dreamers dreaming within desolate city landscapes, the ruined buildings that we had all seen. This plan was abandoned when the device began to spontaneously produce the images we had seen in the shared dream.
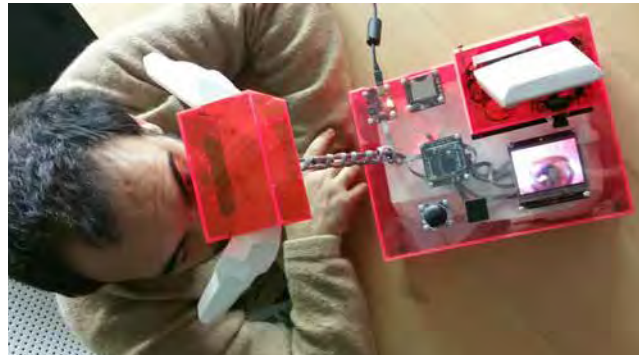
Figure 2: A participant undergoing retinal analysis with the base module.

Participants were instructed to locate the device in the space where their dreaming usually took place. After

retinal inspection of the participant, raw material (dream images) began to appear on the LED display.

Figure 3: The portable module installed at the bedside of a participant in order to record the context of dreaming and construct a timeline of dreams

At first it was not clear to us what the dark shapes that the device began to reveal were. Only after staring for a long while at the first images did we realize that what we were seeing was the silhouettes of buildings on a horizon. Once we had made this discovery we began to understand that the city we were looking at was our hometown, Newcastle. And yet it was not the city we knew. The familiar buildings around the riverside were now derelict and empty. Nature had begun to reclaim many of the structures, weeds were growing through the iconic silver shell of the Sage building, the great tower of the Monument had crumbled and fallen to rubble, grass grew through the platforms of the train station.

Data from the first three participants showed the same bleak images of a desolate and abandoned city. As in the shared dream we saw a Newcastle devastated by

some natural disaster, terrorist atrocity or perhaps, simply decaying and crumbling like Detroit after long economic stagnation.

As more data was collected from different participants we began to see the gigantic figures that appeared to all of us who shared the dream. From some perspectives the strange fluid figures looked almost human, or angelic. In others they appeared to be monstrous, perhaps holding weapons. For many participants this was confirmation that the dream really had been shared, they were not crazy:

P4: Oh my god! You've photographed the dream! This means it really happened doesn't' it? We weren't hallucinating!

Other participants remained skeptical.

P7: Well it's a nice little show you've got going on with your dream catcher but you've obviously Photoshopped it all. It is pretty much what I saw in the dream but I guess you saw it too so that's how you know what it looked like?

For some participants the images proved not only that the dream was real but that we were now living in the "end times" and that the dream had been a prophecy. Some attributed the images to some sort of technological telekinesis, others to a form of divine revelation. A minority of the participants thought that a fraud or deception was being perpetrated and organized by the government

Figure 1: Photograph produced by the Dream Catcher.

Perhaps the most interesting interpretation of the images was that the machine itself had learned to dream. Somehow our dreams had spilled over into this device and as the end of the world grew closer the boundaries between fiction and reality were becoming more porous. The following table roughly summarizes the participants' interpretations of the images

Interpretation	Number of Participants
Technological Prophecy	43
Divine Revelation	22
Government conspiracy	15
Fraud	13
Don't Know	7

Table 2: Interpretation of the images

Figure 4: Photograph produced by the Dream Catcher.

MetaRationalizations

Frederic Jameson famously remarked that it is easier to imagine the end of the world than to imagine the end of capitalism [12]. No doubt it is also easier to dream about the end of the world, Hollywood has been doing almost nothing else for the past twenty years. Picturing the destruction of famous buildings is good box office and increasingly easy, even for amateurs, to portray with Photoshop and After Effects. Psychotherapists have argued that the notion of the end of the world is ultimately comforting. If we believe the world is going to end then our own death is no longer irrelevant: the earth itself becomes mortal along with us. Thus we are spared the awful thought that life will go on without us. There is then something ultimately reassuring about the apocalypse [21]. This shared dream from this perspective was nothing more than a standard wish fulfillment in responses to a drive as old as Eros,

Thanatos – the death drive. But the dreamcatcher photographs of the dream convinced many, including the members of our own lab that something new was happening. The laws of nature had changed.

Functioning Fakes

As we investigated the images other researchers in the lab began to create fake prototypes that also began to function. Day by day more researchers would bring in strange devices that they had made as props to illustrate ideas. Once presented in the lab, they all began to function as described. One by one a collection of functioning fakes began to build up.

The Book of Sandpaper

A designer created a leather bound book she claimed was an infinite compendium of lost and forgotten books. Wherever it was opened it showed fragments of legendary texts: Aristotle's book on comedy, a first person gospel by Jesus Christ, a Shakespeare play about a journey to the moon. The book always seemed to open at a text that each reader somehow needed in that moment. An RA in the very depths of despair was consoled by a passage on the joy of lost love from one of Cleopatra's diaries. An administrator with a broken heart found lines from a burned Kafka novel that made him think he might one day laugh again. The book never showed the same passage more than once and it appeared to be infinitely large.

The Author Eraser

A sociologist presented a device he called the author eraser. It looked something like a small vacuum cleaner and when it was passed over the list of authors on the front page of an academic paper it sucked off the names of all the senior academics who had added only

minor edits or made no contribution at all. Not only did it hoover the names from the physical piece of paper it removed them from all digital archives as well.

The Asset Stripper
A computer scientist demonstrated an asset stripping virus by asking a Professor who had recently amassed a small fortune from a spin off company to check his bank balance during the presentation. When the Professor looked at his banking app he saw his balance decreasing dramatically. As the audience members checked their bank apps they realized their balances increased the closer they stood to the Professor. The computer scientist explained that it was redistributing his wealth. The Professor fled from the campus pursued by a crowd waving their mobiles and thanking him.

GossApp
A game designer developed an app that allowed users to gossip anonymously about their neighbors. Anyone who was discussed on the app immediately succumbed to the descriptions on it. If a man was described as fat he immediately gained weight. If a woman was denounced as a drunk she developed a drinking problem. If someone was said to be looking old their wrinkles immediately deepened. The effects could not be reversed so victims took revenge by speculatively cursing others as they had been cursed.

The Brilliantification Pad
An artist created a dictaphone-like device to be worn on the sleeve at all times. It would listen to conversations and type a manuscript that would turn half formed notes into brilliant insights and ideas. It produced a succession of fantastic ideas no matter who it was attached to or how dull their conversation. The

most banal clichés were transformed into profound poetry. The silliest notions morphed *into the most brilliant inventions.*

The Solution Printer
A young researcher finally decided to create a solution printer. Adapting the largest 3D printer in the lab she created a device which would print solutions to whatever problem was specified. The first print outs addressed some of the fairly trivial problems that beset members of the lab: there was a machine that cured baldness, a skin stretcher that would iron out wrinkles without leaving the surprised look of plastic surgery, there was a volume control to turn down loud and vexatious people.

The researcher became convinced that this solution printer could avert the catastrophe that we had all dreamed about. She specified a device that would provide energy without creating an environmental catastrophe. It printed out a windmill. Following the conservative Philosopher Roger Scruton's demand for a "real solution " to global warming [15] the researcher specified a device that would provide us with the energy we need without disrupting our lifestyles in any way or spoiling the landscape.

The solution printer duly produced a perpetual motion machine but the apocalyptic images of the shared dream persisted. The researcher tried specifying other problems that may have produced the desolation we saw in the dream images; so far she has not succeeded in creating anything to alter the visions of destruction first glimpsed in the collective dreaming. Eventually she concluded that the solution printer cannot save us because we do not understand the problem.

Discussion

Since the "oddness" that began with the collective dream it is now obvious to everyone in our lab that the laws of nature have become unstable. We have arrived at the limits of reason specified by Hume in the eighteenth century. Hume argued that just because bread nourished him yesterday this was no guarantee that it would do so the next day:

"I shall allow, if you please, that the proposition may justly be inferred from the other: I know for a fact that it always is inferred. But if you insist that the inference is made by a chain of reasoning I desire you to produce that reasoning."

 (David Hume, 1902, p.34)

GK Chesterton pointed out at the beginning of the twentieth century that the laws of nature are not laws at all coming to this conclusion by way of studying the laws of fairyland:

"As I put my head over the hedge of the elves and began to take notice of the natural world, I observed an extraordinary thing. I observed that learned men in spectacles were talking of the actual things that happened—dawn and death and so on—as if *they* were rational and inevitable. They talked as if the fact that trees bear fruit were just as *necessary* as the fact that two and one trees make three. But it is not. There is an enormous difference by the test of fairyland; which is the test of the imagination. You cannot IMAGINE two and one not making three. But you can easily imagine trees not growing fruit; you can imagine them growing golden candlesticks or tigers hanging on by the tail." [10]

It has long been understood that fictions sometimes become real and ideas that were once fantasies can break through from the world of the imagination into reality. In 1907 when the idea of a flying machine was, to most people, nothing more than a fantasy, HG Wells wrote "The War in The Air" predicting aerial warfare a decade before bombs began to fall from actual warplanes. After reading some obscure papers on the properties of radium Wells realized that if the new form of energy that the scientists were imagining could be harnessed then a bomb could be made. In 1913 he published "The World Set Free" asserting that the atom bomb was invented in 1956. Reality caught up to Wells before that in 1945 when this terrifying fiction was dropped onto Hiroshima and Nagasaki.

There is of course a well documented feedback loop between the imaginings of science fiction writers and engineers [6]. The influence of Star Trek on the development of the mobile phone is self evident. The inventor of Quick Time is on record as saying that he got the idea from an episode of the Next Generation when Data walks into his room and asks to hear Mozart. But fiction today is penetrating the real at a much faster rate than ever before. The speed of change is so dizzying that it cannot but appear miraculous. At the Solutionist Studio it is now only necessary to describe a device for it to exist.

Wells begins "The World Set Free" with an account of humanity's development from its first appearance on the planet. Once "Man" has made tools enough to distinguish himself from his nearest ancestors there appears a storyteller. This storyteller tells eager listeners of a day to come when some hero will battle with a mammoth and win. It is this "seeker" that

dooms the mammoth and propels the development of civilization forward.

"Such a man was that Leondardo da Vinci, who went about the court of Sforza in Milan in a state of dignified abstraction. His common place books are full of prophetic subtlety and ingenious anticipation of the methods of the early aviators. Durer was his parallel and Roger Bacon - whom the Franciscans silenced – of his kindred. Such a man again in an earlier city was Hero of Alexandria, who knew of the power of steam nineteen hundred years before it was first brought into use. And earlier still as Archimedes of Syracuse, and still earlier the legendary Daedalus of Gnossos." [19].

HG Wells would have found nothing surprising in the notion of "design fiction". Sterling makes a distinction between science fiction that is fantastical and design fiction which makes "more sense on the page" [16]. But Wells' science fiction was always plausible, so was that of Leonardo and Archimedes.

Plausible fictions do not account for the events at the Solutionist Studio where fake prototypes become real. In the Satanic Verses Salman Rushdie writes of a hospital ward full of mythological creatures such as manticores. A man with a tiger's head explains that the English are responsible: "They have the powers of description, and we succumb to the pictures they construct." In his latest novel Rushdie describes a nurse whose arms start to rot when she picks up a baby. It later emerges that she was stealing medical supplies to sell them to drug addicts and as the story progresses it becomes apparent that the baby exposes corruption [14]. The metaphoric corruption of bad faith becomes real rotting flesh. Magic realism often proceeds by making metaphors real. In this sense magic realism is an accomplishment of language. The wonder tales of the Arabian Nights, the transformations of Ovid, the metamorphoses in Kafka, the miracles that take place in Gabriel Garcia's town of Macondo – none of these can be accounted for with the notion of advancing reason and technological progress. These fictions offer no scientistic explanations nor speculate on how technologies might accomplish the wonders described. Magic realism answers no problems and offers no solutions futuristic or otherwise. But these wonder tales are the oldest form of literature that survives to us and it can articulate human fears and desires that are perhaps deeper than those described in the fantasies of rationalistic design fiction.

Conclusion

This paper has described fictions that became reality in the Solutionist Studio. The lab was given its title in a spirit of irony. Morozov defines solutionism as solutions for problems that do not exist or quick fixes for complex social, political and environmental problems [13]. We called our lab "the Solutionist Studio" in a spirit of irony in the hope of avoiding that kind of thinking; but the irony was on us. We present our findings here as a piece of magic realism because we know that if we claimed them to be true we would not be believed. And yet the only fiction presented here is the notion that this is fiction.

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Imaginary Design Workbooks: Constructive Criticism and Practical Provocations

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ABSTRACT

This paper reports design strategies for critical and experimental work that remains constructive. We describe a design workshop that explored the "home hub" space through "imaginary design workbooks". These feature ambiguous images and annotations written in an invented language to suggest a design space without specifying any particular idea. Many of the concepts and narratives which emerged from the workshop focused on extreme situations: some thoughtful, some dystopian, some even mythic. One of the workshop ideas was then developed with a senior social worker who works with young offenders. A "digital social worker" concept was explored and critiqued simultaneously. We draw on Foucault's history of surveillance to "defamiliarise" both the home hub technology and the current youth justice system. We argue that the dichotomy between "constructive" and "critical" design is false because design is never neutral.

Author Keywords

Design fiction, domestic technology, surveillance, privacy

ACM Classification Keywords

H.5.m. Information interfaces and presentation

CONSTRUCTIVE VS CRITICAL DESIGN?

From a certain point of view design is a very practical business that mainly requires precision and clarity. Like engineering and architecture it is ultimately concerned with construction and in this respect it is much more of a science than an art. But design is also linked to messy Humanities based practices like criticism and even fiction. Critical design can function like an essay to highlight some aspect

of our lives that we might not otherwise notice [14,15,13]. Design Fiction describes products and services which do not exist to reflect on the social and political impacts of new and emerging technologies [3,7,26,27,38,39,41]. Construction and criticism can sometimes appear to be polar opposites. Indeed, the title of a recent paper by Forlizzi et al calls for a divorce between these types of design [16]. This paper argues that the dichotomy between criticism and construction is a false one.

The idea of criticism as a primarily negative or destructive act has long been rejected in the field of STS (socio-technical studies). In 2004 Bruno Latour wrote:

"*The critic is not the one who debunks, but the one who assembles. The critic is not the one who lifts the rugs from under the feet of the naïve believers, but the one who offers the participants arenas in which to gather.*" [25].

We take the design of voice activated "home hubs" as an example of a domain where critical thinking is essential to any kind of constructive work. The paper reports findings from a design workshop at Mozilla which aimed to explore the home hub technology space. The workshop was built around "imaginary design workbooks" - collage based documents made up of images, sketches and invented diagrams, signs and symbols. Participants used these workbooks as a resource to create narratives around potential technologies. The narratives were often dark and dystopian reflecting contemporary concerns with the possible abuses of technological power.

Voice activated home hub technology affords unprecedented invasions of privacy. The potential for new forms of surveillance are such that they might transform the home into a cell of a penal colony. Taking a Foucaultian perspective on the development of prisons we consider how home hubs might be developed in the context of non-custodial sentences for young offenders. The paper concludes with imaginary design workbook pages sketching the notion of a "digital social worker". We argue that design in these contexts is inherently political and for this reason any constructive design work must also be critical.

DESIGN IN THE POST PRIVACY AGE
In 2010 Mark Zuckerberg declared that privacy was no longer a social norm:

"People have really gotten comfortable not only sharing more information and different kinds, but more openly and with more people," he said. "That social norm is just something that has evolved over time." [23].

Clearly, this is a self-interested statement from the CEO of a company that is leading the way in demolishing our previous notions of what was and was not "public" information. But it would be difficult to argue that social norms have not changed following the mass adoption of smart devices. The phones we carry today are literally our fingerprints: they log where we go, what we read, what we buy, and the questions we ask. As a condition of use apps can access our cameras, microphones and contacts as well as installing spyware in return for as little as a flashlight.

In addition to the devices we carry, there are now networked technologies in the home such as Alexa and Google Hub. These voice activated devices allow users to perform speech based internet searches, stream music and radio, as well as place shopping orders, get weather forecasts and so on. Although manufactures insist that the listening mode of such devices is only activated when a user gives a "wake word" like "Alexa" or "OK Google" they are technically capable of listening all the time and indeed must do so in order to detect the wake word [44]. Police in Arkansas recently demanded that Amazon turn over recordings made in the home of a murder suspect [34]. The surrounding publicity raised questions for many customers about what was and was not being recorded.

Mozilla Workshop
In the summer of 2017 Jofish Kaye invited Mark Blythe to run a design fiction workshop at the biannual *All Hands* meeting of Mozilla. Figure 1 shows a forward-looking and deliberately provocative figure for discussion at that meeting:
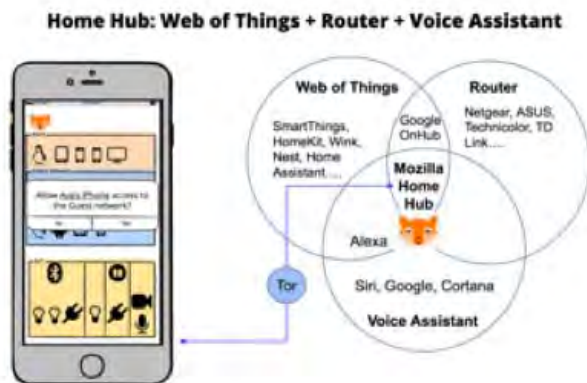

Figure 1 Home Hub. Mozilla All Hands Meeting 2017

There are any number of ways in which router, voice assistant and web of things technologies might be configured to produce novel functionalities and services. Jofish wanted a workshop that would explore this space in as imaginative and creative a way as possible. Design fiction is increasingly recognized as a useful tool for thinking about new and emerging technologies, not merely in terms of technological possibility but also potential social impact (e.g. 1,7,8,9,24,27,35,39,40). We designed the workshop around an "imaginary design workbook".

IMAGINARY DESIGN WORKBOOKS
In "Magic Machine" workshops participants create devices from cardboard, plastic cups, straws and other lo fi materials in order to articulate desires and fears around new technology. [3,4]. The workshops begin with the Arthur C Clarke quote about any sufficiently advanced technology being indistinguishable from magic (ibid). This allows participants to imagine possibilities without feeling constrained by whatever is currently technologically plausible. We wanted to capture something of this spirit in our thinking about the home hub space. While planning the Mozilla workshop the first and second author were working on a paper based on a fictional writer called Valdis Ozuls who wrote prescient design fiction in the 1940s [9]. Following this we thought it might be interesting to create an imaginary designer. At first we thought this might be someone working in an unfamiliar country or society. Perhaps their designs could have been stolen in an act of industrial espionage. The ethics of this scenario were problematic however and the idea developed into a found object. The "found object" device is such a staple of post modern literature that Umberto Eco's Name of the Rose begins with a preface entitled "Naturally, a manuscript." This describes how the author finds a fourteenth century book, which he purports to then translate. Here we imagined that we had found a design workbook.

Design workbooks are documents used to record initial concepts, sketches and inspirational materials [21]. The first author suggested that we might find the workbook of a Chinese designer. He sent crude line drawings of a chameleon like hub to the second author who transformed this idea into a much more elaborate and imaginative final form [9].

Enrique was inspired by The Codex Seraphinianus (Figure 2), an encyclopedia depicting an imaginary world created by its author Luigi Serafini [35]. The illustrations in the codex are surreal creations which suggest biotechnologies and hybrid creatures, part mechanical and part organic. It is written in an invented language and features many diagrams and instructions that are impenetrable yet suggest a kind of logic. The symbols and text imply taxonomies and meaning without ever specifying anything. Such material is open to multiple interpretations in ways useful for design [20]. Serafini intended to elicit a similar experience to that of

children reading books they cannot understand which they know hold meaning for adults [45].
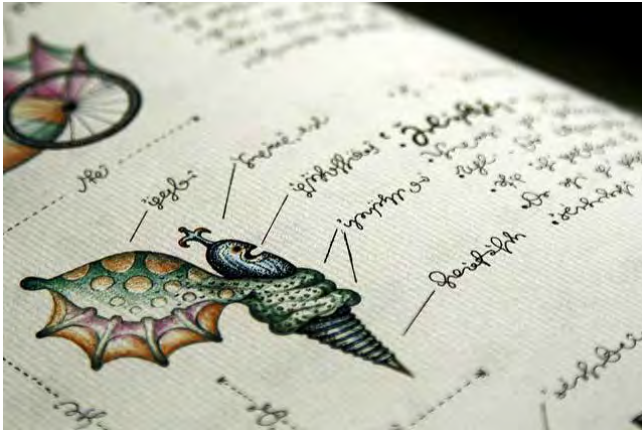
Figure 2. codex 3. Jack Lyons. CC BY-NC-ND 2.0 Photograph of page from Codex Seraphinianus

This inspired the second author in making an "imaginary design workbook" that would explore the home hub space. He created the books through collage, gluing images, sketches and diagrams into the pages of a blank notebook and adding watercolor and other effects like metallic masking tape with symbols written onto it. The document was then scanned, and twenty five copies were printed and bound for the workshop.

Bookonon: Imaginary Workbook Examples
The imaginary workbook, "Bookonon" was divided into three sections each containing around ten pages. The first section featured hybrid creatures of the kind depicted in Codex Seraphinianus (figure 3).
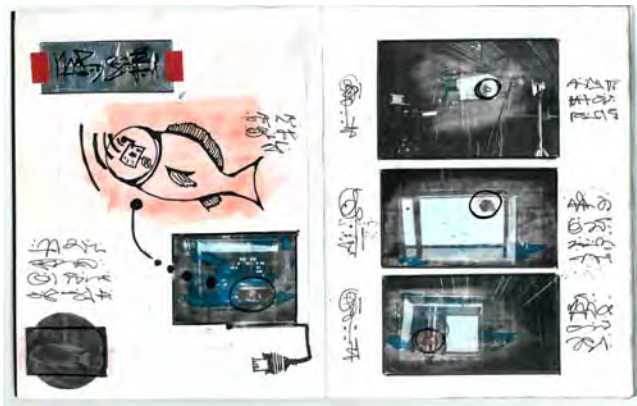
Figure 3: Bookonon Section One Example

The second section featured more obviously mechanical devices which often implied physical augmentation of some kind (Figure 4).
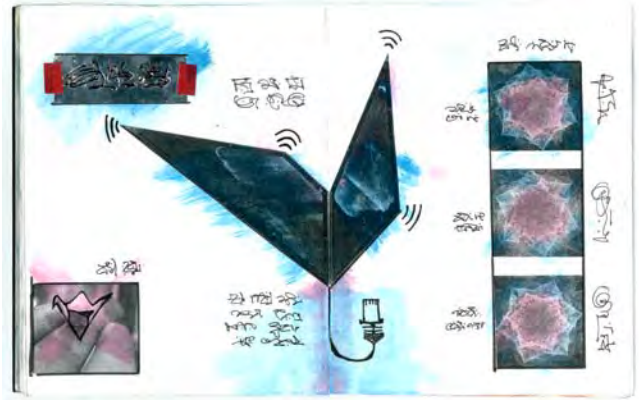
Figure 4: Bookonon Section Two Example

The final section drew on insect like or cell based imagery to create this kind of layout (Figure 5):
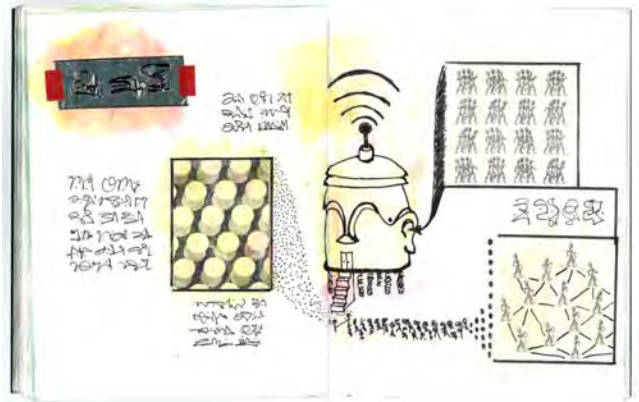
Figure 5: Bookonon Section three Example

The original notebook was multi textured with various materials including photographs, sketches, aluminum foil and supposed writing. The scanned workshop booklet was flat but was perhaps all the more strange for that. Copies of the booklet were given out to the workshop participants and the morning session began with this preamble:

"*What if we found a designer's notebook in a non place, like an airport? We know nothing abut them, not even where they live or what language they speak, the notebook is written in an invented language. Could we make any sense of it?*" [Workshop Notes]

The participants were then invited to choose a sketch and annotate it, attempting to make some kind of sense of what was being depicted. The participants found the books very engaging and the activity generated a lot of good-humored

discussion.

Figure 7: "Translated" Imaginary Workbook

The annotation in the bottom right hand corner of the workbooks in figure 5, says "wifi mesh network web" and "some other sensing /network protocol". The session generated many concepts some plausible, some wild and fantastic.

Following this we participants asked the participants to create narratives around the imaginary devices based on Kurt Vonnegut's story shapes e.g. "man in a hole" where a man (though it needn't be a man) gets out of a hole (though it needn't be a hole) [43].
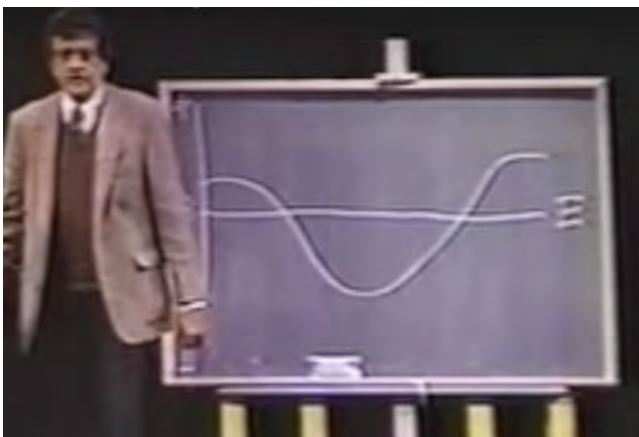
Figure 6: Kurt Vonneugut, Man in a Hole Story shape. [43]

The participants annotated pages from the workbook in pairs and then shared back to the group by telling a story that followed the "man in a hole" shape.

The stories that were improvised were often somewhat apocalyptic – reestablishing networks after some catastrophic event, finding ways to communicate in private under a totalitarian regime. Other ideas were more mundane: how could something configured like a pet help to identify and manage emotions; raised voices with no laughter, for example, might cue a change in lighting or music. Or a system might use insight from Gottman's

"Love lab" work in psychology to inform algorithms that would encourage positive romantic relationships or positive parenting [22].

Many of the ideas were concerned with alternative or hacked networks, sometimes making use of wildlife or insects or hybrid pets depending on the images that the participants were responding to. One quietly spoken engineer surprised everyone with a beautifully improvised first person account of the frustration a young man experiences in his networked driverless car. He hacks the vehicle in order to take control and ride the freeway for the first time. The engineer's performance received much applause.

In the afternoon session the participants were invited to create their own imaginary workbooks based in countries other than the one they lived in, such as North Korea or the Congo. They were also asked to create workbooks for alternate timelines, such as a homehub network for a 1980s Soviet Union state. They created their own symbols which were then interpreted by other participants.
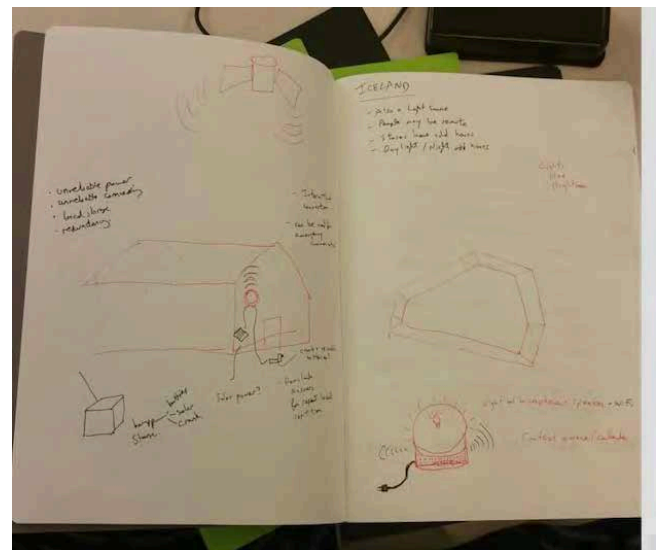
Figure 8: Participant Workbook

Participants come to workshops like this with a variety of backgrounds and aptitudes which shape how they engage with the material. The workshop was made up of engineers and coders but also people with a very strong background in concept design and future casting. For instance, the fourth author, Miriam Lueck Avery is director of strategic foresight in the Emerging Technologies group at Mozilla. Prior to this she was a research director at the Institute of the Future, so she is used to synthesizing technology scenarios with diverse problem sets.
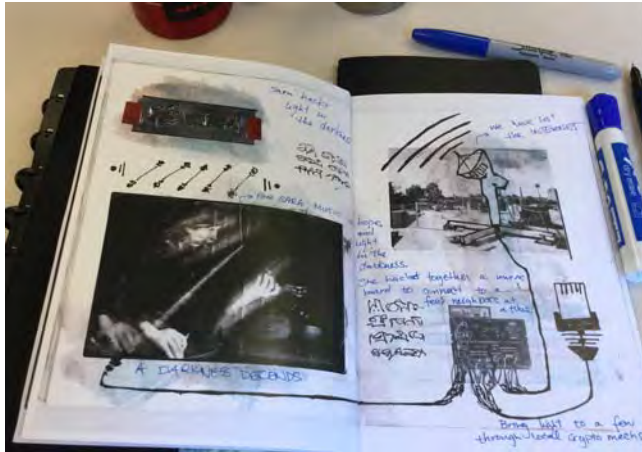
Figure 9: Miriam's Synesthesia Machine Workbook Page

The text in the middle reads: "For Sara music is hope and light in the darkness. She hacks together a [illegible] board to connect to a few neighbors at a time".

After the workshop Miriam worked one of her workbook ideas into a short story. This story is called *Andrew and the Synesthesia Machine* and begins with someone who asks questions: why don't the pipes in his building work, why isn't there clean water, he becomes an activist and gets answers. The narrator introduces him to a student at a university working on an experimental prototype.

"*She had built something that might change everything. We went to visit her in the lab. The second prototype box was black and shiny and the size of an apple. The first prototype covered the bench. A cord snaked between a microphone stand, a Lexan box lined with mirrors and screens, a synthesizer, and several laptops. […]*

Andrew had so many questions. The student had many answers. The microphone listened. The lexan box and synthesizer hummed to life. Images swirled in the box. Ghostly fingers seemed to depress the keys. Soon the room came alive with noise and light.

The questions and answers had become explainer videos, set to custom music. […]. It took voices, and turned it into videos. It took videos, and turned it into music. It took music, and turned it into text. It took text, and turned it into smells. She called it the Synesthesia Machine. […]

Then, one of the other labs pinged back. The student stopped. That had never happened before! Their output system uses viruses. They infect, and persuade. Like that virus that rats get, which makes them more likely to be eaten by cats. The two projects could work together! […]

A system is developed but it is potentially dangerous.

Last week, some rogue government agents deployed a similar technology in the Philippines, and things got dark. (Many were arrested, and others died). But we could use it for good. It must be used for good."

The protagonists use the machines at a gathering of rich and powerful people:

"Two thousand people, people of power, were breathing my special air.

The lights dimmed slightly before the schedule indicated they should. The images and voices and music started flashing across the screens. They also flashed across the tables. Moods and smells flooded the room. Smells of sewage and sadness joined my spikey persuasion viruses in the nostrils of the powerful. Strange music keened overhead, abstract but unforgettable.

A low murmur of reaction soon mounted to a roar. It started as a roar of confusion. The pitch then changed to consternation. Finally, outrage."

Miriam's story encapsulates many of the concerns and possibilities that were discussed during the day: fragmented communities, an increasingly authoritarian state, broadening divisions in society, the potential for technological developments to be used not for "good" as the protagonist of Miriam's story insists, but rather political and social domination.

Although much of the workshop was playful many serious issues were discussed. It was very clear that while this kind of voice activated home technology had the potential to improve lives it also had some worrying implications.

AFTER THE WORKSHOP

Feedback on the workshop was extremely positive: it had been very stimulating for organizers and participants alike. This kind of stimulation and debate is sometimes framed as a goal in itself but it can also be characterized as a weakness: such activities are just discursive, maybe interesting but ultimately of no practical value. This kind of work is not useful, practical or constructive, it is just social critique that might be accomplished better with an essay. But both the academic and industrial partners pursued the ideas after the workshop and developed them further.

The Digital Social Worker

After the workshop the material was discussed with the fifth author Rob McCabe, a senior social worker for Birmingham City and Council. Many of the workshop ideas began to coalesce around the complex-needs of the families that he works with on a daily basis. The use of extreme characters and situations has long been recognized as being of practical use in design. In 2000 Djajadiningrat et al considered technology for "extreme" users like a polyamorous woman or the Pope and demonstrated how these extremes can help to widen or narrow the design space [12].

Rob recently authored a report on a school that served some of the most troubled children in the city. A cohort of seventy five children cost the city approximately seven million pounds in fees to institutes for young offenders

[29]. There was a very high rate of recidivism amongst this group with one prosecution making repeat offences more likely. Rob is currently spearheading the Birmingham Pathfinder Project: 'Different Perspectives-Shared Authority'. School age pupils who have Social Emotional Mental Health (SEMH) difficulties in Birmingham are amongst the most deprived children in the City. Their lives are often characterized by severe multiple disadvantage, such as being born into families where there is an entrenched culture of violence and experiences of multiple traumatic episodes. Family profiles can feature a spectrum of Adverse Childhood Experiences (ACES), including domestic abuse, substance misuse, criminality, bereavement, family breakdown, sexually harmful behavior, self-harm and mental health issues.

Rob is leading a multi-agency "Pathfinder" which offers a new kind of intensive and relational support, wrapped around by a multi-agency team, dedicated to the most troubled pupils and their families. The pathfinder aims to reach families that need help earlier and more quickly through staff who have a shared understanding of multiple and complex needs of their clients. The aim of the project is to achieve positive and longer-term relationships to create more capacity in families for sustained change. By demonstrating a more ACE informed collaborative or 'co-resolve' approach to building stronger families the pathfinder is attempting to re-imagine the 'statutory service-client' relationship. A Parent's Forum is underway and aims to shift family awareness from 'what's wrong with my child?' to 'what's happened to my family?'

Working with Rob we developed a number of scenarios around a complex needs family. "Jessica" is a single Mother who lives with her fifteen year old son Jack. Jack has committed multiple violent offences and often physically intimidates his Mother. The scenarios revolved around "Winnie" a workshop inspired home hub type device with always on speech recognition and access to various home sensors, links to the school as well as the pathfinding social work team. Some fifteen or so one line scenarios were written, for example:

Winnie informs the school that Jack only spent two hours in bed last night.

Winnie messages Jessica to say that Jack has taken six lagers from the fridge.

Winnie registers raised voices and changes the lighting and music.

A mirror logs Jack's red face as stressed cueing a path finder phone call.

Winnie registers Jack's speed typing text messages and infers agitation, it logs a call from Jack's father with raised voices, Winnie suggests that Jack engage with his anger management programme.

Winnie registers an argument between Jessica and Jack. Jessica employs an agreed "safe phrase" and Winnie places a call to the police.

In these scenarios Jack has been sentenced for an offence and given choice between Young Offenders Institute and living with Winnie.

Enrique developed further imaginary workbook pages around the idea of a Digital Social Worker:

Figure 10: Digital Social Worker

The sketch in figure 8 features the kind of cut and pasted magazine pictures typically used in a design "mood board". It suggests the digital social worker as an agent in the service of better statistics. There are data plots pointing at smiles when the numbers go up and hands that bubble up from executive performance awards.

Figure 11: Digital Social Worker 2

The second sketch (figure 11) free associates around ideas of a family pet. There is a very unthreatening puppy but the idea of a dog also conveys the notion of a guardian. Again

this kind of layout is typical of mood boards in early concept development.

The boundary between provocation and proposal is thin. We wondered what the imaginary workbook would look like if it became real. Enrique turned the imaginary language into English for the spread below.

Figure 12: Imaginary to Real Workbook

"Winnie" is pictured here as a realistic home hub like Alexa. The device is linked to social services and the police and framed as an alternative to imprisonment in a young offender's institute. In the bottom left of figure 12 is a sketch of a toilet illustrating urine monitoring to check for drug intake. Communication devices are monitored, text messages and speed of typing infer agitation, the device is linked to the fridge showing patterns of consumption and there is a wearable monitor pictured with a photograph in the centre suggesting a system involving a "safe phrase" to be spoken by the mother or carer to trigger police intervention. Another iteration of the idea supports activities like meditation:
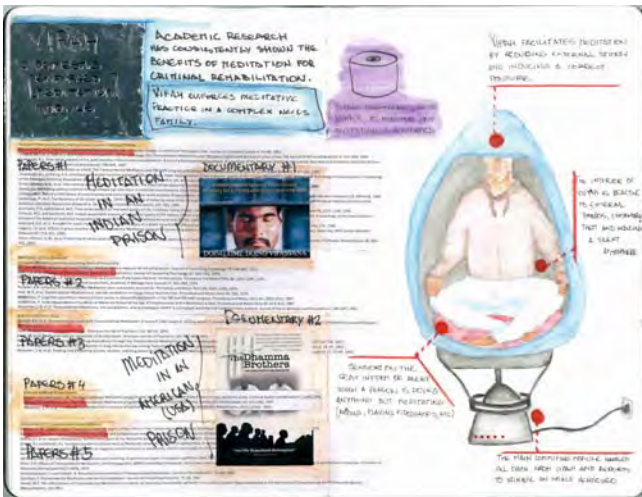
Figure 13: Vipah

The page includes scrapbook style references to academic studies on the benefits of meditation for criminal rehabilitation. Elizabeth Buie also considers this kind of application of application in her thesis [11]. Here the chair-pod reduces external stimuli and helps posture and the seat indicates whether it is actually being used for meditation or something else like playing video games. The idea of "enforced meditation" is something of a paradox and could be described as surreal. Indeed the surrealist filmmaker David Lynch promotes transcendental meditation through his foundation and provides a long bibliography of studies which show the benefits of meditation in prison e.g [1, 2].

These discussions took place outside of the setting of the original workshop. But discussions about always-on voice systems continued at Mozilla as well. In order to engage with immediate ethical concerns about always on voice recognition, an artist was commissioned to create a friendly representation of the system:

Figure 14 Foxy image by Heather James Knight.

The cute characters in figure 14 were seen as far less threatening and sinister and facilitated discussions in Mozilla around commercial applications. The figure was modified below to represent the digital social worker idea:

Figure 15 Digital Social Worker Modification.

The image is perhaps less friendly but remains largely unthreatening and underplays the more disturbing aspects of the idea by keeping things cute.

The digital social worker idea might be dismissed as "solutionist" a quick technological fix for a complex social and political problem [30]. But it is imagined in the context of the pathfinder project with multi agency wrap around support. McCabe shared the design (and a draft of this paper) with senior social work colleagues. We were expecting responses expressing interest but serious reservations about ethics. But reactions were much more positive than we expected and Rob's colleagues were very excited by the possible applications of such a system. Much like ankle tags [36], a home hub could be part of a disciplinary system which is not unproblematic, but may be preferable to incarceration.

Clearly this is a provocation but it is not simply a critique of existing technology. And in order to mitigate against solutionism we developed further narrative based design fiction.

IMAGES VS NARRATIVE

Images can be powerful ways to illustrate design concepts and explore ideas. Clearly there are advantages to images over text in terms of leaving room for interpretation and ambiguity. But narrative complicates fiction by introducing the element of time [33]. One of the differences between a standard HCI scenario and a design fiction is the inclusion of conflict – the basis of any drama [6]. Annotating the imaginary workbooks generated many concepts but the story shapes allowed for the construction of narrative. The addition of narrative very often led straight to the possibility of abuse – in Miriam's story for example, the technology is deployed by rogue agents in the Philippines and things get "dark" before anything positive happens.

The notion of a digital social worker in the one line scenarios and sketches focused on the users and the technology. In order to consider the idea from alternative angles we made a design fiction that would focus on the social context and the state. We further explored the digital social worker with a more developed narrative in order to mitigate against solutionism and consider the perils as well as the possibilities of this technology.

Historical Design Fiction

The digital social worker idea was applied to the world of Valdis Ozuls a fictional writer named imagined as living through the Soviet Occupation of Latvia [9]. Ozuls is an academic historian but also writes, under various pseudonyms, many very prescient stories that more or less accurately predict some of today's technologies. For example, in the 1940s he writes a story describing a President who sends thirty second audio clips to hand held devices that it is compulsory for citizens to carry (ibid). An Ozuls story written in the 1980s was set, like some of the imaginary workbooks, in the former Soviet Union:

"He was able to understand his life only when it was almost at an end. Long after the state had fallen, when the city had a different name and the files had at last been made public, Maris Berzins browsed through his Winston database and felt as if he were meeting another self from forty years ago. It was an experience common to anyone exposed to their Winston data and known by scholars as the Proustian effect. Maris was surprised at how much of these data were absent from his own memories, forgotten, half remembered or actively distorted. He looked through the information with a mixture of fondness, surprise, embarrassment and shame. Unlike the files compiled by humans he could attribute none of this to error, here it all indisputably was" (ibid)

Maris discovers that his case worker and future wife, Liga, had been intervening in their lives through Winston lon before they met. She was remotely monitoring family life and trying to help: if the atmosphere was tense she changed the channel on the radio, if voices were raised she dimmed the lights and so on.

"As he went deeper into the file Maris realized he had had to learn an entirely new version of his own life story. Incidents that he had thought were happy co-incidences had been carefully planned by Liga. Discovering that they liked the same music, literature and films were not the serendipitous accidents that they had seemed, she had been studying him. She had seduced and married him in order to perfect the measures and sensors that Winston would later use on the rest of the population" (ibid)

Maris discovers that the officials who arrived one day to install the Winston programme in his home had been ordered to do so by Liga. She had joined their family in order to refine the design.

"The initial publicity for the Winston programme had framed it as "positive surveillance", the age of the state spying on its own citizens to prevent rebellion was over. This was not a punitive regime, it was rather a service: a Stasi Godmother. Winston would offer the best advice on

childcare, supply parents with vital data about their children [,,]

There were some early successes and the deaths of some vulnerable children were prevented through early detection of neglect. But Winston's advice was not consistent, some days it advised parents to be strict other times to leave the kids alone. Sometimes the order was to replace butter with vegetable oil and sometimes the exact reverse. Then corrupt case workers began taking bribes so that Winston would give them more favorable reviews as parents". (ibid)

When Maris discovers that Liga had been the one who ordered the arrest of his first wife he closes the file and erases the data.

The Ozuls story draws on Timothy Garton Ash's account of reading his own secret Stasi file when it was released twenty years after he had lived in East Germany [18]. He called the effect Proustian after the famous episode in *Remembrance of Time Past* where the author vividly recalls visiting his grandmother as a child when he dips a madeleine biscuit in tea. Garton Ash's file was some 300 pages long but this was dwarfed by comparison to the files of some dissidents which were 40,000 pages long (ibid). The Proustian effect described is Ash's but the rest draws on other fictional accounts of life under the Stasi in the nineteen eighties such as the film *The Lives of Others*. Winnie becomes "Winston" as a reference to Orwell's protagonist in 1984.

This narrative based design fiction operates as a kind of thought experiment: what if current technology had existed during the 1980s in a country like Latvia under surveillance by the KGB (ibid). This move considers not just technological possibility but historical precedence: what has happened before when the state has taken an extreme interest in the home life of its citizens. It is as pessimistic as the design workbook images are optimistic.

But the criticism implied in the narrative (the dangers of surveillance, possible abuses of power) are not intended to simply curtail all development. This is impossible: these systems are not only being built, they are already in our homes. The fictions both positive and negative, work to indicate the shape of the design space. Winston is imagined as a system that would help deal with a troubled teen in a family with complex needs albeit in another time and place. However bizarre or totalitarian a system like Winston might seem it is no less bizarre than the current system of youth justice. Fictions whether text or image based can help "defamiliarise" or make strange [37] our present-day realities. Historical writing can have the same effect. Looking at the past prompts questions about the present. Nowhere is this clearer than in Michel Focuault's historical survey of the rise of the prison system.

DISCUSSION: DEFAMILIARISATION BY DESIGN
Foucault begins *Discipline and Punish* with a juxtaposition of two design artifacts: a death sentence and a timetable.

The death sentence orders that Damiens, a regicide, be publicly executed by "drawing and quartering". Foucault quotes extensively from an eye witness account so that the reader is confronted with exactly what this means. Each of the man's limbs are tied to a horse pulling in different directions.

Figure 16: Execution of Robert Francois Damiens

Following a detailed and harrowing description of this execution Foucault transcribes the rules for "The House of Young Prisoners in Paris". The times and manner in which they rise, make their beds and say their prayers are all minutely specified as are the ways in which they wash and eat. After listing their routine hour by hour Foucault observes that less than a century separates these two penal styles. The bloody spectacle of public torture is placed alongside the dry routine of the prison in order to render them both strange. How odd that men and women separated by only a few decades could consider either as aspects of the same abstract idea: justice. We cannot see either public torture or incarceration in quite the same way again.

We are often blind to our own historical moment. Whatever happens to be the norm for the era we live in is taken for granted: it is normal and ordinary. Although prison may seem to us quite unremarkable this is not how it would have seemed to our ancestors, nor is it likely to seem so to our descendants. Foucault continues the strategy of defamiliarisation in *Discipline and Punish* by focusing on the period before the prison sentence became the standard punishment for all crime. Reformers of the early nineteenth century considered many alternatives that might seem odd to us now. One of the most popular ideas was that punishment should fit the crime symbolically. Foucault quotes from the reformer, Vermeil:

"those who abuse public liberty will be deprived of their own; those who abuse the benefits of law and privileges of public office will be deprived of their civil rights; speculation and usury will be punished by fines; theft will be punished by confiscation; "vainglory" by humiliation;" (Vermeil, 68-145; cf. also Dufriche de Valze, 349 cited in Foucault)

For Le Peletier, violent criminals should be subject to physical pain, the lazy sentenced to labour and more ambiguously "he who has acted despicably will be subjected to infamy" (p.105) For these reformers one size did not fit all. Foucault lists a whole range of these "picturesque punishments", they include imprisonment but it is only one strategy amongst many.

The idea that prison represents any kind of social justice is difficult to sustain in the face of the statistics on the over representation of ethnic minorities and the lower classes in world prison populations [29]. A recent report into the British criminal justice system found overt bias and discrimination: young black people are nine times more likely to be jailed than young white people [10]. Added to the social justice critique is the spiraling economic cost of prisons. Even journalists for right wing newspapers like Britain's *Telegraph* describe the UK's prison system as "completely and utterly broken" citing the famous statistic that it costs more to send someone to prison than it would to send them to Eton or Oxbridge [32].

Beyond the Construction / Critique Dichotomy
Foucault once remarked that it had taken ten years to turn Sartre's philosophy into a t-shirt but a matter of months to do that to him. His work is often invoked as a slogan like "knowledge is power" where power is a tool of oppression. But Foucault was always quick to point out that power can also be liberating. He was an enthusiastic frequenter of LA bathhouses and enjoyed S & M fetish games so he was very familiar with the liberating possibilities of willing consent in a power relationship [28].

The beginning of this discussion frames an execution and a timetable as design artifacts. This takes a broader view of design than is sometimes taken in HCI where it can be strongly or even exclusively linked to making something through craft or coding [13]. What constitutes "design" has been fought over across many disciplines including: product design, furniture making, service design, illustration, fashion, sound, film, animation and so on. Linguistic analysis of HCI papers indicates that the word "design" functions primarily as an honorific [7]. We have attempted to show that design in a post privacy space is inherently social and political. The terms and conditions of apps like Tinder are as much a part of the design as the swipe left or right interaction. The contract creates the space for selling data that underlies the business model without which the app does not function. Narrow artifact based definitions of design are simply inappropriate in this domain. Therefore design in this space must and should entail social and cultural critique.

The Digital Social Worker could be presented solely as an ironic provocation, a design for debate or a "questionable concept" [42]: this kind of provocation could be framed as a Swiftian "modest proposal" - let us abolish prison for young people by turning their homes into prisons. We might also present it as a critique of already existing

systems: the technology that you willingly adopt can be framed as a punishment for a crime. But we are not doing either of these things. Rather we are attempting to explore the potential and possibilities of already existing technology with a critical awareness of the abuses that such a system would be vulnerable to if it were developed. Understanding the historical precedents of states surveilling their citizens is crucial to both a critique of current consumer technology and also the ways in which it might be adapted to the needs of extreme users like vulnerable families. Critique and Construction should not be separated in contexts like these.

Ray Kurzweil described a fable about a Chinese emperor who promised to reward an inventor with anything he asked for. The inventor asks for rice, one grain on the first square of a chessboard, 2 on the next, then 4, 8, 16 and 32 with the doubling continuing until the 64th square. The Emperor agrees to this seemingly modest request but by square 21 there are a million grains, in the middle of the board there are 4 billion grains. Kurzweil related this story directly to the doubling of computing power described in Moore's law and argued that in 2006 we reached the centre of the chessboard. After that point the math becomes dizzying moving through petabytes, tetrabytes and exobytes at a rate that strains our ability to conceive number [24]. We are living in an era with technology that would have been literally magical to any other generation and the magic is everywhere, in the landscape itself and far beyond the boundaries of any traditional discipline.

CONCLUSION
This paper has argued that the dichotomy between constructive and critical thinking is false. In order to be constructive thinking must be critical. Home technologies that record the minutia of our lives are already with us. The question is not should these data be collected but how should they be used and regulated. In these kinds of "post privacy" spaces design must engage with political, ethical and legal issues. Indeed, it already does, the question is whether designers are prepared to acknowledge this and take responsibility or not.

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"Grand Visions" for Post-Capitalist Human-Computer Interaction

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Author Keywords

Post-capitalist HCI; Post-capitalism; Post-barter; Grand
visions; Late capitalism; Science fiction;

Introduction

The design, development and deployment of new
technology is a form of intervention on the social,
psychological and physical world. Whether explicitly
intended or not, all digital technology is designed to
support some vision of how work, leisure, education,
healthcare, and so on, is organised in the future [11].
For example, most efforts to make commercial systems
more usable, efficient and pleasurable, are ultimately
about the vision of increased profits as part of a
capitalist society. This workshop will bring together
researchers, designers and practitioners to explore an
alternative, post-capitalist, "grand vision" for HCI,
asking what kind of futures the community sees itself
as working towards. Are the futures we are building
towards any different from those envisioned by Silicon
Valley entrepreneurs, which are typically neoliberal,
absent of strict labour laws, licensing fees, tax
declarations and the necessity to deal with government
bureaucracy?

Recently, Reeves et al. identify two types of future
envisioning; 1) those based on extrapolation or

Visions of the Future

Above *SpaceX's* vision of reusable, cheap interstellar travel to Mars and beyond. Image credit: SpaceX

Below Ring-shaped "orbital" world from *The Culture*. Image credit: Mark Salwowski
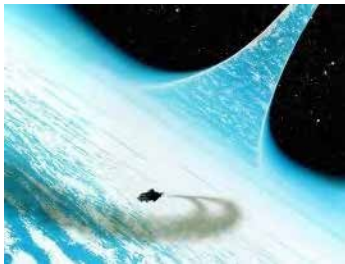
"projection" from the current state, where our vision of the future is based on detailed knowledge of the past, and 2) grand visions that serve as waypoints for us to work towards. Reeves et al., conclude that envisioning in Ubicomp and HCI research is almost entirely of the "projection" variety, and there are few grand visions presented [16].

With this workshop, "by announcing one or more grand visions of the future, we seek to direct present actions in such a way as to make it come to pass" [18]. We are specifically interested in exploring grand visions of post-capitalist computing, in explicit contrast to what we see as a prevailing implicit vision of neoliberalism in HCI. This workshop will:

- Explore the above assertion that the mainstream HCI community is oriented around neoliberal capitalist visions of a hi-tech future.
- Serve as an opportunity to present alternative world visions, towards which HCI researchers can orient their work.
- Facilitate the establishment of a supportive community of researchers, whose work is already (explicitly or implicitly) anti- or post-capitalist.
- Support new and existing scholars in considering the implicit values of research in HCI.

Background

Jameson [10] suggests that, *"It is easier to imagine the end of the world than it is to imagine the end of capitalism."* This statement rings true if we consider themes of popular modern films and television, which are much more likely to deal with zombies, plagues,

volcanoes and earth shattering meteors, than utopian visions of egalitarian societies. It also resonates with the motivations behind much contemporary technology development. New technology is typically proposed as a way of cutting costs, removing or lowering the need for human work, increasing the reach of goods and services, disrupting inefficient industries. Even instances where technology is designed to bring joy, support or comfort, it is still justified as being good value for money, or intended to form part of a product ecosystem. For example, the SpaceX Mars colonisation vision[1] proposes it is a good opportunity for real estate investment. It is rare that technology is envisioned, without that vision being constrained and framed by how it will be paid for. This constraint to the capitalist system has potential to impact upon the most vulnerable of society, such as those reliant on state welfare, those who have limited financial resources, and those who have been forced to migrate. Moreover, it is very rare to see technology designed towards a future in which making money is not a key concern – it seems to be currently beyond our collective imagination. However, this was not always the case, and much energy and scholarship has previously been invested in considering how post-capitalist societies may function, and how technological infrastructures may support them.

Historical Context of Post-Capitalism
Post-capitalism is the proposal of a socio-economic model that completely replaces capital as the primary method of organising society. This idea is not new - Marx and Engels wrote at length about the destruction, replacement or evolution away from capitalism towards

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[1] http://www.spacex.com/mars

a society where humans are freed of labour by the technological advances of the time. This work, along with social experiments such as the Paris Commune [19] helped to progress and disseminate understanding of alternate socio-economic systems, such as socialism, communism and anarchism. Each of these represents a specific vision of a post-capitalist society, with their own histories of implementation and evaluation.

During boom periods of capitalism, post-capitalist visions often slip into the background and out of general public discussion. Following economic crises in the global capitalist system, such as the Wall Street Crash of 1929, and the "Great Recession" of 2008, there is increased thought and discussion of how to replace capitalism with alternative socio-economic systems [16]. This reflection of socio-economic systems in popular culture is detailed, as Boyle [3] posits that many recent films that employ the end of the world as a major plot device are exploiting the discourse that the Great Recession was a "once-in-a-century credit tsunami". This discourse was created to portray the boom-bust nature of capitalism as natural and unavoidable, attempting to deter thoughts of post-capitalism [3].

Post-Capitalism in Fiction
Imaginations of a post-capitalist world are prevalent amongst science fiction. For example, *The Culture* series of books by Iain M. Banks describe a utopian society, free from money and reliant only on voluntary labour, with citizens able to indulge in leisure, fluidly switch gender, take drugs and do whatever they wish – all scaffolded by advanced AI systems, massive sentient spaceships and myriad other advanced technologies [1, 5]. Furthermore, *Star Trek: The Next*

Generation depicts a post-scarcity utopian socialist society, as Captain Picard describes: "*This is the 24th century, material needs no longer exist […] the challenge, is to improve yourself, enrich yourself, in your eyes*" [20]. Their society is shown in stark contrast to the caricature of hypercapitalism in the cruel and uncivilised Ferengi society. The futures envisioned in works of fiction like The Culture and Star Trek have demonstrably inspired technology researchers to work towards the implementation of individual devices. For example, the hand-held communicator in Star Trek is acknowledged as a major design influence on early mobile phones [22]. It is curious, however, that the egalitarian high tech societies portrayed in science fiction are rarely cited as inspirations for changes in how society should be organised, or for social movements. It appears that, as Jameson [10] implied, these fictional societies may be so different from our current experience that we simply cannot imagine them. Or, perhaps, we have not yet tried hard enough. As pioneering feminist science fiction author Ursula Le Guin reminds us, capitalism's "power seems inescapable; so did the divine right of Kings" [13]. Just as she describes a need of "writers who can see alternatives to how we live now" [ibid] we argue the same is true in our own community.

Post-Capitalism in HCI
Utilising speculation, envisioning and fiction is becoming an important theme in the HCI community, and researchers increasingly contribute speculations on the future of interaction design [4, 15, 23]. Indeed, there is much work that can be described as anti-capitalist, such as much work related to the maker and DIY movements, empowerment of people to encourage grassroots activism, increasing and facilitating civic

participation through technology, and so forth [7, 12, 9]. Importantly these works often imagine how such interventions may fit into the present, or near future, and have a grassroots centred, rather than corporate centred approach. In addition, work such as Light's (et al.) powerful critique of HCI's "bovine design" at CHI 2017 [14] highlight a pressing need for the community to address these questions.

Towards a Post-Capitalist HCI?

The projects mentioned in the previous section are quite subtle. Their values can be read as anti-capitalist, but they often lack a systemic view of the future world in which they see the technology existing and working. In other words, they fall into the 'projection' form of envisioning. There is little systemic consideration of how to hasten the end of capitalism [21, 24], or how technology might support a post-capitalist world in a more holistic way [16]. These are two example types of contributions we are seeking in this workshop.

This workshop will bring together researchers, designers and practitioners in order to undertake speculative design work both for a post-capitalist future, and also in critique of this idea. Much in the tradition of design fiction [15] or experiential futures [6] we aim to design and prototype diegetic objects that help us suspend our disbelief about a future society.

At the same time, the prototypes generated during the workshop will embody each other's ideas and, in turn, facilitate presentation and discussion. Importantly the focus is on things not words – it is not a space to debate philosophies of post-capitalism and HCI, but a space to speculatively design technology which demonstrate these ideas.

Workshop goals and themes

This workshop follows on from the successful "Alternate Endings" workshop at CHI 2014 [15], which explored design fiction as a way to consider implications of HCI work, but raises the stakes to consider visions at societal scale.

We envision this workshop as a gathering of HCI academics interested in design, computer science or the humanities once capitalism is over. Our goals are:

- Create a forum and space to explore the idea and practice of anti-capitalist or post-capitalist work within the HCI community.
- Discuss the challenges and complexity of imagining such alternative futures and the value of this to the community.
- Experience a rapid cycle of generating and prototyping imagined interactive technologies for alternative futures.
- Appreciate and critique a plurality of material outcomes that embody diverse social, political and ethical futures.

In this workshop, we predominantly explore design for and around the concept of post-capitalist futures. This may entail, for example, the design of tools, platforms and approaches to enable or hasten a post-capitalist future, or indeed critical perspectives on the potential dangers of such a future.

Organisers

The organising committee is formed of members with a broad range of experience and expertise, such as investigations of politics, civic engagement, design fiction and interaction design. A number of members have prior experience organising successful workshops at CHI and other venues.

Tom Feltwell is a research assistant and PhD student at Northumbria University, and his research aims to use technology design to counter, critique and expose these issues.

Shaun Lawson is Head of Computer and Information Sciences and Professor of Social Computing at Northumbria University.

Ben Kirman is a postdisciplinary critical and speculative designer embedded within the University of York, UK, "pioneering" design fictioner, and co-chair of the first Fictional Conference on Design Fiction's Futures.

Debbie Maxwell is a lecturer in Interactive Media within the Department for Theatre Film and TV at the University of York.

Conor Linehan is a lecturer in Applied Psychology at University College Cork.

Enrique Encinas is an interaction design fictioner and PhD researcher at Northumbria University. He sometimes acts as Kurt Vonnegut's cyranoid.

Tom Jenkins is a PhD candidate in Digital Media at the Georgia Institute of Technology. His work focuses on the use of research through design to produce technologies that support commoning, particularly in cohousing communities.

Stacey Kuznetsov is an Assistant Professor at the School of Arts, Media, and Engineering (AME). She is interested in how technology can be used to construct shared myths that serve as alternatives to capitalism.

Website:

A website for the workshop is hosted at http://hci.post-capitalist.com, which hosts the call for participation, organiser information, and the workshop outputs.

Pre-Workshop Plans

The workshop intends to solicit 15-20 participants, drawn from the HCI community and other relevant disciplines to explore the workshop's themes. Specifically we intend to appeal to those willing to produce diegetic prototypes (of some form), rather than those who wish to purely discuss these topics. Participants will be invited to choose one of the following submission formats: 1) A standard 2 page ACM Extended Abstract format position paper, where the authors outline their motivations, ideas and potential designs for the workshop. 2) A short video submission (2-4 minutes) describing the authors' motivations, ideas and potential designs around the workshop theme, along with a 1-2 paragraph expression of interest. We don't impose any creative restrictions on the format or content of the video and actively encourage potential attendees to choose according to preference. Furthermore, in supporting both written and video submissions, we hope to welcome those who are confident and comfortable in the use of words or images. The Call for Participation will be published on the website, along with

dissemination through relevant mailing lists. It will also be publicised by the organisers through their institutions and professional networks. The submissions will be curated by the workshop organisers.

Workshop Structure

The workshop will be structured over one day as follows:

09:00 – 09:15	Introduction by organisers
09:15 – 10:15	Short presentations by participants
10:15 – 10:50	Form groups, design ideation
10:50 – 11:00	Coffee break
11:00 – 12:00	Making session
12:00 – 12:30	Presentations of initial designs
12:30 – 13:30	Lunch break
13:30 – 15:00	Making session
15:00 – 15:15	Coffee break
15:15 – 16:00	Production of demo-ready prototypes for inclusion in zine
16:00 - 17:00	Final presentations, synthesis and closing

The making sessions throughout the workshop will be group based. We will use an adapted version of Friedman et al's *Envisioning Cards* as a starting point from which to carry out values-centred ideation [8]. The specific approaches and tools used by participant groups will vary depending on the disciplines of the attendees – everything from short stories, to videos, to working technology prototypes fit within the overall idea of diegetic prototypes. To support the design activities throughout the workshop, a number of physical resources will be supplied, such as modelling clay, pawnshop trinkets, sheet metal and plastic bags, as well as electronic prototyping platforms such as Arduino and Raspberry Pi. Overall, the intention of the making sessions is to produce diegetic prototypes (working or not) that embody desired values in post-capitalist computing.

Following the workshop, all participants will be invited to a dinner at a local worker-owned cooperative.

Post-Workshop Plans

The artefacts produced by participants will be collated into a zine, inspired by the TBD Catalogue [17] the 3D Additivist Cookbook [1] and the Disobedient Electronics zine [9] in order to document the design fictions from the workshop. This will be disseminated to each participant's institution, as well as a limited number available to order from the website. The website will also be used to document the designs created, through photographs and narrative pieces by participants. Immediately following the workshop, we will find a suitable space to display the objects, accompanied by author commentary and an overview of the workshop.

The insights gained from this workshop will be used to inform the design of a follow-up workshop, or series of workshops, at other venues and conferences. This will allow us to draw from different groups of people interested in post-capitalism, allowing a broader perspective on post-capitalism and HCI. The artefacts will also be treated as a collection, will be submitted to gallery spaces, presenting the physicality of the objects, as well as opening up the workshop topic to the general public. Furthermore, we intend the collection of produced artefacts to be displayed within the CHI conference, possibly as part of the CHI Art exhibition or another poster/demo session. This would help directly disseminate the results of the workshop to the attendees.

Call for Participation

It is acknowledged that all digital technology is designed, whether knowingly or not, to fit a specific worldview or political stance. For example "sharing economy" services such as Uber or AirBnB, support a Silicon Valley-centric future devoid of state regulation and anti-monopoly legislation. As a community, we must question to what end are we improving the efficiency, efficacy and satisfaction of interactions. Are our goals any different to that of entrepreneurs?

New technology is typically proposed as a way of cutting costs, removing or lowering the need for human work. Yet it is rare to see technology designed towards a future in which making money is not a key concern – it seems to be currently beyond our collective imagination. In this workshop we wish to counteract this. We wish to convene academics, artists, designers, and developers to explore the interstices of HCI and post-capitalism, and design to support and facilitate a post-capitalist future.

We welcome one of two formats of submission: 1) A two-page ACM Extended Abstract format position paper 2) A short video submission (2-4 minutes) along with a 1-2 paragraph expression of interest. Both submission formats should outline the authors' motivations, ideas and potential designs for the workshop. Examples of topics include: tools to enable greater civic participation, technologies and systems to remove corporate/financial influence, how fully automated luxury communism might work, tools to suppress the rise of capitalism, disrupting the marginalisation of vulnerable populations, approaches to encourage communism and the emancipation of big data.

We ask the authors to indicate how many authors will attend the workshop as places are limited. Further details can be found at: hci.post-capitalist.com

Format: Either 2 page ACM Extended Abstract or 2-4 minute video with 1-2 paragraph expression of interest
Submit to: tom.feltwell@northumbria.ac.uk
Deadline: 2nd February 2018
Notification: 22nd February 2018
Workshop: 21st/22nd April 2018, Montréal, Canada.

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RECONSTRAINED DESIGN: CONFRONTING OBLIQUE DESIGN CONSTRAINTS

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ABSTRACT

This paper presents the identification and analysis of a set of four 'oblique constraints'—named as *progress dogma*, *future nudge*, *means and ends*, and *infrastraints*—which act as pervasive but often unacknowledged constraining influences that shape design practice and by extension limit future possibilities.

We ask: How and why is power exerted? How might this lead to impoverished or problematic futures? How can this dynamic be changed from a design perspective? Drawing from examples of recent work around renewable energy we show how design can be *reconstrained* to reveal new pathways and encourage more inclusive, holistic, and environmentally responsible futures.

INTRODUCTION

Power—specifically social and political power—may be defined as the ability to influence the course of events. Power has a temporal aspect, in the sense that 'influence' means acting in the present to change the future. When this situation is applied to design, there are:

forces (of power) that influence **people** (designers) and therefore also (designed) **events.**

On one level, this is not news to designers. Design practice always happens under a particular set of forces or conditions, commonly known as constraints. These constraints may be straightforward and indisputable, such as a physical or material quality—the force of gravity or the tensile strength of a structural beam. Constraints of this basic type influence the design process by informing choices and decisions.

But constraints can also be more abstract, hidden or complex (e.g. legacy infrastructure), meaning that they are often overlooked by designers as they focus on more practical, material, and (seemingly) apolitical concerns. The pervasive nature of these grander constraints results in a narrower range of technological possibilities than we might otherwise experience. They keep us to a limited path or trajectory, and in some cases condemn us to repeating the same mistakes over and over again. Rather than acting directly, their path of influence is **oblique**.

This paper draws on historical and contemporary examples to identify and examine four constraining factors shaping our possible futures. From another perspective, the constraints we identify could be described as barriers to a more responsible design practice. The constraint of *progress dogma*, for example, blinds future-shapers—scientists, technologists, politicians, designers—from the potentially negative implications of their proposals. The simple story of progress is: technology is good, and as long as technology takes the lead, the future will be better than the present. The three other major constraints on how the future happens that are discussed in the first part of this paper include: *future nudge*, *means and ends*, and *infrastraints*. The pervasive and hard-to-pin-

down nature of these constraints means that they are often ignored, taken for granted, or treated as immutable laws. This acceptance serves the interest of those with the power to benefit from their continuance.

Underpinning this paper is the basic question: What is a better future? Our goal is to improve our understanding of: a) how and why power is exerted, b) how this may lead to impoverished or problematic futures, and c) how this dynamic could be changed from a design perspective. To address the last point, in the second part of this paper we draw from examples of our recent work to show how design can be *reconstrained* to reveal new pathways, and how design practiced apart from traditional large-scale oblique constraints might encourage more inclusive, holistic, and environmentally responsible futures.

IDENTIFYING (AND RETHINKING) OBLIQUE CONSTRAINTS

We now present four oblique constraints to illustrate how design practice can be inadvertently restricted by indirect, but powerful, influences.

PROGRESS DOGMA

Charles Eames once described design as 'a plan for arranging elements to accomplish a particular purpose' (Eames 1972). The appeal of this simple statement is that it operates across multiple scales, material complexities, and timeframes: from a piece of furniture to a city plan; from a length of wood to biological parts (now seen as designable through synthetic biology); or from the marketplace of tomorrow to a distant future world. But especially relevant is the phrase 'a particular purpose'. In general terms this is the arranging of available elements to create useful objects designed to exist and usually to be sold. Increasingly these elements are technological, and as such the designer can be seen as tasked with translating technological potential into useful, usable, desirable products. The assumption is that these products make life better.

The first oblique constraint we approach, therefore, is the fundamental belief that technological development will simply and inevitably lead to a better future—the constraint of *progress dogma*. According to political theorist Langdon Winner:

'It is still a prerequisite that the person running for public office swear his or her unflinching confidence in a positive link between technical development and human well-being and affirm that the next wave of innovations will surely be our salvation.' (Winner 2010: 5).

Belief in technology has a strong foundation. Christian Schussele's painting *Men of Progress* (Figure 1) was commissioned in 1857 by Jordan Mott, the inventor of a coal-burning stove, to celebrate a group of key scientists and inventors who were thought to have positively altered the course of contemporary civilisation. The group included Cyrus McCormick (mechanical reaper), Charles Goodyear (vulcanised rubber), Elias Howe

(sewing machine), and William T. G. Morgan (surgical anaesthetic). It would be difficult to argue that these four inventions were not instrumental in improving people's lives in significant ways. There are others featured in the painting, however, whose inventions were more ambivalent—most notably Samuel Colt (the revolving gun).

Figure 1: Christian Schussele's *Men of Progress* (1857).

Colt's legacy is informative, since his success in selling a particularly questionable agenda was built on the exploitation of novel techniques that highlight how power can be acquired, manipulated, and maintained. Colt pioneered bold and innovative marketing methods, such as commissioning artist George Catlin to produce a series of paintings that romanticised the use of Colt weapons in exotic scenes with wild animals, native Americans, and bandits (Houze, Cooper, and Kornhauser 2006: 203). He also solicited the support of government officials and other prominent individuals by giving them custom engraved weapons. The historian Barbara M. Tucker has suggested that through his marketing techniques Colt transformed the firearm from a basic utilitarian object into a central symbol of American patriotism (Tucker 2008).

The twentieth century saw a refinement and proliferation of similar methods of public manipulation, perhaps best exemplified by Norman Bel Geddes's Futurama exhibit at the 1939 New York World's Fair. The installation featured a 35,738 square foot (3320 m2) model depicting a utopian vision of America set 25 years in the future. The technology that inspired Bel Geddes's proposal was the internal combustion engine, his client General Motors' core product. He designed super highways to connect America's cities, revolutionary run-offs allowing the cars to join and leave the motorways without slowing down, and the sprawl of a perfect picket-fenced suburbia.

For visitors whose outlook had been influenced by the Great Depression, this future was compelling. It was a place that was clearly better than the present, and American consumers bought into the dream. As a result, many aspects of Futurama became reality. Futurama was of course motivated by other interests than simply creating a better future, not least the selling of a particular political and corporate agenda—interests that

are strikingly revealed in E. L. Doctorow's 1985 novel *World's Fair*. As a family leaves the ride, the father says:

"'It is a wonderful vision, all those highways and all those radio-driven cars. Of course, highways are built with public money," he said after a moment. "When the time comes General Motors isn't going to build the highways, the federal government is. With money from us taxpayers." He smiled. "So General Motors is telling us what they expect from us: we must build them the highways so they can sell us the cars."' (Doctorow 1985: 285).

Futurama provides a valuable historical lesson, in that through hindsight we can compare the promise of a corporate future with the reality that came to pass. Highways were built and millions of cars were sold. But Bel Geddes's vision—a vision constrained by his role as a designer working for a corporate client with the brief to glamourise and sell the technology—neglected to present obvious shortcomings. These shortcomings included not only traffic jams, smog, accidents, and road rage, but also more complex societal consequences such as insurance fraud or the decline of cities that relied on automobile manufacturing.

Far from being simply positive, then, technological progress is often problematic in complex and unforeseen ways. This point has been argued many times in the past: by William Blake and the Romantics, William Morris and the Arts and Crafts movement, and by avant-garde provocateurs like Dada. Yet somehow, as Winner (2010) noted, the real-life implications of technology are easily overwhelmed by the seductive power of a well-crafted techno-utopia such as Futurama.

Herein lies the oblique constraint: designers, whether working for clients on market-focused projects or in research-based roles on public engagement, are seldom encouraged to explore what could go wrong with a particular emerging technology or its products. Negativity does not sell. Progress dogma has the effect of constraining designers under its power to present only positive outcomes.

Reconstraining progress dogma facilitates a different approach to utopian future narratives by accepting that when a new technology is released into the world things also inevitably go wrong. The method might be described as follows:

1. Arrange emerging (not yet available) technological 'elements' to hypothesise future products and artefacts.

2. Apply alternative plans, motivations, or ideologies to those currently driving technological development in order to facilitate new arrangements of existing elements.

3. Develop new perspectives on big systems.

With the purpose of:

1. Asking what is a better future (or present).

2. Generating a better understanding of the potential implications of a specific (disruptive) technology in various contexts and on multiple scales—with a particular focus on everyday life.

3. Moving design 'upstream' to not simply package technology at the end of the technological journey but to impact and influence that journey from its genesis.

Ultimately the aim is to facilitate a more responsible approach to the technological future. One early example is 'Audio Tooth Implant' (Auger-Loizeau 2001), which examined the implications of implantable technology for human enhancement by proposing possible applications and access points for technology to enter the body. Building on the growing popularity of mobile telephones at the time, the resulting product was an implantable telephone. The project was presented at the Science Museum in London in an exhibition called 'Future Products'. From here it quickly entered the public domain through both the popular press and specialist media.

The reconstraint of progress dogma means critical responses become equally relevant to positive ones, with the discussion raised by dissemination being the key output of such a project. As Rachel Metz wrote in *Wired*:

'Auger and Loizeau measure success by reactions to their idea, not the venture capital money (which Auger said they turned down) that stemmed from the swell of media coverage. What gratifies them are the hundreds of e-mails they received from people (including several dentists) interested in learning more, and a Slashdot mention that garnered 437 comments.' (Metz 2006).

The goal is to add a space for considered appraisal that predicts what might go wrong with a design before a product is made available to a wider public. This approach essentially tests applications before they happen, building in a layer of responsibility and allowing for adjustments to be made rather than dealing with problems after the event.

FUTURE NUDGE

Product lineages are often mistakenly imbued with an evolutionary logic that gives them the appearance of rightness and inevitability. Comparisons between, or conflations of, natural and technological evolution have been made as far back as the nineteenth century, when Charles Darwin first published his theory of evolution (Darwin 2009). This revolutionary work inspired philosophers, writers and anthropologists such as Marx and Engels, Samuel Butler and Augustus Pitt-Rivers to suggest that technological artefacts evolve in a manner similar to natural organisms. There are, however, key differences between biological and technological evolution, including the role humans play in shaping change. As George Basalla points out when describing

the difference between the theories of Darwin and Marx:

'In Darwin's theory biological evolution was self-generating; in the Marxian scheme the evolution of technology is not self-generating but is a process directed by wilful, conscious, active people and molded by historical forces.' (Basalla, 1989: 207).

This description bears a resemblance to 'artificial selection', the term Darwin himself used in 'Variation under domestication', the opening chapter of *On the Origin of Species*:

'One of the most remarkable features in our domesticated races is that we see in them adaptation, not indeed to the animal's or plant's own good, but to man's use or fancy.' (Darwin 2009: 18).

Other attempts at achieving an understanding of technological evolution have been put forward, most notably Gilbert Simondon's seminal work *On the Mode of Existence of Technical Objects* (Simondon 1958), and Bernard Stiegler's *Technics and Time: The fault of Epimetheus* (Stiegler 1998). For the purposes of this paper, however, a more appropriate method of classification is one proposed by Basalla that emphasises the value of the artefact:

'A theory of evolution cannot exist without demonstrated connections between the basic units that constitute its universe of discourse. In technology those units are artefacts ... it becomes apparent that every novel artefact has an antecedent. This claim holds true for the simplest stone implement and for machines as complex as cotton gins and steam engines.' (Basalla 1989: 208).

From the design perspective the artefact approach is appealing. This is because technology can be viewed simply as a means to an end—the systems, techniques and materials that support the existence and function of the product. Technological progress, therefore, facilitates the iterative development of the lineage.

Figure 2a (left) and 2b (right) magnify the incremental design steps that result in the artificial evolution of a product.

We describe this kind of incremental technological change as *future nudge*, that is, a process that appears to be evolutionary but in fact is not random, and is therefore not evolutionary. The automobile provides a good example. As Figure 2a shows, travel becomes instrumentalised as we focus on the object rather than the act of travelling. The car iterates in small steps made possible by advances in specific areas, similar to the development of mobile devices such as the iPhone (Figure 2b)—seven phones in seven years—where each new device is a small advancement on the previous one.

The typical progression follows Moore's Law—smaller, more powerful, more efficient—and has been successful in generating new sales revenue with new models released each year. Describing the way technology and technological products evolve, so that what comes next will be similar to what came before, the economist Robert Heilbroner wrote:

'All inventions and innovations, by definition, represent an advance of the art beyond existing base lines. Yet, most advances, particularly in retrospect, appear essentially incremental, evolutionary. If nature makes no sudden leaps, neither, it would appear, does technology.' (Heilbroner 1967: 9).

In this process we can only design what the product could realistically evolve into. Smart products, for example, are usually existing products simply updated with 'smart' technology.

Precisely because future nudge is an artificial form of selection, we can use it to explore who decides, and who makes the future, both historically and in the present. In the past, for example, the lobbying power of automobile companies held sway over America's future, as evidenced in the Futurama exhibit discussed above. Unpacking power relations in future nudge is tricky: it is partially a faux-force, a lack of imagination; instrumentalised thinking coupled with a blinkering of alternative possibilities and other ways of life.

One approach to reconstraining future nudge is to use counterfactual histories (Bunzl 2004) and alternative presents—both of which provide insight into how certain aspects of life might look if different choices had been made or different paths were taken in the past—to imagine what might happen if we stepped out of an existing product lineage. Another Auger-Loizeau work, the 2003 'Iso-phone' (Figure 3), was developed to challenge the telecommunication industry's progression towards efficiency and ubiquity through the growth of the mobile telephone sector. The question the project asked was, what if, rather than directing development towards availability and mobility, designers prioritised a qualitative approach to focus on the experience. The concept used sensory deprivation techniques to minimise distractions, facilitating a total focus on the conversation.

The question where agency in artificial selection is concerned is, who chooses? Who makes the decisions? How do we 'take back control', in that much abused phrase? How can we use a speculative approach to imagine new coordinates and new constraints—and thus escape a naturalised view of technological evolution as something no one controls? At present, stepping outside the forward march of future nudge is a privilege of the wealthy. This is satirised in 'An Ikea Catalogue From the Near Future' (Near Future Laboratory 2015), where

the most expensive sofa, called the 'Nostalgi', is described as being reassuringly *not* 'smart'—while everyone else is sold the next micro-iteration of a predictable product line.
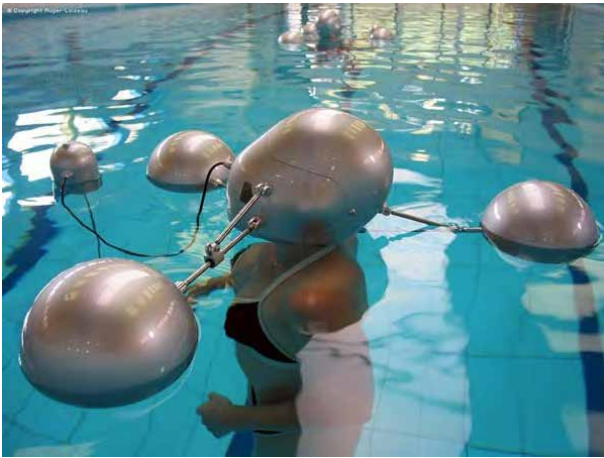

Figure 3: Auger-Loizeau's 'Iso-Phone' is a solution focused on the experience and not the efficiency of communication.

MEANS AND ENDS

In 1927 Paul Mazur of Lehman Brothers made the following (now infamous) statement:

'We must shift America from a needs to a desires culture. People must be trained to desire, to want new things, even before the old have been entirely consumed. We must shape a new mentality in America. Man's desires must overshadow his needs.' (Quoted in Curtis 2002).

The statement, made during an interview with the *Harvard Business Review*, signals the rise of conspicuous consumption and the worship of gadgets. Designers were, and still are, complicit in this process.

The philosopher Albert Borgmann has another way of describing this historic shift in emphasis, through what is known as his 'device paradigm'. For Borgmann, *things* are inseparable from their context: we engage and interact with them in their worlds. *Devices*, on the other hand, unburden us of their contexts through the operation of complex background machinery; the more advanced the technology, the more invisible or concealed the machinery. Borgmann used the fireplace or hearth as an example of a thing: it provides a focal point for the household, links people to the local terrain through the gathering of firewood, and demands an idea of how much wood is required to get through the winter. In contrast, the central heating system 'procures mere warmth and disburdens us of all the other elements', while the means become invisible, intangible, controlled and managed by others (Borgmann 1984: 42).

Designers and consumers alike have become obsessed with the end, the device—the glossy and glamorous product—while the systems that produce these ends have become increasingly opaque. This pathway essentially leads to automation, where devices (such as the Nest thermostat) satisfy all of our needs as efficiently as possible through techniques such as

machine learning and prediction algorithms. Jean Baudrillard was already describing the effects of automation in the 1960s when he wrote (in *The System of Objects*) about the passivity of the modern consumer:

'When it becomes automatic … its function is fulfilled, certainly, but it is also hermetically sealed. Automatism amounts to a closing-off, to a sort of functional self-sufficiency which exiles man to the irresponsibility of a mere spectator.' (Baudrillard 2005: 118).
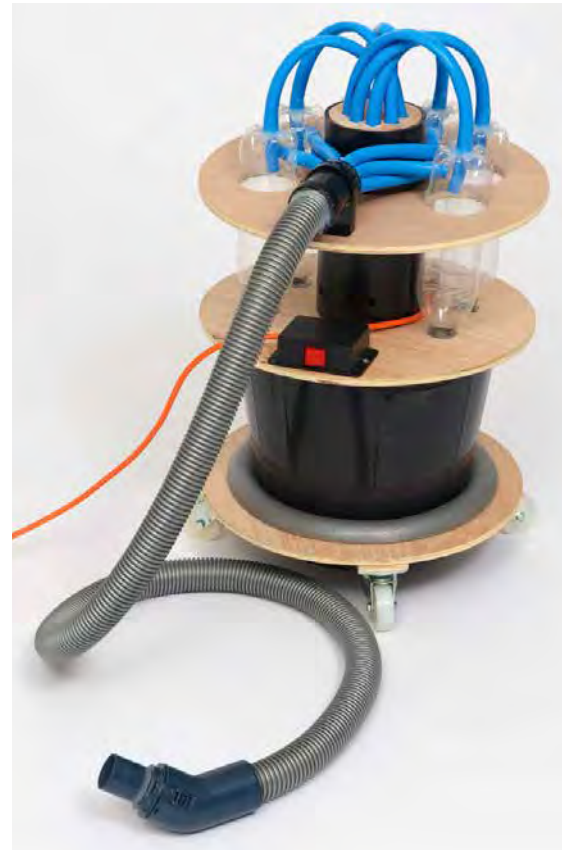

Figure 4: Open hardware vacuum cleaner by Tom Lynch.

The perfect example of a device is Yves Behar's $700 Juicero, a juicer that uses QR code and a Wi-Fi connection to check fruit packs for freshness and refuses to operate if the system determines that the fruit is out of date. Such examples epitomise the consumer goods industry's current habit of steering consumers towards the end, giving the designed artefact an almost religious status in contemporary society. This has allowed the means to go ignored, to remain hidden, unquestioned or undetected. Bespoke tamperproof screws, non-accessible batteries, warranty seals, technology telling us when our fruit is fresh, intentional and increasingly rapid obsolescence—these practices are becoming the norm.

By removing the constraint of end-focus, designers can reclaim the means on behalf of their products and the people who use them. Solutions can be adapted to local terrains or can engage with local systems, materials and making. Figure 4, for example, shows an open-source hardware vacuum cleaner designed by Tom Lynch. All

elements were sourced or made locally and the whole process was documented on the project's wiki—the result being a fully functional and replicable product for under €50.

INFRASTRAINTS
Infrastructural and legacy constraints inform almost everything we do and everything we design—from food systems to transport, manufacturing to entertainment. We are locked into paths determined by decisions or choices made in previous eras, when the world was a much different place. For various reasons these legacies stubbornly persist through time, constraining future possibilities and blinkering us from alternative ways of thinking.

The remainder of this paper will focus on the subject of energy. Tesla's invention of alternating current at the end of the nineteenth century won out over Edison's direct current because it allowed electricity to be transmitted over large distances. This afforded the building of huge power stations in the countryside, generating power through the burning of fossil fuels and distributing it radially across national grid systems. Power arrives as if by magic at our houses via sockets in the walls. These sockets, and the plugs that are inserted into them, dictate how all electrical products are used and how all products are designed.

We have been thinking about how to change this relationship—how to *reconstrain* our approach to energy. The island we live on, as a location with ample sun, wind, rain, and sea, would seem to be a place where renewable approaches to energy might thrive. What you see when you fly over the island supports that notion: banks of solar photovoltaic panels line several of the hillsides, and wind farms are exposed to the full force of the gales blowing in from the sea. However, beneath this optimistic surface lies a darker reality.

The problem, stated simply, is as follows. Solar PVs only generate energy while the sun shines. Wind farms generate energy when the wind blows. The wind is unpredictable and the sun shines during the day when most people are at work, meaning that energy cannot realistically be consumed in real time. The only viable option at the moment is to sell energy back to the grid; but unfortunately this conflicts with the power company's business model. As things stand, users of renewables still rely on the grid during dark or windless periods, and therefore utility owners argue—with some reason—that these users should pay for grid upkeep.

So while the infrastructure battle continues, what else can be done? We decided to reimagine energy infrastructure on our island based on the implementation of renewables. This brings us to the second part of the paper: reconstraining energy through locally based bespoke design solutions.

ENERGY RECONSTRAINED: RECENT WORK

As technology advances it becomes increasingly concealed, hidden in complex systems, its actions determined by invisible algorithms or unseen actors. In Borgmann's terms, this has the effect of dislocating *ends* from *means*. As outlined above, the present tendency is for designers and consumers alike to focus on the instrumental end—the object of desire—while ignoring the means, the obscure and complex infrastructures that allow the device to work. Nothing illustrates this estrangement of means and ends better than our attitude towards energy. Electricity, as a form of energy, comes through sockets on the wall that deliver a seemingly endless supply. These ubiquitous and generic sockets determine the design of every electrical product, providing a neat end to the designer's role and responsibility. Our lives are energy rich, but our relationship with energy is threadbare—ethereal and distant, a number on a meter, a bill at the end of the month.

In our community-centred approach to energy we aim to break down the wall. One example of a design approach that goes through the wall—and out of the box—is the Zimbabwe Bush Pump (de Laet and Mol 2000). The assembly for this clean water pump contains instructions for the whole community, all of whom are involved in the installation. The pump is designed to be robust but also fluid in its components, so that if one component breaks it can be replaced with something to hand. Our project is similarly committed to designing a thing that solves a problem such as energy storage, but does so using local materials, the local environment, local people and their skills.

Our first in a series of working prototypes, the Gravity Battery, is an open source energy generation and storage solution. It is built from a combination of natural materials, which provide a source of energy or a means to store energy, and cultural materials, such as tools, artefacts, and components that are made, recycled, and re-appropriated. We chose the research space based on our local context: knowledge, materials, and terrain. This is an example of a new approach towards technological application that places an emphasis on local production over global, community engagement over alienation, and participation in the design process over the simple consumption of products.

All parts are sourced or made locally. Solar power lifts the mass during the daytime, storing it as potential energy. (The real-life context could be, for example, one of the local homes that are built on the cliff sides of the island.) When it is needed the energy is released by dropping the weight, in this case 15kg, which in turn rotates the motor—now a generator—to produce electrical energy. The power available is determined by the size of the dropping mass, the speed at which it drops, the gearbox ratio, and the drop distance.

The latest iteration (Figure 5) uses a locally found scrap motorcycle engine as the gearbox, ready-made and

super efficient, minimising complex making. Normally the motorcycle engine burns fossil fuel (petrol) to move the piston down, which is converted to rotary motion with the crankshaft. Rotary motion (or RPM) is modified by the gearbox and ultimately rotates the rear wheel via a chain drive providing forward linear motion to the motorcycle and rider.

We reverse this situation: instead of fossil fuel, gravity spins the rear wheel, using it as a pulley attached to the falling mass. This in turn spins the drive sprocket, increasing RPM in the gearbox and finally driving the crankshaft at a speed determined by the selected gear, the diameter of the pulley, and the falling mass. For communication purposes we had to think of a use for the generated energy, so we decided it would power a self-contained vinyl record player.

In practical terms the gravity battery provides a demonstration of how means and ends, or products and their infrastructure, can be reconsidered to facilitate a more engaging and responsible relationship with energy. The project is currently in progress: we have developed several functional prototypes using the battery in combination with a variety of products such as record players, lights and kitchen devices to explore how interactions change. The next stage is to move into local communities to test the concept in the wild.
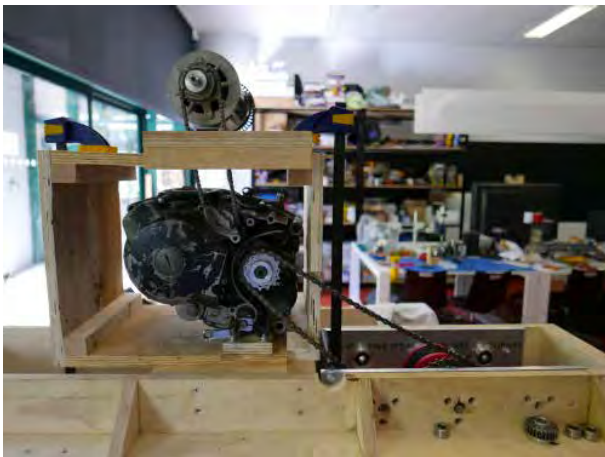

Figure 5: Example of reconstrained design: the Gravity Battery.

CONCLUSIONS AND FUTURE WORK

The four categories we have identified and examined in this paper—progress dogma, future nudge, means and ends, and infrastraints—are not meant to represent a fully comprehensive list of oblique constraints. Part of our future work will consist of identifying and analysing further constraints and finding the means to rethink or work around them. By reconstraining design with new sets of coordinates, we hope to create a space in which it becomes possible to apply plans, motivations, or ideologies that are different to those currently driving technological development—in order, ultimately, to facilitate new arrangements of existing elements and to develop new perspectives on large-scale systems.

As we described in the second part, our current work is with renewable energy. By thinking about what lies beyond the wall—local contexts, landscapes, materials, skills, culture—it becomes possible to develop bespoke solutions which question existing power relations and envision preferable futures. Where we live in Europe, local terrain means cliffs and cliff-side communities.

This local terrain has already provided inspiration for one solution—the gravity battery—to grid storage issues that problematise solar panels. The most striking aspect of the gravity battery design is the tangible relationship that it affords with energy. Turning up the volume on the gravity-powered record player makes the mass fall faster, reducing the time available to listen to the music. (In the immediate next steps we plan to boil a kettle, toast some bread, power a reading lamp, and so on.)

Looking further ahead, we are working on a book of one hundred alternative energy ideas. The concepts in this book will range from small operational prototypes such as our low-power gravity battery, which exploits the vertical nature of the island, to more spectacular and ambitious concepts such as a huge series of elevators in the capital city.

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We-Coupling! Experiential Evaluation and Extensions of Co-Embodiment

Studio Abstract

Positive social and collaborative effects are hailed as a major advantage of embodied and tangible approaches to interaction. This workshop offers a hands-on exploration of what can be seen as extreme versions of such benefits - systems and techniques with the potential to share or transfer embodiment between two or more people. Through participatory demos, studio attendees will explore and compare a variety of approaches to experiencing the perspectives of another body, and controlling bodies other than their own. These comparisons will be a launch pad for collaboratively combining existing "body sharing" systems and mocking up new design concepts. By bringing together ideas and approaches in an actionable manner, this studio will share and develop imagination, knowledge, and skills relevant to the design and study of interactive systems in which the body plays a central role

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Studio Proposed Schedule
In advance of the event, we will strive to make participants familiar with each other's names, backgrounds and interests etc. On the day we intend to have several demos running before any participants arrive. We anticipate that early arrivals will value the social icebreaking effects of experiencing a form of

embodiment sharing even before the studio commences! These steps will enable use to maximize time for, and effectiveness of collaborative creative and analytical activities. We propose a provisional schedule (left) and explain our approach (below).

1. Hands On Experience & Capture
Key to this studio is the opportunity for participants to personally experience and thus compare different systems - in a supportive atmosphere, at a much more leisurely rate and focused way than a typical conference "demo" session. In small groups participants will experience several systems and techniques, whilst one or two members of each group will take turns in documenting and observer roles, such as camera operator and note taker/sketcher.

On the day we will provide perforated pro forma templates for participants to make notes concerning each demo they experience, this will include space for quick sketches and diagrams. To help ensure capture of immediate impressions we will instruct participants to briefly interview each other after trying each system. We will also create online folders for participants to immediately share short media files of each experience with each other.

At the very least, the experiences offered will include tried and tested activities with systems provided by the organisers. In addition to these, we expect that participants will also experience additional devices and techniques contributed by workshop attendees from both near (there is much relevant research activity in the Tokyo region) and far. Based upon submissions received in phase one of our call for participation, we will curate a menu of experiences that is blend of

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Draft Schedule

9.00 – 9.15
Who is in the room?

9.15 – 10.30
Hands On Experience & Capture

(coffee)

11.00 – 11.30
Hands On Experience & Capture

11.30 – 12.30
Articulate & Analyse

(lunch)

13.30 – 15.00
Generate & Experiment

(coffee)

15.30 – 16.00
Generate & Experiment

16.00 – 16.30
Design Critique

16.30 – 17.00
Wrap up & Next Steps

diverse techniques and technologies. In the unlikely event that few appropriate submissions are received we shall present a few short videos of related work as additional material for inspiration.

2. Share & Analyse
Individuals will very briefly present one or two key insights or impressions from the Experience & Capture stage. All observations and interview sheets will be displayed on a large surface (depending on the room, this could be large pin-boards, tables or even the floor). The perforations on the "capture" pro-formas will allow notes on different aspects of the same session to easily be spread. For commencing scaffolding discussions of how these experiences may complement or challenge theory, we will divide the studio into two parallel groups.

For the first group, we will introduce some design cards that we shall prepare in advance. These illustrated cards will summarise a variety of embodied interaction theoretical concepts from a small number of papers that are important to our community. Participants will attempt to place these cards at the most appropriate and most provocative locations on the insights display. Modification and additions to the theory cards will be encouraged! Blank cards will also be available.

In parallel, the second group will undertake a similar activity but in reverse. That is, they will attempt to take notes, sketches and of participants' insights from the Experience & Capture phase and physically attach them to pre-made posters of embodied interaction frameworks. Again, participants will be very welcome to modify, extend and critique theory in the light of their experiences earlier in the morning!

If both groups wish to use the same portion of a sheet, one group may duplicate the insight onto spare pro-formas. Then in plenum, all participants will be encouraged to briefly present one important insight (or difficulty) that arose from the theory discussions.

NB All text on the design cards and posters we provide will be in both Japanese and English. We hope such "subtitling" will help ease international exchange!

3. Generate and Experiment
As participants break for lunch we will ask them to start considering potential directions for the afternoon's creative activities. Possibly (depending on layout of venue, and submissions received) we might offer participants the opportunity to eat lunch together whilst experiencing one or more shared embodiment system. Such break time use in the "semi-wild" may generate useful insights and conversations. Furthermore, taking systems to the conference hospitality area may increase the visibility of participant's work to TEI community members attending parallel studios.

We shall begin the afternoon session by with a quick physical activity to form teams into informal teams according to shared motivations, and contexts of interest. Groups of participants will then be supported in embodied experimentation for developing new (or improved) forms for sharing or transferring bodily sensations. All groups will be challenged to relate their concepts to a particular real world context with which at least one team member is very familiar. Experimentation will include modification and/or repurposing of the systems in the room, combining different systems, and/or quick and dirty prototyping with craft materials and second hand clothing and/or

any equipment participants bring with them, and/or roleplaying new application areas.

Design Critique and Next Steps
In plenum, different groups will give a participatory demonstration of their application/system concept. There will be a little time for comments, but audience members will be encouraged to give feedback by writing and sketching on post-its. This will include making connections with (still on display) material from the earlier theoretical session.

We will conclude with a brief session identifying specific opportunities for participants to take further any nascent interest in collaboration on emerging practical and/or theoretical concerns. We will facilitate a two-stage process of individual post-it note writing followed by plenum sharing of blossoming prospects.

Bill of Materials

- Flipchart paper, Post-it notes, blu-tac, markers
- Markers, scissors, craft knives, various sticky tape
- A small sewing kit
- A small assortment of craft materials (e.g. string, straws, feathers, card, cups, elastic, balloons etc.)
- A small assortment of second hand clothing for possible hacking

Technical Requirements

To be provided by the host institution:

- 12 power outlets for charging laptops, cameras etc
- A flexible room with chairs and tables but also some empty floor space for people

To be provided by the studio hosts

- Several systems relating to sharing embodiment (see studio description document).

To be provided by phase one accepted participants

- Prototypes and/or other materials for participatory demonstration of their shared embodiment research or practice

To be provided by the participants

- We hope that most participants can bring some kind of device(s) with digital photo/movie making and basic video editing capabilities

Estimated Budget

We have institutional support that enables us to be self sufficient in regard to materials.

1st phase Draft CFP (abridged)

We are delighted to call for participation in a TEI studio for full-bodied experimentation with systems and techniques for sharing or transferring senses of embodiment between two or more people. We seek participatory demonstrations from scientists, technologists, artists, designers, and performers who wish to share their work in a hands-on multidisciplinary creative collaborative workshop. Please send a circa 500 word description of your system or activity. Please include details of your spatial and durational requirements for your participatory demonstration. If available, please include a URL or reference for further information about your system or activity. Deadline: 31st November 2016 (shortly after this date interested non-demo presenters will also be welcome to register).

What's the ma er with[in] design fiction?

Enrique Encinas[1], Tommy Dylan[1] and Robb Mitchell[2]

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Keywords: Design Fiction; Digital Dreamcatcher; System; Autopoiesis; Suspension of Disbelief; Dream

Abstract: What design fiction is seems to be a matter of debate whilst how design fiction accomplishes its feats lacks attention among the design research community. This research program focuses on how people engage with a fictional story world through interactive artifacts or in other words, how disbelief is suspended when design is employed as an ingredient that embodies some aspects of a fictional narrative. In order to explore this, we invited four participants to interact with a purposefully designed prototype: the Digital Dreamcatcher. The Digital Dreamcatcher is a fictional device that interprets dreams by printing personalized poetry. Based on qualitative analysis from interviews with participants, we propose a preliminary conceptualisation of design fiction as system, rather than simply an object or a story. Looking at our data from the perspective of design fiction as a system also allowed us to identify "suspension of disbelief" only in autopoietic design fictions. These are design fictions able to create, extend and maintain themselves. This insight might enable practitioners using or considering the use of design fiction to look at their current or prospective work from a new perspective.
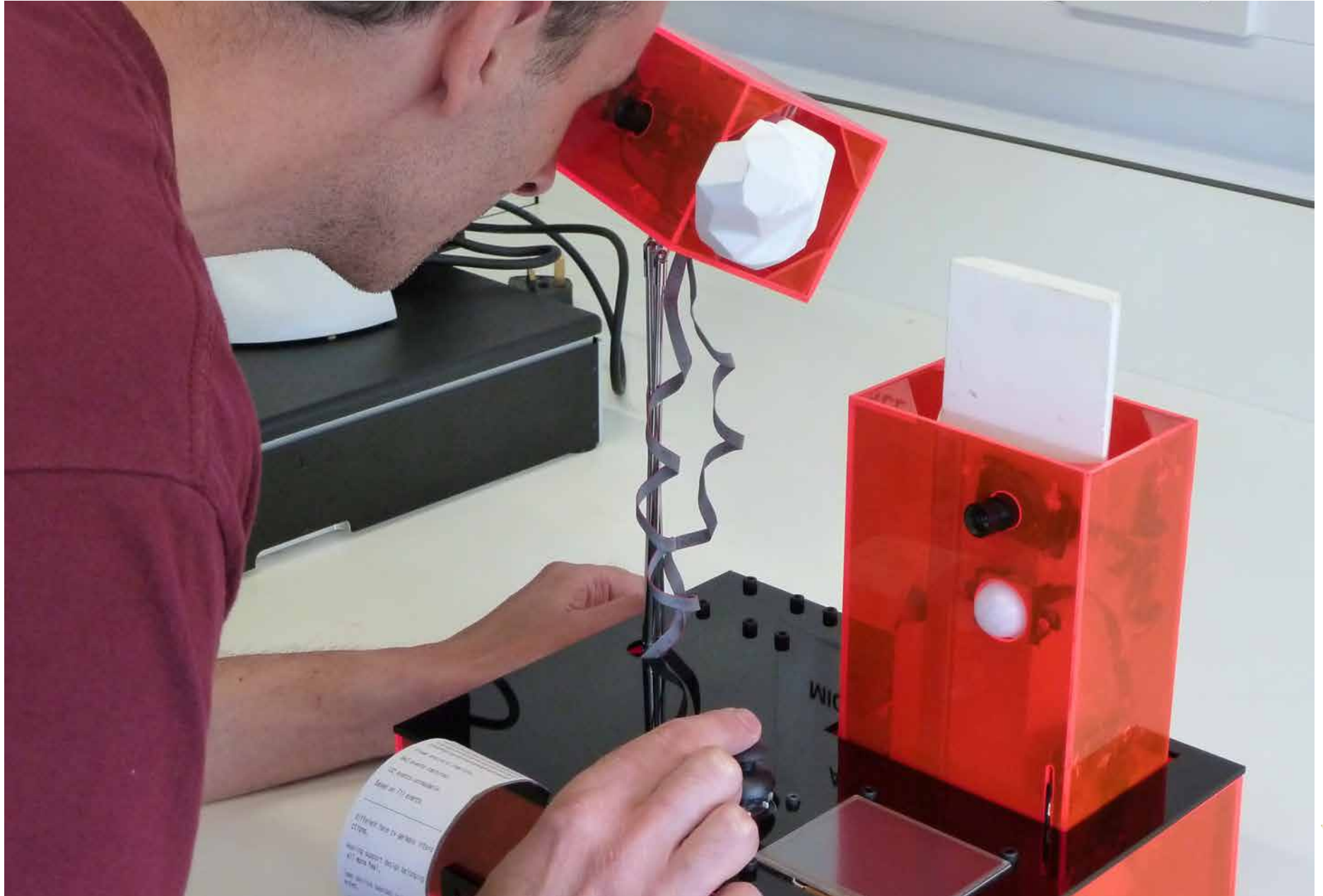
Encinas, Dylan and Mitchell | What's the ma er with[in] design fiction?

Introduction and Background as Research Artefacts

The use of design within a particular fictional world is increasingly practiced not only in filmmaking (Bleecker 2009), industrial design (Google 2012) or urbanism (e.g. Bel Geddes Futurama exhibit in 1939) but also in research contexts (Blythe 2014). Of particular interest for the design research community (Hales 2013) is the term Design Fiction, a concept with a definition seemingly as malleable as the circumstances where it is applied (Post 1969). Overall, Design Fiction is intricately related to context, narrative and, of course, design. Lindley et al for example, define it as "Something that creates a story world and has something being prototyped within that story world" (Lindley 2015) and Sterling as "the deliberate use of diegetic prototypes to suspend disbelief about change" (Sterling 2012). What design fiction is seems to be a matter of debate, whilst how design fiction accomplishes its feats lacks attention among the design research community. Does the audience of a design fiction, like Futurama or Google Glass, automatically "suspend their disbelief"? and if so, why? Hence, this project focuses on how people engage with a fictional story world through design or in other words, how disbelief is suspended when design is employed as an ingredient that illustrates some aspects of a fictional narrative.

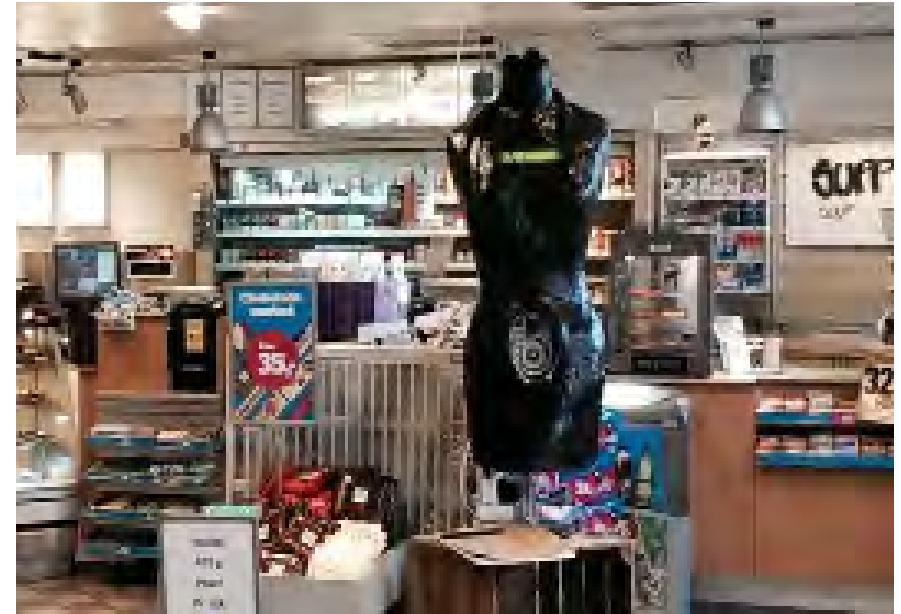This project evolved from our previous work using prototypes as research

Figure 1. Chronotraption "Prana". Photo: Jonas Leonas. Prana, was devised to embody multiple metaphors of time (both from Eastern and Western culture) in a single object. It is a time keeping device that takes breath as the basic unit for measuring time. A LCD displays standard time in a particular format: instead of seconds, the clock ticks in pranas. A modified floppy disk drive in her abdomen mimics the dynamics of breathing.

artefacts in the field: *the Chronotraptions*. The Chronotraptions embodied significant principles on the phenomenon of time from a variety of scientific and cultural perspective. They were placed in a gas station and a tourist office to capture idiosyncratic aspects of time. In both environments, a notebook was placed next to the Chronotraptions as an invitation to passersby to answer the question "If you had made this object, how would you name it?". A title generally provides a hint into what an object means for its author, it focuses the ambiguity of a material

Figure 2. Chronotraption "TeleTikTak". Photo credit: Jonas Leonas. TeleTikTak is a two-channel interacti e modified computer CRT monitor. It displays a pixelated clock pendulum in black and white colors (channel 1) oscillating between two states (TIK and TAK) at a constant low speed. Channel 2 presents the movement of a metronome between the same TIK and TAK states, but at a faster speed and with a multicoloured shadow contouring the image. When someone approaches TeleTikTak and reaches for the mouse a ached to it, the movement is detected and it automati ally shifts from channel 1 to channel 2.

representation by pointing at a certain domain of meaning. Therefore, it seemed a suitable and convenient way to encourage observers to give relevant feedback on the Chronotraption without taking too much time. Breaching spatial conventions and kindly disrupting the ordinary, the Chronotraptions served the purpose of navigating and surfacing
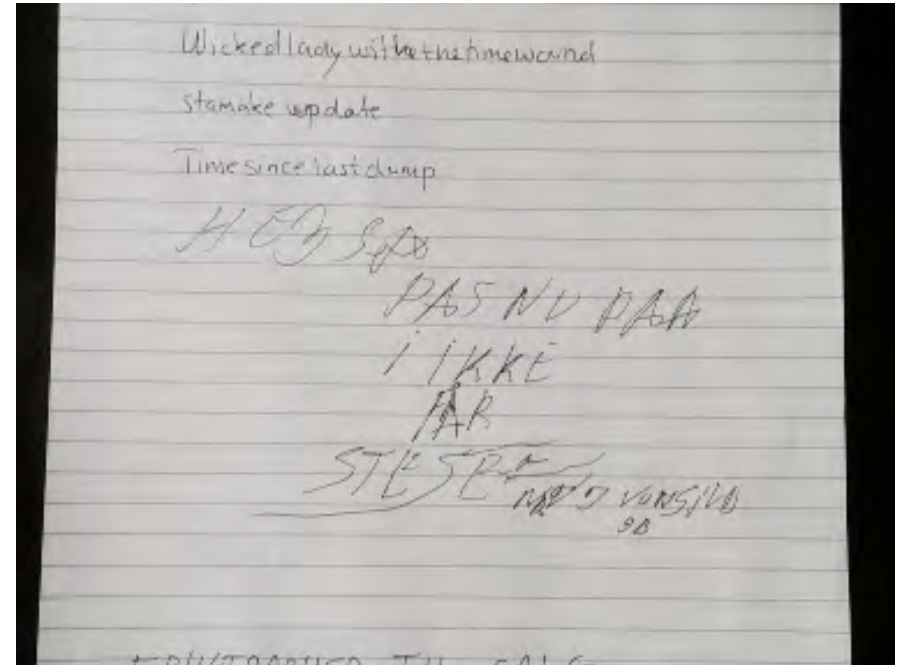

Figure 3. Notebook with Tentati e Titles donated by participants for the Chronotraption "Prana". Photo credit: Jonas Leonas.

notions of time in the field. These research artefacts fostered discussion and deliberation, aided at navigating complicated topics and helped conveying abstract ideas. More importantly, the Chronotraptions seemed to act as a invitation to explore a story world created by their audience. This was evidenced by the ingenuous and diverse titles given to the Chronotraptions and gathered in the notebooks: "Menstruation Bomb", "Delicious Matrix", "Biological Countdown", "Fertility For Sale", "Stomache Update", "On/Off Pussy Control", "Naughty Watch- The Sequence". However, interesting as they might be, these titles did not tell us much about the story worlds behind them. This in turn, sparked our interest to investigate the role design can play in envisioning and navigating such story worlds.

Context as Alternati e

The science fiction author Cory Doctorow illustrates design fiction as follows: "An engineer might make a prototype to give you a sense of how something works; an architect will do a fly-through to give you a sense of its spatial properties; fiction writers produce design fiction to give you a sense of how a technology might feel." (Doctorow 2016). While we sympathise with this definition that focuses on realism and extend it to the design arena, we wanted to explore the boundaries of design fiction beyond the scientifically possible. Hence, we asked ourselves, "what would a magic realist design fiction look like?" The answer was published as a paper in a scientific conference (Encinas 2016). In it, we imagined a night where everyone shared the same dream. We illustrated the repercussion on the mainstream media with a set of photo-collages portraying grandiose headlines and speculated on the impact it could have caused on an imaginary technology lab: the Solutionist Studio. In the Solutionist Studio, prototypes that were being conceived and used as props suddenly started to work. One researcher made a "Digital Dream Catcher" to produce ambiguous images that might stimulate reflection and discussions around the shared dream. However, the paper goes on to explain that when people used it they recognised the images produced as actually belonging to the shared dream. The line that separates fiction from reality had become entirely porous.
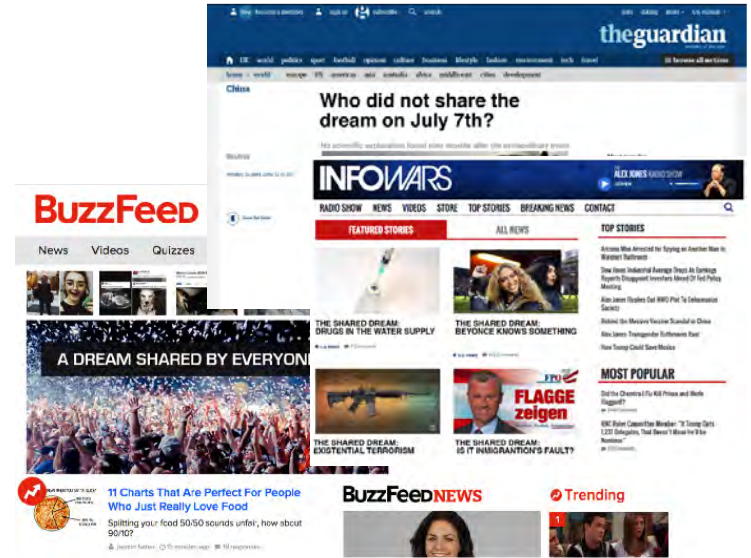

Figure 4 [Top] PhotoCollage of Mainstream Media reporting the Shared Dream. [Left] Fictional image from the shared dream produced by the Digital Dream Catcher Photo: Enrique Encinas.

The "Digital Dream Catcher" and the magic realist design fiction that surrounds it assumes a reader that "suspends disbelief", embraces the story and undergoes a reflective process. While this seemingly straightforward progression might be accurate for prose forms of design fiction, is it the same for more graphic, or material design fictions?

Prototype as Vehicle

Research through design makes use of purposefully designed artefacts or prototypes to explore the boundaries of knowledge, frequently involving users in various ways during different stages of the research and/or design process (Gaver 2012). In contrast to purely scientific approaches, design is generative, it assumes not a single world to be discovered but a multiplicity of worlds awaiting to be created and the theory derived from it is, in Bill Gaver's words "provisional, contingent, and aspirational" (Gaver 2012). We have chosen the Digital Dreamcatcher as the vehicle for exploring how an audience creates, understands and navigates the story world made available by a design fiction.

Originally, the Digital Dreamcatcher was a device that generated ambiguous images about a fictional dream shared by everyone. In this project, we have slightly adapted the functionality of the Dreamcatcher to foster ambiguity while keeping the content generated related to the participant. Rather than producing images about a universal dream, the Digital Dreamcatcher produces fictional poems about the person's dream.

The Digital Dreamcatcher consists of two modules. The Sleeper Module is a portable device to be placed by a bed for data capture. The Dreamer Module is a device that interprets information provided by the Sleeper and generates poetry. Both modules consist of a FEZ SPIDER mainboard
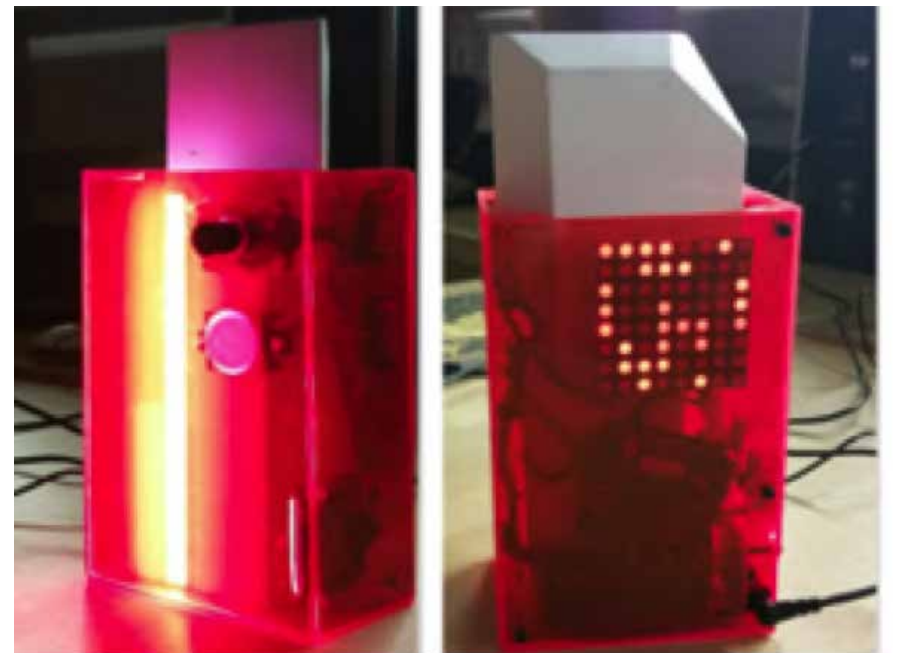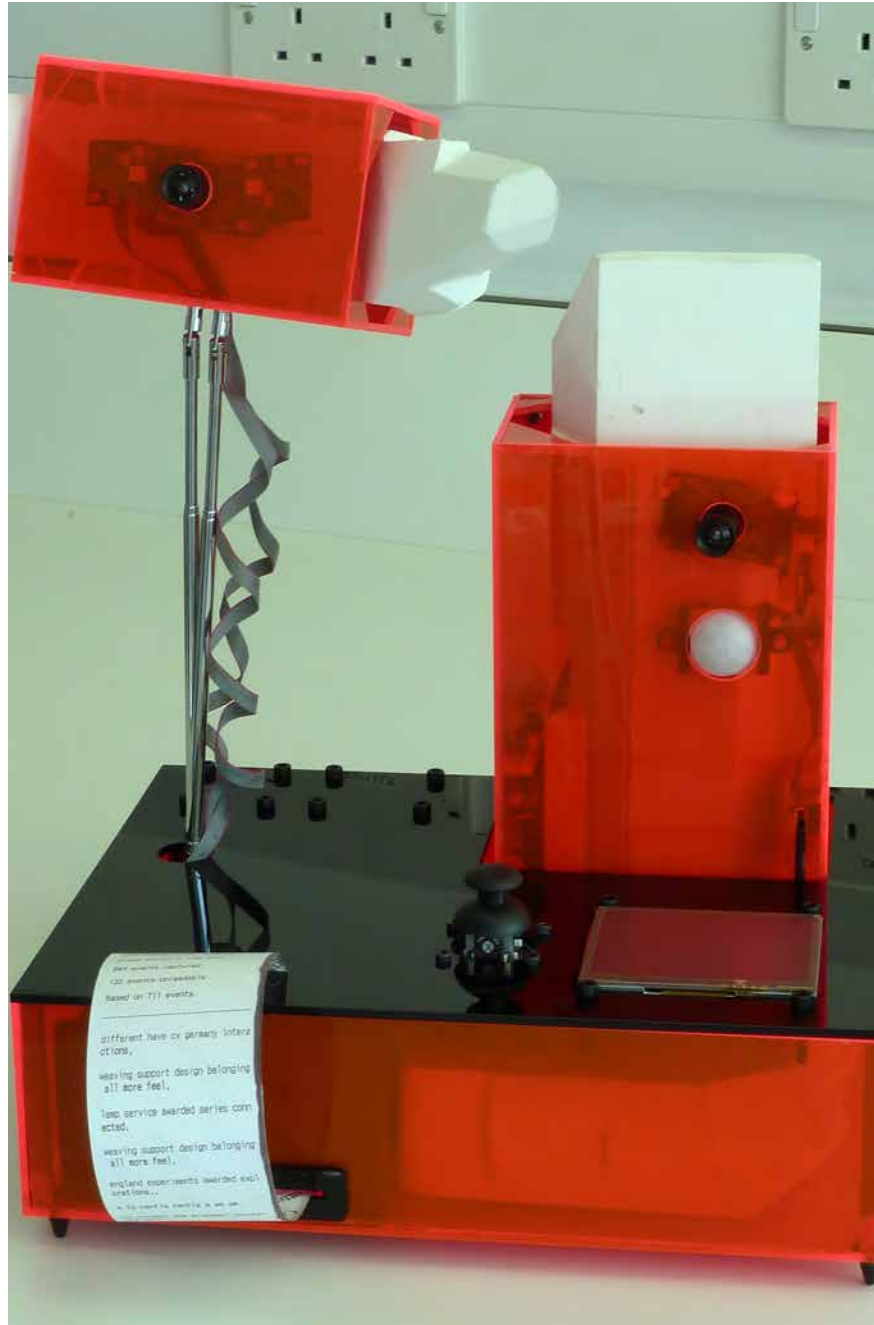

Figure 5. Sleeper module. Photo: Enrique Encinas. [Top] Sleeper module capturing data in a bedroom. [Bottom] Elements in the front and back sides of the module.

from GHI Electronics, and a set of Microsoft Gadgeteer compatible modules attached to it. On a functional level, the portable module captures images and records data of a dreamer dreaming. When a participant returns the Sleeper module to us after spending a night with it, we attach it to the base and insert the SD card into the Dreamer module. The camera is subsequently activated to capture images of the retina of the participant. When a participant looks into the viewer we see them seeing. Finally, the push of a button triggers the printing of an ambiguous, abstract and of course, fictional representation of the participants dream. We manually edit the poems before interviewing each participant and store them in the memory of the Dreamer module. The content of the poem is generated based on public information from each participant available online. In essence, an algorithm (Vajra 2016) is fed paragraphs from each participant's blogs, linked in, twitter, etc and generates poems.

Figure 6. Dreamer module with Sleeper module a ached. A poem is being printed on the bo om left of the picture. On the bottom right there is a screen that displays the retina of the participant when it is located in front of the Dreamer's camera Photo: Tommy Dylan.

Process as Invitatio

We are interested in studying the elements that provide for the emergence and maintenance of engagement with fictional contexts by investigating the interaction between people and design fictions. To do so we invited four participants (two male and two female PhD Design and Media Students) to interact with a purposefully designed fictional prototype: the Digital Dreamcatcher. Later, we studied their responses through qualitative analysis of recorded interactions and semi-structured interviews. We did not predefined the number of participants that would take part in our study. Rather, we invited and studied each participant independently in order to enlarge our data sample cumulatively. Once our dataset proved sufficiently extensive we decided to focus on the knowledge gathered and deepen our analysis. We intend to apply the insights from this study in a future design iteration of our prototype and invite new participants to experience it.

Each participant followed the same procedure. First, we briefed the participant regarding the overall research project. We mentioned the Digital Dreamcatcher was a design fiction and handed over the Sleeper module. We instructed the participant to position it next to the bed where dreaming takes place. If a participant asked to explain the reasons for it, we just indicated that the device would capture relevant information regarding dreaming patterns. On the next day, the participant was invited

Figure 7 Close up of a poem produced by the Digital Dreamcatcher. Photo: Tommy Dylan

to take part in a semi structured interview. This interview was structured in 3 stages. During stage 1 we asked participants questions related to the previous night such as "How did sleeping next to the Sleeper module make you feel?" "Do you remember your dreams from last night?" "What do you think the device was doing?". Stage 2 saw the assembly of Dreamer and Sleeper module, a photo of the retina of the participant, the production of the poem and a discussion on how the poem related to the participant. Questions in this stage were similar to "How is this poem related to your dream" "Why is the machine printing this?" Stage 3 comprised an explanation of the actual workings of the prototype and a discussion on the overall experience interacting with the Digital Dreamcatcher.

Outcomes as Insight

We have structured the findings in relation to the stage of the interview where they emerged. This way we can relate them to the prototype according to the task performed by participants. To preserve their anonymity we will refer to participants as [P1][P2][P3][P4].

Stage 1 - On the Sleeper module

The presence of a foreign agent (the Sleeper module) within the environment where participants slept was, at times, a cause for unease and even distress. This was best exemplified by [P1] who initially turned on the device before getting in bed but shortly after decided to turn it off. For her the main problem was the camera: "I had similar feelings to when a paralysis nightmare happens. In mine , an unknown threatening presence is watching me sleep, which in this case was the camera. So we turned it off. Sorry!"

[P3] was also affected by the working of the device. The lights glowing in the back of the Sleeper module disturbed his sleep and consequently, he decided to switch it off after two hours. However, [P2] noted that in those two hours the device certainly recorded information: "I am sure it captured something". Also, [P2] was hesitant to act upon the device, he was "afraid to move" this "calibrated machine". [P4] also mentioned a hypothesis regarding the behaviour of the device. He thought it might be
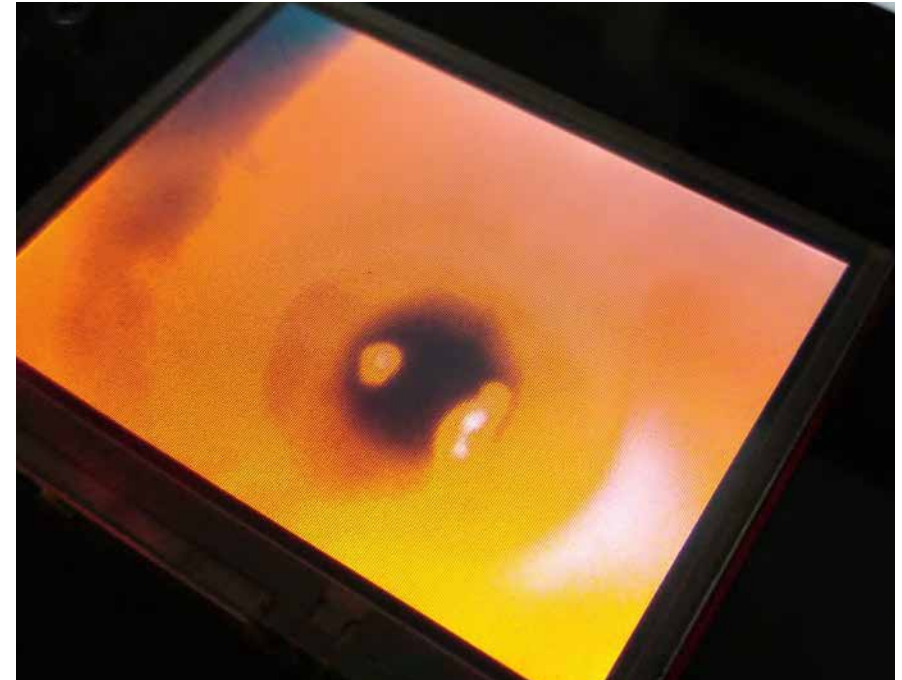

Figure 8 Close up image of the retina of a participant as shown by the Digital Dreamcatcher. Photo:Tommy Dylan.

capturing sound and temperature, the latter because it "influences the quality of sleep".

The Sleeper also served as a platform to discuss dreams and dreaming. During this part of the interview, all participants shared dreams from the past. [P2] recalled a vivid nightmare happening the night the Sleeper module was present. [P3] explained how she is able to modify the narrative trajectory within her dream so it does not turn into a nightmare.

Speculating about the Sleeper module went a step further in the case of [P3]. She usually has vivid dreams and was utterly surprised when she woke up and was unable to recall any. According to her, the Sleeper

module might be the cause of such outcome: "Maybe because I knew this was gonna sort of capture what I dreamt, I sort of store it there instead of knowing when I woke up". This seemed to her a desirable design feature: "If I had nightmares and I knew they would be stored there, I wouldn't have to wake up tired".

Stage 2 - On the Dreamer module and the poems

This stage of the interview comprises the responses of participants to the poems printed by the Dreamer module. Essentially, participants were asked to look directly into the camera and press a button. The device printed a poem that participants read aloud. After this, we asked questions like "how is this poem related to your dreaming process?" and "What does this message mean to you"? For each participant we repeated this process three times, producing and discussing three poems.

Some participants reacted with a mix of surprise and curiosity to the poems. [P3] for example, exclaimed "Wow! I've been thinking about what I've done before and how can I use it here" (by "here" she refers to where is currently studying). She seemed puzzled to discover the connection between herself and the words printed: "This is really weird, because it is sort of what is going on in my life at the moment". An explanation to such statement followed: "my dreams are usually about what I've done in my day". The reaction of [P3] after reading the second poem aloud was that of perplexity: "This is freaking me out." When asked why, she

replied: "because I know it cannot read my dreams but it feels like it can read my dreams." We wondered if seeing this poem was making her feel uncomfortable. We received a positive answer: "maybe because I have dreams that only make sense to me, dreams are so personal…"

The way participants engaged with the content of the poems seemed to follow an approach based on particular meanings rather than in full sentences or the overall poem. [P4] reacted to single, meaningful words. Nopal, for example, reminded him of a dear food back home and triggered comments on the lack of joy consuming food in [Anon]. He felt this word to be a suitable part of his dreams along with, for example, "The Nordics" because both are salient in his everyday. [P4] had been watching the TV show "Vikings" about a nordic civilisation. While some terms were ignored, other words provoked reflection and required second thoughts. [P3] was meditative after reading "blistering winds", words that reminded her of daydreaming and how the Dreamcatcher might be also recording dreams while she is awake. Finally [P4] wondered why the word "windows" appeared in many of the poems.

We asked our participants about their thoughts on what dreams are to make better sense of the interpretive key they used to talk about their dream. Interestingly, the manner in which the content of the poems was explained closely related the theoretical concept of dream the participant had. [P3] saw dreams as a mechanism of storage or disposal of everyday events. At the same time, the words that she felt more relevant were
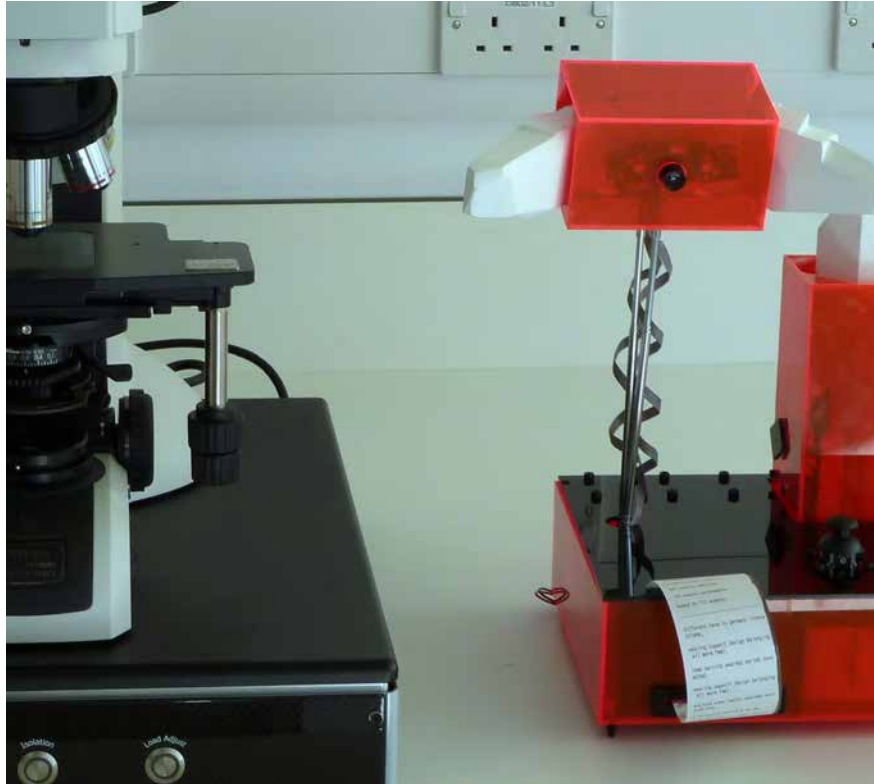
Figure 9 The Digital Dreamcatcher next to an opti al microscope. Photo: Tommy Dylan.

those close to her everyday experience. Similarly, [P4] explained dreams as a process of exposure of hidden desires, sometimes responding to bodily reactions. Subsequently, the appearance of the name of a food in the poem was for him notable in this regard.

Interestingly, [P2] responded in a very different manner to the poems. Immediately after reading the first verses, he realized how we have constructed the poem and when facing the question "what does this mean to you?" his answer was: "Random bits from my linkedIn profile". Our invitation to "tag along" with our fiction had failed. However, his

comments afterwards proved invaluable in understanding why. They also provided rich insight into design for fictional contexts. For [P2] the artefact was "maybe too believable", mainly due to the components employed in its construction: camera, LEDs, etc. Also, for [P2] there was "too much truth" in our setup and reminded us of the work of Ann Light (Light) where a mere glove served to create and navigate a fictional world.

Stage 3 - On the overall experience

In this final stage of our interview we asked participants how they thought the poems were produced and what were their impressions on the overall experiment. Participants [P3] and [P4] both deduced that the poems were related to information available online and referred to "pre-captured data" or "algorithms that search online". At the same time, both participants reflected on the implications of publishing information online and how it is consumed. For [P4] the Dreamcatcher might help raising awareness regarding the information one is consuming and how it might influence one's ability to dream.

A lot of design possibilities were also discussed. [P2] suggested that the Dreamcatcher should be "refictionalized" to facilitate unusual interactions that would elicit the fantastic. He suggested employing magnetism or light in abstract ways. [P3], however, imagined the Dreamcatcher in the context of the home. Maybe as a toaster, or coffee maker, that produces a testimony of dreams while one gets a grip on the day to come.

Design Fiction as Autopoietic System

A closer look into the responses from participants to the Digital Dreamcatcher has allowed us to approach design fiction from a different perspective. Rather than considering a design fiction as an object or the story surrounding an artefact, we argue that a design fiction is a system. A system that encompasses not only artefact and story, but participants and researchers too.

Design Fiction as System

Undoubtedly, at the core of a design fiction is a designed artefact (story, illustration or prototype) that embodies the ideas of a designer and certainly, sets the stage for the story world where the design fiction exists. In our case, this artefact is the Digital Dreamcatcher. However restricting the identity of the design fiction to the artefact or the intentions of the designer in constructing the story that accompanies it would be, following our results, to assume too much. For [P3] the story surrounding the Digital Dreamcatcher involves memories of her past, surprising technological affordances and reasons for personal experience. For [P2], in turn, the story is reduced to his LinkedIn profile. The space of knowledge that a design fiction occupies varies depending on how a participant embraces the artefacts designed. Researchers facilitating the interaction between participants and artefacts play an important role here. Undoubtedly,
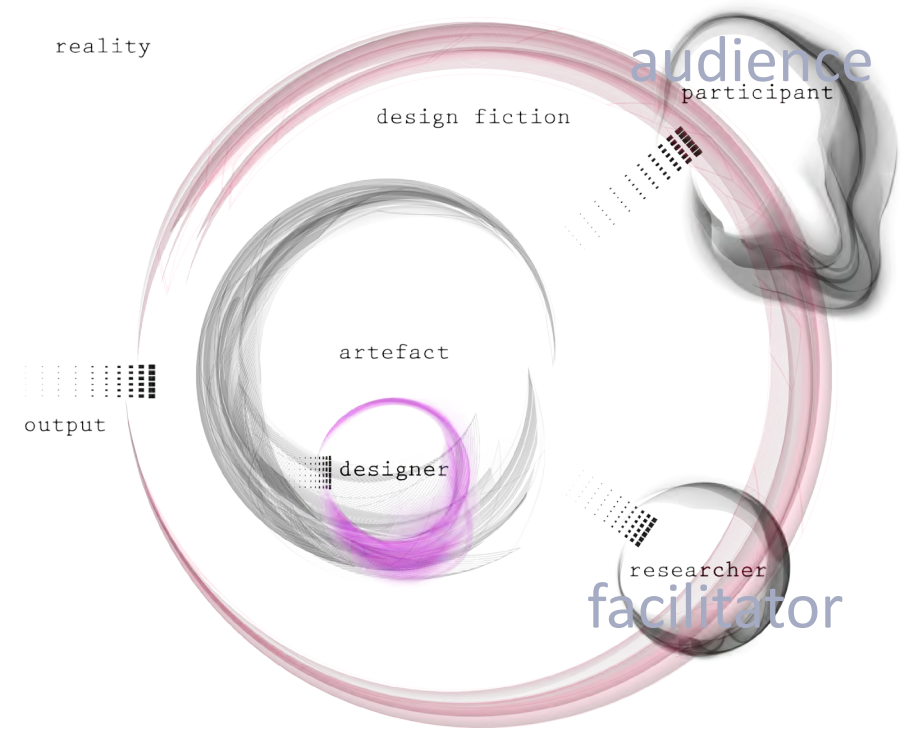

Figure 10 Diagram of design fiction as system Photo:Enrique Encinas.

how we tailored the questions and conducted the interviews also had an impact on participants' involvement. For example, asking participants what dreams are after they had read a poem provided them with a dialectic space where to correlate familiar words with an overall understanding of dreaming.

As we aim to show with Figure 10, we see design fiction as a system with a flexible boundary defined by the interaction between artefact (and implicitly, the designer), participant (audience) and researcher (facilitator). The dotted lines in the image illustrate the information flows between each structure. This flows "inflate" or "deflate" the boundary of the design

fiction, extending or constraining its range of influence (in the diagram, the red boundary). Furthermore, the three way interaction between artefact, audience and facilitator influences the outcomes (in the form of knowledge) the design fiction produces. We can find a number of examples of this effect throughout our data: In the interaction with [P4], we discussed information production and consumption and how that relates to health and wellbeing. [P3] elaborated on how a technological device like the Digital Dreamcatcher might disrupt privacy and the sense of ownership we have concerning our dreams. With [P2] we explored design possibilities and opportunities for future design fictions. None of this instances were aspects initially encoded within the design fiction but rather emerged locally in the interaction between the elements of the design fiction system: audience, artefact and facilitators.

"Suspension of disbelief" occurs in autopoietic design fictio

Design Fiction is frequently defined as "the use of diegetic prototypes to suspend disbelief about change". While we acknowledge the value of this definition, we argue that "suspension of disbelief" is not an automatic response to design fiction. As our participants showed, exposure to a design fiction does not imply suspension of disbelief on the part of the audience. [P3] and [P4] were able to "go along" with the fiction, hence suspending their disbelief. However, [P2] did not do so after discovering how the Digital Dreamcatcher was producing dreams. We offer a possible

reason for this effect, one that is based on the concept of autopoiesis.

The Chilean biologists Jose Maturana and Francisco Varela [] coined the term autopoiesis to describe systems that continuously generate and specify its own organisation. The term was initially applied to living organisms, like biological cells, that produce the parts or elements they are made of. By contrast, a system is allopoietic if it cannot maintain a system of production of its own components. For example, a bakery is an allopoietic system because it produces bread but it does not produce workers, ovens or bricks. In essence, autopoiesis is a system's ability to create and maintain itself.

If we were to view design fiction as a system, what would entail to define it as autopoietic? Following the definition by maturana and Varela, the design fiction should be able to generate the elements from which it is made. As we specified in the previous section, these elements can be of various nature and certainly, quite unlikely to be generated by a design fiction in the manner that a biological autopoietic system generates its elements (a design fiction would hardly generate its audience in the same way a cell its mythocondrias). However, a design fiction can integrate the elements it is made of by assimilation within its own story world. An autopoietic design fiction reach audiences, gains facilitators or enlist artefacts. It stories are kept alive through a willful suspension of disbelief.

We believe that the design fiction emcompassing the Digital

Dreamcatcher, [P3] (and similarly [P4]) and us as researchers might have at times behaved as an autopoietic system and as a consequence, participants were able to "suspend their disbelief". This design fiction was able to expand and maintain itself. With [P3] for example, the design fiction was extended by speculating on the Digital Dreamcatcher interpreting, not only night dreams, but daydreaming too. Likewise, [P4] "created" the fiction by grounding it on the possibility of a Digital Dreamcatcher that was able to listen to him speaking in dreams.On the other hand, in the case of [P2] the design fiction was allopoietic, its story collapsing into a conversation about design features of the physical artefact rather than assimilating new elements.

Conclusion as RTD2017

This preliminary characterisation of Design Fiction as a system with autopoietic or allopoietic characteristics has originated a number of interesting questions that deserve further study. Are there any other relevant elements influencing the design fiction system? How are the particular interactions between elements within the system characterised? How does a design fiction system interact with reality or an audience without a researcher? and more importantly, what makes a design fiction autopoietic?

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Wait for the drop: Designing a gravity powered turntable of the future

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Abstract. This project presents a bespoke vertical turntable that plays music for 10 minutes on power generated by a small gravity battery. Blending speculative and practical design, the gravity turntable is designed and built according to the constraints of a near future storyworld in which radial grid electricity does not exist, and energy must be produced and consumed by exploiting local terrain, knowledge, and materials. The conceptual basis of this project draws inspiration in part from Borgmann's 'device paradigm', seeking to go 'behind the wall' to design a holistic product that demonstrates a harmonious relationship with its energy source and the surrounding environment.

Keywords: Speculative design, design fiction, renewable energy, gravity battery, critical futures

1 Introduction

Energy is essential to modern living. Our inseparability from energy is not just a matter of electricity consumption and use, but includes our inseparability from infrastructures of generation, transmission, and storage. But while our lives are energy rich, our relationship with energy is poor; electricity is abstract and distant, a number on a meter. Most of us have little understanding of how energy works.

As technology advances it also becomes increasingly hidden, lost in complex systems, controlled by invisible algorithms. This has the effect of dislocating ends and means. The present tendency is for designers and consumers alike to focus on the end—the object of desire—while ignoring the means, the complex infrastructures and systems that allow the device to work. Nothing illustrates this dislocation more clearly than our attitude towards energy. Electricity, as a form of energy, powers our lives. It magically appears in sockets on the wall that deliver a seemingly endless supply. Behind the wall, however, energy resides in massive, alien infrastructures.

Drawing inspiration from Albert Borgmann's 'device paradigm', this project transforms a grid-dependent 'device'—a record player—into a situated 'thing'. As an instrumental product, our record player no longer exists as an isolated element dislocated from its infrastructure; instead, it has become an integral part of the local ecosystem.

2 Background: Redesigning Madeira

The artefact we present is part of ongoing research sited at the innovative island edge of Madeira. In our project, 'Redesigning Madeira', the island's vertiginous topography and numerous microclimates provide an ideal venue for the conception and testing of multi-scale energy experiments. We aim to provide solutions—some practical, others (for now) fictional—that return control of energy generation and consumption to communities while challenging historical constraints of infrastructure.

Our overall approach blends speculative and practical design in much the way that design fiction does. Design fiction is commonly defined as the 'design of diegetic prototypes to suspend disbelief about

change' (Bleecker 2009). In our case, we have imagined and conceptualised a fictional storyworld to manipulate the constraints that influence our design approach to energy. Essentially, Madeira in this storyworld has no radial model of central energy generation, so that communities must find innovative ways to use remoteness and peripherality to their advantage. This allows for the imaginary reconstruction of society and human behaviour—from how energy is generated, to the rethinking of products that no longer have wall sockets ready to provide them with always available power.

In our recent work, we have focused on helping communities to reclaim ownership of energy generation and storage by employing local knowledge and materials to develop gravity batteries. The gravity battery is a storage device designed to be used with a variety of renewable energy generation methods. In our case, energy provided by the abundant Madeiran sunshine is captured by solar photovoltaics. This energy powers a motor, and with the help of a homemade gearbox is used to lift a fixed weight into the air. When it is needed the energy is released by dropping the weight, which in turn rotates the motor—now a generator—to produce electrical energy. The power available is determined by the size of the dropping mass, the speed at which it drops, the gearbox ratio, and the drop distance. To communicate the concept of the prototype we recorded a short video that shows how the energy generated powers an out-of-the-box record player (Fig. 1).

Fig. 1 Gravity battery powering an out-of-the-box record player: https://vimeo.com/202043363

The next iteration, to be shown at xCoAx, builds on our gravity-based energy generation methods and applies them to the domestic environment of product design. Our bespoke gravity turntable is a product that exists in a near future storyworld where living rooms have no wall sockets, but still provide a space to gather with friends and enjoy music together.

3. The Gravity Turntable

In the simplest terms we are proposing to 'remove the wall' that makes energy abstract and intangible. The wall and socket facilitate generic and problematic approaches to both the design of electrical products and the way they are used. The metaphorical removal of the wall reveals local contexts and highlights local terrains, materials, and skills. We reify this metaphor by building a wall-less, gravity powered turntable from recycled materials following an open-source approach.

3.1 Conceptual Context

In *Autonomous Technology*, Langdon Winner describes how 'abstract general ends' such as 'health, safety, comfort, nutrition, shelter, mobility, happiness, and so forth' have become highly instrument specific: 'The desire to move about becomes the desire to possess an automobile; the need to communicate becomes the necessity of having a telephone service; the need to eat becomes the need for a refrigerator, stove, and convenient supermarket' (Winner 1978). Borgmann took this idea a step further in *Technology and the Character of Contemporary Life* with his description of the 'device paradigm', which differentiates between things and devices. Things are inseparable from their context: we engage and interact with them in their worlds; means and ends exist in an unbroken continuum. Devices, on the other hand, conceal their contexts. In his study Borgmann examines the human need of warmth, detailing the shift from the stove as thing—'a focus, a hearth, a place that gathered the work and leisure of a family and gave the house a centre'—to the device, the central heating plant that 'procures mere warmth and disburdens us of all the other elements' (Borgmann 1984).

Our energy infrastructure, developed and implemented a century ago, similarly 'disburdens us of all the other elements'. Electricity, the mysterious entity that is essential in powering modern life, appears to be as unproblematic and ubiquitous as the air we breathe. The always-on availability of energy manifests clearly in the design of domestic products—design that stops at the wall where infrastructure begins. A shift to alternative modes of product design that are aware of the local environment, people, and materials at hand does not mean reverting to a nostalgic or pre-industrial past. Rather, it means promoting the *thing*-ness of the product, which supports an ecosystem of practices derived from its use.

The gravity turntable is a 'thing' rather than a 'device' because of the shift it causes in the practice and attitude of listening to music. The gravity turntable is wall-less: the gravity-based mechanism for energy generation is an integral design feature. Hence, its energy infrastructure and its functionality are components of equal aesthetic relevance. The experience of listening to music on the gravity turntable is highly influenced by its design. Its maximum playback time—10 minutes—and the slight effort it imposes on its user encourages active rather than passive listening, and quality over quantity. After all, a record is not an mp3 file, so why should their modes of enjoyment be the same?

3.2 Implementation

As mentioned earlier (Fig. 2) our last iteration used gravity as an energy storage and generation solution. For our next iteration, the gravity turntable, we are implementing a small scale version of the gravity battery in a domestic product. The gravity turntable plays a record for an uninterrupted 10 minutes. It does so without the need for any external energy supply, by using gravity as the energy source for its functions. This is one of the main design constraints we have adopted in our process. The other design constraint is intimacy. The gravity turntable provides an active listening experience in exchange for a minor athletic effort on the part of the listener. After placing the record and adjusting the position of the needle, a weight must be pulled up until it reaches a height of 2 meters. The listener adjusts the headphones provided and releases the weight. Music begins to play, and lasts until the weight reaches the floor.

The energy demands of the gravity turntable require that the record is oriented vertically, rather than horizontally as is typically the case. While the weight falls, the spin produced in the transmission gear is used directly to spin the record at 33 rpm. Also during the time the weight falls, another gear is connected to a small motor that works as a generator, providing enough energy for signal treatment (i.e. filtering) and amplification. Finally, the signal is driven through a jack port into which headphones (or speakers) are connected.

Fig. 2 Detail of the gravity battery mechanism and weight

3.3 Technical Rider + Demo

The latest iteration of the gravity turntable is currently in the final stages of development. Images of the device and video of it functioning will be added to the final version of this document.

The gravity turntable is a self-contained unit that does not have any additional energy requirements. We will bring the full product to xCoAx and install it in any room of reasonable size. The setup time is approximately 2 hours.

For the demo we will supply external speakers, along with noise-cancelling headphones for individual visitors to experiment with at the installation site.

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