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Ileana Mariş was born in Ieud, Romania on the 1st of February 1985. She moved to the Netherlands in 2004, where she followed her Bachelor in Liberal Arts and Sciences at the University College Roosevelt in Middelburg. Ileana graduated Summa Cum Laude in 2007.

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In this dissertation, Ileana examines the nature of designing without a product. This type of designing is concerned not with the functionalities of a designed object but with uncovering the underlying design theory of what would make that design work for the people engaging with it. Ileana puts forward arguments for a view of design as a liberal art, an art shared by all those interested in improving their worlds.

On Design as Liberal Art

Ileana Mariş

On Design as Liberal Art: The Art of Advancements

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On Design as Liberal Art: The Art of Advancements

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--- Ileana Mariș, December 2013

English Summary

Research topic: In this thesis, I examine the nature of designing without a product (Jones 1980). Traditional design thinking was concerned with designing objects that are means to a pre-defined end, ranging from chairs to medical equipment to satellites. Design without a product is concerned with discovering what would make a new design work for the people engaging in or with it. In their practice, designers develop and are guided by a set of design theories of what they think would make a new design work. These theories are independent of the object of design; they can be equally applied to the design of for instance, a new online community or an offline participatory exhibition. The importance of designing without a product is that it is an act of designing visible across all domains of human life (Alexander *et al.* 1977), be it developing a new curriculum for a course, creating a new choreography for a dance performance or planning a new way of working together in an organization. Designing without a product is not exclusively the domain of professional designers; it is a type of designing shared and performed by all those concerned with improving their world.

Researchers have been so far restricted in exploring empirical cases and in theorizing about the nature of designing without a product. That is the case as the current understanding of design has been dominated by the design as process paradigm (Lawson 2006, Cross 2011). This paradigm puts forward a view of design as a mechanical art of problem solving by initiating change in stable products or systems. Design is seen a goal oriented process in which designers employ cognitive design thinking and scientifically tested theories of design. Juxtaposing designing products with designing without a product, we obtain different conceptualizations of what the design world is made of. The design field is riddled with uncertainties about the nature of the design object, design process and methods, design knowledge and acts of designing. These uncertainties ignite various controversies (Latour 2005, Venturini 2010) in the design practice about how to define the object of design, what knowledge is needed in designing, how to approach it and with what desired goals.

My aim in this thesis is to explore these design uncertainties and deploy the controversies visible in the design practice in order to learn what designing without a product has become in the daily practice of those engaging in it. Building on Buchanan (1992, 1995, 2001), I want to

move away from the taken for granted view of designing as a mechanical art for problem solving to a view of design as a liberal art of advancements. I am guided in this aim by three research questions, adapted for the study of design from Latour (2005):

- How to deploy the many controversies about designing without a product without restricting designing in advance to a specific domain (individual or structural)?
- How to render fully traceable the means allowing designers to stabilize these controversies?
- Through which procedures it is possible to reassemble designing without a product not as a mechanical art of solving design problems but as a liberal art of advancements?

Research methodology: Drawing inspiration from Latour (2005), I adopt an Actor Network Theory methodology for studying design. Ontologically, this methodology puts forward a view of the design world as *made by* a dynamic assemblage of people and the objects they live and work with. The design world is viewed as constantly negotiated, emerging and advancing out of the multiple interactions and performances of this heterogeneous assemblage. Through these negotiations, it is not only the designed which changes and is advanced. The designers and the practice of designing itself are transforming too.

Epistemologically, this methodology proposes a view of knowledge as co-created in practice, as integral to doing (Strati 2007, Gherardi 2009, 2010, 2012). Knowledge does not reside in individuals' heads, nor is it a production factor which can be easily managed, stored and used strategically. Rather, knowledge is seen as "a collective, situated activity" (Gherardi 2012: 199). Knowing and learning is something people achieve together by engaging in collective action (Corradi *et al.* 2010, Nicolini 2011).

Empirically, I learned about the practice of designing without a product by following the design work performed at the Amsterdam Museum. I studied how the museum employees and their collaborators engaged in transforming the museum from a historical, knowledge authoritarian institution, to a story-centered, participatory, online and offline meeting place. I learned about their design practice by means of extensive observations, reflective interviews and document analysis. As a research design, I employed the strategy of deploying controversies developed by Latour (2005) and Venturini (2010).

Research insights: By examining the uncertainties in the field of design on the nature of design object, design knowledge, design process and the acts of designing, and by deploying the different controversies designers in this study engaged in their work, I obtained a different view on designing than offered in the field of designing products. Designing without a product is not a mechanical art, a goal oriented process, in which a designer solves problems by initiating change in a stable product or system. Designing without a product is a goal in itself (Jones 1980). It is concerned with initiating change in ‘constitutive entanglements’ (Orlikowski 2007) between people and the things they work and live with, of which the designer and those concerned with the designed are a part too. It is not a design performed by drawing representations of the world but by drawing things together in the world. The designers’ focus is on how to make the emerging assemblage of people and things work. Design knowledge is a sensible knowing in practice, sustained and refined through ‘taste making’ (Gherardi 2009), namely through the collective negotiation and appraisal of a preferred way of doing things. To design is no longer a way of mastering and controlling singular, agreed-upon matters of fact. It is a way of engaging with matters of concern which are multiple, ambiguous and debatable (Latour 2004). It is a matter of being in the world, of engagement, empathy and care.

I build on Buchanan’s (1992, 1995, 2001) conceptualization of design as liberal art, by developing an understanding of designing without a product as a liberal art of advancements. As a liberal art of advancements, designing without a product is an art of living, of being in the world that involves everybody and everything as equal partners in changing the world. It is an art not focused on developing products but on creating the circumstances that people and things can live and work together and enrich each other’s lives. In designing without a product, the designers’ concern is no longer of how to be good technicians or good researchers in user tests and parameters calculations; it is about how to be good participants in the world.

Theoretical contributions: I contribute to design theory by offering empirical insights of designing without a product (Jones 1980) and by theorizing about its nature as a liberal art of advancements. I extend Jones’ (1980) definition of design as ‘to initiate change in man-made things’, a definition that continues to dominate the design literature. I propose an understanding of design as to initiate change in ‘constitutive entanglements’ (Orlikowski 2007) among people and the things they live and work with. Rethinking the notion of design

contributes to a theorizing about designing as a performative, sociomaterial practice (Knorr Cetina 2001, Gherardi 2012) in which the material is a constitutive element, rather than a means to an end.

I contribute to Buchanan's (1992, 1995, 2001) effort to understand the nature of design as liberal art by drawing on Gherardi's (2009, 2010) notions of collective knowing in practice and taste making. I extend Buchanan's view of design as a liberal art by examining it from a post-humanist perspective (Latour 2005, Orlikowski 2007). I offer empirical evidence that design as liberal art is an art of living with things, of advancing constitutive entanglements, of which the designers are a part too. Rather than being an art performed through cognitive processes of placements, design as a liberal art of advancements is performed through place-making, or taste making. It nurtures a knowing by doing, by engaging in practice with others in continuous appraisal.

I contribute to organizational design by offering empirical evidence of organizational designing by drawing things together for advancements. This type of designing is different from designing through strategic planning for effectiveness. Researchers interested in studying organizational design, as well as those interested in initiating changes in their organizations would benefit more from examining the constitutive entanglement between technologies and organizations.

Nederlandse Samenvatting

Onderwerp: In dit proefschrift onderzoek ik de notie van *designing without a product*, of ontwerpen zonder product (Jones 1980). Van oudsher wordt ontwerpen geassocieerd met het design van objecten die een vantevoren gedefinieerd doel dienen, zoals stoelen, medische apparaten en satellieten. In design zonder product proberen de ontwerpers te ontdekken hoe zij een nieuw ontwerp kunnen maken dat werkt voor hen die meedoen. Ontwerpers ontwikkelen een set theorieën over wat zij denken dat hun ontwerp succesvol maakt. Deze theorieën zijn onafhankelijk van het te ontwerpen object; zij kunnen evenzeer gebruikt worden voor het ontwerpen van een online community als voor een offline participatieve tentoonstelling. Het belang van ontwerpen zonder product is dat het wordt geëxperimenteerd op allerlei verschillende gebieden (Alexander *et al.* 1977), bijvoorbeeld in het ontwikkelen van een curriculum voor een nieuw vak, het maken van een nieuwe choreografie, of het plannen van een nieuwe manier van werken binnen een organisatie. Ontwerpen zonder product is niet alleen het domein van professionals: iedereen die probeert zijn wereld te verbeteren doet eraan mee.

Tot op heden is er weinig empirisch en theoretisch onderzoek gedaan naar ontwerpen zonder product. De belangrijkste reden daarvoor is dat het huidige denken over ontwerpen gedomineerd wordt door het ontwerpen-als-proces paradigma (Lawson 2006, Cross 2011). Volgens dit paradigma is ontwerpen vooral een mechanistisch proces waarbij het oplossen van problemen centraal staat. De ontwerper initieert een verandering in een product of systeem dat daarna weer stabiel blijft. Daarmee is ontwerpen een doelgericht, individueel, cognitief proces dat zich afspeelt in het brein van de ontwerper. Door het ontwerpen van producten te contrasteren met het ontwerpen zonder product verkrijgen we een ander inzicht in de wereld van design. Er zijn nog veel *uncertainties*, of onduidelijkheden, binnen het vakgebied dat onderzoek doet naar ontwerpen. Met name het te ontwerpen object, het proces en de methoden van ontwerpen, design-kennis en het ontwerpen zelf staan ter discussie. Deze onduidelijkheden leiden tot verschillende *controversies* (Latour 2005, Venturini 2010) in de *design practice*, de dagelijkse realiteit van het ontwerpen. De controverses gaan bijvoorbeeld over de definitie van het te ontwerpen object, de kennis die nodig is om te kunnen ontwerpen, de juiste benadering en de gewenste doelstellingen.

Mijn doel in dit proefschrift is om via het onderzoeken van deze onduidelijkheden te komen tot een nieuw perspectief op design. Daarbij maak ik gebruik van de controverses uit de *design practice* om te leren wat ontwerpen zonder product betekent voor de ontwerpers zelf. Geïnspireerd door Buchanan (1992, 1995, 2001) verlaat ik het geijkte perspectief op ontwerpen als een mechanistische kunde met als doel het oplossen van problemen. In plaats daarvan komt een nieuw concept van *design as a liberal art of advancement*: als een *liberal art* van continue verbetering. Als leidraad gebruik ik de volgende drie onderzoeksvragen, gebaseerd op Latour (2005), voor het bestuderen van design:

- Hoe kunnen we gebruik maken van de vele controverses over ontwerpen zonder product zonder het ontwerpen vantevoren te limiteren tot een specifiek aandachtsgebied (noch individueel noch structureel)?
- Hoe kunnen we greep krijgen op het vermogen van ontwerpers om deze controverses uit de wereld te ruimen?
- Hoe kunnen we ontwerpen zonder product conceptualiseren als een *liberal art of advancements*?

Methodologie: Geïnspireerd door Latour (2005) volg ik Actor-Network Theory als methodologie voor het bestuderen van design. Ontologisch gezien propageert deze methodologie een perspectief van de designwereld als het resultaat van de acties van een dynamisch collectief van mensen en de objecten waarmee ze leven en werken. Deze wereld wordt gezien als onderhevig aan continue onderhandelingen en veranderingen. De onderhandelingen veranderen en verbeteren daarbij niet alleen de ontworpen objecten; de ontwerpers en de *design practice* veranderen ook.

In epistemologisch opzicht stelt deze methodologie dat kennis wordt gegenereerd in de praktijk (Strati 2007, Gherardi 2009, 2010, 2012). Kennis bevindt zich niet in de hoofden van individuen, noch is het een productiefactor die gemakkelijk gemanaged, bewaard en strategisch gebruikt kan worden. In plaats daarvan wordt kennis gezien als een “collectieve activiteit” (Gherardi 2012: 199) die plaatsvindt in de daad van het ontwerpen. Weten en leren is iets wat mensen samen volbrengen door deel te nemen aan collectieve activiteit (Corradi *et al.* 2010, Nicolini 2011).

Wat betreft de empirie heb ik het ontwerpen zonder product geanalyseerd aan de hand van de veranderingen die het Amsterdam Museum in de afgelopen jaren heeft doorgemaakt. Medewerkers transformeerden dit museum van een autoriteit op het gebied van historische kennis naar een participatieve online en offline ontmoetingsplek waar verhalen centraal staan. De onderzoeksmethoden die ik gebruikt heb zijn langdurige observaties, interviews en documentanalyse. Mijn onderzoeksstrategie was *deploying controversies* (Latour 2005, Venturini 2010). Dit betekent dat ik juist die situaties heb geanalyseerd waar mensen het oneens zijn met elkaar, om zo verschillende ideeën over design naar voren te brengen.

Inzichten naar aanleiding van mijn onderzoek: Door mijn analyse van de onduidelijkheden over de aard van design, in het bijzonder over het te ontwerpen object, design kennis, het design proces en de daad van het ontwerpen, heb ik een nieuw perspectief gekregen dat verschilt van het gangbare denken over het ontwerpen van producten. Ontwerpen zonder product is geen mechanistische kunde waarin een ontwerper doelgericht problemen oplost door het initiëren van veranderingen in een stabiel product of systeem. Ontwerpen zonder product is een doel op zichzelf (Jones 1980). Het gaat om het aansturen van veranderingen in ‘constitutive entanglements’ (Orlikowski 2007) tussen mensen en de dingen waarmee ze werken en leven. Het ontwerpen zonder product gebeurt niet door het tekenen van modellen van de wereld, maar juist door het combineren van mensen en dingen uit die wereld. De designer let daarbij vooral op het vinden van een geslaagde combinatie van personen en dingen, zoals in een tentoonstelling. Design kennis is een *sensible knowing in practice*, een ambachtelijke kennis gevormd in en door de praktijk. Deze kennis wordt verfijnd door ‘taste making’ (Gherardi 2009), namelijk door het collectief onderhandelen en evalueren van een geprefereerde manier van doen. Ontwerpen is niet langer een manier om meester te worden van stabiele, overeengekomen *matters of fact*, feitelijkheden, maar een manier van omgaan met *matters of concern*, aandachtspunten die immer ambigu en betwistbaar zijn (Latour 2004). Het is een manier van leven, van betrokkenheid, empathie en zorg.

Ik bouw hiermee voort op Buchanans (1992, 1995, 2001) concept van design als een *liberal art*, door het toevoegen van mijn kijk op ontwerpen zonder product als een *liberal art of advancements*, oftewel een *liberal art* van continue verbetering. Als een *liberal art of advancements* is ontwerpen zonder product een levenskunst, de kunst van het collectieve zijn in de wereld waarin iedereen zijn steentje kan bijdragen aan verandering. Het is een kunst die zich niet zozeer richt op het ontwerpen van producten, maar op het creëren van

omstandigheden waarin mensen samen leven en werken en op die manier elkaars levens verrijken. Bij het ontwerpen zonder product gaat het de designers er niet om goede techneuten of goede onderzoekers te zijn; in plaats daarvan willen ze veeleer goede burgers zijn.

Theoretische bijdrage: Mijn bijdrage aan de theorie van het ontwerpen is het aandragen van empirische inzichten over het ontwerpen zonder product (Jones 1980) en het theoretiseren over de aard van design als een *liberal art of advancements*. Ik breid de definitie van Jones (1980) van design als ‘het initiëren van verandering in door mensen gemaakte dingen’ uit met een begrip van design als het initiëren van verandering in ‘constitutive entanglements’ (Orlikowski 2007) tussen mensen en de dingen waarmee ze leven en werken. Het herdefiniëren van design draagt bij aan het theoretiseren over ontwerpen als een performatieve, *sociomaterial practice* (Knorr Cetina 2001, Gherardi 2012) waarin het materiële een constitutief element is in plaats van een middel tot een doel.

Ik draag bij aan Buchanans (1992, 1995, 2001) ambitie om design te begrijpen als een *liberal art* door te refereren aan Gherardis (2009, 2010) noties van collectief, ambachtelijk weten in de praktijk en *taste making*. Ik breid Buchanans idee van design als een *liberal art* uit door het te analyseren vanuit een post-humanistisch perspectief (Latour 2005, Orlikowski 2007). Ik lever empirisch bewijs dat design als een *liberal art* een kunst is van leven met dingen, van het verbeteren van *constitutive entanglements* waar de designers zelf ook bij horen. Het is geen kunst die kan worden gezien als een cognitief proces van *placements* (Buchanan 1992). Ontwerpen als een *liberal art of advancements* vindt eerder plaats door *place-making*, of *taste-making*. Het stimuleert een weten-door-te-doen, door het meedoen in de collectieve evaluaties van en door de praktijk.

Mijn bijdrage aan organisatiekunde en, vooral, organisatieontwerp is een empirische studie naar organisatieontwerp als de kunst en kunde van het effectief samenvoegen van mensen en dingen voor continue verbetering. Dit verschilt van het ontwerpen door strategisch te plannen. Onderzoekers en anderen die geïnteresseerd zijn in organisatieontwerp zouden er goed aan doen meer aandacht te geven aan *constitutive entanglements* tussen organisaties en technologieën.

Introduction

Imagine a group of museum employees in a meeting room. They are surrounded by a large collection of books, reports they and others wrote, phones, iPads and notebooks on which they write things down. For more than three years, they have been working on a project intended to transform their museum, the Amsterdam Museum, from an institution where the public can enjoy carefully curated art and learn about the history of the city, to an offline and online meeting place where the inhabitants of the city can also share stories, ideas and experiences with each other and the museum employees. They have been working on this project together with other colleagues from different departments of the museum and with people from outside the museum. Among their collaborators were web designers, museum volunteers, government officials, financial bodies and lawyers. Together, they have been planning and creating a new museum practice in which the story of Amsterdam is told not exclusively through art and historical objects but through a collection of museum objects, online and offline interactive technologies, and the public's contributions of stories, pictures and personal objects. Their dream is to create a museum in which people can connect in a more personal way with the museum's collection, with the city of Amsterdam and through these with each other.

Many designers today design not only at the scale of a product, but also 'at the scale of life', engaging in what Jones (1980) called 'designing without a product'. The museum employees and their collaborators are designing a new way of being a museum. This new museum practice will bring into question the very identity of the museum, the ways of working of museum employees, the means they use to tell their story and the ways in which they relate to the museum's collection and to the public (Maris *et al.* 2012, 2013). This expansion of the notion of design to incorporate 'the scale of life' is visible in other front running industries too, particularly in the social technology industry. The people working at Apple, for instance, are designing not just an elegant, user friendly mini-computer, the iPad we saw in the meeting room. They are designing for an entirely new way of living, working and interacting with computers.

It is this type of designing ‘at the scale of life’, of ‘designing without a product’ (Jones 1980) that interests me and that I explore in this thesis. Jones (1980) explained designing without a product as ‘a way of living in itself’ shared by everybody interested in improving their world. In Jones’s (1980) view, designing without a product is not so much guided by a given, external goal, as by a ‘shared imaginative living’; designing without a product is ‘a goal-in-itself’. When engaging in designing without a product, designers (professionals or not) engage in initiating change ‘in the total situation’, ranging from the purposes of the things designed, to the way of living and working with the things designed, all the way to the practice of designing itself (Jones 1980).

Similar ideas have been put forward by authors who contemplated on the expansion of design from its focus on designing products, to design as integral to initiating change in all human activities. In a recent interview given at the Kolding School of Design International Advisory Board (<http://www.designskolenkolding.dk/index.php?id=3469>, retrieved on 20 October 2013), Buchanan explained the expansion of design in the contemporary world, to refer to a shift from products and communication to actions, activities and processes. In his words:

“The practice of design is expanding, but it still means ”human making”. The meaning of the word design has broadened, because we’re now able to design a wide variety of products, e.g. products that are tangible and products that are intangible. The biggest change in design practice has been the change from artefacts and communication into a new world of actions, activities, and processes.”

In light of these shifts in design, calls have been made in the literature to view design as a core discipline for engaging in the world, ‘a way of living in itself’ (Jones 1980). Alexander *et al.* (1977) called for a view of design as an activity at the center of everyday life. Simon (1969) argued that design needs to be seen “not only as the professional component of a technical education, but as a core discipline of any liberally educated man” (Simon 1996[1969]:138). Gropius (1937: 20), in his proposal for a new thinking of architecture, argued for a view of architecture as an “integral part of the stuff of life necessary for everyone in a civilized society.” Buchanan (1992: 6) put forward a view of design as a liberal art of technological culture, an art in which designers “combine theory with practice for new productive purposes.”

In examining the Amsterdam Museum design project, I build on Buchanan's (1992, 1995, 2001) insights and explore the nature of designing without a product as a liberal art. Empirical evidence indicates that engaging in designing without a product is performing designing as a liberal art, as an art of advancements. Design as a liberal art of advancements is concerned with moving people and the things they live and work with forward. The move is not to a specific, agreed upon point in time and place under strict design requirements, but as a journey towards a better place where we can live with things. Design as a liberal art of advancements is an art of living, of being in the world that involves everybody and everything as equal partners in changing the world (Maris *et al.* 2012). It is an art interested in creating the circumstances that people and things can unfold in ever richer assemblages, in which people's horizons can be extended so that things can develop differently and in which things' horizons can be extended so that people can live differently.

Even though Jones introduced the idea of designing without a product in the 1980's we have so far been restricted in theorizing about this type of designing and in illustrating it with empirical research. Yet, the value of understanding the nature of designing without a product is immense as many professional and non-professional designers today continue to practice it, with Apple and the Amsterdam Museum being only two examples.

Why have we so far been restricted in theorizing about designing without a product? In the largest part of the 20th century, the academic understanding of design was dominated by the design as process paradigm (Lawson 2006). The domination of design as process has narrowed our understanding of design to refer to a problem solving undertaking (Simon 1969, Dorst 2006). It has focused our attention on designing products which can be clearly defined in terms of their requirements and purpose (Cross 2001, 2011). Consequently, our vocabulary is restricted for talking about the design work done by designers like Steve Jobs and his followers, as well as the design work done by non-professional designers like the museum employees and their collaborators (cf. Boland and Collopy 2004). Their design work is not limited to designing a product, but entails designing a way of living with those products in a foreseeable future. Designing a way of living with a product is not a problem that can be solved once and for all. Rather, it can only be advanced, one step at a time, as new wishes or challenges arise (Maris *et al.* 2012). Our vocabulary will remain limited as long as we continue to take for granted our own assumptions of what designing is all about.

Following the design as process paradigm, we take for granted the idea that designing is a structured, albeit iterative process, in which professional designers make use of well tested knowledge to solve existing everyday problems (Simon 1969, Dorst 2006). Many academics have dedicated their time to mapping *the* design process, to understanding its stages and the types of decisions taken within each stage (Lawson 2006). We take almost for granted that design is done by drawing. We have seen these drawings as quintessential to the design process; they are the physical materialization of design thinking (Lawson 2006, Ewenstein and Whyte 2009). We praise the genius minds of individual designers, examine their drawings and follow their moves from ‘problems’ to ‘solutions’.

The detriment of this paradigm is that it nurtures an understanding of design as a stabilized, uncontested, linear albeit iterative process, which has a clear beginning – a problem, and a clear end – a solution to that problem. In such studies, discussions on how to approach developing a solution to the problem at hand find their closure in the designers’ modes of reasoning, the types of knowledge they draw on in their work and in the structural methods they employ in the design process. The solutions proposed, usually in the form of a product, are seen as a materialization, a stabilization of the different interests and points of view visible in designing.

Yet, when the design process is categorized and stabilized, it becomes uninteresting from both a practical and theoretical point of view. From the literature, we know the ideal stages of the design process. We know the different types of design methods and the ideal situations in which they can be applied to achieve the most optimal solution. However, this theoretical stabilization of the process of designing has great consequences for researching design. Namely, if we take as starting point in research that designing is a linear, albeit iterative process, that the designers’ theories are cognitive theories and that the design methods are standardized, then we have no way to see the issues, challenges and uncertainties designers experience in their work when they go about designing, when they employ such design methods in practice, when they make models and prototypes of the product to be designed or when they draw on existing design theories. Latour (2008: 12) made a similar argument when he wrote about design drawings:

“In its long history, design practice has done a marvellous job of inventing the practical skills for drawing objects, from architectural drawing, mechanic blueprints,

scale models, prototyping etc. But what has always been missing from those marvellous drawings (designs in the literal sense) are an impression of the controversies and the many contradicting stakeholders that are born with these.”

When we try to understand designing as practiced by those contemporary designers who engage in designing ‘at the scale of life’ (Jones 1980), the design as process paradigm falls short of accounting for the complexity and wickedness we observe in practice (Maris and Huizing 2012, Maris *et al.* 2012, 2013). The uncertainties designers engage in their work are hidden in the iterative process while their differing arguments are silenced into an overarching theory of design. We have no way of learning about the dilemmas designers have in their work, about how they assemble the world and how they understand the world as they try to change it for the better. The spirit of designing as a real life, world-making undertaking is lost in abstraction.

Perspectives on design: from craft to liberal art

If we are to begin to understand what designing without a product is, we need to first understand how design has been conceptualized so far. We need to unpack the various meanings that were loaded in the notion of design. Only after unpacking the notion of design, would we be able to advance our understanding of designing without a product, not as a mechanical art of problem solving, but as a liberal art of advancements.

Depending on the scientific tradition they work in, different authors have seen design as a process (Lawson 2006), a problem solving activity (Archer 1969), a creative activity (Reswick 1965), a science (Simon 1969), a working hypothesis (Buchanan 1992) or an act of faith (Jones 1966). Different perspectives on design can be identified too, namely design as craft, design by drawing, design as process, design as science, design as aesthetic embellishment, and design as a liberal art.

Many authors tend to make the distinction between the different perspectives as an evolution in practice that responds to larger societal and cultural shifts (see Jones 1980 and Lawson 2006). Writing about the traditional design methods, Jones (1980) argued that the first initiator of change in man-made things was the skilled craftsman, the maker-of-things.

Lawson (2006: 19) argued that particular to the work of craftsmen is a “natural, unselfconscious action-based approach”, one in which the craftsman designs objects as he makes them, through doing and experimenting, following traditional working patterns that were transmitted from generation to generation (Alexander 1964). Design thinking and design acting were performed simultaneously, unseparated from the act of making the object of interest. Jones (1980: 15) referred to *design as craft* as “craft evolution”, making reference to the ways in which a given tool or product evolved through generations as it was continuously reproduced and modified (Lawson 2006). At the basis of craft evolution, of the continuous reproductions and modifications lies, it is argued, a body of situated and negotiated folk knowledge, which resided in the collective mind rather than in that of any individual (Jones 1980, Friedman 2003).

Industrialization brought with it rapid technological developments, which Alexander (1964) argued, are too much for the craftsman’s evolutionary process to cope with. Designing is rethought following the division of labor in design, the development of scientific education in design principles and methods and the rationalization of design processes (Simon 1969, Cross 2001, Lawson 2006). Design becomes a professional practice, developed through specialized education and training, one in which design tasks are clearly defined and divided among specialized designers. A different approach to design is developed at that time, one that will be at the heart of the 20th century modern design practice, namely *design by drawing*.

Jones (1980) argued that the introduction of design by drawing led to a reconceptualization of the ways of working and making a product. For the first time, design thinking and making are separated, performed at different times, and in many cases, by different people. Design drawing is now seen as the quintessential activity of designing, the medium through which designers think and express their creativity (Ewenstein and Whyte 2009). Individual creativity and talents are encouraged, appreciated and awarded. Design knowledge becomes more and more specialized. It does not reside in the craftsmen’s collective mind as folk knowledge anymore, but rather in the heads of specialized individual draftsmen (Lawson 2006). Cross (2011) argued that this division in design between making and thinking has made possible the study of design thinking in its own right.

In the academic literature, the study of design and design thinking has attracted the interest of many researchers. This academic effort led to the development of a scientific approach to

design. In the literature, *design as process* soon gained popularity. It is rooted in a rigorous scientific base that employs scientific methods to model design problems. Design as process is conceptualized in a positivistic manner as a set of activities that can be easily identified, singled out and studied objectively. Design is viewed as goal-oriented, in which the goal is offering a solution to a given well-defined problem found in a given system or organization; meeting a need; improving a situation or creating something new or useful (Hevner *et al.* 2004, Piirainen *et al.* 2010). Different authors proposed different models of the design process (for architecture see Markus (1969), Maver (1970); for industrial design see Archer (1969); for information systems design see Hevner *et al.* (2004). Yet, common stages can be easily identified: definition of the problem, identification of the field of solutions, implementation of the chosen solution and evaluation of the implementation process. As Sidorova *et al.* (2008) argued, issues of system functionality and design take central stage in these types of research while the implementation success of these systems is rationally evaluated in terms of the utility of the system.

Such courses of action in the design process, it is argued, are never taken at random. Rather, they involve the application and testing of rigorous theoretical thinking. Based on this argument, another conceptualization of design becomes visible, that of design as science. Winter (2008: 471), for example, coined the terms ‘design research’ to describe “research aimed at creating solutions to specific classes of relevant problems by using a rigorous construction and evaluation process” and ‘design science’ that “reflects the design research process and aims at creating standards for its rigor”. At the core of design as science rests the idea of design as systematic, based on rational thinking, predictability and use of generalizable knowledge. Simon (1969), in his outline of design science, illustrated such ideas by arguing that at the basis of design science rests the idea of applicable theories of how to do things to accomplish desired goals. Such a theoretical, scientific thinking in design, Friedman (2003: 515) argued, “enables the designer to move from an endless succession of unique cases to broad explanatory principles that can help to solve many kinds of problems”. The view of design as science is in direct opposition with that of design as craft outlined above. At the core of design-as-science, it is argued, rests systematic instead of unsystematic knowledge, rationality instead of creativity, predictability instead of invention.

Another meaning given to design is that of aesthetic embellishment of products (Balsamo 2010). Viewed from this perspective, design is equated with style and form, which are seen as

something separate from the function of the product. Design does not so much belong to the production domain, as it does to the domain of consumption. Design becomes a matter of taste and appeal (Balsamo 2010). Design objects become status objects with which people of all generations want to associate. Many users of Apple computers, for instance, argue that it is primarily the ‘smooth design’ of the products that attract their attention, while owning an Apple product is an indication of being hip, modern and cool. Also from this perspective, design is something related to fashion and fads, as something temporary, which is in opposition to the materiality of the product itself. This perspective on design has been rightfully criticized as a serious misconception of what the work of a designer entails (Buchanan 2001). Newer interpretations of design as aesthetics bring to the fore the idea of care and engagement (Borgman 1995). The aesthetics of products or systems are what engages us with the material world. Sensibility to form and beauty is part of human nature; we are attracted by what we conceive as beauty. A beautiful pen, a beautiful piece of music or a beautiful phone engages us at an emotional, sensory level. For this perspective therefore, to design aesthetically implies to foster engagement between the social and the material.

Buchanan’s (1992: 5, italics in original) described the transition in design too and argues that “we have seen design grow from a *trade activity* to a *segmented profession* to a *field for technical research* and to what now should be recognized as a new *liberal art of technological culture*”. For Buchanan (1992: 6), design as a liberal art is an integrative discipline, “concerned to connect and integrate useful knowledge from the arts and sciences alike, but in ways that are suited for the problems of the present”. This integrative nature of design as a liberal art was fundamental to the Bauhaus School (Gropius 1937). The conceptualization of design as a liberal art departs from the previous approaches in one fundamental way, namely regarding its view of the nature of the subject matter of design. As Buchanan (1992: 15, italics in original) explained:

“The linear model of design thinking is based on *determinate* problems which have definite conditions. The designer’s task is to identify those conditions precisely and then calculate a solution. In contrast, the *wicked-problems* approach suggests that there is a fundamental *indeterminacy* to all but the most trivial design problems.”

While determinate design problems can be solved by means of calculations or other solution-focused strategies, indeterminate problems remain open-ended as they are too complex, too

wicked to be solvable through rational means. When Buchanan (1992) and Cross (1982) talked about design as ‘a technological culture’, they conceptualize technology in a different way than the common understanding of it as an artifact. Following Dewey, they view technology as “an art of experimental thinking” (Buchanan 1992: 8). Design as a liberal art of technological culture is visible in any domain of human life, as Buchanan (1992) argued: “There is no area of contemporary life where design – the plan, the project, the working hypothesis which constitutes the ‘intention’ in intentional operations – is not a significant factor in shaping human experience”. Design as a liberal art can be applied to any human domain, categorized by Buchanan (1992) as the domains of symbolic and visual communication, material objects, activities and organized services to complex systems of living, working, playing and learning.

In light of my exploration of the nature of designing without a product, of designing ‘at the scale of life’ (Jones 1980), I consider Buchanan’s (1992, 1995, 2001) view on design as a liberal art as highly relevant and appropriate. Design as a liberal art is an art in which theories of design are not tested and falsified but put in practice and valued based on their ability to deliver practical outcomes that work for the people engaging in or with the designed. It is an art that supports a way of being which foregrounds everybody’s participation in shaping their world (cf. Simon 1969, Alexander *et al.* 1977). As a liberal art, design is essential to any person interested in taking an active part in a ‘shared imaginative living’ of what our collective existence is to become in our hands (cf. Latour 2005).

In his conceptualization of design as a liberal art, Buchanan (1992, 1995, 2001) continued to focus on designing products, seen in his discussion of graphic design, everyday products, sequences and schedules to reach organizational objectives, and built environments. In these writings, the designer is portrayed as somewhat detached of the designed. In Knorr Cetina and Bruegger’s (2002) terms, Buchanan does not account for object sociality, in other words, for how the designer and the designed share the same space for living and working and are ‘constitutively entangled’ (Orlikowski 2007) in such a way that through designing both the designed and the designer change (cf. Jones 1980, Maris and Huizinga 2012, Maris *et al.* 2012). Likewise, Buchanan continued to focus on design thinking as a cognitive ability, exercised through placements, a view which again detaches the designer from the world he works in. Following Gherardi (2010), I argue that designing is a matter of collective performance rather than of individual effort and that design knowledge is integral in doing

rather than cognitive (Maris and Huizing 2012). Designing is distributed across an entire assemblage of people and objects who engage in designing and is performed as a dynamic activity over time. From this perspective, we could argue that designing is not a matter of using placements, but of place-making or what Gherardi (2009) called ‘taste making’. The designer, the designed and the practice of designing itself are transforming through these performances.

What is needed therefore is a view of design as a liberal art that foregrounds designing as being in the world, with the designed and the designer sharing the same space for living in a ‘constitutive entanglement’ (Orlikowski 2007). A view of design is needed that leaves things open and foregrounds the emergent nature of designing, focusing not on using placements, but on place-making or ‘taste making’ (Gherardi 2009), not on drawing but on drawing things together, not on solving problems and creating finite products but on advancing issues of which products are only one part.

In this thesis, I build on Buchanan’s (1992, 1995, 2001) idea of design as a liberal art. I develop an understanding of design as the liberal art of advancing what Latour (2005) coined ‘assemblages of people and things’, or what Orlikowski (2007) called ‘constitutive entanglements between the social and the material’. In simple terms, I put forward a view of design as a liberal art concerned with how we can lead a free and enriching life with things. Across the various chapters of this thesis, I examine different aspects of this art only to bring them together in a theory of design in the Conclusions of the thesis.

What is design?

Looking at the diversity of perspectives on design outlined above, what seems to be central is the elusiveness of the concept itself. Putting forward a definition of design seems therefore a very error-ridden act, as there will always be the danger that we exclude something. Yet, for the purpose of this study, I consider it useful to have a working definition of design, one that is meant more to indicate the direction of the investigation. I find Buchanan’s (1992: 8) definition of *design* as “the plan, project or working hypothesis [for] shaping human experience” insightful and I adopt it in this study. As for the notion of *designing*, I employ it

in this study to refer to the human purposeful acting to develop and advance design in a specific actor network.

How to resume the task of exploring designing without a product

So how can we break loose of our own taken for granted assumptions about the nature of design as a mechanical art of problem solving? My starting point is the assertion that design is what designers do, not what theorists say designers do. The discrepancy between theory and practice has been recognized by Buchanan and Margolin (1995: x), who argued:

“One of the anomalies of the twentieth-century culture, particularly of the academic culture, is an excessive separation between theory and practice, between the words and symbols used to understand important subjects and the concrete actions of individuals and groups who employ personal and formal knowledge to accomplish practical purposes.”

The effect of such a separation between theory and practice is that too often we explain design by referring to larger social, cultural, economic forces, developing a larger-than-life theory of designing, instead of drawing on the designers’ own experiences and life stories and develop a theory internal to the field. Buchanan and Margolin (1995: x) lamented the impact of such theoretical practices that push the designers’ life worlds to the background by making the following worrying observation “...the agency which serves and shapes our daily lives is seldom more than a footnote to other causes in social and cultural discourse.”

If we are to understand what doing design is and what doing design does in the world, we need to leave the task of composing designing to the designers themselves and have them tell their own stories of what their world is made of. Yet, how can we do this?

I follow Bruno Latour’s (2005) way of working in studying designing without a product. Central to Latour’s Actor Network Theory (ANT) is the idea that there is no such thing as ‘society’, held together by ‘social forces’ that offer ‘social explanations’ to ‘social events’. Latour (2005) rejected this tautological thinking and argued that society – in Latour’s terms the ‘collective’ - is always in the making through the many connections humans and non

humans engage in. Latour (2005) argued that taking a stabilized ‘society’ as a starting point for any inquiry into the nature of collective existence, would not do justice to the actors’ rich associations, worldviews and actions that they bring to the fore in their making of their collective life. By returning to the etymological meaning of ‘social’ as ‘to follow’, ‘to associate’, Latour (2005) put forward the premises of a sociology of associations. In this sociology, the task of the researcher is to ‘follow the actors’ in their making of their own collective existence, by tracing the associations they engage in, instead of imposing on them a scientific explanation (Latour 2005).

Following Latour (2005), I argue that taking a stabilized design process as a starting point for inquiry into the nature of designing without a product would not do justice to the designers’ own associations, dilemmas and worldviews. What we need is a focus on practice (Gherardi 2012), in which we follow the designers themselves and trace what designing is in their everyday work (Maris *et al.* 2012). Practice theory has gained popularity in organizational studies due to its critique of the predominant views of knowledge in organizations (Orlikowski 2000, Brown and Duguid 2001, Schatzki *et al.* 2001). Previous approaches theorized about knowledge either as something residing in the individuals’ heads (a cognitive perspective) or as a production factor which can be easily managed, stored and used strategically (a commodity perspective). Practice theory puts forward a view of knowledge as “a collective, situated activity” (Gherardi 2012: 199): knowing and learning is something people achieve together by engaging in collective action. In practice-based studies, the attention is directed to what people do, in collectives of human and non-human actors, as it is argued that knowing is integral to doing (Corradi *et al.* 2010, Nicolini 2011).

A focus on practice does not entail imposing yet another frame on designing, different in some ways from design as process or design by drawing. Rather, it entails the foregrounding of what designers do in their everyday work. It directs the focus on things unfinished, under negotiation, on projects that are not yet stabilized and that are still running with no end in sight. It requires a sensitivity to the designers’ own worldviews, dilemmas and collective negotiations. And it demands reflection (both from the researcher and the designers alike) on the consequences of designing, on what does doing designing do. In other words, it demands a reflection on how doing designing reproduces not only the designers’ practice but also it brings about a certain order in our own everyday practices and associations.

In the overview of perspectives on design presented above, we have seen how different authors theorized about design from stabilized frames of reference: design as process, design as science, design as craft, design by drawing and design as liberal art. Rather than obtaining a clear understanding of the composition of the design world, we are left with a number of uncertainties. Latour (2005) introduced the notion of uncertainties to refer to what is still unclear, uncertain in the field of inquiry in this case, the field of design. In his exploration of the nature of ‘the social’, Latour (2005) examined five uncertainties about the social world: on the nature of groups, nature of actions, nature of objects, nature of facts and the types of studies performed in the science of the social. These uncertainties pile on top of each other, further building on each other, a fact that amplifies our uncertainties even more. In this thesis, I examine four uncertainties about the composition of the design world, observed in both literature and practice:

- **1st uncertainty:** on the nature of the object of design: is design a matter of solving structured or ill-structured problems by initiating change in a finite product or system, or is it a matter of advancing wicked assemblages of people and the objects they live and work with? Is design a liberal art, a vocational art or a science?
- **2nd uncertainty:** on the nature of design knowledge: is design knowledge a cognitive knowledge, residing in the designers’ heads, to be employed in designing like any other resource, or is it a matter of taste making, of learning through the senses, of collective knowing by doing? Is design an integrative discipline or does it have its own knowledge base?
- **3rd uncertainty:** on the nature of design process: is designing a matter of following well-defined stages of designing, with a clear beginning and a clear end, or is it a matter of practice, of collective performance, of designing over time? Is a designer the one who is trained and licensed as a designer or the one who changes current situations into preferred ones?
- **4th uncertainty:** on the nature of the act of design: is designing a matter of drawing and making changes in representations of the world, or is it a matter of drawing things together, of collective living in the world? What changes through designing, the designed, the designer, the practice of designing, or all at once?

Following Latour (2005), I argue that by refraining from imposing a stabilized framework on the practice of designing, as design is problem solving, design is performed by drawing or design knowledge is a resource, we are better prepared to understand how designers themselves make sense of their world and how they deal with these uncertainties about the nature of their work. In their work, designers engage with these uncertainties by discussing their extremes, by negotiating their meanings, by making choices and by appraising their appropriateness to their practice. In this thesis, these uncertainties become visible across four sets of extremes, that the museum employees and their collaborators made discussable in their aim to transform the museum into an online and offline meeting place:

- The museum as an institution for preserving the history of Amsterdam vs. the museum that needs to open up to the world and tell the story of Amsterdam together with the public
- The museum as a place where objective knowledge and historical objects are collected through research and curating vs. the museum as a place where knowledge is gained through learning with others and where historical value and identity are negotiated
- Designing online communities following a service level agreement vs. designing online communities through partnering, trust and empathy
- Designing an organization by means of a plan (strategy) to be implemented later and top-down vs. designing an organization in the here and now, by involving all the actors concerned, both human and non-human

Controversies arise in practice about how to define the object of design, what knowledge is needed in designing, how to approach it and with what desired goals. Latour (2005: 23, italics in original) argued that ANT is “able to find order much better *after* having let the actors deploy the full range of controversies in which they are immersed.” As such, we can learn about designing without a product, what it is and how it is practiced in a real life project, by deploying the full range of controversies designers engage in about the nature of their work and the composition of their design world.

Research aim

What Latour did for the notion of ‘the social’, I aspire to do for the notion of design. In his book, Latour engaged in the task of redefining ‘the social’ as collective by feeding off controversies about the nature of the social world, visible across the classical sociology of the social and the new sociology of associations. In this thesis, I aim at examining the nature of designing without a product by feeding off controversies about the nature of designing visible across theory and practice. Through this analysis, I aim at developing a vocabulary for talking about designing at ‘the scale of life’ (Jones 1980). Building on Buchanan’s (1992, 1995, 2001) insights, I want to take the first steps towards a theory of designing, not as a mechanical, product oriented process, but as a liberal art of advancing our ways of living with things.

Research objectives

To attain this aim, I set out the following research objectives:

First, I want to pick up the thread left by Jones in the 1980’s when he distinguished between Designing With a Product and Designing Without a Product and examine how both types of designing have been addressed in the literature. The former is well entrenched in the design practice of professional architects, engineers and industrial designers, who engage in ‘initiating change in man-made things’ (Jones 1980). The design literature displays a rich array of studies on design problems, design processes and methods, design thinking and design drawing that I will review in this thesis. The latter, designing without a product, is less clearly defined and as such in more need of exploration.

Second, relying on the theoretical and methodological insights of Actor Network Theory (Latour 2005), I want to examine and deploy the many design controversies observed in the Amsterdam Museum project on what needs to be done and how to transform the museum from an institution to an online and online meeting place. Venturini (2010: 263, italics in original) argued that “controversies remain the best available occasions to observe the social world and its *making*”. That is why, I believe that by examining empirical design controversies, this study will bring to light new and unique insights into the nature of

designing without a product and into what it means to practice designing ‘at the scale of life’ (Jones 1980).

Third, I want to examine the uncertainties on the nature of designing without a product by comparing and contrasting the theoretical conceptualizations of design problems, design thinking, design processes and methods and design drawing with the insights on these concepts obtained from deploying empirical design controversies. I want to evaluate the appropriateness of existing concepts and theories, which were built in the tradition of designing with a product, for studying and theorizing about designing without a product. I expect that once we start moving away from design as a process for problem solving, the existing concepts would need to be reconsidered. I intend to draw on the empirical insights from the Amsterdam Museum project to develop a vocabulary to talk about designing without a product. With this vocabulary, I want to make the first steps towards a theory of designing without a product as an art of advancing our ways of living with things.

Research questions

In his inquiry into the nature of the social, Latour (2005) asked three particular questions. I will adopt and adapt these three questions in my exploration of the nature of designing without a product.

How to deploy the many controversies about designing without a product without restricting designing in advance to a specific domain (individual or structural)?

With this question, I want take the first steps towards an actor network methodology (Latour 2005) that can allow us to examine design controversies as they play out in the real life performance of a design project. I put forward the argument that studying designing without a product by using structural theories and quantitative methods that emphasize designing as a well-structured process whose effects can be calculated and predicted (Hevner *et al.* 2004), does not do justice to the wickedness and indeterminacy of the practice of designing. The same argument is extended to theories and research methods that focus on understanding how individual designers think and work (Cross 2011). Such theoretical and methodological approaches, while helpful in particular studies, are not useful in studying designing without a

product where the focus is not on the individual designer and his work, but on the ‘the total situation’ (Jones 1980).

It is possible to deploy design controversies if and only if researchers refrain from keeping frames stable, as design is problem solving or design knowledge resides in designers’ heads. Following ANT, the design world does not exist out there, as stable and independent, *made of* individuals, objects, actions and facts. Rather, the design world is *made by* these actors as they engage together in practice. It is emerging out the many controversies, discussions and negotiations human and non-human actors engage in together as they try to change their world for the better. Design is a matter of deploying controversies. By staying close to the actors themselves, following them as they enroll others in practice and allowing them to carry on their controversies without imposing a stabilizing frame on them, it will be possible to see and describe the uncertainties about the nature of designing: is design a process or a practice, is design knowledge a cognitive ability or integral to doing, is designing a matter of problem solving or a matter of advancing our ways of living with things?

How to render fully traceable the means allowing designers to stabilize these controversies?

Controversies are stabilized, in other words agreements are made and design proposals are put forward in practice. Yet, stabilization is an effect of many discussions, negotiations, enrollments of human and non-human actors, tours and detours performed in practice, and not a starting point for theorizing (Latour 2005). Way too often researchers take as a starting point a stabilized design process, meaning that they have performed the stabilization work on behalf of the designers themselves. With this question, I want to take a step back and explore how designers in this study engaged themselves in stabilizing controversies about the nature of their work.

This can be done by inquiring into design as an act of associations in which people and the things they work with continue to enroll each other in practice. Designing then is seen as an act of drawing things together (and as more actors are drawn together, the more perspectives would be voiced and the more controversies would be ignited). Latour (2005) argued that to render traceable, in other words to make visible how actors engage in stabilizing controversies, researchers need to remain aware of two things. One the one hand, in the study

of designing, researchers should refrain from jumping to fixed phases of designing, to finished drawings, to finished products or solutions as sources of explanations of designing. That is why, in this thesis, I focus on movements, on those situations in which the course of designing is still unclear and contested, in which things are still being drawn together and negotiated, in which existing theories of designing and best practices are questioned and in which the object of designing is still emergent. Only then negotiations are visible, how such negotiations are carried out and with what effects.

On the other hand, researchers, in this case of design, need to refrain from jumping to individual level of creativity or to the process level of rational design decision making as means of resolving debates. In Latour's (2005) terms, researchers need to keep the design world as flat as possible. To keep the world flat, it means that no theoretical priority is given to either individual level or structural level of analysis. Rather, the theoretical focus is on connections, enrollments and associations. That is why, in this study I focus on those situations in which designers enroll other actors, human and non-human in building and expressing their worldviews and their arguments. Only in such situations it becomes visible how temporary connections and agreements are established in practice.

Through which procedures it is possible to reassemble designing without a product not as a mechanical art of solving design problems but as a liberal art of advancements?

To develop a new conceptualization of designing without a product, not as a process for problem solving but as a liberal art of advancements, I will employ the three procedures of practice studies, namely the three readings of practice proposed by Gherardi (2010). The first reading, a reading of a practice from outside, is concerned with identifying the elements composing a practice that make it recognizable as a practice to its practitioners and non-practitioners. With this reading, I will examine the elements of the discipline of designing as problem solving and of the discipline of design as a liberal art, in terms of philosophical underpinnings, ontological perspectives, nature of design problems, task of designers, nature of design knowledge, design methodology, act of designing and evaluations and appraisal. I will compare and contrast them with the aim of identifying the specific characteristics of design as a liberal art of advancements.

The second reading, a reading of a practice from inside, is conducted from the point of view of the activity being performed. I will examine what the activity of designing consists of in designing as problem solving and in designing as a liberal art, how and by whom it is performed and with what (intended) effects. I will explore the nature of design knowledge in problem solving and in design as liberal art, as knowledge is the ordering mechanism of every activity in a practice. This reading will allow me to understand the nature of design as liberal art of advancements as it is performed in practice.

The third reading, a reading of practice as a social practice, is concerned with the examination of the social effects of performing a practice. With this reading, I will consider the larger societal implications of doing design, of engaging in design as a liberal art of advancements. This reading will allow me to examine the societal effects of design and see the political project that design as a liberal art is nurturing, a project centered on how we could live our lives together with the objects that enrich our existence.

Theoretical contributions and practical relevance

By tracing the actors themselves as they advance their understanding of the new entanglements in the emergent future of the Amsterdam Museum, and by feeding off controversies in the ever present design uncertainties of the nature of work, process, method and knowledge, I make the following theoretical contributions to design theory:

I advance Jones' (1980) theory of 'designing without a product'. I offer empirical evidence of the nature of designing without a product, how it is practiced in the real life context of a museum and with what effects. I further advance Jones' (1980) notion of designing without a product by theorizing about its nature, what kind of design is designing without a product and how is it different from designing products. I offer a view of designing without a product as a liberal art of advancements.

I further build on Jones' (1980) understanding of designing without a product by extending his definition of design. Jones (1980) viewed design as 'to initiate change in man-made things', a view that remained dominant in the design literature to this day. With the example of the Amsterdam Museum, I offer evidence of designing as to initiate change in 'constitutive

entanglements' (Orlikowski 2007) between people and the things they live and work with. This is highly relevant for theorizing as it helps us move beyond the distinction between micro- and macro-phenomena, between human agency and structure, between the individual genius and abstracted design process. Jones' (1980) view, shared by many authors in the literature is that change is as planned, conceived and envisioned by the designer. I argue that change is mediated, co-created and performed by both humans and non-humans. This shift helps us theorize about designing as a performative, sociomaterial practice in which the material is a constitutive element, rather than a means to an end.

I contribute to Buchanan's (1992, 1995, 2001) conceptualization of design as a liberal art and to his effort of understanding what kind of art is design as a liberal art by drawing on Gherardi's (2009, 2010, 2012) notions of collective knowing in practice and taste making. I extend Buchanan's view of design as a liberal art by examining it from a post-humanist perspective (Latour 2005, Orlikowski 2007). I offer empirical evidence that design as liberal art is an art of living with things, of advancing constitutive entanglements, of which the designers are a part too, by deploying controversies about what needs to be done and how. It is an art of drawing things together and making the emerging assemblages work. And, it is art of learning through the senses, by engaging in practice with others; it nurtures a knowing by doing through continuous appraisal and taste making.

I further contribute to design theory by taking the first steps towards an actor network methodology for studying design. By means of this methodology, we can examine designing as performed by designers, without framing a priori their world into a design as process, design by drawing, or design as problem solving. In this way, we can narrow the gap between theory and practice, and offer an understanding of design as what designers do, rather than what theorists say designers do. Such practice-based theories of design can be more relevant for practice, not as prescriptive theories telling designers what to do (they know that already) but as a means for reflection and appraisal of their practice.

I bring a contribution to organizational designing, by offering empirical evidence of a different type of designing than the strategic planning for effectiveness theories offered in organizational design. I offer empirical evidence of organizational designing by drawing things together for advancements. Researchers interested in studying organizational design, as well as those interested in initiating changes in their organizations would benefit more from

examining the constitutive entanglement between technology and organization: you cannot implement a new technology without considering how the organization of work and processes needs to change to make that technology part of the organization's practice.

As for the designers themselves, those I worked with in this project and those learning about this study, the insights I present in this thesis might not be of much practical help. That is so, because design as liberal art is not a prescriptive art, telling people what they need to do to improve their world. On the contrary, it is a liberal art of living with things. Every design office or organization would create its own way of designing, its own way of working and living with things.

Yet, the insights I present in this study do make a call for designers to open up to the world, just like the Amsterdam Museum opened up to the world. By opening up to the world, contemporary designers engaged in designing products and in designing without a product would begin to see that who they are and what they know is not a matter of their talents and training; it is a matter of being engaged, constitutively entangled with all those participating in design and being affected by the design.

That means that their responsibilities are shifting from caring for the performance of a product, to caring for the well-being of associations of people and things; from controlling a process to arranging the practice. Their responsibility is a matter of making sure that people and the things they live with can unfold in ever richer assemblages which do not, in any way, limit the freedom of any member of the assemblage to participate in the world.

Composition of the thesis

In the next chapter, I discuss the methodological considerations in this research. I explain how design controversies took me by surprise during the empirical research. I explain too how I came to learn to feed off these controversies in my exploration of designing without a product. I present the strategies I used to study designing without a product, both while engaging in the empirical research as well as in analyzing the data. In this chapter, I offer an answer to my first research question, namely: How to deploy the many controversies about design without restricting designing in advance to a specific domain?

In the following chapters, I offer an answer to my second research question, namely: How to render fully traceable the means allowing designers to stabilize these controversies? In these chapters, I examine four interrelated uncertainties about the nature of design and deploy the controversies that are ignited in practice as designers begin to make these uncertainties discussable.

In the third chapter, I explore the uncertainty visible in both literature and practice on the nature of the task of designing. In this chapter, I ask the question: is designing without a product a matter of problem solving or is it a matter of advancing wicked assemblages of people and the objects they live and work with? After illustrating, with examples from the Amsterdam Museum, how contemporary design problems are becoming more and more wicked I explore in the fourth chapter, the uncertainty on the nature of design knowledge. I ask the question: is designing without a product a matter of rational calculations, or of creative insights, or a matter of collective taste making?

After describing how the designers in the Amsterdam Museum engaged in designing by means of taste making, I explore in the fifth chapter, the uncertainty on the nature of the design process and design methods. Here, I ask the question: is designing without a product a process in which methods produce results or is it a practice, in which designers engaged in collaborations perform (towards) results? And after illustrating how in the Amsterdam Museum project, designers perform towards results, I explore in the sixth chapter, the uncertainty on the nature of the design act. I ask the question: is designing without a product a matter of drawing and making objects work, or is it a matter of drawing things together, and making the emerging assemblage of humans and things work?

In the conclusions to the thesis, I offer an answer to my third research question: Through which procedures it is possible to reassemble designing without a product not as a mechanical art for solving design problems but as a liberal art of advancements? Following Gherardi's (2010) three readings of practice, I present here the outline of design as a liberal art of advancements, illustrate how it builds on Buchanan's (1992, 1995, 2001) insights and how it differs from the mechanical art of solving design problems. I also address here some future research implications of this study.

Exploring Design Controversies: An Actor Network Theory Inspired Methodology for Studying Design

Exploring design controversies was not what I set out to do when I first started the empirical research. Neither had I expected them to be there, nor to develop into the arenas where what it means to design is defined, negotiated and contested. They hit me, so to say, in a moment when I least expected, when I thought I had everything figured out.

My initial research interest was in obtaining a first-hand understanding about the practice of designing for online interaction and collaboration. I was very interested in learning about how web designers go about developing online spaces, such as social media and online communities, where people with similar interests can meet, share ideas and learn from each other. I was curious to find out what design theories web designers employ in creating such online spaces, what their worldviews are and how they employ such theories and worldviews in their work. In other words, I was interested in the design thinking and acting of social media designers.

I learned about the intention of the Amsterdam Museum to develop an online community for its general public and its employees. The particular setting of developing an online community for a museum fascinated me, and so I began following the project. I made contacts with Mediamatic, the web designers' office that would develop the online community for the Amsterdam Museum. I made agreements with them and with employees from the Amsterdam Museum to allow me to attend their design meetings, observe web designers at work and interview the web designers and the museum employees that were involved in the project of developing the online community.

I was four months into my field research, when I attended one such design meeting between two web designers from Mediamatic and three museum employees. The aim of that meeting was to propose some changes to the layout of the community's pages and to discuss the

possibility of having sub-communities too, each with its own interest theme. The website of the online community was already finished and launched and the museum was engaging in diverse activities to attract people to participate in the community. While waiting for everybody to get ready for the meeting, one of the museum employees told me about a new project she was working on. This project was an exhibition about Johan Cruijff, the internationally acclaimed Dutch football player. The idea of this project was to invite members of the newly developed online community to share stories and pictures of their encounter with Cruijff. The plan was to collect these stories and build the exhibition entirely based on them. The exhibition would be entitled 'Johan and I', and would present the story of Johan Cruijff through the eyes and experiences of his fans.

The difficulty was that this exhibition ignited a museum wide debate that slowed down the progress of the preparations. Particularly the idea of inviting football fans to provide, on the online community, the materials for a museum exhibition and possibly even get involved in curating the exhibition itself was less welcomed by some museum employees. The latter welcomed the online community itself as a means to communicate with the public, but they could not get comfortable with the idea that the members of the online community would get so closely involved in organizing the activities of the offline museum. The idea of blurring the museum's online and offline boundaries, of changing established ways of preparing an actual exhibition, both in terms of what materials are presented, how and by whom, ignited many discussions and uncertainties.

The museum employee explained, almost defending her ideas, that when you try to develop a new technological system which people believe will not affect their ways of working, everybody goes along with the idea. Yet, when you try to change established ways of working and of being a museum, everybody has an opinion about it and ideas for how it should be done. Coordination is difficult, and the more actors are involved, the more difficult the coordination process becomes. Conflicts and negotiations are not exceptions, but the rule (cf. Simon 2010, Odding 2011 for similar insights).

It was then that I realized that my research would not be complete if I did not explore in more detail the entanglement between designing the online community and the practice of the museum itself. And, I became fully aware that if I did not look at these controversies, I would not be able to understand the nature of the change the museum is going through once it

develops an online community for its general public and its employees. Going to the literature to find explanations for these controversies only complicated the inquiry. Also there I found more controversies than concrete answers. As I delved deeper into these controversies, I understood that they are the very arenas in which different ideas, bodies of knowledge and interests are drawn together, where what it means to be an open, participative museum and how to achieve it are defined, negotiated and contested. These controversies would offer unique insights into the nature of designing without a product and into the possible shift from design as problem solving to design as an art of advancements.

In this chapter, I discuss the methodological considerations I took in this research. I address the first question of my research: How to deploy the many controversies about design without restricting designing in advance to a specific domain (individual or structural)? The chapter is structured as follows. I begin in section two by introducing the research setting of this study, the design project initiated and performed at Amsterdam Museum. I address here the nature of the object of design in this project. I continue in section three with presenting the methodological foundations of this study. As mentioned in the introduction of the thesis, I follow Latour's (2005) way of working in tracing designing without a product. I too feed off controversies, this time the design controversies, with the aim of building an understanding of the nature of designing without a product. Section four presents the shift I made in research strategies, and introduces exploring controversies as the main research strategy I employed. Here I describe what moves, methods and techniques I made use of to explore and feed off design controversies. Section five outlines the analysis techniques I employed in this study in moving from empirical insights to concepts. At the end of the chapter I return to the methodological question of this study and re-emphasize the value of feeding off controversies in exploring the nature of designing without a product.

Research setting: the Amsterdam Museum project

I explore the nature of designing without a product as a liberal art of advancements by following the design work that is being done at the Amsterdam Museum, the Netherlands. Almost three years ago, the board of the Amsterdam Museum has initiated a museum redesign project with the aim of transforming the museum from an institution to an online and offline meeting place for people interested in Amsterdam and its stories. As a city museum, the

Amsterdam Museum has been centered for decades on telling the story of the city of Amsterdam and of its inhabitants. The exhibitions the museum offers are thematic, focusing on presenting the discussions on such Amsterdam related topics as migration, prostitution, fashion or entrepreneurship among others. The Amsterdam Museum's focus is therefore different from art museums like Van Gogh Museum or the Rijksmuseum in Amsterdam. The latter are collection focused and aim at presenting exhibitions of famous art.

The Amsterdam Museum redesign project is emblematic of a larger, worldwide journey of transformation that the museum world is going through. Around the world, city museums are undergoing steep changes in their relationships with the public, in their functions and in their ways of exhibiting art (Hein 2000, Phillips 2008, Skartveit and Goodnow 2010, Odding 2011). The Museum for Art and History in Santa Cruz (USA), for instance, is developing towards an organization that is relevant to different communities in the area, and that encourages participation and discussion in the museum by means of event-centered experiences (Simon 2010). In Europe, Tate Britain is going through the same transformative process. The museum is developing online membership clubs that encourage people to "Be a part of Tate", and become attached to the museum (Barden 2011). In a world of social media and communal forms of organizing, these developments may not be unexpected. Yet, they imply serious questions of organizing, identity and authority for those responsible for the museums viability and continuity (Odding 2011).

The Amsterdam Museum is heading for a similar course. It tries to find suitable fresh arrangements in its interaction with the public, its supportive technologies and way of organizing. Central to this redesign project has been the development of an online community platform, The Heart <http://hart.amsterdammuseum.nl/>, where both the public and museum employees are encouraged to meet, share ideas and tell together the story of Amsterdam. To develop this platform, the Amsterdam Museum has been collaborating with Mediamatic, a web design office in Amsterdam.

Mediamatic is a web design office with more than 20 years of activity. At the moment of writing, around 40 people are working at Mediamatic, among whom are concept designers, interaction designers, graphic designers, front and back end developers, project managers, events managers, marketing employees and so on. Mediamatic characterizes itself on their website as "being active as a cultural institution. We are interested in cultural developments

that foster new technologies, and new technologies that spur cultural developments”. They present their work in terms of “researching and developing new ways of organizing resources and people”. As “creators of interactive social media projects”, Mediamatic has engaged in designing new media applications that encourage collaboration, interaction and sharing such as social network sites, event services, installations and storytelling sites. Their work is project based. Developments and insights obtained from one project are used as a base for innovation in the following projects. Their clients are varied, ranging from ministries, businesses, cultural organizations, museums and foundations.

The collaboration between Mediamatic and the Amsterdam Museum started many years ago, when Mediamatic built two other online communities that were subsequently part of two physical exhibitions organized in the museum, namely Memories from the East and Neighborhood Shops (see Appendix 1 for print screens of these two communities). The new online community, The Heart, would be an overarching community that would bring together all those interested in the story and history of Amsterdam (see Appendix 2b for a print screen of this community). The Amsterdam Museum considered that by developing their own online environment, rather than simply adopting existing platforms such as Facebook, they could foster more meaningful and authentic relationships between themselves and the public. At the moment of writing, the online community is very active. It has three large sub-communities dedicated to different interest groups on Amsterdam in which both museum employees and interested public participate with stories, discussions and photos.

The management of the Amsterdam Museum acknowledged that simply developing an online community platform where employees and the public could meet and collaborate would not by itself transform the museum into an open meeting place. Rather, for the new museum to be authentic, it was considered that the ways of working and being a museum will have to change too. The development of this online community platform therefore went hand in hand with a reorganization of the museum itself. It consisted of the introduction of new ways of working inside the museum, more open and interactive ways of preparing exhibitions and presenting art, the organization of different types of community oriented activities and exhibitions in particular neighborhoods of the city, and so on.

The redesigning of the museum itself raised many issues and discussions about the museum’s identity, its role in the Amsterdam community and the museum’s knowledge authority in

telling the story of Amsterdam. What it means to create new online and offline spaces for interaction and collaboration between the museum employees and the public, and what the implications are for being a museum, were always under debates and negotiation. It is these design issues and controversies in designing an open, participatory museum that I observed and traced during field research and that I deploy in this study.

The object of design in designing without a product and its ontology

The object of design in the Amsterdam Museum project is the museum as an online and offline meeting place. This is the dream of the museum employees, and everything they do in and outside the museum is directed towards realizing this dream. This object of design is not a stabilized product that has clear requirements. It is not a design problem which can be easily solved once and for all. Rather, it is ‘an assemblage’ (Latour 2005), a ‘constitutive entanglement’ (Orlikowski 2007) of people – museum employees, public, volunteers, web designers, and objects – museum collection, interactive technologies, public stories. The work that museum employees perform is directed towards making this assemblage of people and things work. One museum employee explained the nature of the object of designing without a product in the following way:

“The big idea... I don't think I do something really different now than I did when I made the network of organizations in Amsterdam. I don't see a real difference. And I recognize that in people like Steve Jobs: it's all the same mechanism, it's all the same thing you are doing. I don't know how to say that but it's all about getting people and technology work together and create circumstances in which people feel free to express themselves, and in which they can be creative.”

This multiple and emergent object of design reflects a relational ontology. According to ANT, humans and the materials around them become what they are in relation to or as a result of their relationship with each other (Law and Mol 1995, Knorr Cetina 2001, Orlikowski 2007), in associations that need to be constantly performed. The design process is per definition one such forum where both designers and the objects of their design become what they are only in relation to each other. This is what Latour (2005) meant with the notion of ‘assemblage’ and what Orlikowski (2007) meant with the notion of ‘constitutive entanglement.’ There is no

museum without its employees, collection, buildings or without the public and funds. When the aim is to transform the museum into an online and offline meeting, the entire assemblage of people and things needs to be taken into account and set in motion. This is the wickedness of contemporary designing. In this thesis, I will illustrate how the museum employees dealt with the wickedness of their design situation, what types of knowledge, methods and strategies they employed in meeting the ambition of making their museum more interactive and open to the local public.

How to feed off design controversies: An ANT methodology

In order to be able to trace, make visible and feed off the controversies about the nature of designing without a product, I adopted in this study the Actor Network Theory methodology. Nickelson and Binder (2008) and Yaneva (2009) made a similar choice in their studies, yet they focused more on the material entanglements in design than on deploying design controversies. I follow Latour (2005) in arguing that taking an ontological perspective that prioritizes either structure or human agency would not be able to account for the diversity of actors, activities and relations that are at play during a design project as the one observed at the Amsterdam Museum. Actor Network Theory (ANT) provides a methodological perspective that cultivates the ontological interest in relational materiality and in performativity. A central tenant of ANT is that humans and the objects around them become what they are in relation to or as a result of their relationship with each other (Law and Mol 1995, Knorr Cetina 2001, Orlikowski 2007), in associations that need to be constantly performed. Such interests in relational ontology and performativity are also shared by certain authors working in the practice theory tradition, such as Pickering (1993), Knorr Cetina (2001) and Gherardi (2009, 2010) and in the sociomaterial approaches of, for instance Czarniawska (2004) and Orlikowski (2007). Lee and Hassard (1999: 393) describe ANT as:

“empirically realist, in the sense that it leaves the task of challenging its empirical base to the research and user communities it addresses, and ontologically relativist in that it typically embarks on research without a clear picture of what sort of entities it will discover through investigation. This distinguishes ANT from both modern and postmodern research strategies.”

ANT was particularly insightful for this study as it moves beyond the distinction between micro- and macro-phenomena, between human agency and structure, in this case between the individual genius and abstracted design process. Latour (2005) urges researchers that if they are to move away from these distinctions, they need to keep the world ‘as flat as possible’ and to ‘follow the actors themselves’ in their making of the world. In this study, this was a very difficult task, yet not impossible.

To keep the world as flat as possible, I directed my attention to how museum employees, their collaborators and the objects they work with such as interactive technologies, public stories and the museum collection engage together in doing, acting, making, performing, creating and negotiating their world(s) (Latour and Woolgar 1979, Law and Mol 1995, Latour 2005). I followed the actors in their everyday practice, observing how people engaged objects to make their ideas and arguments concrete and how objects engaged people as sources of knowledge or as triggers of inspiration. And, I tried to move away from stabilized agreements, from examinations after-the-fact and focused on mapping the issues and uncertainties that were visible in various meetings: what where they about, who and what took part in them, what arguments were brought to the fore and how, and how the museum employees managed or not to reach an agreement. Focusing on those instances where things were still in the making was fascinating. Latour (2005: 89) wrote in the following way about the fascinating power of such instances where things are still in the making:

“When you are guided to any construction site you are experiencing the troubling and exhilarating feeling that things *could be different*, or at least that they *could still fail* – a feeling never so deep when faced with the final product, no matter how beautiful or impressive it may be.”

Also to be able to trace, make visible and feed off controversies, I made a re-turn to practice (Gherardi 2012). I explored the real life practice of designing not as an empirical object out there, stable and independent of my own research. Rather, I used the notion of practice as an epistemology (Gherardi 2012). Practice theory puts forward the view that knowledge does not reside in individuals’ heads, nor that it is a production factor which can be easily managed, stored and used strategically. Rather, knowledge is seen as “a collective, situated activity” (Gherardi 2012: 199). Knowing and learning is something people achieve together by engaging in collective action, it is integral to doing (Corradi *et al.* 2010, Nicolini 2011).

Therefore, employing practice as epistemology means that we can learn about design only by examining the doing of design. Such an epistemological perspective departs radically from the objectivist epistemology that dominates the design as process paradigm. In this latter epistemological perspective, knowledge about design is obtained by testing theories, abstracting and deducting. Practice as an epistemology foregrounds movements, doings, changes and negotiations as the locus of knowing. Ways of working, worldviews and methods are never stable but always under negotiations in practices. As such, practices are in a continuous state of becoming, indeterminate and incomplete. Our knowing of practices is equally incomplete, yet as long as we allow the actors to deploy their controversies without us closing them too soon, we can learn together with them what their world is made of.

The research strategy: from ethnography to exploring controversies

As the field research progressed and I moved towards exploring design controversies that are ignited in the Amsterdam Museum redesign project, I knew that the research strategy I was employing at that moment would need to be revised.

Following my initial interest in the web designers' ways of working and thinking towards creating social media, I began my empirical research with the intention of conducting a full-fledged ethnography. The benefits of conducting an ethnography is that it encourages the researcher to immerse in the research setting of his/her study, learn about the ways of living and working of the people s/he is following and gain the ability to describe and explain their social world from an emic perspective, as the people themselves would describe and explain it (Hammersley and Atkinson 2007, Saunders *et al.* 2007). Following ANT's call to "follow the actors themselves, that is try to catch up with their often wild innovations in order to learn from them what the collective existence has become in their hands" (Latour 2005: 12), ethnography seemed to be the most appropriate research strategy to follow. There are few ethnographic studies of web designers' practices, and as such this study was a great opportunity for obtaining a first-hand understanding of how web designers actually engage in designing, building and developing the type of social media that are becoming part and parcel of our lives.

I spent the first four months of fieldwork conducting observations of web designers at work at Mediamatic, I attended the design meetings they had internally with developers, project managers, interaction designers and so on, the meetings they had with employees of the Amsterdam Museum but also with other clients, and attended some of the events organized by Mediamatic. In the same period, I conducted observations at the Amsterdam Museum, focusing particularly on the work practices of the E-culture department. This department was the most involved in the actual development of the online community. I attended their internal meetings, as well as meetings with the museum volunteers that would be among the future members of the community. Throughout the observation period, I keep detailed field notes, made recordings of meetings and took pictures. Also in this period, I conducted 20 semi-structured interviews with project managers, designers, developers and the museum employees who were involved in the Amsterdam Museum project.

However, as my focus switched towards exploring the design controversies I could no longer ignore, I felt that the ethnographic research strategy was not strong enough to trace the different actors, issues and perspectives I was observing in practice. Unlike individual and collective behavior which I could observe in the field, controversies are more elusive and are not easily researched through an ethnographic approach. Too many times, controversies gave way to general agreements in meetings, only to surface later in informal discussions and interviews.

Likewise, I became unsettled about the ethnography's conceptualization of 'the field'. When exploring controversies which involve not only human but also non-human actors, both present and absent, passive and active, in which different actors coming from various areas of expertise meet in both physical and virtual places to debate and negotiate their views, can I talk about 'the field' and if yes, what is that 'field'? 'The field' was becoming larger and larger, more and more heterogeneous. It became clear that I would get lost in this 'field' if I did not employ a more systemic strategy to trace these actors and the debates they engage in. That is why, while still maintaining the ethnographic principles of immersion and openness, I decided to adopt more systematically the strategy of exploring controversies, as developed by Latour (2005) and Venturini (2010). In my shift from ethnography to exploring controversies, the unit of analysis did not change: my focus was still on how different human and non-human actors relate to each other and what they do and say when engaging in designing the new, more interactive way of being a museum.

What is in a controversy?

Venturini (2010: 261) argued that “controversies are situations where actors disagree (or better, agree on their disagreement)”. A controversy is settled when actors manage to reach a compromise they can live with (Venturini 2010). Controversies, Venturini (2010) argued, are by far the most complex phenomena to be observed in collective life. What makes them so complex becomes clear when we look at the five features of controversies summarized by Venturini (2010):

First, they involve all kind of actors, human and non-human, from individuals, to products, economies, laws and regulations. While not all actors are equal or act in the same manner, they are brought together by a shared, albeit disputed, interest. As Venturini (2010: 261) put it: “Every controversy functions as a ‘hybrid forum’, a space of conflict and negotiation among actors that would otherwise happily ignore each other”. Second, controversies are the space in which both new relationships among different actors are developed, and where social entities that were thought as one actor break apart into conflicting actors. Third, they are reduction-resistant. Controversies are difficult to solve because it is usually impossible to reduce them to a single question. Fourth, they are debated, emerging when ideas or ways of doing things that were previously taken for granted begin to be discussed and questioned (remember the difficulties the museum employee had when she proposed using stories of football fans in a museum exhibition). Last, controversies are conflicts. Issues of power and (argumentative) force are central even when controversies are negotiated following a democratic approach.

The strategy of exploring controversies shares with ethnography three main commandments of observation, namely:

- You shall not restrain your observation to any single theory or methodology;
- You shall observe from as many viewpoints as possible;
- You shall listen to the actors’ voices more than to your own presumptions.

To this list, exploring controversies adds yet another commandment, one that springs from the philosophical underpinnings of ANT from which this strategy was developed, namely to keep the social world as flat as possible so that all the actors become visible and their voices heard (Latour 2005):

- You shall not limit in advance the number and types of entities you will observe.

And, in contrast to ethnography (and other research strategies too, like experiments, case studies or simulation) which focuses on exploring relatively stabilized practices and established ways of doing things, norms and cultural values, exploring controversies directs the researcher's attention towards those settings that are unsettled, in becoming. Many contemporary design projects, particularly of the kind and magnitude observed in this study, are such unsettled settings where everything is open for discussion, where there are many stakeholders with different interests and where there is no one fixed solution to be adopted (Buchanan 1992). Here lies the power of this approach for studying 'design at the scale of life', 'designing without a product' (Jones 1980). Venturini (2010: 264) explained:

“To understand how social phenomena are built it is not enough to observe the actors alone nor is it enough to observe social networks once they are stabilized. What should be observed are the actors-networks—that is to say, the fleeting configurations where actors are renegotiating the ties of old networks and the emergence of new networks is redefining the identity of actors.”

The research methods employed in tracing controversies

During the empirical research, I employed the following research methods: observations, reflective interviews, document analysis and literature review. Another method that I planned on using but that did not work was reflective diaries. I asked six employees, four from the Amsterdam Museum and two from Mediamatic, to maintain a digital reflective diary throughout the period of the design project. I prepared themes they could reflect on. The aim of this reflective diary method was to allow the research participants to express their ideas, views, uncertainties without me intervening with specific questions. And, they could write down their thoughts when those thoughts occurred, or at a time that suited them most. However, only one employee maintained such a diary for a period of two weeks. The explanation they gave for not doing it was lack of time and that they would prefer to discuss these themes with me in person, rather than in writing.

Counting also the first phase of the ethnographic research, in which I followed the project of designing the online community itself, I spend a total of eight months conducting the empirical research. This period was interrupted for purposes of preliminary data analysis, writing intermediary reports and papers, attending conferences, reading and teaching. In this eight-month period, I spent time at the Amsterdam Museum, at Mediamatic and attending events and workshops organized by both organizations.

The empirical research did not end after this period. I kept close contact with the Amsterdam Museum and Mediamatic, meeting with contact persons from both organizations to discuss drafts of conference papers and reports I wrote on the study. Also, I have been writing them e-mails with questions regarding new developments in the project, as well as with questions for clarification of issues I observed in the field or that they talked about during interviews. Chapters of this thesis were read by a few museum employees, including this chapter on methodology. Their comments and suggestions were taken into account while writing the final versions.

Observations

One research method I used extensively was observations (Spradley 1980). I spent a total of 10 weeks observing the employees at work, attending their meetings at the museum and at Mediamatic, sitting with them in their offices, joining them at events and so on. During the observations sessions, I kept track of all the actors the employees met with or invoked to discuss their views, ideas, objectives, expectations and plans for the design project. In these meetings, I examined how various policy documents, budgets, budget proposals and sketches mediate discussions, instigate debates and new ideas. I joined the meetings they had with the museum volunteers, who constituted a big part of the intended users of the online community to be designed. I attended meetings between museum employees and the web designers who would develop the community site. Here also, I examined how existing technological infrastructures such as the museum website, other online community sites the museum is managing, budgets and policy documents inspired, hindered, motivated, allowed all the participants to discuss ideas, express issues and problems, share information and make plans for how the design process could proceed.

During these meetings and workshops, I paid particular attention to how ideas were exchanged and negotiated between the different employees, to the nature of those ideas and to the nature of the objects brought to the table to materialize those ideas such as sketches, policy documents, stories, web pages and pictures.

During the field research, I came to learn that it was in these meetings that the current state of affairs in the Amsterdam museum was translated into design situations, that plans and ideas on how to make the museum more open and collaborative with their public were debated, that solutions were examined and proposed and that possible impacts of these solutions on the ways the museum is functioning in general were imagined. I realized that in order to be able to show associations between the different human and non-human actors and to allow the silent actors to speak, I should not miss any detail of these encounters. Therefore, during these meetings, I kept detailed field notes, took pictures and recorded the conversations, which were later transcribed verbatim for analysis. After each meeting, I engaged in informal conversations with the participants, asking for clarifications of what I observed.

At Mediamatic, I observed the web designers sketching and asked them to explain what they were doing, to express verbally the conversations they had with their work. I attended the design meetings in which they discussed sketches and other design plans with their colleagues, with the museum employees and the museum volunteers as the future members of the community. And, I participated in workshops organized by Mediamatic for the museum employees and the future members of the online communities. It was during these observations at both the web designers' office and the museum that I could see, for instance, how the ideas the museum employees expressed in their meetings with the designers, were articulated by the policy documents and other schemes the employees developed during meetings with their colleagues at the museum, who at their turn received instructions from the museum director in the form of e-mails and other documents. By tracing back this chain of mediators, I could see that what designers and museum employees know, comes from other different sites of productions, transported and translated by a multiplicity of material and human epistemic mediators. Taking field notes and drawing graphs and schemes were my grips during these examinations.

Reflective interviews

To supplement these observations, I conducted 42 reflective interviews. Coming from the learning history projects (Roth and Kleiner 1995), reflective interviews encourage the interviewees to describe in their own words their experiences, thoughts and understandings of the activities they are undertaking.

I interviewed employees working in different departments at the Amsterdam Museum, from curators, to project managers, employees from the financial department, new media employees, and the director. I asked them, among others, about what it means to work in a museum today, about the museums' current strategies to welcome the public, about the problems they see and what they would like to have changed. I asked them to describe their experiences in their collaboration with the web designers, what they learned from such collaborations. I interviewed employees that were not actively involved in the redesign project. I asked them among other things, about their work practices before and after the implementation of the online community, their views and experiences on how the museum operates today and their opinion about how the museum presents itself and its societal role to the public.

At Mediamatic, I interviewed concept designers, graphic designers and technicians. I asked them about their design philosophies, the design principles they follow, their sources of inspiration, their views on the impact online communities have in organizations. I asked them to reflect on their collaborations with the museum, what was different in these projects from the rest, and so on.

Multiple reflective interviews were conducted with 5 of the 37 interviewees, who were selected based on their active involvement in all the phases of the design project. The focus of these interviews was on the progress of the project, how their views changed during the project and on their reflection on the design process in general. All interviews were semi-structured. They lasted between one and one and a half hours, were recorded and later transcribed verbatim for analysis. Three interview guides I employed in the study can be seen in Appendix 3.

Document analysis and literature study

As for document analysis, I examined policy documents, annual reports, design proposals, budget applications and preliminary sketches. I followed how museum employees relate to them, how their work on the design project was enabled, inspired or hindered by them. I analyzed a large number of newspaper articles and blog posts in which the developments in the Amsterdam Museum, as well as similar developments at other museums in the world were discussed. When analyzing these documents, I paid particular attention to the issues addressed and the ways they were addressed. Many of the items presented in these documents became sources of interview questions.

Besides these documents, I reviewed extensively the design literature. I examined theories of design problems and solutions, of design knowledge and thinking, of design process and methods and of design drawing. I read empirical studies of architects, engineers, product designers, information systems developers and social media designers. I read into the field of product design and organizational design. When examining the literature, I also focused, like in the empirical study, on identifying the debates and uncertainties about what designing is and how it is performed in practice. I compared and contrasted the insights found from the literature review with the insights obtained from the empirical studies, examine what researchers say designers do and what designers say about what their world is made of. I drew on all these studies and on the empirical insights from the Amsterdam Museum project in examining the uncertainties about the nature of designing without a product.

From empirical insights to theoretical concepts

In analyzing the insights obtained from these methods, I followed *inductive reasoning*, guided by the idea that theory building should develop from empirical data. Following ANT's principles, I took an *emic perspective* in this study. That means that in this research, the participants themselves were invited to tell their own story and outline their own worldviews and experiences in engaging in the practice of designing. In the analysis, the 'voice' of both human and non-human participants was central, as I tried to follow their arguments, their mediatory actions and their world framing, as Latour (2005) put it.

I conducted the analysis in multiple iterative phases of reading, coding and writing memos (Glaser and Strauss 1967, Patton 2002, Srivastava and Hopwood 2009). I employed open codes to delineate insights on the different design controversies presented by the designers in this study in their interviews but also in the transcripts of meetings and other conversations. In choosing the words for these open codes, I tried to employ as much as possible words used by the designers themselves, known as *in vivo* codes, such as ‘participating in the system’, ‘being a host’, ‘observing users’ or ‘reacting to users’ needs’ referring to the methods designers described as using in designing for online interaction.

I used axial coding to connect insights obtained through open coding into larger categories, or synthesizing concepts that told me something new and unique about the nature of designing at the Amsterdam Museum. In developing these concepts through axial coding, I sought to offer a theoretical understanding of how the designers in this study understand the nature of their work, particularly of the design task, design methods, design approaches, design principles, design process and design knowledge as they engage in transforming their museum into an online and offline meeting place. The list of open and axial codes I used in coding the empirical insights can be seen in Appendix 4.

In coding and analyzing the data, I employed two analytical strategies, developed by Corbin and Strauss (1990), namely that of asking questions and making comparisons. As I was reading the data, I developed three sets of questions that subsequently guided the analysis. Each set of questions was aimed at bringing to the fore one aspect of the different layers of the same controversy (Venturini 2010). These aspects are: 1. what are the different controversies about; 2. who/what engage in them and how; and 3. with what effects.

The first set of questions was directed at identifying the matters of concern around which controversies developed. When analyzing the data, I asked continuous questions such as: ‘When the Amsterdam Museum employees conceive the plan to shape the museum experience, what issues become important, what is discussed, negotiated and debated concretely?’ Each statement made during a meeting, an interview or an informal conversation, connected to larger issues, discussed in the academic literature, specialized professional literature, in workshops, conferences and lectures, which needed to be mapped too. Asking

such questions continuously and making comparisons across the data helped me in systematically tracing the controversies and the issues that were addressed.

The second set of questions was aimed at foregrounding the materiality of the practice of designing. Controversies are populated by a heterogeneous assemblage of museum employees, web designers, managers, financial bodies, government officials, members of the public, online and offline technologies, pieces of art and history, stories and pictures, and so on. In analyzing the data, these type of questions I asked were meant to bring to the fore the nature of the relationships between designers and their objects of work, such as sketches, design proposals, the online community site, the art collection and so on. An example of such a question is: ‘What does a design proposal do in the collaboration between Mediamatic and the Amsterdam Museum?’ Analyzing controversies would not be complete without paying attention to the ways in which objects inspire, mediate, give body and substance to a debate or how they convince others into action.

The third set of questions was directed at exploring what these controversies do in such a design project as the one observed at the Amsterdam Museum. Each controversy examined brought together not only different ideas and different actors, but also different visions of what the new museum should or could be in the future, as well as different visions of how this new museum should or could be developed in the future. Venturini (2010: 263, italics in original) argued that “controversies remain the best occasions to observe the social world and its *making*”. As such, the types of questions I asked here were: what exactly do we see *in the making* when we examine these controversies? Is it a new museum practice, a new design practice, a new system of appreciating and evaluating these practices or something completely different?

These sets of questions allowed me to keep the analysis as flat as possible, by focusing on issues that engage both human and non-human actors, giving priority to neither one of them. And, they offered me the ability to keep the inquiry open to new insights, while remaining systematic in the examination of each controversy.

Closing remarks

The question that guided this chapter was: ‘How to deploy the many controversies about design without restricting designing in advance to a specific domain (individual or structural)?’

In this chapter, I argued that in order to achieve this goal, we need to adopt a methodology that foregrounds movements and dynamics instead of stabilized processes; one that keeps the social world as flat as possible and does not prioritize either human agency or structure (Latour 2005). Existing methodologies that focus on examining already settled design processes, that limit designing to an act of problem solving, or that foreground stabilized, agreed upon theories of design are not open enough when examining those design situations in which the designed is still emerging, in the making; where the design theories and approaches to be employed are still debated; and where the clients challenge the professional designers about what should be done and how. The power of the ANT methodology is that it provides researchers with the techniques to maintain the design world as flat as possible, to allow all the actors to express themselves without prioritizing them in advance and to focus on the actors’ different performances and enactments.

Also, in order to deploy the many controversies about design, I argued for a re-turn to practice (Gherardi 2012). Unique insights about designing can be obtained by exploring - rather than deducting and testing - the real life, everyday doing of design. The Amsterdam Museum is a museum in the making. Different work philosophies, worldviews, roles (employees, web designers, public, financial bodies, government) and materials (technologies, art objects and public stories) are brought together and ideas are sought to make these assemblages work.

The value of examining and deploying controversies lies in that they are the arenas in which the practice of designing is constantly negotiated, valued and refined. Controversies allowed me to move away from stabilized designs, stabilized processes and methods to observe design in the making. And this is particularly valuable in examining the nature of designing without a product, a type of designing practiced by contemporary designers yet still little understood in the design literature.

In the following chapters, I examine four design uncertainties on the nature of designing I observed in both literature and practice and deploy the controversies designers ignited as they tried to make these uncertainties discussable. In these chapters, I will address the second research question of this study, namely: ‘How to render fully traceable the means allowing designers to stabilize controversies?’ I am aware that our accounts can be incomplete. The projects we are following continue to develop in our absence too. We hear about important events that took place, about valuable decisions that were taken or about vivid discussion that were held when we were not there. Yet, I will try to offer as close a descriptive account as possible of what I observed, heard, read, noted, recorded and understood during my research. I will try to include all the actors, human and non-human that, according to the people I talked to, made a difference in their work. And I will try to show what the practice of designing has become in their discussions, meetings and mixing of ideas, perspectives and materials.

First Controversy: Beyond Problem Solving – Advancing Constitutive Entanglements

The dream of many - if not all - designers is to make the world a better place. This is their dream, no matter if they work in the domain of software development, fashion, architecture, art and culture, or any other domain. They strive to fulfill this dream every day by means of choreographing and advancing assemblages of people and things, assemblages that add value to human life (Jones 1980, Boland and Collopy 2004), and that hopefully would develop that ‘quality without a name’ (Alexander *et al.* 1977).

The dream of creating a better, more open, interactive and socially responsible museum has been nurtured in the Amsterdam Museum for many years. Museum employees have been trying to find suitable fresh arrangements in their interaction with the public, in the museum’s supportive technologies and ways of organizing. The ambition the Amsterdam Museum has put forward is that by 2020 the museum would be ‘a meeting place’ for those interested in the story and history of Amsterdam, be they local inhabitants, museum employees, researchers, historians or any another interest group. The aim was to change the museum from a cultural, educating institution to one in which joint learning with the public is promoted, from a collector of history to a co-producer of life stories, and from an authority in art, to a host of artistic expression. This vision for the Amsterdam Museum was clearly indicated in the Policy Plan Amsterdam Museum 2020 (2011):

“In 2020, the Amsterdam Museum is an open and accessible museum that increases the bond with and between different groups of people living in Amsterdam and that functions as a ‘meeting place’ of the city. [...] In addition, the Amsterdam Museum will be for tourists ‘the entry to the city’ by being the connecting element between tourists and other cultural historical attractions in the entire Amsterdam metropolis.”

Current approaches to design have favored a focus on design as structured process aimed at solving ill-defined problems (Button and Sharrock 2000, Cross 2001, 2011, Hevner *et al.* 2004, Lawson 2006). The design as problem solving paradigm has focused the researchers' attention on designers' problem solving skills and abilities. Lawson (2004, 2006) analyzed how architects engage with their design situations, by focusing on styles of thinking and the principles, strategies and tactics they employ in understanding and solving problems. Lawson (2006) argued that designers engage with problems by combining both convergent and divergent thought, by applying rational thought and analysis and imagination and creativity respectively. There are different strategies through which designers cope with the insecurity of the problem situation, namely by generating alternatives and working with 'parallel lines of thought' (Lawson 2006), by following 'organizing principles' (Rowe 1987) or 'primary generators' (Drake 1979). Cross (1990, 2007) and Dorst (2010) similarly focused on the designers' skills and abilities to deal with design problems. Cross (1990: 127) summarized design ability as "comprising resolving ill-defined problems, adopting solution-focused cognitive strategies, employing abductive or appositional thinking and using non-verbal modeling media".

However, the situations which designers engaging in designing without a product confront themselves with do not render themselves easily to strategies of problem solving (Rittel and Webber 1973, Buchanan 1992). Think for instance at the problem of eradicating world poverty, fighting terrorism or tackling global warming. Global warming has been on the national and international governments agendas for decades. It continues to ignite a lot of debates inside these governments but also among them and other communities of scientists, industries and nature lovers. It is an issue in which everything is questioned, including the existence of global warming itself, how fast it happens and with what effects. What seems to be a solution for a community, is a bigger problem for another (Latour 2004). Adopting solution focused cognitive strategies (Cross 1990) might bring about temporal solutions to local problems of global warming but finding a solution to the larger problem of global warming itself seems to be an impossible task.

This is the case in the Amsterdam Museum too as, for instance, of how to support and facilitate interaction among the public and between the public and museum employees does not have clear cut solutions. There are no established ways to transform a museum into an online and offline meeting place. There are no tested theories and methods that can guarantee

success. And, there are no master designers who could manage the complexity of this project and take the design task into their own hands. There are various actors engaged in designing, each with their own expertise, interests and expectations. Designing a museum as an online and offline meeting place is not so much a problem in the sense design theorists understand the word, but more a collection of issues that involve a large number of actors, from museum employees and the public, to the museum collection, interactive technologies and public stories. And design issues cannot be solved, they can only be advanced in a continuous designing, a ‘designing over time’ (Jones 1980) in which small steps are taken, their consequences valued and ideas reconsidered as new needs and new ambitions arise (Maris *et al.* 2012).

The aim of this chapter is to explore the nature of designing without a product by examining a first uncertainty: is designing without a product a matter of problem solving, or is it a matter of advancing wicked entanglements? The structure of the chapter is as follows. In section 2, I follow the traces left behind as researchers and the designers in this study tried to come to grips with the nature of design problems. I address the notion of wickedness (Rittel and Webber 1973, Buchanan 1992) and present the discussions that are seen in the literature and at the Amsterdam Museum on what makes contemporary design situations wicked. In section 3, I follow the traces left behind as the designers in this study as well as in the literature attempt to deal with wicked design situations. I examine how researchers of organizational design explained the process of designing for emergence. I address the notion of advancements and explain through which means advancing is generated at the Amsterdam Museum. I end this chapter with the conclusions drawn from exploring this uncertainty.

Design problems and wicked entanglements

Not a design problem, but a constitutive entanglement

The term ‘design problem’ is so much engrained in the literature that many times we take the notion for granted as ‘something that needs to be solved’, ‘if it is not a problem, one cannot solve it’. Our understanding of what counts as a design problem, has been shaped by the predominance of research on designing products. Viewing designing from the perspective of product development, Asimow (1962) and Hansen and Andreasen (2008) equated a design

problem with a need that requires to be fulfilled, for instance the need for safer cars or the need for faster computers. Lawson (2006) described design problems as ‘unsatisfactory situations’ which require improvement, such as a noisy house which requires a better sound insulation. Hevner *et al.* (2004) discussed design problems as business opportunities, as when a company wishes to put an innovative product in the market, like the known example of James Dyson and his revolutionary vacuum cleaners.

When we look at design from the perspective of designing without a product, the notion of ‘design problem’ becomes problematic itself (Dorst 2006). The goal of the Amsterdam Museum is to become an interactive, online and offline meeting place where the local inhabitants and the museum employees can meet with each other and share their stories about Amsterdam. If we look at the Amsterdam Museum case from a product development perspective, one could argue that the design problem is that, at the moment, the museum is not interactive. Developing an interactive online community and including other interactive technologies in the museum itself would solve this problem. Yet, this is not how the museum employees themselves perceived their design situation.

For the museum employees, changing their museum into an online and offline meeting place is a matter of an all-encompassing transformation that touches upon the very essence of their museum practice. The Amsterdam Museum as an institution was seen by some of its employees as lagging behind and unresponsive to larger societal changes, to “new ways of communicating and being in the world”, as one employee put it.

One such societal change is in the way people relate to each other and to issues that matter to them. One employee explained that in the last years, a new type of museum public has come about (cf. Simon 2010). This new type of public consists of people who are active in all kinds of online environments. They want to express their opinions about issues that matter to them, instead of just silently listening to or watching the museum’s version of the story. In her words:

“People get used to all kind of possibilities on the internet and they ask for the same possibilities in the museum, even in exhibitions. They want to participate, they want to say they like it, they want to share because they are used to zapping, used to do things in their own ways at a time that suits them best.”

Another societal change is in the way people learn about history (cf. Odding 2011). Museum employees feel that more and more visitors do not “carry with them a historical knowledge of events” as one employee argued. Rather, visitors want to learn about historical events by doing, by talking to others, or by searching online. And yet another societal change has to do with the ways in which museums are funded. Due to financial crises, local governments and other financial bodies are diminishing the budgets offered to museums. At the same time, they require museums to be more clear and transparent about their role and importance for the local communities, who are contributing to the museums’ budgets through their tax payments.

However, the museum is not seen as in ‘need’ of change (Hansen and Andreasen 2008) to attract this new group of people, as their exhibitions and activities continue to be visited by interested public, particularly tourists. Likewise, the museum employees do not perceive the situation as necessarily ‘unsatisfactory’ (Lawson 2006), as more and more members of the public carry with them devices on which historical knowledge can be searched as desired.

Amsterdam museum employees do not perceive their situation as a problem to be solved. They see it as a challenge to move the museum further so that it can keep up with and respond to these larger societal changes. The museum employees want to achieve this goal by developing a more meaningful, personal and interesting relationship with the local communities, to become a museum for the local public too, not only for tourists. The aim for the museum is to become “an online and offline meeting place” where locals can bring in and share with others their personal experiences and opinions about the story and history of Amsterdam. In the long run, an involved and committed public would also be willing to support the museum financially, either by donating, participating in crowd funding or volunteering. As another employee put it:

“We want to do something new that we haven’t done before and that’s bringing the Amsterdamians together in a really stimulating and interactive environment. It’s not only meaningful for us if you write 100 stories, we want a creative environment that we do not have yet and in our vision we make clear that we want to be a museum for the Amsterdamians and not only for tourists. So ok let’s make a start, let’s bring them closer together and to us. We think that by creating this kind of environment people will participate more and maybe more people will join our projects, but it’s also an improvement if people respond more in a light way, by just liking things.”

If the museum is to accommodate itself to this ‘new way of communicating and being in the world’, it needs to undergo an organizational transformation. The manager of the e-culture department, responsible for arranging and managing the museum’s online presence on its own online communities and on the existing social networks, argued that an online community cannot by itself transform the museum into an interactive organization. What is needed is that the organization undergoes an all-encompassing transformation to create what she called ‘a sincere and authentic organization’. In her own words:

“If you develop a community but not adapt your organization or your relationship with the public I believe it will not work. You will not have a sincere and authentic organization if you preach interaction online but offline you are very hierarchical and authoritarian with the public. Both need to be developed in parallel, otherwise it will not work.”

The design space at the Amsterdam Museum is far from being centered on a product that needs to be developed and implemented in the museum practice. On the contrary, it is an assemblage (Latour 2005), a ‘constitutive entanglement’ that extends both online and offline (Maris *et al.* 2012, 2013). With the notion of ‘constitutive entanglement’, Orlikowski (2007) put forward an ontological claim that people and the objects they work and live with do not exist independent of each other, meeting only in one-way interactions (a humanistic or technological determinism perspective) or only in two-way interactions (a mutual reciprocation perspective). Rather, people and the objects they work and live with became what they are only in relation with each other. In Orlikowski’s (2007: 1438) terms: “(h)umans are constituted through relations of materiality – bodies, cloths, food, devices, tools, which, in turn, are produced through human practices.”

The Amsterdam Museum is such a ‘constitutive entanglement’ between people, technologies, budgets, the museum’s collection, public stories and personal objects. You cannot have a museum without its collections, employees, historical knowledge, buildings, technologies and public. It follows that at the Amsterdam Museum, the design space is populated with interactive technologies, the museum’s collection, public stories and personal objects which raise significant challenges to the museum employees in terms of how they can be arranged and accommodated in a museum as an online and offline meeting place. The design space includes museum employees, members of the public, but also volunteers, interns and

freelancers who work together with the museum employees. They too raise important challenges in design, in terms of how they can work together, how they can engage in collective storytelling online in communities and offline in exhibitions.

The design space further includes the web designers who would develop the museum's online community. They too would need to work closely with the public to learn from them what they would like to have on the online community, they would need to be aware of the museum's ambition of storytelling by means of historical objects and personal stories and see how they can accommodate this ambition on the online community. It includes public and private funding bodies that provide the money used in the museum, as well as the local government which creates cultural policies on the expected role of the museum in the local community. It includes other museums in Amsterdam, the Netherlands and the world, which also engage in similar transformations and which act many times as inspirations for the Amsterdam Museum.

In transforming the Amsterdam Museum into an online and offline meeting place, it is this entire constitutive entanglement that needs to be taken into account, shaken up, rearranged and advanced. You cannot have an open, interactive museum without art that attracts the public's attention, without people who are interested in posting and sharing their own stories, or without technologies that facilitate and mediate such exchanges. And the more actors are enrolled and need to be taken into account, shaken up, rearranged and advanced, the more wicked is the nature of designing without a product (cf. Buchanan 1992, Callon 1986).

Not ill-structured, but wicked

Much of the academic writing and thinking about "design problems" has been so far influenced by the work of Herbert Simon (1973), seen as the father of the rational problem solving paradigm. In his seminal paper, Simon (1973) argued that most of the problems designers encounter in their work are 'ill-structured problems'. For Simon (1973), ill-structured problems are those problems that, in contrast to well-structured problems, do not have a set of goals that can be well formulated at the beginning of the design, do not have a set of well-defined rules about how to approach them, that cannot be fully known by the designer and that lack a definite criteria for testing the proposed solutions.

While the two types of problems are different in the degree to which they can be defined, according to Simon (1973) there is no difference in the way they are solved. A problem solver can solve an ill-structured problem by transforming it, or framing it, as a well-structured problem. Simon's (1973) ideas have found support in the works of among others, Sinott (1989), Basadur *et al.* (1994), Jonassen (1997) and Ge and Land (2003).

Simon's (1973) ideas have attracted much discussion and also criticism. Yet, this criticism has been put forward from within the problem solving paradigm. No substantial move has so far been made away from the idea of design as problem solving. Dorst (2006) set to reanalyze and revise Simon's ideas. He made a case for reconsidering the notion of 'design problems', which I support in this study, yet he did not manage to escape the problem solving doctrine. Dorst (2006) criticized Simon for not seeing a difference between how ill-structured and well-structured problems are solved.

Following Suchman (1987), Dreyfus (2002) and Hatchuel (2002), Dorst (2006) proposed a rethinking of ill-structured problems as 'paradoxical design situations', consisting of many 'conflicting discourses'. For him, design problems do not exist out there in the world but are situated in the local design context (Suchman 1987), as constructed by the designer himself. Such paradoxical situations cannot be solved by means of calculations, as well-structured problems can. Dorst (2006) argued that paradoxical design situations can be solved by redefining the problematic situation until a solution is developed that transcends or connects the different discourses. The co-evolving of design problems and solutions until "a matching problem-solution pair" is obtained (Cross 2007: 102), has become a more generally accepted approach. This approach finds support in the work of Schön (1983), Kolodner and Wills (1996) and Lawson (2006), among others.

New insights on the nature of contemporary design problems have been put forward by Rittel and Webber (1973), when they argued that planning problems are wicked problems. Churchman (1967: B-141), in an editorial for *Management Science*, referred to Rittel's description of wicked problems as a "class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing." The notion of wicked problems gained popularity in design following Buchanan's (1992) paper.

Wicked problems are, like ill-structured problems, difficult to define and lack a predetermined set of rules on how to approach them (Coyne 2005). However, Buchanan (1992) argued that wicked problems differ from ill-structured problems in one fundamental way. Ill-structured problems are undeterminate, to be made determinate by the designer as s/he attempts to solve them. Wicked problems are indeterminate, meaning that “there are no definitive conditions or limits to design problems” (Buchanan 1992: 16). As such, wicked problems can never be made determinate and solved once and for all. Any solution to a wicked problem will generate new problems that need to be addressed. The process is continuous, the design is emergent. The indeterminacy of wicked problems is illustrated by the 10 properties put forward by Rittel and Webber (1973, as cited in Buchanan (1992: 16):

1. “Wicked problems have no definitive formulation, but every formulation of a wicked problem corresponds to the formulation of a solution.
2. Wicked problems have no stopping rules.
3. Solutions to wicked problems cannot be true or false, only good or bad.
4. In solving wicked problems there is no exhaustive list of admissible operations.
5. For every wicked problem there is always more than one possible explanation, with explanations depending on the Weltanschauung of the designer.
6. Every wicked problem is a symptom of another, "higher level", problem.
7. No formulation and solution of a wicked problem has a definitive test.
8. Solving a wicked problem is a "one shot" operation, with no room for trial and error.
9. Every wicked problem is unique.
10. The wicked problem solver has no right to be wrong—they are fully responsible for their actions.”

Buchanan (1992) kept Rittel and Webber’s original vocabulary of ‘problems’ and ‘solutions’. This has limited our vocabulary to talk about wickedness not as something to be solved, but as something that can only be advanced one step at a time. Therefore, it is these very notions of ‘problems’ and ‘solutions’ that need to be reconsidered if we are to move away from design as problem solving in our exploration of designing without a product. In this section, I propose a reconsideration of ‘design problems’ as ‘wicked constitutive entanglements’. In the next section, I will propose a rethinking of ‘problem solving’ as ‘advancing constitutive entanglements’.

As the employees of the Amsterdam Museum experienced as well, the world is becoming more and more complex, itself an outcome of the constitutive entanglements between people and interactive technologies (Orlikowski 2007). As Buchanan (1992: 15) argued, in contemporary designing “there is a fundamental indeterminacy in all but the most trivial design problems.” This has significant implications for contemporary designing, for designing ‘at the scale of life’ (Jones 1980), where designers no longer confront themselves with determinate problems which have definite conditions.

I illustrated above how the design space of the Amsterdam Museum is a constitutive entanglement, an assemblage of diverse human and non-human actors (Orlikowski 2007, Latour 2005). And here lies the wickedness of the project, illustrated by a number of observations, which substantiate some of the 10 properties of wicked problems put forward by Rittel and Webber (1973):

First, simply adopting interactive technologies in the museum practice will not, by itself, transform the museum into an online and offline meeting place. The entire assemblage needs to be taken into account. All actors need to be mobilized in bringing about sustainable organizational, technological, financial and attitudinal transformations in the museum. As one employee of the e-culture department argued:

“This is always a discussion, how to get people working together. If you look at the online community, it is a very large group which is involved: it’s us the e-culture department, the web-designers, the visitors of the site, the people in the museum...if such a group is to work they need to feel involved, concerned with the museum. The museum needs to encourage that. It should also make it possible that people from the community get access, that they and their stories literally get access in the museum, in exhibitions and events and that people are open for this. This goes through all the layers of the organization, the environment needs to change if the community is to work, otherwise it is not a community but an old-fashioned members group.”

Second, as the museum continues to open up to the new public and the new way of communicating and being in the world, more and more human and non-human actors will enter the assemblage and would need to be considered: more interested members of the

public, more stories, more information technologies, more financial bodies and more historical objects in the museum's collection.

Third, not only the number of actors will change, but also their roles in the design process. Already, some interested members of the public become very active in the museum as volunteers, working side by side with the museum employees in preparing exhibitions, in cataloguing the museum's collection or in organizing community activities in different neighborhoods of Amsterdam. Other actors become temporarily important and influential, only to recede in the background on other occasions. For instance, in preparing the exhibition 'Johan and I', the public and their stories were central to curators and project managers. Yet, as soon as curators moved to preparing an exhibition on the Golden Age of Amsterdam, the public's stories were not as relevant as the museum collection. The challenge in the museum is to bring public stories and the museum collection in an assemblage in which they can both enrich each other and present a more interesting story to the public:

“If you want the past to be in the service of the present, then you have to come up with means that people feel attached to and for that you need not only museum objects but also that you take care that the objects would unfold and thus become more interesting by attaching more understandable stories to people, and going so far that people can bring in their own stories.”

As both the number and the roles of the different actors engaged in the assemblage continue to change, there will continue to appear ever new assemblages that need to be taken into account: new audiences, new funding, new collaborations. Designing will be slower, and riddled with even more debates than before. Stabilization becomes more difficult than ever.

Fourth, the different actors involved have different worldviews, different expertise and even different interests in the project. Differences can no longer be managed following the ways of traditional project management. The manager of the e-culture department explained her changing role when she argued that “as a manager you can no longer influence the whole conversation, or dictate the direction in which things should go”. She argued that a more decentralized way of managing is required, in which people can take initiative and organize themselves. As a manager, she is no longer a decision maker, but a designer who creates an environment where people are not afraid to contribute their ideas. As manager-as-designer

(Boland and Collopy 2004), the manager cannot design the future, s/he can only design for the future. As such, managers-as-designers would always be one step behind the actions and interactions of their employees and their collaborators. In her words:

“The first thing is that you need to know that you only can facilitate, you cannot really make it happen, you can only make the environment and the way you act so that you almost invite the process to happen. [...] Traditional project management doesn't fit this way of working. Now I can't give a set of specifications because I don't know them yet. I will know the specifications when I am working with the group. And that's difficult because in a museum people are used to making exhibitions, and their work kind of stops at the moment the exhibition opens. But if you make an exhibition that wants people to interact then the work is almost just starting when the exhibition opens and it's ending when the exhibition is closed or even later if the community stays alive as in *Memories from the East*. So it's a whole new way for people to be involved in the process.”

Fifth, there are no established ways to deal with the museum's particular entanglement. Everything is new and unique. Following the example of other city museums that went through similar changes, such as the Museum of Liverpool, also a museum focused on engaging the public through storytelling, or the Santa Cruz Museum of Art and History (Simon 2010), which developed fascinating participatory programs, does not seem to help in every situation. Contrary to Rittel and Webber's (1973) argument, the museum employees' work was characterized by a lot of trial and error. Offline, some exhibitions were successful and engaged many members of the public in storytelling. Others were less successful and faded away. 'Some things work and attract the public and others don't; and you don't know what until you try it' one community manager explained. The museum director made a similar argument when he expressed his feeling of working like a pioneer:

“And it is very interesting because everybody is trying to invent the wheel, nobody knows exactly how it works, everybody is trying. There is a lot of effort that is going into the air. And we have best cases, and we try best cases from Liverpool and it doesn't work, oh no, because it's different...So we are really developing like pioneers.”

Sixth, the outcomes and effects this project could have cannot be predicted beforehand. What the museum employees and their collaborators are doing, is putting the basis of a very different way of being a city museum. They are not only redesigning the Amsterdam Museum; they are redefining the very idea of what it means to be a city museum. Its effects at the societal scale cannot be underestimated, ranging from the ways in which the public perceives, engages with and relates to museums in general, to the ways in which money is brought in museums or to the community relevance of museums.

This increased wickedness of the world, as seen in the Amsterdam Museum case, demands a reconsideration of designing as problem solving. The situation the museum employees are confronting themselves with cannot be solved once and for all. There are no available strategies on how to engage this entire assemblage, this constitutive entanglement, how to mobilize it towards a museum as an online and offline meeting place. There are no fixed solutions for developing a welcoming online community, or for encouraging and fostering the public's participation online and offline, or for making museum employees comfortable in giving up their knowledge authority and in accepting the public's insights are equally valid. Such issues can only be advanced, one step at a time, with one stabilization of this assemblage being the starting point for a new issue, a new assemblage, a new round of designing.

Designing as advancing constitutive entanglements

Theoretical examinations of problem solving in designing products, have presented the design process as one in which designers need to identify the requirements of the product, analyze them and develop solutions that would meet these requirements (Simon 1969, Lawson 2006, Cross 2007, 2011). Such examinations present a design process in which designers work towards reducing complexity, calculating parameters, evaluating possible solutions, excluding those that are improbable to solve the problem and limiting attention on those alternatives that could, in the end, offer an optimal, feasible solution (Dorst 2010, Lawson 2004). When we look at the Amsterdam Museum project however, we see a wicked situation in which every design move leads to an expansion of complexity, with ever new actors entering the design process, and ever more opinions and possibilities needed to be considered.

Wicked situations have no clear cut solutions, they can only be advanced. This is visible at the Amsterdam Museum but also outside of it. Think for instance at the difficulties politicians and other non-governmental bodies encounter when they try to address global environmental issues (Latour 2004, Washington 2013), or the lack of education among poor children, or when they try to eradicate world hunger. Eradicating world hunger is not a matter of producing more food, but it also raises issues of distribution, of political and economical stability, of social hierarchies and cultures of donations (see Bassette and Winter-Nelson 2010).

Similarly at the Amsterdam Museum, transforming the museum into an online and offline meeting place cannot be achieved by simply developing an online community or implementing interactive technologies in the museum practice (Maris *et al.* 2012, 2013). The infamous adage in website development “Build it and they will come” is no longer valid. Relationships and roles need to grow. The public’s participation in museum’s online and offline activities cannot be expected to happen by itself, it needs to be inspired and facilitated (Simon 2010). The museum employees cannot be forced to assume new roles, of communicators with the public rather than educators of the public, of co-producers of stories rather than official story tellers (Odding 2011). They need to have the time to grow in these roles, they need an organizational culture that encourages the development of such new roles and they need material arrangements that support such new roles, like the online community, interactive exhibitions or neighborhood events. The new Amsterdam Museum as an online and offline meeting place is a work in progress, a continuously emergent design. It is advanced one uncertainty at a time.

Designing for emergence

Recent studies on organizational designing offer insightful ideas for conceptualizing designing in emergent situations like that of the Amsterdam Museum. Boland and Collopy (2004) argued that in current, dynamic organizations managers are as much decision makers as designers. They proposed a distinction between decision attitudes and design attitudes. Decision attitudes favor a situation in which the manager has ready at hand a set of alternative solutions from which he chooses the best one. Design attitudes drive the manager to invent the best solution. In contrast to the idea of the manager as able to easily understand the design

problem and foresee – by means of calculation – the outcomes of his design decisions, Boland and Collopy (2004) underlined the uncertainty and indeterminacy managers as designers confront themselves with. A design attitude does not take a design problem for granted, but starts by questioning the way the problem is represented. While problem solving remained central for Boland and Collopy (2004: 10), they argued that what is important is that it “remains liquid and open, celebrating new alternatives as it strives to develop a best design solution”.

A similar argument was put forward by Dunbar and Starbuck (2006) who argued that researches are making a shift from ‘a focus on fit’ towards ‘emerging fits’. Carroll *et al.* (2006), following a study of designing a new organization at NASA, looked at the importance of discovery and refinement in organization designing processes and how they are influenced by the design tools used in the exercise. Garud *et al.* (2006) also underlined the importance of emergence and generativity in the organizational designing of the current, global organizations. In contrast to Boland and Collopy (2004) however, for Garud *et al.* (2006) the manager is not the only idea generator in the organization. Rather, ideas come from multiple ‘generative engagements’ that take place both inside and outside the organization. Looking more at the design process itself rather than the work or visions of individual managers, Garud *et al.* (2006: 277) voiced an increasing concern in current organization designing literature: “how can organizations be designed to transform themselves even as they continue to perform seamlessly on a day-to-day basis?”

Schreyögg and Sydow (2010) share this concern too. They even condemned those approaches that focus too much on organizational fluidity and argue that they lose the very essence of organizing. In response to this concern, both Garud *et al.* (2006) and Schreyögg and Sydow (2010: 1251) proposed approaches that balance ‘the conflicting demands of organizational efficiency and fluidity’. Schreyögg and Sydow (2010) argued for the importance of continuously maintaining organizational boundaries and identity by establishing ‘action patterns’ that distinguish the organization from its environment. Garud *et al.* (2006) emphasized the importance of seeding organizational elements such as people, technologies, processes and governance with ‘generative properties’. Designing for emergence implies recognizing the incompleteness of organizational acts (Siggelkow and Rivkin 2005, Schreyögg and Sydow 2010), and paying attention not only to what drives the organization

but also to what drives the employees' to engage, share knowledge and create new things together (Czarniawska 2004, Garud *et al.* 2006).

These studies on organizational designing are very helpful in conceptualizing the design work done at the Amsterdam Museum. Here too, the museum employees confront themselves with the challenge of designing for emergence, while at the same time continuing their activities so that the public can still come to the museum. However, there is a difference in how these studies approached organizations and how the museum employees approached their museum. The museum employees relate to their museum not as a collection of separate, independent entities that need to be coordinated into an emergent design by a manager or a group of managers. Remember the e-culture department manager above who argued that she can no longer control the number of actors engaged or the direction in which things are moving in the museum. Rather, they approached it as a constitutive entanglement in which coordination needs to be constantly performed by all the actors involved, both human and non-human, and in which alternative emergent designs are possible.

Knowing that things can always be different, that different emergent designs are possible, the museum employees are looking for various ways in which they can keep the process open. "You never know beforehand what's going to happen so you must leave things open", as the manager of the e-culture department argued.

Designers' ways to keep things open and foster advancements

There are different strategies the museum employees and their collaborators employed in keeping things open and fostering advancements. Somewhat similar to what Garud *et al.* (2006) and Schreyögg and Sydow (2010) proposed is a strategy which a museum employee coined as "implementing mechanisms that feed themselves":

"There is always the idea that one person can grab the world and I think that the world is much too complex for that so I try to make surroundings where you can let things happen decentralized. I am not the only person who thinks that, that if you want to make things happen in a very complex surroundings you need to implement mechanisms that would kind of feed themselves."

One such ‘mechanism that feeds itself’ is the idea of treating everybody in the project as equal partners. Hierarchical levels in the museum are reconsidered towards more horizontal ways of working. Work begins to be organized in projects, with employees from conservation, communication, financial and marketing departments working together in organizing exhibitions or other events. Also among the museum employees and the public, the aim is to find ways in which they can engage together online and offline as equal partners in telling the story of Amsterdam. It is argued that as people and their objects are treated like equal partners, they would be more open towards taking tasks into their own hands. For instance, the members of the online community would take over the management of their online groups, they would begin their own topics of discussion alongside those raised by the museum or organize their own events online and offline in neighborhoods. The manager of the e-culture department explained her design theory for fostering advancements in the following way:

“I think this is only possible if you treat everybody as equal. You can only leave things open if they can act responsible and I think that people will only take responsibility if you treat them, well, as responsible people and that means if you treat them like equals. That’s a bit the theory behind it.”

Another ‘mechanism that feeds itself’ is encouraging the public and the employees to become committed to the museum. This can be achieved by facilitating that the public and the museum employees can work together on projects of shared interest. One example given is that of a group of volunteers who are very passionate about textiles and who work together with the museum employees in caring for, maintaining and documenting the museum’s collection of textiles. The argument goes that as the public is encouraged to engage more closely with the museum’s collection, as in the case of the textile volunteers, they would become more committed to the museum as ‘through their work, they invest themselves in the museum’s collection’ as one curator explained. A committed group of volunteers would continue their work for the museum, would encourage their friends with similar passions to engage, and would enrich the museum’s collection or knowledge base as they engage in research or storytelling.

And another ‘mechanism that feeds itself’ is making that the local community can continue on its own the projects the museum started for it. That implies identifying and connecting with what the museum director called ‘the community builders’. The director gave the example of the Neighborhood Shops project the museum initiated in Amsterdam. Some of the shop owners that participated in the project became so enthusiastic about it that after the project ended, they continued to collect stories and personal objects reflecting the changing roles of neighborhood shops. In this way, the museum’s ambition of making people aware of the value of neighborhood shops in connecting and sustaining the local community was continued by these community builders. The director explained this mechanism for fostering advancements in the following way:

“In such community projects, it is very important that it is not a hit and run action of yours, but that you are successful in a way that it continues without you. So you think of a project together with the people who are going eventually to continue your project. And then you build the whole project and you help them with the big machine you have and when the big machine goes they still have to go on with their small machine. Maybe they are even more successful that way, and the project continues without you.”

Besides this strategy of ‘implementing mechanisms that feed themselves’, the museum employees managed to keep things open by embracing uncertainty rather than trying to reduce it. One of the qualities of designers working in wicked situations is that they are able to embrace uncertainty and turn it into a source of inspiration and learning (Cross 2011). This was particularly visible in preparing the ‘Johan and I’ exhibition. The project manager of this exhibition explained the thrill of ‘not knowing what you get’ when he asked the community members to contribute their stories of their encounter with Johan Cruijff. This is the world upside down for a museum, he explained, as the preparations for an exhibition do not start with physical objects from the museum collection but with the expectation of obtaining insightful stories from the public. The uncertainty of not knowing what you get, inspires the museum employee to think of new, creative ways to attract good stories, or to do something different altogether in preparing the exhibition. In the worlds of the project manager:

“Normally you have an object and it’s from the 17th century and you know how you are going to combine it to form a sort of red line through your exhibition. But now we

don't have that, we still have to figure out what the results will be in two months of search for stories. Maybe it will be disappointing and then we have to be creative, ok what are we going to do? [...] Now we say "if we don't have objects, we still tell the story" and that is the world upside down for a museum. If I talk to curators, and I say that this story needs to be told, then they say "yes, but we don't have a collection."

In preparing exhibitions and other offline and online events, the museum employees adopt a 'design attitude' (Boland and Collopy 2004) which allows them to explore, together with their colleagues, the different possible alternatives they could follow in creating an open and interactive museum environment. In their work in wicked situations, designers are more like choreographers than decision makers. Choreographers are constantly thinking of new dances, new and inspiring arrangements of music, movements, dancers and decor. New music, or a new dancer, or a new decor can inspire new choreographies, that would lead to new dances altogether. Designers like choreographers, work at developing new ways of being and doing things together. That's also their motivation and challenge, of how to create environments where people and the objects they work and live with can flourish together in new, inspiring entanglements.

Just as choreographers are part and parcel of their dances, so too designers and those living with the designed are part and parcel of their designs. Change is not as designed, conceived or made by a genius designer (Jones 1980). Change is also mediated, co-created, re-interpreted and re-valued by those who live with it. Hence, the designed is always emergent, advancing as those who live with it continue to translate, reinterpret and reenact it. Designing as advancing is not a goal oriented activity, directed towards meeting an *a priori* defined propose. Rather, it is an end in itself, a 'shared imaginative living' (Jones 1980) in which the designers, the designed and the practice of designing are constantly enriching each other.

When the translation, reinterpretation and reenactment stop, the advancement stops too and the designed becomes stabilized as a black box. That is what happened to Peter B. Lewis Building, designed by Frank Gehry for the Weatherhead School of Management, Case Western Reserve University (Boland and Collopy 2004). Now that the building is finished, the design is stabilized and it tells us little of the many actors that were involved and the many uncertainties and controversies they experienced. The new Amsterdam Museum is still in

becoming, with new art, new employees, new technologies, new stories from the public bringing with them new questions to be addressed (cf. Knorr Cetina and Bruegger 2002).

Conclusions

In this chapter, I explored the uncertainty observed in literature and practice on the nature of design problems in contemporary designing. Our understandings of design problems and how designers engage with them, has been dominated by the design as problem solving paradigm. In this paradigm, design problems are presented as stable, structured or ill-structured for which solutions can be developed by means of calculations, abductive thinking or creative insights.

I argued that in designing without a product, the design as problem solving paradigm does not do justice to the wickedness and complexity observed in practice. The design situation at the Amsterdam Museum is not a design problem with clear boundaries, known number of actors and clear requirements. Rather, it is a collection of issues raised by a wicked, ever expanding entanglement of human and non-human actors which all need to be taken into account in designing. The Amsterdam Museum is not unique in that sense, the entire world is becoming more and more wicked. World challenges such as fighting terrorism, eradicating world poverty and dealing with global warming indicate the increased wickedness of the world as well as the immense difficulty it raises in dealing with such issues.

I argued that wicked situations cannot be solved, they can only be advanced. Working in wicked situations raises the important question of how to stabilize discussions and disagreements so that the organization can continue to provide its services while at the same time not closing the discussions too soon, as that could limit the number of possible alternative designs (see also Garud *et al.* 2006 and Schreyögg and Sydow 2010). I illustrated how the museum employees deal with the stabilization-openness challenge by means of two strategies: implementing mechanisms that feed themselves and embracing uncertainty by adopting a design instead of a decision attitude.

In the next chapter, I continue the exploration of designing without a product by following the actors further in their moves of advancing the Amsterdam Museum towards an online and

offline meeting place. I explore issues of design knowledge and creativity and illustrate how the designers at the Amsterdam Museum engage in designing not through individual design thinking but through collective taste making.

Second Controversy: Beyond Design Thinking - Design Taste Making

Designers working in wicked situations, engaging in designing without a product, share many similarities with choreographers (Beiswanger 1962). They both work towards composing new arrangements of people and objects. Choreographers, like designers, deal with both the intention and the unexpected, with the planned and the uncalculated. Defined aims for future compositions bring together people and objects in configurations that cannot be predicted beforehand. As Beiswanger (1962: 13) argued “form springs” out of this “rich interplay between the planned and the unexpected”. Their work is emergent, meaning that the composition of a dance, or of a collective of people and objects, are only achieved in the process of making them. Just like “the curtain may never actually descend, once and for all, on the continued making and remaking of a dance classic” (Beiswanger 1962: 14), so the doors may never be closed for the designing and advancing of living assemblages in a museum or any other organization for that matter.

Current approaches in design literature have portrayed designers either as calculative agents, as decision makers (Simon 1969, Lawson 2006) or as genius minds who possess unique intellectual skills and abilities (Dorst 2010, Cross 2011). Simon (1969) in his *Sciences of the Artificial* attracted the attention to ‘designers’ ways of thinking’ as different from those of scientists. The difference lies, according to Simon (1969), in that scientists are concerned with the analysis of what is, while designers are concerned with the synthesis of what ought to be. Following Simon (1969), many researchers have engaged in exploring the unique nature of design thinking (as different from scientific thinking), with the aim of theorizing about the strategies, techniques and tactics designers employ in their work. Peter Rowe introduced the term of design thinking in design studies in 1987. Most prolific and influential work has come from the group of researchers engaged in the Design Thinking Research Symposia (Cross *et al.* 1992). Writing from within the design as problem solving paradigm, design thinking was conceptualized as the cognitive ability of solving ill-defined problems by means of abductive

reasoning and solution-focused strategies (Cross 1990, 2007, Christiaans and Dorst 1992, Dorst 2010).

Such theories of design thinking have been very insightful in understanding how designers go about dealing with ill-defined problems in product design. However, as the notion of design thinking has received more and more attention outside the field of product design, particularly in management and organization studies (Brown 2008, Martin 2009), the existing theories have attracted criticism too. Ewenstein and Whyte (2009) criticized the attention given to individual designers as master minds at the detriment of the collective practice of designing. Kimbell (2009, 2011) also lamented the focus on theories of cognition to explain how designers think, as they separate thinking from doing.

The same shortcomings of the focus on design thinking are visible when we look at designing without a product at the Amsterdam Museum. I have illustrated in the previous chapter that the designers at the Amsterdam Museum are not engaging in designing a product, or in ‘initiating change in man-made things’ (Jones 1980). Rather like choreographers, they work towards advancing assemblages of people, technologies, works of art, public’s stories, pictures and so on; they engage in initiating change in ‘constitutive entanglements’ (Orlikowski 2007) between people and the things they work and live with. Their work situation is too wicked, uncertain and serendipitous to be manageable by one or two designers as master minds. And, it cannot render itself to calculations and predictions either, as the elements making up the design situation – both humans and non-humans - are themselves evolving in the design practice.

New, helpful insights come from practice based studies. Practice based theories focus attention on work as a situated, collective activity where thinking is not separated from doing (Schatzki *et al.* 2001, Orlikowski 2007, Gherardi 2010, 2012, Kimbell 2009, 2011). Conceptualizing thinking as inherent in doing offers a unique advantage for theorizing in a new way about the ‘designerly ways of knowing’ (Cross 2007) in wicked situations, where designers engage in designing without a product. Following Hennion (2001, 2004), Gherardi (2009) introduced the notion of ‘taste making’ as what practitioners do when they engage reflexively in their practice. Taste making is “a collective achievement that allows practitioners to appraise the various performances of their working practices that, in being appraised and contested, are constantly refined” (Gherardi 2009: 536).

Gherardi (2009) argued that taste making is performed through three processes. One process is that of sharing a vocabulary for appraisal. While engaging in practice, practitioners collectively develop and negotiate a lexicon for talking about and appraising the performance of their practice. This vocabulary for appraisal is developed based on the practitioners' sensible knowledge (Strati 2007), knowledge acquired through the senses rather than through rational thought. Central to the act of appraisal is the making of aesthetic judgments of what is a good and beautiful practice. A second process is that of crafting identities within epistemic communities. A practitioner's attachment to the object of practice sustains his/her identity. Different ways of relating to the object of the practice upholds different identities and different tastes. A third process is that of refining practices. Practices are refined through taste making, through continuous negotiations and appraisals by means of aesthetic judgments.

The notion of taste making allows us to move away from the creative genius individual to the creative collective, from calculation to appraisal, from rational judgments to aesthetic judgments and from objective knowledge to sensible knowledge (cf. Maris and Huizinga 2012). These moves could be beneficial if we are to understand how the designers at the Amsterdam Museum engage in advancing the museum towards an interactive online and offline meeting place for those interested in the story and history of Amsterdam.

The aim of this chapter is to explore this uncertainty in designing without a product: is designing without a product a matter of rational calculations, or of creative insights, or a matter of collective taste making? The structure of the chapter is as follows. In section 2, I follow the traces left behind as researchers and the designers in this study tried to come to grips with the nature of design thinking. I describe the museum employees as amateur designers (Gherardi 2009) and illustrate that their work is not so much governed by rational calculations as much as by collective appraisals based on sensible knowledge (Strati 2007). In section 3, I follow the traces left behind in the attempt to understand the designers' particular 'thinking and working styles'. I illustrate how the museum employees collectively engage in developing their own style or taste for designing, which springs from a relational, rather than individual, creativity (Suchman 2002, Yaneva 2009, Kimbell 2009, 2011). In section 4, I illustrate how the museum employees perform and refine their practice over time. I argue that what keeps designing without a product going as continuous advancing is the collective designers' shared ambition to improve things, working 'towards a never-achieved perfection' (Gherardi 2009). I reinforce the argument that designing as advancing is a 'shared imaginative

living' (Jones 1980) in which the designers, the designed and the practice of designing are constantly enriching each other. I end this chapter with the conclusions drawn from exploring this uncertainty.

Design thinking and its discontent: calculation, imagination, appraisal

Design thinking and professional designers

Broadly defined as purposeful thinking towards achieving an end goal, design thinking has fascinated many researchers writing both in the design literature, as well as outside of it (Brown 2008, Martin 2009). This fascination springs from the perceived unique nature of design thinking (Simon 1969, Cross 1982). However, the term has remained elusive to this date. Design thinking cannot be observed in practice as such. Designers too have difficulties explaining what for them is at times an unconscious, intuitive process. Consequently, the notion remains much discussed and debated in the literature. This debate seems to be carried out between those who take a structural, computational approach (Simon 1969, Friedman 2003), and those who take an agentic, cognitive approach (Lawson 2006, Cross 2007, Dorst 2010) to design thinking. This debate has been carried out from the perspective of designing products. A new side to the debate is developed by those who examine designing without a product. They argue for a move away from the notion of design thinking, towards exploring design knowing (Kimbell 2009, 2011) and taste making in practice.

Ultimately aspiring for the development of a 'science of the artificial', Simon (1969) took a scientific if not computational approach to design. While Simon did not use the notion of design thinking, his writings do indicate an interest in how designers approach their work. His theorizing about design thinking has been highly influenced by the modernist, scientific call of the time, in which rationality and objectivity were given central stage (at the detriment of creativity and intuition). Inspired by computer science, Simon and Newell (1962) and Simon (1969) brought forward the idea of simulation as a thought experiment in design. As a "technique for achieving understanding and predicting the behaviour of systems" (Simon 1996 [1969]: 13), simulation can be a great source of objective knowledge in design. Besides simulation, the theory of the general problem solver (Simon and Newell 1962) underlines the

importance of a designer's information processing abilities. Simon's ideas are on par with computational theories of the mind (Fodor 1975), popular at that time, that support the view that thought can be reduced to a computational process (Lawson 2006).

Simon (1969) took a structural, objectivist stance to knowledge and thinking. For Simon, design knowledge and thinking are outside the real world situation, abstracted in formulas, computations, principles and theories. Rowe (1987), following his study of architects and urban planners, presented a similar account by offering descriptions of 'procedural aspects of design' and introducing generalized principles that are shared among designers working in different domains. Friedman (2003) supported this objectivist approach too. Friedman (2003: 515) argued that such design formulas and principles, "enable the designer to move from an endless succession of unique cases to broad explanatory principles that can help to solve many kinds of problems."

While remaining inspired by Simon to a certain extent, Lawson (1979, 2006) turned the conversation on the nature of design thinking towards the cognitive side of individual expert designers. The researchers engaged in the Design Thinking Research Symposia made a similar turn (cf. Cross 1990, 2007, 2011, Cross *et al.* 1992). For Cross (1990) and Dorst (2010) design thinking is a "specific and deliberate way of reasoning" (Dorst 2010: 138), characterized by abductive processes, in other words by synthesis. This kind of reasoning is specific to professional designers, who are trained in the 'techniques of the artificial' (Cross 2001) and have built a long term experience in design. In their work, designers draw on this internalized body of knowledge and experience to make sense of new design situations. Cross (2011) explained that abductive thinking is different from deductive and inductive thinking in that it is about hypothesizing about what *may* be (see also Simon 1969). Abductive thinking, Cross (2011:10) argued, is "the logic of design that provides the means to shift and transfer thought between the required purpose or function of some activity and appropriate forms for an object to satisfy that purpose."

Lawson (2006) made the distinction between reflective thought, or reasoning and imaginative thought or creativity. He argued that the two types of thought are not exclusive, yet, they are applied at different occasions. For Lawson (2006), reflective or rational thought is directed towards external needs of a particular situation. The designer him/herself is not seen as part of that design situation, his/her task is to solve a design problem brought to him/her by a client.

Imaginative or creative thought, such as scenario-making, is directed towards an internal need of the designer. For Lawson (2006) reflective, rational thought is quintessential to designing. As such, he argued, the products of imaginative thought “would always need evaluation by rational thought in order that the designer’s work should be relevant to the real-world problem” (Lawson 2006: 138). In reflective thought, designers employ solution focused strategies (Cross and Dorst 1998), such as focusing attention on identifying a ‘primary generator’ (Drake 1979) through which designers narrow down, examine and analyze the possible range of solutions. Another solution focused strategy is that of pattern-formation (Alexander 1964, Cross 1982) in which “the abstract patterns of the user requirements are turned into the concrete patterns of an actual object” (Cross 2007: 25).

Design taste making and amateur designers

At the Amsterdam Museum, where we see designing without a product, the design situation is very different from those described by Simon (1969), Cross *et al.* (1992) and Lawson (2006). First, the designers engaged in the project are not professional designers, like the architects and industrial designers Lawson and Cross worked with. They are museum employees doing design work in that they are hypothesizing (Buchanan 1992) about the possible future of the museum. They are initiating change (Jones 1980) in the ways in which the museum is functioning, in relation to its public, employees and collection. Second, they do not have the body of design knowledge that professional designers have, acquired through education and work experience. They do not know established theories of design, nor are they trained in using abductive thinking. Third, they are not separated from their design situation, like professional designers working for a client. The museum employees, working like designers, are part and parcel of their design situation (cf. Jones 1980). They hypothesize about the possible future of the museum which includes them too. Change is directed towards their ways of working, their relationship with the public and their perceptions of the importance of historical objects and personal stories in telling the story of Amsterdam.

The museum employees at the Amsterdam Museum are amateur designers. An amateur, Gherardi (2009) argued, is somebody who engages in a practice for the love of what s/he is doing, meaning in a non-professional, non-instrumental way. Amateur practices, such as listening to music or wine tasting (Hennion 2004) have been studied in terms of the passionate

attachment of amateurs to the object of their practice. This is in contrast to the study of professional practices, such as professional design, where the focus is on the instrumental logic of the practice (like design as problem solving), examined in terms of the cognitive processes employed (inductive, deductive, abductive thinking), the utility and efficiency of such processes and in terms of the specialized body of knowledge (design principles and theories) used in such work.

As amateur designers, the museum employees are fascinated by the idea that their museum “can be different, more open, personal and interactive” as one employee put it. Another employee expressed the same fascination when she argued that what attracts her most in her design work is that:

“...it is really new, that we have to invent new ways of doing things, not only in the technical but also organizational perspective. I am most motivated if I can experiment with new ways... it doesn't have to be really spectacular.”

As amateur designers, the Amsterdam Museum employees do not possess the specialized knowledge professional designers do. Rather, they develop sensible knowledge (Strati 2007) in doing, by engaging in practice with other museum employees, web designers, members of the public, online communities and historical objects (Maris and Huizing 2012). One employee explained that the difference between her professional work at the museum and the work she is doing for the redesign project is that for the latter everything is so new that ‘you almost need to feel what is necessary’, ‘we learn by doing’. This sensible knowledge is at the basis of taste making, the collective process through which the museum employees appraise and refine their practice. Central to their practice of designing therefore is not so much an evaluation of their work in terms of efficiency or fit (Lawson 2006). Rather, it is a valuation, an appraisal in terms of whether the changes they propose are appropriate for the museum and meaningful to the employees and the rest of the people that would participate in them.

‘Working like pioneers’ as the museum director put it, the museum employees were collectively developing and negotiating a common vocabulary for talking about and appraising their work. This vocabulary was composed of words the employees used in their museum practice, others that they learned from their collaboration with web designers and others that they read about in museum related and other literature. The process of appraisal, of

valuating was directed at three aspects of their work, namely at the current practice of the Amsterdam Museum (as we have seen in the previous chapter); at the ways of working towards creating an online and offline interactive museum environment and at the qualities of the changes they proposed for the new museum.

Appraising the current way the museum is functioning, some employees argue that it is 'inward focused' (cf. Odding 2011), meaning that it presents the exhibitions the program managers think are interesting, using objects they consider relevant and that the employees work too much 'from behind their desks' rather than talking to the public. It is argued that this 'inward focus' is not appropriate in the current age when the general public is more and more interested in taking part in public discussions, including in museums. The new Amsterdam Museum would need to be 'participative', a term made popular in the museum literature by Simon (2010) and her book 'The Participative Museum'. At the moment, the museum is 'not participative enough, we are doing quite poorly on that', as one employee explained. A participative museum is one that makes the public's participation and interaction with the employees its 'raison d'être', one that invites the public to contribute their stories, share their opinions and actively participate in events both online and offline.

Other museum employees argued that for the museum to become participative, its exhibitions and events would need to be organized in a different way than before. At the moment, it was argued, the work is done too much in a 'project based manner' in which curators, project managers and other employees work on an exhibition as a self-contained event. Their work ends when the exhibition opens. In designing for participation and collaboration, the museum employees would need to remain 'involved', 'connected' and 'present' to encourage discussions and interactions. Their approach to preparing exhibitions, characterized as 'designing in steps' (planning, assembling, testing, displaying and marketing) would need to be replaced with a 'designing over time', in which exhibitions are allowed to change and grow following the public's reactions and contributions. The manager of the e-culture department explained this challenge they experience in the museum:

"In a museum people are used to making exhibitions, and their work kind of stops at the moment the exhibition opens. But if you make an exhibition that wants people to interact then the work is almost just starting when the exhibition opens and it's ending when the exhibition is closed or even later if the community stays alive as in the

Neighborhood Shop community. So it's a whole new way for people to be involved in the process. [...] And that's what is really different if you design for interaction, the real difference is that it is designing over time, so you cannot sit at your desktop, make a plan and implement it and then maybe test it and improve it, no, you have to be involved and you have to design...well, it is more like travelling than it's like designing in steps.”

‘Designing over time’ is a matter of remaining involved with the designed (an exhibition or an event), as well as remaining alert and responding to people’s needs and wishes as they engage with the designed. As such, many museum employees acknowledged that the exhibitions they prepare would need to be ‘attractive’, ‘approachable’, ‘transparent’, ‘smooth’ and ‘easy to join’ for all types of audiences, terms they learned from web designers.

The same qualities were wished for in the online environment too. At the moment, they argued, the museum’s two main online communities – Neighborhood Shops and Memories from the East – are not transparent or approachable for everybody as people have the feeling that they are ‘closed communities’, only for those who participated in the projects from the beginning. The museum employees would need to overcome this challenge in the new online community, The Heart, such as by making clear on the home page that this is a community for everybody interested in the story of Amsterdam.

It was argued as well that attention needs to be given to the ‘tone of voice’ with which the museum communicates with the public, both online and offline. It is argued that at the moment, the museum’s voice is ‘too authoritative’, and that would need to be replaced with a friendlier and even ‘personal voice’, with the employees and the public addressing each other with the colloquial ‘je’ instead of the polite ‘u’. The new museum as an online and offline meeting place would need to be a space where the employees and the public can relate to each other like ‘partners’ in storytelling about Amsterdam.

This vocabulary for appraising the practice has been negotiated times and again during meetings at the Amsterdam Museum. For instance, different employees had different understandings of what a ‘participative museum’ means, and a different view on the ‘degree of public participation’ that would be appropriate for the museum: should the public be encouraged to participate by sharing their stories online or taking it a step further and invite

the public to participate in curating exhibitions built around their stories? Similarly, what the appropriate degree of participation is of museum employees themselves was debated too. Should it be their job to go out into the neighborhoods and talk to people there, or only engage with the public in the museum? Taken together, these collective negotiations of a shared vocabulary to talk about and appraise the practice express the aesthetic judgments of what a museum as an online and offline meeting place could entail and what needs to be done to achieve it. These negotiations lay at the basis of the formation of a particular taste for designing an open and interactive museum, which I will elaborate on in the following section.

Thinking (through) styles, constituting identities

This vocabulary for appraising the practice has been developed by the museum employees over a long period of time. It did not spring from this project alone. Change and innovation have been the museum's modus operandi for many years. Organizationally, the museum has been changing considerably in the last decade towards a project based organization, working with volunteers and towards what the director calls 'cultural entrepreneurship' – combining profit generating activities such as cultural events or presentations with community support and education activities such as free neighborhood events or workshops. Technologically, the Amsterdam Museum, together with the web designers of Mediamatic have been engaged in developing and maintaining online communities even before Facebook was launched. In 2003, the museum launched Memories from the East, followed by the Neighborhood Shops community launched in 2009.

In all these years of engaging in design work, working either on their own or collectively with web designers on new organizational forms, the Amsterdam Museum employees have developed their own style of working. They developed their own distinctive taste for designing for interaction and collaboration, different from that of other museums that do similar work, such as the Jewish Museum in Amsterdam, the Brooklyn Museum or Santa Cruz Museum of Art and History. Examining the events they prepare and the online communities they develop and maintain we can easily see 'the Amsterdam Museum signature'. The shared vocabulary for appraising the practice the museum employees develop and negotiate not only sustains the practice, but also constitutes it (Gherardi 2009).

There are sporadic studies in the design literature that we can draw on, that examine how a design company or a design school develops its own style or identity in the field and how that identity is negotiated and sustained in practice through the projects that company engages in (an exception is Yoo *et al.* 2006). Following cognitive theories or abilities theories, most studies have concentrated on the individual ‘thinking and working styles’ of famous designers, such as Gordon Murray, Mike Borrows or Kenneth Grange (Cross 2011). Their style of designing, their unique professional identity in the field has been seen as springing from their creative personalities (Meneely and Portillo 2005), their ‘I can do it’ and risk-taking attitudes (Cross 2011) and personal ways of working such as the use of drawing or software, alternating intensive thinking with relaxation or building a collection of precedents (Lawson 2006).

Yet, we know little of how individual thinking and working styles are translated and negotiated into a practice, shared by all the other designers, technicians, projects managers and so on working with the famous designers. Focusing only on the individual thinking and working styles, we forget that designing is a collective activity, performed collectively in or across a design company by employees with different skills and abilities (Bucciarelli 1994, Alexiou and Zamenopoulos 2008). Many looking at Peter B. Lewis Building at Weatherhead School of Management see it as the work of Frank Gehry, while in fact it is the work of a multitude of people and technologies working at Gehry’s firm, Gehry Partners LLP, as well as outside of it (Gehry 2004). Also, by examining individual thinking styles we are made to think that creativity is an individual personality trait (cf. Boden 2004). Exploring the close work at such a design firm as that of Gehry Partners LLP, or at the Amsterdam Museum, we obtain a view of creativity as relational, springing from the spontaneous associations of designers and the objects they work with (Suchman 2002, Yaneva 2009, Kimbell 2009, 2011).

It is through engaging in a collective practice that the famous designer and his team *together* develop their particular style of working, their own distinctive identify in the field, their own specific taste for designing. This taste for designing is specific to that group of designers and is recognizable in all the projects they undertake. Tonkinwise (2011) called this shared way of working the ‘style of practice’ and argues that designers create new products or processes by ‘innovating within their style’. Designers are ‘thinking through styles’, meaning that even when they create a very new product, it is still recognizable as belonging to a firm of designers. Yoo *et al.* (2006: 215), in their study of the design practice of Gehry Partners LLP,

used the term ‘gestalt’ to refer to “an organisation’s ability to approach its design problems creatively and individually, yet maintain unity across design outcomes”. Yoo *et al.* (2006) examined how Frank Gehry’s architectural vision and ways of working are translated and negotiated with each project into a companywide gestalt. This shared gestalt functions as their organizing pattern in the buildings they create – which makes them recognizable as Gehry buildings - as well as in the organizational forms they develop around each project. While each project is organized in a different way, depending on the available resources and the goals (ranging from the Fish Sculpture in Barcelona to the Peter B. Lewis Building), they all carry the company’s gestalt forward through negotiations and adjustments.

Similar processes as those described by Yoo *et al.* (2006) and Tonkinwise (2011) are seen at the Amsterdam Museum. Throughout the years of design work, the Amsterdam Museum employees have been collectively developing their own style or taste for designing. Their taste for designing is specific to their museum and is visible in everything they do, from preparing exhibitions, to relating to history, to developing the new online community platform, The Heart. It is a style of working through which the museum distinguishes itself (Bourdieu 1984) from other museums in Amsterdam, the Netherlands and the world. The museum employees have been developing their collective taste for designing by means of a relational creativity (Suchman 2002, Yaneva 2009, Kimbell 2009, 2011). Throughout the years, the employees drew inspiration for their practice from the museum’s collection, from the nature of the museum as a city museum, from other museums in the Netherlands and abroad, and so on. In comparing their practice to that of other museums, the Amsterdam Museum employees not only appraise their own practice but they also delineate and constitute their professional identity (Bourdieu 1984) in the national and international museum world.

The Amsterdam Museum sets to tell the story of Amsterdam and of its people, with exhibitions on subjects such as migration, prostitution, football or fashion. The collection the museum has is not composed of famous paintings or famous historical objects, but of things laden with historical or personal value, such as letters from the war. These objects engage the visitor in a personal way, making him/her think of similar past and present events. This is different from an art museum, whose purpose is to display art and historical objects for people to see. The Amsterdam Museum’s employees draw inspiration from this particular nature of their museum and its collection to design a storytelling environment in their museum. Two employees explained:

“If you look at our mission statement, then you see that our collection is not central. Central is the story of Amsterdam and the way in which people can engage with it. And that is crucial because it is different from saying ‘we want to tell this story and here is our collection’. Now we say ‘if we don’t have objects, we still tell the story’ and that is the world upside down for a museum.”

“Most museums until last century told their stories via objects and the better their objects, the better their museum. The Rijksmuseum, they have 2 million visitors, that’s because they have the Night Watch. But in our museum it is different. People are more interested in personal stories and oral history. The way to tell oral history in more interesting ways is also changing via recording, internet, and other multimedia. And that means that it would be stupid to neglect these aspects because our target audience is doing this, they are using media to tell stories to each other, that’s why YouTube, Facebook and Flickr are popular, because people want to tell stories.”

Their style of designing online and offline activities in which participation and collective storytelling is wished for indicates a taste for facilitating and inspiring ‘so that you almost invite interaction to happen’ as one manager explained. This is clearly visible in some of the exhibitions they prepared, such as ‘Johan and I’, centred on the fans’ encounter with the football player Johan Crujff. The visitors are inspired to contribute their stories both online on the community page and offline in the actual exhibition by being presented with other people’s encounter with their football legend.

In making their taste for designing, the Amsterdam Museum employees also draw inspiration from and compare their practice to that of other museums in the Netherlands and abroad. The most mentioned one is the Brooklyn Museum in New York which is acclaimed for inviting the local public to share online their videos and pictures about their neighborhood. From the Brooklyn Museum, the Amsterdam Museum has borrowed ideas of activities to organize and ways to inspire the public to contribute their stories. Yet, the Amsterdam Museum employees argue that their style of working is different from that of the Brooklyn Museum in that they do not aim only for online interaction, but that they develop ways in which the online content can make its way into the actual museum, in exhibitions that bridge the online and offline environments, like ‘Johan and I’.

Similarly, the Jewish Historical Museum in Amsterdam, which also developed an online community for its public, represents another source of inspiration, especially for designing simple and intuitive community pages. Yet, the Amsterdam Museum employees differentiate themselves from the Jewish Historical Museum. They argue that their aim is to create a fun online environment, seen in the bright red colors of the pages, in the personal tone of voice in which members communicate and in the freedom the members have to organize themselves and monitor their own content. The Jewish Historical Museum approach is one guided by the seriousness of their topic, namely remembering the victims of the Holocaust, seen in the light colors of the pages, the simplicity of the layout, type of pictures presented, such as old family portraits and in the close monitoring by the museum of all the content posted, so that any incorrect information or inappropriate content is filtered out before appearing online.

The taste for facilitating and inviting is directed not only towards designing the new online and offline interactive museum, but also towards organizing the practice of designing itself. Like Gehry Partners' gestalt is visible in both the buildings they create and in the organizational forms they develop when designing those buildings (Yoo *et al.* 2006), so is the Amsterdam Museum's taste for facilitating and inviting visible in both the online and offline activities they design and in the practice of designing them. The e-culture department manager argued that for her it is of utmost importance that the museum facilitates that all the employees, but also members of the public and web designers can express their ideas and 'participate as equal partners' in designing. They are all touched by the design in one way or another, so their input is very valuable for the quality of the design. But, she argues, people will only contribute their ideas and will take responsibility for their actions if they feel that their ideas are appreciated as those of equal partners. In her own words:

“Equality doesn't work if you are not consistent. You cannot preach equality on the online community and not do it in all the parts of the project because I see everybody, my colleagues, the web designers, the volunteers as part of the bigger project. So if I'm equal with the volunteers but not with my colleagues then it will not work, I don't think it will work.”

Frequent meetings are organized between museum employees and members of the public to discuss ideas for the new museum. An insightful example was a meeting between employees working on the development of the new online community The Heart and the members of the

Memories from the East sub-community. In this meeting, the employees explained the museum's plans for the new community, that in contrast to Memories from the East the community would be opened for everybody to contribute, that the content will be organized in themes of interest and that the museum employees would contribute daily with news and information on 'the object of the day'. The members of the sub-community were then invited to provide feedback on these propositions and to indicate what they would like to have in the new community. Through discussions and negotiations, agreements were then made that the new members would be required to build an account and a profile, that there would be possibilities to communicate privately on the community and that the editorial board of the community would be formed not of museum employees, but exclusively of interested members. These meetings illustrate how the employees and the members of the public engage collectively in appraising their practice and that through appraising it, they are also refining it.

Refining practices and practitioners through taste making

Taste making is a continuous process of appraisal and negotiation. As practices are constantly appraised and negotiated, they are also constantly refined (Gherardi 2009). Each project that is undertaken, such as an exhibition, an event or a new online community, represents an opportunity to collectively reflect on the practice, to negotiate together what can stay the same and most importantly what can be improved in the ways in which they do their work. It is the employees' ambition to make their museum better, more interactive, more participative, that fuels their work in each new project they engage in. It is this 'repetition without repetition' (Gherardi 2010) that carries the practice further, while constantly refining it 'towards a never-achieved perfection' (Gherardi 2009, see also Yoo *et al.* 2006).

All the online and offline activities, events and exhibitions that the employees of the Amsterdam Museum design carry the museum's signature (Bourdieu 1984), seen in the focus on storytelling, in presenting different perspectives on the same topic and in the use of interactive technologies. Yet, each activity, event or exhibition is unique in its combinations of stories and storytellers (be they historical objects, people or technologies). Each activity, event or exhibition that was designed before is used as a starting point for the next ones, just like professional designers use sketches or precedents to develop new ideas or explore new venues (Lawson 2006). As an employee explained:

“We try to make each project a part of the ongoing design project, maybe how to make more interactive environments. We try to learn from each project and improve and always immediately ask ‘ah this improvement here, which is maybe a local improvement, can we also generalize it into a global improvement?’ or at least share this improvement with other projects. So this is something that is continuous so you are never actually focused on just one project.”

The museum’s existing online communities Memories from the East and Neighborhood Shops act as such precedents for the new overarching online community, The Heart. By means of appraising these two communities, in terms of how they function, how easy it is for their members to interact with each other or how clear their aims are for the rest the public, the employees are reconsidering the choices made before in light of new ideas for the new community. In designing the new online community The Heart, the employees are maintaining some elements that are seen to work for the people participating in Memories from the East and Neighborhood Shops, while imagining new possibilities to overcome the shortcomings of these existing communities. While the essence of the new community would be similar to the existing ones, in that it will also be centred on sharing stories about Amsterdam, its form would be refined and advanced. A museum employee working with the online communities illustrated this entangled process of appraisal and refinement, when she explained that:

“In Memories from the East, there are small incentives to take part, you can comment, you can ask questions. There is a group of volunteers that go to the people in the neighborhoods and help them write their story. These are small things but I think they make Memories from the East a success. In Neighborhood Shops we are still ignoring people’s needs. It misses some ways in which you can really start slowly, to get used to the site and later on do something for yourself. We need to change this in the new community, maybe organize trainings for new members in how to use the site, or add some more incentives to participate, like a free entry ticket to an exhibition for the most active participants.”

The refinement of the practice consists not only of a refinement of how things are done. It also consists of a refinement of its own practitioners (Jones 1980). All the elements making up the design situation – both humans and non-humans - are themselves evolving in the

design practice. The practice, with its object of practice and its practitioners are ‘constitutively entangled’ (Orlikowski 2007) in such a way that a change in practice will bring about a change in its practitioners and vice versa. This constitutive entanglement is difficult to see if we examine practitioners in terms of their individual thinking styles or creativity. From these perspectives, change is seen as internal to the individual designer, as he learns by studying, by doing, by creative insight (Lawson 2006, Cross 2011). Yet, how new lessons are translated into a refined collective practice is not that clear.

The idea that a refinement of the practice of designing is constitutively entangled with a refinement of its designers is not new. Jones (1980) mentioned it too, in his thesis of designing without a product, when he talked about ‘designing as learning’. Jones (1980: xxvii) argued: “if the main purpose of ‘the design process’ is collective learning, the deliberate seeking of new ways of living, then we must expect to make changes in our processes and procedures”. Designers change through their designs, as the things designed in designing without a product include, not exclude, the designer. This perspective, Jones (1980: xxxiv) argues, requires a new conception of the self not as an individual, but “as relations, able to develop”, in other words, as a practitioner entangled in a material, epistemic practice (Orlikowski 2007, Knorr Cetina 2001).

The key mechanism for this double refinement is therefore learning in practice (Knorr Cetina 2001, Gherardi and Strati 2012). The Amsterdam Museum employees, together with the public and other partners, learn in practice by engaging collectively with an open-ended epistemic object (Knorr Cetina 2001). This epistemic object is the museum as an online and offline meeting place, in all its epistemic states: as exhibitions, activities, the online communities and even the employees themselves.

Knorr Cetina (2001) characterized epistemic objects as ‘lacking in completeness of being’, like exhibitions that are ‘not interactive enough’, online communities that are ‘not approachable enough’, the museum which is ‘not participative enough’ or other colleagues who are ‘not open enough towards the public’. This lack attracts the practitioners’ collective interest and nurtures their ‘wanting’ to overcome it (Knorr Cetina 2001). This collective interest is seen across the museum when various employees ask each other questions like: how can we make our exhibitions more interactive? How can we make the new online

community more approachable to the public? Or how can we convince our colleagues about the value of personal stories in telling the story of Amsterdam?

The employees are part and parcel of their object of design as they hypothesize about the possible future of the museum which includes them too. Change is directed also towards their ways of preparing exhibitions, their relationship with the public online and offline and their perceptions of the importance of historical objects and personal stories in telling the story of Amsterdam.

By appraising the current practice, the museum employees are learning about what is lacking both in their practice and in their objects of practice, including themselves as practitioners. And this is a different type of knowledge than is obtained through calculations, through rational through or through cognitive processes (Lawson 2004, 2006, Cross 2007, 2011). It is a relational knowledge, obtained by engaging in practice with other human and non-humans. It is obtained by doing and by valuating the practice and the self. It is a sensible knowledge (Strati 2007: 62) that “accounts for the subject’s intimate, personal, corporeal relation with the experience of the world”. The development of such sensible knowledge indicates once again that the designers are as much part of their design situation as the rest of the assemblage they engage in designing.

In meetings like the one mentioned above between the museum employees and members of the Memories from the East sub-community, the employees and the community members are discussing their plans and ideas for changing their museum into an online and offline meeting place. Through these discussions and appraisals, they are not only refining their practice, but they are also refining themselves by discussing the quality of their previous decisions, the potential of their new ideas and suggestions and by questioning the value of their taken for granted assumptions of what they thought would make their museum interactive online and offline.

With every refinement, the museum employees are taking their practice further, gaining more understanding of what it means to design. As one employee explained: “it is really a matter of experience and growing together in learning just what it is, how things work and how people will react.” Designing without a product, as designing for advancing constitutive entanglements implies also a refinement and advancement of the practice of designing itself.

Conclusions

In this chapter, I illustrated how taste making, as the collective process of appraising and negotiating the performances of a practice, is quintessential to designing without a product, as observed at the Amsterdam Museum. I argued that the value of examining taste making in designing is that it allows us to move away from the creative genius individual to the creative collective, from calculation to appraisal, from rational judgments to aesthetic judgments and from objective knowledge to sensible knowledge. Making these moves is vital if we are to do justice to the daily practice of designing as experienced by designers themselves, which is much more personal, passionate and collective than the current theories of design thinking allow us to see.

I illustrated how the museum employees engage in advancing assemblages of people and the things they work and live with by means of constantly appraising and refining their practice. Working like choreographers, the museum employees have developed a shared vocabulary for appraising their practice, not in terms of rational calculations or evaluations of efficiency or fit, but in terms of aesthetic judgements of what makes their practice appropriate.

Also, I illustrated how the museum employees' creativity is a relational property of an assemblage rather than a characteristic of individual employees. By borrowing ideas from different material and non-material sources and translating them to their own situation, the Amsterdam Museum employees have developed and continue to develop their own taste for designing. It is this taste that carries their signature in everything they do, and that sustains and evolves their professional identity in the national and international museum world.

Their object of design, the museum as an online and offline meeting place, is still a work in progress. As the employees appraise and refine their practice and themselves as practitioners, they are taking a step further in understanding what it means to advance collectives, what it means to make things work. And as one employee argued above, this is not a matter of 'designing in steps' by applying rational design methods to create an interactive environment. Rather, it is a matter of 'designing over time', in which not methods, but a methodology 'as a shared imaginative living' (Jones 1980) takes central place. I turn to this argument in the following chapter.

Third Controversy: Beyond Design Process – Practicing Designing

In the previous chapter, I have made the argument that if we are to account for the collective performance of designing without a product, we need to move our focus away from the individual designers and their design thinking abilities. We need to pay more attention to how designers are part and parcel of a sociomaterial practice (Knorr Cetina 2001, Orlikowski 2007, Kimbell 2009) in which designing is performed as a collective activity, sustained, refined and advanced by means of taste making (Gherardi 2009).

In this chapter, I continue to explore the collective performance of designing without a product by examining another strand in the literature, one that has already made the move away from the individual designer. Particularly, I address here those works that foreground process and method as lying at the heart of designing. The field of design studies has developed a strong process orientation towards design, so much so that the notions of ‘design process’ and ‘design methods’ have become almost synonymous with designing. The common perception of design as process is that it consists of a series of distinct steps which are undertaken in a “predictable and identifiable logical order” (Lawson 2006: 33) to achieve desired outcomes. Various accounts of the stages of the design process have been put forward, ranging from the well-known Markus (1969) and Maver (1970) maps of analysis-synthesis-appraisal-decision, to Lawson’s (2006) analysis-synthesis-evaluation scheme, to the more complex one developed by Verein Deutscher Ingenieure (see Kroes 2002).

Design methods are the techniques, procedures or “process strategies that designers employ” (Cross 2007: 99) during the design process, such as brainstorming, user scenarios or drawing. The birthplace of a systematic inquiry into design methods is seen as the ‘design methods movement’ of the 1960’s, particularly the Conference on Design Methods, organized by John Chris Jones and Peter Slann in 1962 (Jones and Thornley 1963). Following the modernist tradition of the 1960’s, calls have been made at this conference for a theoretical and

professional *move forward* from the individual craftsman, his local knowledge and trial and error methods, to *a* systematic design process, in which knowledge is abstracted and design methods are standardized across products to be designed (Lawson 2006, Cross 2008). The value of this standardization of design work processes and procedures was seen as laying in the designers' abilities to answer effectively and efficiently to the rapid societal and technological changes of the post-World War II period, which a craftsman and his evolutionary methods could not cope with (Alexander 1964). The scientific methods and their values of objectivity and rationality became a model to follow in creating the new design methods, particularly of computational methods, decision making methods or testing methods (Cross 2001). The development of 'design science', as an "explicitly organized, rational, and wholly systematic approach to design" (Cross 2001: 53) culminated this symbiosis between design and science.

The call for standardization and rationalization of the design process has led to the development of designing as a profession (Lawson 2006). Designing was seen as what professional designers do, after being educated in the use of design methods and techniques. The development of designing as a profession has led to a separation between designing and making. The activities of conceptualizing, planning and drawing a product are now the task of draftsmen, while making the actual product is left to the manufacturing sector. Also, it has led to a separation between designers, clients and the users of the products or services to be designed (Cross 2007). Clients and the future potential users of the product are many times involved in the design process only as informants, usually in the starting phases of the project. And, it has led to a theoretical separation between designers and their work processes. More and more theories focus on explaining the rational process of designing, leaving the designers' intuition and sensible knowledge only marginally addressed.

Following these separations, we came to see design as 'design from nowhere' (Suchman 2002, Gherardi 2012). In this context, the notion of 'design from nowhere' indicates that the products of designing result from a well-organized design process and well-developed design methods that designers employ in their work; in other words that methods produce the results.

Recent studies conducted at designers' workplaces challenge this mechanistic view. In Bucciarelli (1994), Bratteteig and Stolterman (1997), Suchman (2002), Yoo *et al.* (2006), Alexiou and Zamenopoulos (2007), Yaneva (2009), and Kimbell (2009) we read about

‘design from everywhere’, where designs are developed through continuous collaborations between designers and other internal or external human and non-human actors. One could argue that when design is ‘design from everywhere’, it is no longer methods alone that produce results. Rather, the products of designing – the designed – emerge in practice out of interactions between designers with their methods-in-practice, the designers’ objects of work and their various external collaborators, such as clients, users, and so on (Maris *et al.* 2012). Similar criticisms have been voiced already in the 1970’s, when the pioneers of the design methods movement themselves recognized that the rational, scientific approach to designing leaves everything lively about designing to the background. Jones (1977, cited in Cross 2001: 50) wrote: “In the 1970’s, I reacted against design methods. I disliked the machine language, the behaviourism, the continual attempt to fix the whole of life into a logical framework”.

The aim of this chapter is to examine another uncertainty about designing without a product: is designing without a product a matter of process in which methods produce results or is it a matter of practice, in which designers engaged in practice perform (towards) results? Designing is about changing the world. No matter how we look at it, we cannot deny the fact that designing is always consequential, that the results of designing will have an impact, either negative or positive, on how we do things or how we relate to each other. Therefore, this controversy is particularly interesting as it raises issues about who or what carries the responsibility for the quality and morality of the designed. We obtain different views on this responsibility when we argue that methods produce results than when we argue that designers engaged in practice perform the results. I will explore here these different views and their implications for both theory and practice. In my empirical research, this uncertainty and its accompanying moral dilemma of responsibility was most visible in the collaboration between the Amsterdam Museum and Mediamatic, the web designers’ office that developed the museum’s online communities. I focus on this collaboration in this chapter.

In section 2, I examine the traces left behind as researchers and the designers in this study tried to make sense of the nature of design methods. I illustrate how in designing for online interaction, the web designers and their collaborators worked more like intuitive craftsmen in exploring new arrangements of people and technologies than like rational technicians in researching and testing existing arrangements. In section 3, I follow the traces left behind as researchers and the designers in this study tried to get a grip on the nature of the design process. I illustrate how the museum employees and the web designers engaged in negotiating

a new way of working together that grew from the ideal of equality of the design project itself. In section 4, I address the issue of responsibility in designing without a product. I end this chapter with the conclusions drawn from exploring this uncertainty.

On scientific design methods and methods-in-practice

The systematic process and methods for designing (online) technologies

From architecture, to engineering, to information systems development and web design, there has been a strong interest in emulating the scientific ethos in the design process and in developing and employing design methods. This interest is still visible to this day.

Cross (2008) related the present day interest in the standardization and in the rigor of the design process and methods to the increased complexity of contemporary design. Many of the materials designers work with today are new, so rigorous testing methods are vital for the success of the products designed. Many design firms work with different professionals, with different trainings and experiences. Well-developed methods for team collaboration and group decision making are necessary for the success of the team work (Levina 2005). And, many of the products and services designed today have a larger societal reach, such as smart phones, computers or social media. One mistake in the design process may cause the product to be rejected, or be unprofitable. Rigorous user-centered design methods, such as developing personas, scenarios, use cases or usability tests and market research are seen as indispensable from a contemporary designer's toolkit (Carroll 2000, Massanari 2010).

Such an interest in the standardization of the design process and in the rigor of the design methods is visible in the Information Systems discipline. The Information Systems discipline is concerned with exploring the challenges of developing various information systems to be employed in organizational settings, such as vigilant executive information systems (Walls *et al.* 1992), organizational memory information systems (Stein and Zwass 1995), decision support systems (Kasper 1996), systems to support emerging knowledge processes (Markus *et al.* 2002) and online communities (Peerce 2000), among others. Following the scientific tradition, information systems development methodologies are defined as “a set of recommended means to achieve the development, or part of the development, of information

systems based on a set of rationales and an underlying philosophy that supports, justifies and makes coherent such recommendations for a particular context” (Avison and Fitzgerald 2006: 568).

Different authors classified information systems development methodologies according to problem situations (Avison and Taylor 1997), philosophical approaches (Ivari *et al.* 1998) or key features of each methodology (Yaghini *et al.* 2009). Based on the nature of the design problem, a distinction is made between *hard methodologies* and *soft methodologies*. Among the hard methodologies are development life cycle methodologies, data and process modeling, prototyping and object-oriented methodologies, which are seen as useful in dealing with well-structured problem situations. Among the soft methodologies are ETHICS, MultiView, soft systems and socio-technical approaches. They are recommended to developers dealing with undetermined, complex problem situations with unclear objectives and uncertain user requirements.

In information systems development, defining the role of the user in the development process has been challenging to this date (Ivari 2006). Many authors theorized about a positive relationship between user participation in the design process and ‘system success’ (Bødker 1996, Markus and Mao 2004, Millerand and Baker 2010, Ivari and Ivari 2011, ISO 9241-210, 2010). However, Pekkola *et al.* (2006) argued that despite the increased interest in developing user-centered development methods, such as participatory design, user centric design, co-operative design or JAD, issues of how, when and whom of the intended users should be involved in the design process remain unresolved. An important challenge is to define who the intended users of information systems are, as more and more of the systems developed are no longer intended only for employees of an organization but also for those working outside of it (Ivari 2010).

Markus and Mao (2004) proposed a multidimensional view of the user as actors, stakeholders and change agents and reconsider the notion of user participation to accommodate both the psychological experience of involvement and the different participation activities and behaviors. Pekkola *et al.* (2004) supported Markus and Mao’s (2004) approach and underline a number of lessons learned from their study: on the importance of commitment of all participants (intended users, managers, developers) to the development approach, of the openness of communication and information distribution in creating a trustful environment

between all stakeholders and of managing unrealistic expectations in reducing the challenges of acceptance of the system (cf. ISO 9241-210, 2010).

Similar insights have been put forward by Preece (2000). In the by now classical book “Online communities: Designing usability, supporting sociality”, Preece (2000: xvi) asked the fundamental question: “why do some online communities entertain, inform, and provide support while others wither and disappear?” Preece (2000) looked for an answer to her question by exploring both social and technical issues of online communities development. Preece (2000) argued that both usability - concerned with how easily people can learn to use and interact with the system, and sociability – concerned with developing software, policies and practices to support social interaction, are needed to achieve success in online communities development. To sustain both usability and sociability, Preece (2000) too argued for use of community centred development techniques to actively involve the community in the development process. Preece (2000) theorized that community involvement stimulates a sense of ownership, which is important for the community’s success.

Despite the recent attempts to examine the nature of the potential users and their online behavior, as well as their roles in the information systems development, the theoretical attention has remained focused on the process of developing the technology itself. Hevner *et al.* (2004: 82) summarized this focus when they argued that “knowledge and understanding of a design problem and its solution are acquired in the building and application of an artefact”. Designing information systems is ‘designing in steps’ - to use one museum employee’s phrase. Design methods are producing the desired results: market research tells designers what type of technology the potential users would like and need; scenario making and personas help them explore different possibilities of use; building methods guide technicians in developing the technology and usability studies tell them what they need to change and improve to make their technology user-friendly. This credo in the power of scientific design methods to bring about the desired results was challenged and deemed unrealistic when designing for emergent open-ended practices.

The emerging practice and methods-in-practice in designing for online interaction

The collaboration between the Amsterdam Museum and Mediamatic started many years ago, when Mediamatic built the Memories from the East, and later the Neighborhood Shops communities. For the new, overarching community The Heart, the members of the e-culture department wanted to have a platform that is standard, simple and easy to use for all its members. A standard, simple community platform contains only the basic functionalities. It is approachable and understandable for every type of member. As the museum's wish is to have an open, user-friendly community, a simple, standard, "nothing new and fancy" platform was seen as a good choice. As such, the online community platform was launched as a standard community website after one round of sketching and building (see Appendix 2a for print screens of the first live version of the platform). It allowed the potential members to register, post stories, send comments, search on the community and create events. These were the functions that were most used in Memories from the East and in Neighborhood Shops, which indicated a certain familiarity with this structure. The idea behind launching a basic community website is that it would allow the designers to add new functionalities over time based on what the community members need or would like to have to make their online experience richer.

What lay behind the simple, 'nothing new' community platform was a design vision for a very new museum-public relationship. The members of the e-culture department wanted to have an online environment that would help redefine the traditional museum-public relationship - characterized as authoritarian, hierarchical and one-directional – in a way more than the Memories from the East or the Neighborhood Shops managed to achieve. They wished for an online environment where both museum employees and the interested public would meet, collaborate and learn from each other in an open, honest, equalitarian, two-directional way. With The Heart community, the members of the e-culture department did not want to develop yet another online platform for the museum, hence their limited interest in the technical infrastructure itself. Rather, their focus was on developing a new type of online museum-public interaction that is not (yet) performed in the onsite museum.

Visible in practice therefore was the move from designing a product, namely designing the technical infrastructure of the online community, to designing without a product, designing

for online interaction. The object of designing is no longer a static product, which can be built, tested, evaluated and adjusted. Rather, it is an emerging social process that grows organically as people begin participating on the site, posting content, commenting or sharing (boyd and Ellison 2008).

Compared to designing static websites and other online infrastructures, which has been practiced for at least 30 years, designing for online interaction, storytelling and collaboration is still in its infant stage. It is an emerging practice, in which web designers learn by doing, by following the example of Facebook and other established social networks, by observing online the community members and by talking with their clients and other stakeholders. The newness of this practice was explained by many web designers. One concept developer explained that the work they are doing now is more at the level of inventing, exploring and discovering the basic requirements of designing for online interaction, than of testing and evaluating. In his words:

“We are still in such a primitive stage of our development. If you compare the work that we are doing to designing a chair, then you see that you are in something that has like a 10 year history of design and then you can compare it to something that has thousands of years of design, right? In the stage we are now, we are actually inventing the chair. [...] So in the mid previous century computers were introduced and we are still at this phase in which we have to invent the basic requirements, we have to find out what is the easiest, most affordable way to do basic things. [...] So all these little patterns are temporary and we are in this process of discovering totally new technologies and finding out what we can do with them to help afford us a more interesting, richer, comfortable and happy life.”

The web designers at Mediamatic argued that in designing for new processes and new ways of interacting online, some of the current web design methods which focus on testing and evaluating, are not always useful. Several web designers were skeptical of such methods as use cases, user research and usability tests, arguing that they are useful in designing but only to a certain extent. They argued that most of the time, and particularly when you are dealing with future members who are not used to online communities, like somewhat older museum public, people do not know what is possible online and as such they cannot express what they want. One web designer asked me what would have been my answer 10 years ago if someone

asked me whether I would buy shoes online. Many people would have said no. “I am not sure these methods help me design better systems” he argued and continued:

“...doing usability studies, observe users in general situations, do pre-design surveys of users’ needs or worries...yeah... are of very limited value to predict the future of human behavior, I would say, but still quite interesting. [...] So that’s very hard. I don’t have a method for making that kind of discovery possible. The only method for that is just observing the users online, being there and responding to their needs. I think that in the end, the design has to come out of a quite intuitive understanding of what you are trying to make. You just have to love it. And then you can do it.”

Future online behavior cannot be predicted beforehand. The design situation is further complicated as online communities, in contrast to static websites, are constantly evolving and changing as members begin participating. Certain functionalities that were believed to work fail to be appreciated by members. Or, members themselves begin organizing the online community in ways the designers had not imagined. This was visible on Neighborhood Shops community, where a group of members created their own spaces for personal communications, separate from the museum related topics. In the Memories from the East community, the members began categorizing the stories themselves following a librarian system. Web designers at Mediamatic explained that they are always behind the members of the community platforms they develop. As such, they cannot use standardized methods, to be applied following an a priori established protocol. Rather, their work methods resemble more what Law coined (Law 2004) ‘methods-in-practice’.

Law (2004) put forward the notion of method-in-practice as he reconsidered the role and purpose of scientific method in science. Law (2004: 45, italics in original) wrote: “The argument is no longer that methods *discover* and depict realities. Instead, it is that they participate in the *enactment* of these realities.” Extending this argument to design, I argue following the insights from Mediamatic and the Amsterdam Museum, that design methods-in-practice are not so much about synthesizing a solution or an outcome, as about performing (towards) an outcome; designing is not about synthesis but about performativity. In other words, designers do not use methods-in-practice to stabilize reality, and react to it later. Rather, they employ their methods-in-practice in making and remaking, producing and reproducing the world together with all the other actors engaged in design or living with the

design. Designers work like choreographers, creating ever new dances together with their human and non-human collaborators.

The manager of the e-culture department lamented some web designers' exclusive focus on functionalities at the detriment of what she called "the higher goal": of inspiring and motivating museum employees and the public to be open towards each other online. In her view, their task goes beyond offering the members the possibility (the functionality) to share stories, towards thinking of incentives for both museum employees and the public to share their stories in the first place. Similarly, their task goes beyond offering a platform where the museum employees and the interested public can meet, towards creating an environment that is inviting and that is able to sustain a collective feeling of belonging to a community of shared interest. In her own words:

"I do believe that designing for social groups has a lot to do with behavior, with welcoming people, those kinds of things. Not so much with just functionalities but how you use those functionalities. I think that you can make a perfect product but if you don't handle the group in an intelligent way, it would not work. And these are the things that the discussion is centered on. My design activities go towards how to get a group working. That is my interest also. It might turn out that you can also make it possible by means of pen and paper, so to say. It is about how to get a group environment so that you connect people and facilitate that they work well together. It is not about tooling but about how people get connected to each other and how that mechanism works."

The web designers at Mediamatic and the museum employees design for online interaction by 'staying close to the community', 'participating yourself in the community', 'observing the members', 'reacting to their needs'. These are their methods-in-practice with which they advance the community further. The emerging design is an outcome of a trail of performances, of actions and reactions performed collectively by the members of the community, web designers, museum employees, public stories and the technical infrastructure. And these performances are continuous. It is through these collective performances across the entire assemblage that the assemblage is kept alive and advancements are facilitated. It is a matter of 'designing over time' (Jones 1980), in which

the entire assemblage is traveling. The manager of the e-culture department explained this argument:

“And that’s what is really different if you design for sociality, the real difference is that it is designing over time. You cannot sit at your desktop, make a design and implement it and then maybe test it and improve it, no, you have to be involved and you have to design...well, it is more like travelling than it’s designing in steps.”

For the e-culture department manager, designing for online interaction, as designing without a product, is not about achieving an end goal once and for all, like arriving at a destination. It is about the journey she makes together with her colleagues, web designers, members of the public and others to find out about the possibilities for collective practice online. Designing for online interaction is a matter of collectively exploring what actions are possible or desirable online, how to facilitate them, and how to sustain the organic growth of the community. With every new discovery, the web designers, the museum employees and the members of the online community are pushing the online frontier further, finding out new challenges and possibilities. The designed is an emergent one, an outcome of these collective explorations, negotiations, actions and reactions, more so than a static outcome of standardized design methods.

The same shift in the design focus as presented by the manager of the e-culture department has been anticipated by Jones (1980) and Buchanan (n.d.). In a recent interview given at the Kolding School of Design International Advisory Board, Buchanan explained the expansion of the notion of design in the contemporary world, to refer to a shift from products and communication to actions, activities and processes. Jones (1980) argued that in practice, the scale of designing is moving from that of objects and finite products to processes “but we’ve yet to admit that designing could become not goal-seeking but shared imaginative living, end-in-itself” (Jones 1980: xxxiv). It is designing as a shared imaginative living that the manager of the e-culture described: it is not about the destination, the manager argued, but about the journey you take with your collaborators. To support designing as a shared imaginative living, Jones proposed a series of design methods that encourage not explanation but exploration, not prediction but imagination and not testing but negotiating. When practiced as ‘a way of living in itself’, “design is not so much about adjusting the status quo, as of realizing new possibilities and discovering our reactions to them” (Jones 1980: xxiii). One designer at

Mediamatic explained this argument too when he compared their work with singing in bar. In his words:

“I think that a lot of our work is like singing in a bar. It’s craft, with a bit of art. But most of it is the craft of looking what you need, how can you organize it, it’s a lot of experience, it’s understanding any of your materials. [...] And there is always singing together with your clients and discovering new ways. We are reacting to the difficulties the users have, the ideas they have and then making steps, slowly making it better.”

Controlling the process, arranging the practice

The design process as control process, a process of control, a social process

The view of designing as travelling, as shared imaginative living, as a collective activity that takes place over time, with no clear end in sight does not find its place in the textbook accounts and models of designing products. In the literature focusing on designing products, designing is conceptualized in a stepwise, albeit iterative manner, with each distinctive step being taken in a “predictable and identifiable logical order” (Lawson 2006: 33). The account of the design process is instrumental, with each step offering input for the next. The process has a clear beginning – the identification of a design problem and a clear end – offering a solution to that problem. Such textbook models of the design process suggest that designers begin their work by analyzing the design problem, then continue with developing possible solutions to that problem and end with testing, evaluating and adjusting the solution (see the classical models of Markus 1969 and Maver 1970). Viewed from this perspective, the design process is a control process, in which each stage is well thought of, well organized and the tasks to be performed to achieve the end results are well defined. Also, the design process is more of a decision making process, in which designers, following the results of their testing methods, decide which alternative solution to the problem is the more ‘satisficing’ one (Simon 1969).

Such maps of the design process have been heavily criticized for being de-contextualized, disembodied, a-historical and mechanistic. Cross and Dorst (1998) criticized the separation of

‘problem analysis’ and ‘solution generation’, arguing that the design problem and solution are explored simultaneously in what they call the ‘co-evolution’ of problem and solution. Lawson (2006) also acknowledged the co-evolution of design problems and solutions when he proposed his model of design process as analysis-synthesis-evaluation. Cross (2001) further criticized these models for misinterpreting the nature of design as prediction, explanation and decision making. A similar argument was put forward by Bratteteig and Stolterman (1997) who argued that such control-oriented models do not allow any space for collective improvisation and creativity. Bucciarelli (1994) and Kimbell (2009) lamented the failure of these models to account for the social aspects of designing as a collective, collaborative practice.

It is by now generally recognized that designers work in more ‘opportunistic’ (Guindon 1990), free ways than the stepwise design process models indicate. The focus on the lone designer has been shifting too towards team work between designers with different expertise and other people such as clients or potential future users of the product to be designed. The move from ‘design from nowhere’ to ‘design from everywhere’ becomes more and more evident. Drawing on Schön’s (1983) work, Lawson (2006) and Cross (2011) argued for a view of the team design process as a communication process, in which team members discuss and negotiate the problems and solutions, build upon each others’ contributions in the conversation and resolve conflicts of requirements or approaches. Alexiou and Zamenopoulos (2008) conceptualized designing as a social process in which the coordination of expertise, resources, goals and requirements takes central stage. Adopting a complex systems perspective, Alexiou and Zamenopoulos (2008) argued that coordination of design work involves synthesizing through learning the knowledge required for collective action; it implies a distributed control process in which decisions are derived from individual goals and requirements; and it highlights the collective undertaking in defining the problem and solution spaces (cf. Cross 2011).

Participatory approaches to designing (Bødker 1996, Steen 2011) have foregrounded not only the cooperation between expert designers, but also between designers and the future users of the product to be designed. Proponents of participatory designing argue for the importance in the design process of combining the designers’ expert knowledge with the users’ personal knowledge in developing successful products (cf. Suchman 2002). Concerns in these participatory approaches have been related to how to involve the users and in which stages of

the process, how to manage and facilitate the process of participation, how to deal with conflicts and power, how to organize the communication between participants in order to facilitate shared understandings or to manage expectations (see Ehn 1993, Gulliksen *et al.* 1999, Beck 2002, Steen 2011). Bratteteig and Stolterman (1997) called for a conceptualization of the design process in terms of group improvisations. Drawing on the metaphor of jazz, Bratteteig and Stolterman (1997: 300) argued that collective creativity is achieved through “the art of orchestrating group design”, as “the art of balancing and managing a variety of concerns in a way appropriate to the situational conditions.”

These latter conceptualizations of the design process are more in line with how designers experience the daily practice of designing. However, the discussion in the literature on the nature of the collective performance of designing does not stop here. Bucciarelli (1994) criticized the kind of studies reviewed above by arguing that they focus too much on how the process can be managed and controlled to sustain collaboration between the different actors involved (see Bødker 1996, Ehn 1993, Gulliksen *et al.* 1999, Beck 2002, Steen 2011). They focus too much on managing differences in goals and expertise to achieve consensus and shared understandings, seen as required for achieving design results (see Bratteteig and Stolterman 1997). Bucciarelli (1994) criticized such studies too for failing to account for the object of design, which in his view, influences the organization of the design process itself and the relationships among design participants.

In his ethnographic study of engineers, Bucciarelli (1988, 1984, 1994) conceptualized designing as a social process. Yet, he offered a deeper meaning to the term. For Bucciarelli (1988, 1994), all activities that are performed at a project, from sketching, dreaming, drafting schedules for new design tasks to sitting in a design meeting are potential design acts that may influence the ways in which the design process proceeds. All employees of the engineering firm as well as people from outside the firm with whom they work, such as suppliers, customers, financial bodies and so on, are contributors to the design process and may influence it. They all come to the design process with different expectations, interests and expertise, based on the ‘object-world’ they operate in, in other words based on the assemblages of physical and epistemic objects, techniques, methods, theories and principles with which a designer works. These different interests and expectations are reflected and negotiated in the process of designing. Yet, for Bucciarelli (1988, 1994), these negotiations do

not necessarily need to lead to consensus or a shared understanding for the design process to proceed.

Bucciarelli (1988, 1994) argued that what keeps the design process together, despite the different interests design participants hold, are the values of the firm, which are more than the sum of individual interpretations. These values are what Yoo *et al.* (2006), in their study of Gehry Partners' work called 'the gestalt of the firm'. They are also what I called in the previous chapter 'the taste' of designing, that museum employees and their collaborators develop together in the practice of transforming their museum into an online and offline meeting place.

Not controlling the process, but arranging the practice

When I observed the design work performed by museum employees and web designers in the Amsterdam Museum design project, I did not see a design process that followed logically ordered, rational steps. What I did see was 'design from everywhere' riddled with discussions, contradictions, negotiations and uncertainties. I saw frustrations as when the manager of the e-culture department lamented some web designers' strong focus on functionalities at the detriment of the 'higher goal' of welcoming people online. I saw judgments of expertise as when one web designer explained to a museum employee that she 'doesn't get it' that online community sites have a different structure than sites for personal blogging. I saw disappointment on the faces of both museum employees and web designers when new community members found the site 'difficult to navigate' and 'not that interesting'. I saw negotiations of roles and power relations as when the museum employees discussed with the web designers the possibilities for a closer collaboration between the two parties, with museum employees participating as equal partners in designing.

Central to all these discussions and negotiations was not so much the controlling of a process of designing, in which all actors are expected to perform their given tasks according to a predefined order. On the contrary, at the heart of these discussions was the arrangement of a practice of designing, in which all actors collectively redefined their tasks and roles according to an unclear yet emerging order (Maris *et al.* 2012). The nature of the object of designing, as an open ended object, served as a catalyst in these negotiations. Let me illustrate.

For many years, it was common practice for web design offices to close service level agreements with their clients. In these contracts, clients and web designers would agree on the specifications of the online community platform to be designed, the costs of developing the platform and the time for delivering the final product, among others. Their layouts would follow the phases of a design process for a stable product, a technical infrastructure. The work relationship between the two parties would be defined as one between “the client” who requires a service, provides information about the desired product to be developed and pays for it when delivered, and “the contractor” who builds and delivers the product on time and within budget. The responsibility for the performance of the product, its quality and sustainability would be established then too, usually resting with the contractor, the web designers. Agreements would be made for ‘feedback meetings’ in which the designers present the clients with preliminary sketches of the product to be developed. Similarly, financial agreements would be made about possible required maintenance work once the site has been launched and functioning.

Yet, the collaboration between Mediamatic and the Amsterdam Museum was not so much focused on developing the technical infrastructure, as much as on designing an online environment that facilitates and sustains interaction. The site for the online community The Heart was launched as a basic site, with minimum functionalities. Most attention went to caring for the community and answering to the members’ needs and wishes online. Among such actions were offering members the possibilities to plan their own events on the community, invite selected members to participate, send private messages, or form sub-groups of interest, like members interested in textiles, and have their own private space on the community, similar to group pages on Facebook. Likewise, most attention went to imagining and implementing incentives for people to join and participate in a sustainable manner. One example was the Johan and I project, in which museum employees made a call to members of the community to share their stories and pictures of their encounter with Johan Cruijff. The call was successful in attracting hundreds of stories and pictures and in creating a vibrant atmosphere on the community. The most interesting stories and pictures were presented in the physical exhibition in the Amsterdam Museum.

It soon became obvious that service level agreements were not productive and sustainable in designing emerging, open ended environments, where constant attention and involvement of designers is necessary. The elusive, unfolding nature of online communities makes it difficult

if not impossible for both the museum employees and designers to establish its specifications beforehand. As members begin participating online, the community can develop in ways that are unexpected to both designers and museum employees. What the end result would be, how much time it would take to design it and how much it would cost is not so easily settled any more. To accommodate the emerging character of the object of design, the ways of working between web designers and their clients needed to change. The manager of the e-culture department explains this challenge and the need ‘to change the practice’ in designing for online interaction. In her words:

“It’s difficult when you work with other parties, like web designers, because they are not used to think that way. That’s for instance if I work with Mediamatic I have to pay every time we redo the website and they have to plan it. And I think we should rethink this - and we are going to talk about that because we should do it differently so we can adapt more easily. [...] I make arrangements with them that we can work with products that are not...well there is no end to them, they are always changing, they are always evolving. The whole practice of designing itself has to change if you are designing for social groups, I think.”

How do you go about rearranging the practice of designing to accommodate an emerging object of design? And not less important, how can you achieve this in a way that is financially sustainable for the museum, which until now had to pay for every small or big intervention designers made in the community?

One museum employee argued that: “The first thing is changing the contract, changing the formal rules of working together.” What was desired was a collaboration based not so much on contractual agreements but on trust. Central to this new contract was a reorganization of the financial arrangements for the project. One museum employee argued that they can no longer ask the web designers to develop something for a fixed price, because they do not know what they want until the community starts growing. The rigid ‘pay-per-hour’ was renegotiated into a more flexible agreement, to be negotiated based on the nature of the task required to be performed and the contribution of the task to Mediamatic’s library of ideas. One employee explained the nature of the new financial arrangements based on trust in the following way:

“So we are working in a much more open way...In IT there are a lot of projects which are very expensive and also a lot of projects which never make it to the finish because there are really rigid ways of financial ways of working together. So that’s a real big change that I trust them, because it is all about trust, I trust them that they will not make too many hours and that they will be honest in declaring their hours.”

The second thing seen necessary in rearranging the practice was a redefinition of roles from ‘clients’ and ‘suppliers’ to ‘partners’ in designing. Another museum employee argued that they want their role in designing to be more pronounced than before: “we want to be involved, make our own mistakes and learn how we can make it better ourselves too”. In practice it meant that museum employees were encouraged to participate in all activities of designing and learn by doing ‘the tricks of the trade’. Some e-culture department employees developed skills in web design, at times making themselves changes on the community platform or developing new pages following the Mediamatic style. For the designers, it meant that they would engage too in discussions about the ways in which the museum can incorporate the online community in its practice.

And third, in rearranging the practice, it was seen as fundamental that mutual learning takes central stage. It was argued that both museum employees and web designers can continue to stay involved in designing an emerging, open ended community only if they learn from each other and can draw on each other’s expertise. The Amsterdam Museum employees are experts in the field of organizing attractive offline events like exhibitions, but are amateur web designers, with everything they know about designing for online interaction being learned in practice. The web designers are experts in the ‘techniques of the artificial’ (Cross 2001), but novice in how the entanglement between technology and museums (or any other organizations) works out in practice.

Through mutual learning the design partners familiarize themselves with their different ‘object-worlds’ (Bucciarelli 1994): web designers learn about what works for museum public, what they like and want in online communities; museum employees learn ‘the tricks of the trade’ of web design, such as how to build intuitive pages, how to write an interesting story online or how to cut pictures in ways that attract an online visitor’s attention. Such mutual learning was beneficial for both parties. For the Amsterdam Museum particularly, it was

argued that as museum employees would also be able to take care of the community and its platform, they would save money on a project that is threatening to go beyond budget.

The negotiation of a new arrangement of the practice is a design exercise in itself (cf. Bucciarelli 1994, Yoo *et al.* 2006), one through which the current ways of working together between clients and designers are problematized, their appropriateness to the current design situation are appreciated and the premises of a new way of working are outlined. The new contact, itself still open ended, is a fantastic mediator in Latour's (2005) terms: it translates a 'design in steps' into a 'design as travelling', a 'design as process' into a 'design as a collective practice'. The idea that a new design practice is in the making in these negotiations was clear to the e-culture department manager, who argued:

“That’s really different; we change the formal aspects of the collaboration. And we try, because it’s new so there is not really a practice already, together we travel and make the rules, new rules, we do that on the go, while we are working. And what’s important in doing it this way is that you have to be fair and honest, I think, otherwise it would not work.”

Responsibility as accountability, responsibility as caring

We cannot deny that design is consequential, that doing designing has an impact on our lives in either a positive or negative way. However, the predominant focus on designing products has narrowed considerations of designers' responsibilities for the designed. As in the service level agreements mentioned above, considerations of designers' responsibilities are limited to a responsibility as accountability for the performance of the product designed. The shared view is that what happens when people start engaging with the product and how that product develops following this engagement, is no longer the designers' responsibility. This argument was made clear to me by a number of technicians working at Mediamatic. One technician argued that his responsibility is to make a properly working site. How people want to engage together online, is their own business. He compared his job to that of a taxi driver, whose responsibility is to offer you the possibility to go where you want, in a safe way. What you do at your destination, whom you meet and for how long is no longer his responsibility. Others shared this view, but in a more cautious way:

“Maybe that’s not the task of the designer, maybe his task is to design it, to implement it, to create the whole plan like also what to do after the implementation. Maybe after the implementation the task of the designer is done, it’s up to other people to analyze the results and react to that.”

We need a deeper conceptualization of responsibility in designing without a product, at the scale of life, than the present view of responsibility as accountability for the performance of the product. The need to rethink responsibility in designing without a product has to do with a number of elements. The object of designing is no longer a fixed product, but an emerging, open-ended practice. We have seen above that designing for online interaction is no longer performed by one or two designers, with clearly set out goals, well-defined tasks to perform and requirements to meet. Designing is a collective practice – a design from everywhere – performed by a multitude of actors, each with different expertise and inputs. Web designers can no longer guarantee the well-functioning of the designed as they are no longer in control of the process. A museum employee acknowledged this when she argued that “they [the web designers] cannot guarantee to do the work in a certain way anymore because we are part of the process and they cannot manage us”. Likewise, designing for online interaction is a matter of designing over time. The designers’ tasks and responsibilities do not end when the community website is launched and members start participating. Rather, they continue until “the community can stand on its own and our involvement is no longer necessary”, as one designer explained.

There are only sporadic discussions in the literature on responsibility in design we can draw on. The questions of responsibility and ethics in design have not been systematically addressed, except for a few individual efforts (see Mitcham 1995, Fry 1995, Manzini 1995). The dominance of the scientific ethos in design, which praises rationality and objectivity, has pushed questions of ethics to the background. Bucciarelli (1994) and Manzini (1995) lamented the conviction shared by post-World War II designers that by means of scientific design methods, generalizable objectives can be clearly formulated and design problems can be rationally addressed. The systematic design process would bring about products and services that are optimal for the clients. The modernist ideal was that the products of designing would bring about unquestionable progress, the advancement of humanity.

We obtain a different view on responsibility in design from the literature that prioritizes rational design process and objective methods. This literature illustrates a ‘design from nowhere’ (Suchman 2002, Gherardi 2012) as a value-free design. The difficulty with this perspective is that it does not allow us to question or theorize the designers’ responsibility, not even as accountability for the performance of the product. The current view is that if the product is not functioning well, or the users do not like it, the fault does not lie with the designer, but with the methods. In that case, it is the methods which need to be evaluated, adjusted or replaced. Once the methods are adjusted and the process re-ordered, good quality design would follow (see Bucciarelli 1988 for a similar criticism).

However, design methods, like scientific methods are not value-free (Law 2004). In light of the larger societal transformations that designing is bringing about, not just in the types of technologies we use, but more substantially in the ways in which we relate to technologies and to each other (Orlikowski 2000, Knorr Cetina 2001) designers can no longer hide behind the scientific ethos of objectivity. They can also no longer limit their responsibility as accountability for the performance of the product only. Many designers and researchers alike begin tracing a new concept of ethics for designing. Manzini (1995: 234) proposed such a new view of ethics in design, one that...

“...does not predicate universal and unquestionable values but refers to a system of values exhibiting the consciousness of relativity, in the context of a general attitude built on the principles of responsibility and solidarity.”

Writing from the perspective of cultural and environmental sustainability, Manzini (1995: 234) equated responsibility in design with solidarity towards the present and future generations, “the responsibility of leaving them an inhabitable world endowed with a range of alternative possibilities analogous to what we have today”.

I find Manzini’s (1995) ideas insightful in conceptualizing responsibility in designing without a product. Manzini pointed out to a new way of thinking about it: not a responsibility as accountability for the performance of the designed, but a responsibility as caring for the well-being of those affected by the design. This view on responsibility as caring was clear in the Amsterdam Museum project. Both museum employees and web designers talked about the need to stay involved in the community, to welcome the members like a host, to listen to or

watch the members, to care for them, all in all make sure that they have a comfortable, enjoyable experience and that they return to the site, and even bring their friends too. One designer explained this notion of responsibility as caring, in the following way:

“We always say that we don’t control a community, we manage the parameters. We make sure that they are safe. It is like a family. You want to make sure that nothing is keeping... nothing is hurting them. You don’t want to tell them what to do. You just want to make sure that nothing is keeping them from being happy. It is just making a comfortable place... And that is just in the general sense like how to not piss off your community.”

Looking further at the Amsterdam Museum project, we see that the meaning of responsibility as caring is even richer than being involved and making sure that the community is not lacking anything to be happy. This would focus the designers’ work too much on the here and now, when in fact their hearts always roam towards the future. For the web designers at Mediamatic and the museum employees, caring for the community also means that they create the space for ‘alternative possibilities’, to use Manzini’s (1995: 234) terms. This responsibility as caring by designing for alternative possibilities implies that designers develop environments that are open-ended, that members can participate in as they see fit for their purpose, or that can develop and grow following the members’ interactions. For instance, community members could connect to a story in different ways, by commenting, by posting pictures that are related to the story, by sharing it, or by posting a similar story but from a different neighborhood. Similarly, sub-groups of interest could create their own group pages, which were accessible only by means of online invitations.

Jones (1980), in his discussion of design methods made reference to a similar conceptualization. For Jones (1980: 73), designing is a conversation about future possibilities. In his words:

“Methodology should not be a fixed track to a fixed destination, but a conversation about everything that could be made to happen. The language of the conversation must bridge the logical gap between past and future, but in doing so it should not limit the variety of possible futures that are discussed nor should it force the choice of a future that is unfree.”

The view on responsibility as caring by designing for alternative possibilities was shared by other web designers, working at different companies and for different online communities. George Oates, former concept developer at Flickr, explained in a blog post her view on designing for online interaction in a similar way. For her too, the designer's responsibility is to offer the members 'a space for play' where they can try things out without being told what to do, where they can join in actively or by simply watching, where they can explore the site by following links they think are interesting. In her words:

“People don't like being told what to do. We like to explore, change things around, and make a place our own. Hefty design challenges await the makers of websites where people feel free to engage; both with the system itself and with each other. Embrace the idea that people will warp and stretch your site in ways you can't predict—they'll surprise you with their creativity and make something wonderful with what you provide.”

Conclusions

In this chapter, I illustrated how the design as process paradigm, with its focus on designing in steps and the employment of objective design methods, does not account for the complexity of designing without a product. It puts forward a 'design from nowhere', where methods produce desired results.

I argued that designing without a product is a design from everywhere with the designed emerging out of interactions between actors with different interests and expertise. It is a 'shared imaginative living' (Jones 1980), a designing like travelling where the journey is more interesting than the arriving at a given destination. I illustrated how in designing for online interaction, web designers and museum employees found the current methods of usability tests and user research limited in exploring new possibilities for actions online. Designing for online interaction is a matter of imagining new arrangements of people and technology but also of empathy, of staying close to the community and reacting to its needs. It is a matter of caring, of nurturing for an emerging, open-ended practice until the community can stand on its own, and the designers' involvement is no longer necessary.

I addressed also the issue of responsibility in design. I argued that both the view of the scientific design process as a value-free designing and the current understanding of responsibility as accountability for the performance of the designed are not what the designers working at ‘the scale of life’ (Jones 1980) experience. I proposed a rethinking of responsibility in designing without a product. I argued for a view of responsibility as caring for those affected by the design. The designers in this study performed their responsibility as caring in two ways: by nurturing the community and by designing for alternative possibilities. How web designers and museum employees actually engage in designing for alternative possibilities in advancing collectives is the subject of the next chapter. I argue that central to their practice is not a design by drawing, but a design by drawing things together.

Fourth Controversy: Beyond Design by Drawing – Design by Drawing Together

So far in the thesis, I inquired into the nature of designing without a product by deploying three uncertainties that are visible in literature and practice. I examined the uncertainty on whether designing is a matter of problem solving or of advancing collectives. I explored the uncertainty on whether we can talk about design thinking and objective knowledge or about design taste making and sensitive knowledge. I examined the uncertainty on whether there are rational design processes and methods or whether we can only see design practice and methods-in-practice. Yet the project is not complete unless I examine what is argued to be the central acts of designing. When we observe designers designing, what is it that they are doing concretely?

In the field of designing products, it is commonly accepted that the central act of designing is drawing. So central is drawing to designing that many authors described the process as ‘design by drawing’ (Jones 1980). In contrast to craftsmen, who create a product by making incremental changes to the actual product, draftsmen create a product by drawing representations of it and by making changes to those representations (Lawson 2004, Cross 2011). By drawing, draftsmen obtain a ‘greater perceptual span’ (Jones 1980) of the design situations they work on. Design by drawing gives draftsmen an immense freedom to explore possible solutions and investigate implications of those possible solutions at a much faster and cheaper rate than working on the product itself (Jones 1980, Lawson 2006). For Schön and Wiggins (1992: 135), design by drawing is a “kind of experimentation that consists in a reflective ‘conversation’ with materials of a design situation”. The act of drawing is seen as being composed of many different actions, such as making plans, drawing sketches, building prototypes and mock-ups, preparing diagrams and developing computer models (Schön 1983, Orlikowski 2004, Yoo *et al.* 2006, Ewenstein and Whyte 2009).

Much attention has been given in the literature to the drawings, prototypes, diagrams, computer models engineers, architects and other draftsmen produce. These drawings are seen as valuable communication tools among designers, as well as between designers and their collaborators (Yoo *et al.* 2006). These drawings and models have fascinated researchers also as they are seen as the physical materialization of design knowledge and design thinking (Bechky 2003, Lawson 2004, Cross 2011). From this perspective, Lawson (2004: 33) wrote that “drawings may be seen as a kind of window into the designer’s mind and consequently into the designer’s knowledge system and method of mental representation”. Each type of drawings, from diagrams, calculation drawings, to propositional drawings, illustrates different aspects of what the designer knows at that moment about the product, from the more specific knowledge summarized in diagrams to the more general, abstract knowledge explored in propositional drawings. Design drawings and models have been also conceptualized as epistemic objects (Knorr Cetina 2001, Ewenstein and Whyte 2009), which stimulate learning by engaging the designers in a ‘conversation’ (Schön (1983), a ‘dialog’ (Cross 2011) about what is missing in the drawing and what still needs to be done.

Design by drawing has been and will remain of great importance and value in designing products. However, finding its place and role in designing without a product remains difficult to this date. Latour (2008) pointed out to this challenge in his address at the Networks of Design meeting of the Design History Society in Falmouth, UK. The challenge lies in that designing products and designing without a product are built around two different narratives about the nature of our relationship with the world. These two narratives have been visible across the chapters of this thesis. One is the narrative of the designer as draftsman, experimenter, problem solver, decision maker whose work space is composed of what Latour (2008) called ‘matters of fact’, in other words matters that are undisputed, institutionalized, stable as natural facts are thought to be, such as cognitive knowledge, objective methods, tools for representing, simulating, manipulating and communicating and close-ended products. This narrative is one of control, mastery, detachment, evaluation and progress.

The other narrative is that of the designer as a craftsman, a care taker, who engages in designing as ‘a way of life, an end in itself’ (Jones 1980), as a traveler who appreciates the collective journey more than arriving at a destination. This designer’s work space is composed of what Latour (2008) coined as ‘matters of concern’, in other words matters that are emergent, that can always be different, that are controversial and negotiated (Buchanan

1995), such as sensitive knowledge, taste, methods-in-practice, open-ended assemblages. This narrative is one of care, empathy, attachment, valuation and advancement.

When we look at the Amsterdam Museum, we do not see a stable object, a matter of fact, an institution-made-of-one which can be indisputably defined, sketched and changed. What we see is an institution-made-of-many, an unfolding assemblage of things: of art, histories, personal stories, online communities, museum employees, members of the public, financial bodies, web designers and so on (Maris *et al.* 2013). Such an unfolding assemblage is difficult, if not impossible to represent in a drawing or a mock-up as it contains too many evolving elements. Any representation would only be an awkward stabilization, a freezing in time of the assemblage, which would be of little use to the designers a few days later, when all these elements would be other than they are (Buchanan 1995). The manager of the e-culture department recognized this challenge in her work:

“I am also involved in other things and all the projects are connected with each other. And that is the difference with this kind of designing, that it is so complex that you can no longer design it at the drawing table.”

The situation is further complicated as each of the actors in the assemblage has his or her own definition of what the museum as an online and offline meeting place could be. Recall the museum employee in Chapter 3, on the first controversy, who described the difficulty of initiating change in the museum. She explained how this redesign project is a matter of everybody’s concern. And everybody has an opinion about why the museum should change or not and ideas for how it should be done. In such design situations, compromises for a design proposal – as could be visible in a final sketch - are difficult to reach. Debates and negotiations are the rule.

The aim of this chapter is to explore another uncertainty about the nature of designing without a product: is designing without a product a matter of drawing and making objects work, or is it a matter of drawing things together, and making the emerging assemblage of humans and things work? In section 2, I examine the traces left behind as researchers and the designers in this study tried to come to grips with the different ways in which designers relate to the world. I elaborate further on the distinction between matters of fact and matters of concern. I illustrate how designing without a product is engulfed in matters of concern, seen in the ways

in which different designers relate to the objects of their work. In section 3, I follow the traces left behind as researchers and the designers in this study tried to understand the nature of the acts of designing. I elaborate what designing by drawing things together means and illustrate how it is performed in practice at the Amsterdam Museum. In section 4, I discuss how the move from matters of fact to matters of concern and from design by drawing to design by drawing things together makes us consider consequence in designing from a different perspective, not as a side effect of designing but as the driving force behind designing. I end this chapter with the conclusions drawn from exploring this uncertainty.

Designers' different ways of relating to the world

The world viewed as a collection of matters of fact

Throughout design studies and histories of design, what is predominantly presented as the main object of design is the product, be it material such as chairs and houses or immaterial such as actions and services (Buchanan 1995). No matter what we take as the starting point of designing as an activity, be it the work of the caveman who invented and developed new tools, or the pre-industrial craftsman who made the objects he worked and lived with, or the designer of the industrial revolution who focused on developing the form and function of mass-produced goods, the same concern with the material is visible. Even to this date, the predominant image of the designer is that of someone who 'initiates change in [existing] man-made things' (Jones 1980) or imagines and conceives entirely new products that serve human needs. Industrial designers conceive of the products we use in our daily life, architects imagine the houses and offices we live and work in, fashion designers create the clothes we wear and graphic designers develop the images we look at and read.

We live no doubtly in a material world. Designers have been so far very successful in creating the products we need and want for our safety, comfort and entertainment. Everything, ranging from pencils to air-conditioning systems, cities, parks and human organs, is and can be designed today (Buchanan and Margolin 1995, Latour 2008). The largest part of design studies have been conducted in the field of product design, focusing on the work of engineers (Bucciarelli 1994), architects (Lawson 2004, 2006), graphic designers (Murray 1993) automobile design (Cross 2011), industrial designers (Lloyd and Snelders 2003), fashion

designers (Breward 2003) and so on. Product design has fascinated many researchers as it is seen as quintessential to modern life and its requirements. A number of reasons for this fascination are visible across the literature.

First, through product design, designers are able to enhance human productivity by offering products that facilitate work, communication and decision making such as computers or enterprise software packages (Kasper 1996, Scott and Kaindl 2000). Second, through product design, designers are able to advance human knowledge by providing products that stimulate learning and exploration such as books, games, space exploration technology or laboratory equipment (Kim 1989, Rieber 1996). Third, through products design, designers are able to make human life pleasant and comfortable by offering products such as air-conditioned office buildings, spacious houses, advanced kitchen appliances (Norman 1988), or products that entertain us such as TV sets or music players (Håkansson *et al.* 2005). Fourth, through product design, designers are able to sustain human life by engineering food, developing products that keep us alive such as heart monitors, or products that help us reproduce such as IVF technology (Orel 1995, Gosden 1999).

Reading the literature on product design, we obtain a view of the world as composed of matters of fact (Latour 2004, 2005, 2008). Matters of fact are those objects that are undisputed, well defined, objective and unintentional. Matters of fact have the same qualities as natural facts: they exist out there, governed by laws of nature. Knowing their inputs is enough in knowing their outputs. Once they are designed and implemented, they are expected to be used as intended and to generate the required outcomes (see Orlikowski 2004, for a similar characterization). For example, objects such as houses, knives, chairs or decision support systems are so common in our lives that nobody would dispute their functions: a house is for living, it should contain walls, windows, doors and a roof. A decision support system is to be used in challenging organizational settings, it needs to combine analytical techniques with the possibilities to store and retrieve data needed in decision making and it needs to allow easy interaction between participants. The argument goes that a well-designed house will provide its inhabitants with a pleasant space for living. A well-designed decision support system will facilitate organizational decision making.

Buchanan (1992, 1995) made a similar argument when he argues that in design studies, the object of design is presented as being determinate. Many design theorists have approached

designing from the same perspective as they approached science. In these studies, designing, like science, is portrayed as having a determinate subject matter which is given to the designer, in the same way as nature is given to the scientist. The designer is portrayed as a rational individual, who approaches the world matter of factly and solves design problems other people bring to him. The knowledge designers have and employ in their practice is treated similarly as a matter of fact, as laws of nature, as generalizable principles and theories across the field of designing. The design process itself is outlined as a structured, albeit iterative process, with clearly defined tasks being performed in a given order (Markus 1969, Maver 1970). The same structure of designing is arguably applied across the field, from designing chairs and vacuum cleaners to designing a university curriculum.

Buchanan (1995) extended the argument to illustrate how in these studies the perceived determinacy of the object of design is extended to the practice of designing too. In his words: “(t)here is a tendency to see determinacy in existing products and project that determinacy back into the activity and discipline of designing (Buchanan 1995: 26). Therefore, in designing, the designer tries to analyze and understand the nature of the problems he encounters or are presented to him by his clients, explores possible solutions by means of drawings, simulations and calculations and synthesizes the solution that is most optimal to solve the problem (see Simon 1969, Hevner *et al.* 2004, Lawson 2006, Dorst 2010). I addressed these approaches to designing in more detail in the previous chapters, when I talked about structured and unstructured design problems, cognitive theories of design thinking and rational design methods.

The products of the design activity, such as drawings, prototypes and 3D models are seen as equally determinate matters of fact, as tools used in designing. Lawson (2004) discussed different categories of drawings, employed for different purposes, such as diagrams for summarizing known information about the product, presentation and instruction drawings used as tools in communication with the client or other stakeholders, or proposition drawings used in exploring, detailing and outlining the product. Cross (2011: 12) discussed design sketches, models and mock-ups as a designer’s tools to think with. These objects are presented as external to the designer, employed to store ideas, materialize thinking and “support the ‘dialog’ that the designer has between problem and solution.” Similarly, Yoo *et al.* (2006: 219) described Frank Gehry’s use of drawings, scale models and 3D representational technologies as “tools for thinking and exploring ideas”. The latter means,

the 3D representational technologies, were further examined as tools to calculate costs, explore scale, and “communicate the complex geometry of a design to contractors and fabricators in a form that improves control of cost and constructability” (Yoo *et al.* 2006: 219). The final drawings represent the product to be designed as a closed, agreed upon compromise reached between the different stakeholders about what the product should be and look like.

The world as a collection of matters of concern

A number of studies of designers at work offer us a series of hints that the designers’ world is not so much composed of matters of fact, as much as of matters of concern. Bucciarelli (1988, 1994), in his ethnographic study of engineers, described how engineers work within ‘object worlds’, in other words, within different domains of knowledge, actions and material artifacts. In the design practice, the same artifact presents itself in different ways to different engineers working in different object worlds. Bucciarelli (1994: 71) argued that “the object of design, at all stages in the design, is a constructed and contested object in the sense that more than one explanation of its behavior, more than one account, or harder still, more than one analysis of its behavior is possible and meaningful.”

Ewenstein and Whyte (2009), in their study of architects, addressed the nature of the object of design by examining its representations in drawings and models. The authors illustrated how the architects in their study engaged with drawings not as stable tools to be used in designing, but as epistemic objects, as objects which are always in flux, contested and negotiated. Working with epistemic objects becomes an exploration in which the designed and the designers develop together, with the designed acquiring more concrete form, and the designer acquiring new insights, knowledge and experience (cf. Nickelson and Binder 2008, Yaneva 2009). Kimbell (2011), in her study of service design, illustrated how designers understood services neither as an activity of economic exchange nor as an economic category. Rather, they understood and related to services as contested “socio-material configurations involving people, processes, technologies and many different kinds of objects” (Kimbell 2011: 41).

Matters of concern, Latour (2005, 2008) argued, are open-ended, multiple, disputed, emerging ‘things’. Latour (2008) used the notion of ‘things’ in the sense that Heidegger introduced it.

Heidegger made a distinction between *Gegenstand* – fixed, close-ended products or objects, and *Dinge* – emergent, open-ended gatherings or things. In design, matters of concern are those things which take different forms throughout the design process, that are open-ended, emergent in practice, that are highly contested and negotiated, a complex assembly of contradictory *issues*, for which different and equally valid arguments can be brought in. Matters of concern cannot be stabilized as matters of fact as they are always negotiated; they can always be other than they are.

Buchanan (1992, 1995) made the same argument when writing that the subject matter of design is fundamentally indeterminate. A subject matter of design that is indeterminate has no limits or definitive conditions; it is universal in scope. Design can be conducted in any domain of human activities, from products to services, to systems and signs. A designer would approach a task at hand based on this own philosophy or working hypothesis about the nature of the man-made world. Alternative hypothesis are possible and different designs are not excluded. Buchanan (1995: 25) explained indeterminacy in a similar way as Latour, following Heidegger, explains matters of concern, namely as contested matters, “matters that admit of alternative solutions”. In Buchanan’s (1995: 25) words:

“Designers deal with matters of choice, with things that may be other than they are. [...] The essential nature of design calls for both the process and the results of the designing to be open to debate and disagreement. Designers deal with possible worlds and with opinions about what the parts and the whole of the human environment should be.”

The design space of the Amsterdam Museum is a collection of matters of concern through and through. The object of design, the museum as an online and offline meeting place, takes different forms in different work situations. For the members of the e-culture department, the museum as an online and offline meeting place takes the form of the online community that needs to be carefully hosted and maintained. For members of the financial department, the museum as an online and offline meeting place takes the form of fund raising activities that need to be carefully planned to encourage the public to contribute financially to the museum. For curators, the museum as an online and offline meeting place takes the form of exhibitions that need to be carefully designed to encourage the public’s engagement while at the same time maintain the museum’s reputation as a cultural institution.

Let me elaborate on this matter of concern, of how to design an engaging exhibition, by giving the example of the preparations for the exhibition ‘Johan and I’ on the fans’ encounter with the Dutch football player Johan Crujff. This was the first exhibition organized in the Amsterdam Museum that engaged the members of the new online community The Heart. It was also the first exhibition of its kind, built exclusively with public stories. The idea was to create an exhibition about Johan Crujff as an embodiment of the spirit of Amsterdam: of someone who is dynamic, entrepreneurial and inspirational to generations of people.

However, no sooner did the project start that this most friendly plan turned into a mine field, both internally and externally. In creating this exhibition, the Amsterdam Museum collaborated with Terza, an event organizing company. Both the Amsterdam Museum and Terza agreed that the best way to collect the fans’ stories was to engage the museum’s online community The Heart. Yet, both parties had different interests in the project and as such had different ideas on how to approach this task. The people working at Terza wanted to create publicity and news value for the exhibition and for Crujff. As such, in their eyes, the best stories should be taken out of the community and saved for the exhibition.

The museum employees wanted to encourage participation and exchange of experiences by offering people a topic that is close to their daily lives, their encounter with their football legend. They considered that the best stories should remain on the site, to attract attention and to bind people together in this shared interest. A large part of the negotiations between the people at Terza and the museum employees were centered on how to encourage people to send in their stories while at the same time not giving away those stories that would give the exhibition news value. A museum employee explained the discussions carried out between them and the people working at Terza:

“Tzara was afraid that if we make all the stories visible to everybody on the community, there won’t be any news value when we open the exhibition, that the press would not be interested or less interested, or maybe the audience will be less interested in coming to the museum. I think that is an old-fashioned way of thinking because our experiences with the website is that there is no such thing... people get more involved by reading stories, they get triggered to donate their own story or put somebody else in contact with the story. It stimulates participation and the news value...well, the stuff

we are going to do with those stories and how we are going to translate those stories into an exhibition, that's something that will create some news value.”

Even if after long discussions, the museum employees agreed to save the best stories for the exhibition, the debate was not resolved in terms of what do to with the stories once they are collected. The difficulty of settling this debate laid in the fact that preparing an exhibition centered on stories contributed by the public was very different from preparing an exhibition centered on objects the museum already has in its collection. They require two different ways of working, which are difficult to combine. As one curator explained:

“Normally you start with an idea and then you search for objects in your collection. Then those objects form the basis of what you want to tell. Your concern is how you are going to combine these objects to form a sort of red line through your exhibition. Now we are looking for stories outside the museum, and public photos and other aspects. We still have to figure out what the results will be in two months of search for stories. Maybe it will be disappointing and then we have to be creative, see what we are going to do. Normally you do a lot of thinking first and then you act. Now we act and then we are going to think and then act again. So that's different.”

This debate extended outside the museum between people working at Terza and museum employees, and inside the museum between different employees. The people working at Terza wanted that the authors of the best stories be further interviewed. The museum employees would then select the best, most interesting material and present it in a coherent, attractive exhibition. Some museum employees engaged in the project wanted to invite the authors of the stories to organize the exhibition and tell the story of their collective encounter with Crujff in their own ways. Separate interviews would then be transformed into spontaneous discussions that take place between authors during the preparation of the exhibition, which could further be used as exhibition material.

Other museum employees disagreed with both plans. In their views, allowing football fans to curate an exhibition in the museum is nothing more than institutional suicide. They were afraid that the public would present only the positive side of their encounter with Crujff, which would support Terza's wish for publicity. They argued that it is not the museum's task to support public figures, offering them a publicity medium. The museum needs to work with

the stories, to combine them into an objective representation of all these encounters, “otherwise we can just use the website and say ‘well, these are the stories’ and it’s the end of the project”, as one curator explained.

The ‘Johan and I’ exhibition that opened at the Amsterdam Museum had a different form than any parties involved in preparing it anticipated at the beginning of the project. The exhibition presented a timeline of all the encounters between football fans and Crujff. Some fans became so engaged in the project that they donated objects for the exhibition, such as a football with Crujff’s signature and t-shirts worn by him in various games. The exhibition continued to grow both online with people still posting stories of their encounter with Crujff after the exhibition was opened, and offline with fans visiting the exhibition continuing to talk about their legend. And in terms of news value, the exhibition did attract media attention, yet its publicity was overshadowed by another, bigger exhibition that the Amsterdam Museum opened around the same time, namely the Golden Age of Amsterdam.

What these and other similar discussions in the museum illustrate is that the matters designers in this project deal with are not matters of fact, but matters of great concern. They are delicate matters which need to be treated with caution because any decision taken could have a great impact on how the museum relates to the public – as visitors, donators or participants, and how the rest of the world relates to the museum – as a cultural institution or a publicity medium for public figures. These are matters that are not well defined, not agreed upon and as such they can most often ignite vivid discussions on how to approach them.

In building exhibitions together with the public, there are no grand theories that have been tested in another museum and that can be applied here too. There are no approved methods that can be applied in designing for participation that can guarantee success. Recall the uncertainty the museum director expressed in Chapter 4, on the second controversy when he explained that they “work like pioneers”, many times feeling that they are “reinventing the wheel” as successful approaches employed by other museums do not always work in the specific context of the Amsterdam Museum.

When dealing with matters of concern, designers cannot master them, as they would master matters of fact. They cannot predict them, calculate them and stabilize them in concrete representations to be implemented later and by somebody else. Designers cannot limit their

attention only to aesthetics either, choosing as it were the most beautiful way of building an exhibition. Such a choice would be arbitrary at best.

Yet, they are still expected to come up with some programs of action (Latour 1994, Nickelson and Binder 2008) based on their experience and sensible knowledge that would indicate what could be done to take the matters of concern a step further. As empirical evidence illustrates, developing such programs of action is not so much a matter of drawing, as much as a matter of drawing things together.

The acts of designing

Design by drawing

Drawing and designing are so strongly entrenched together that many of us tend to understand the terms as synonymous. Many authors writing about drawing in design equate the two terms by appealing to the etymology of the notion of ‘designing’, to mean ‘to draw’. Flusser (1995: 50) argues that etymologically the meaning of ‘design’ comes from the Latin *signum*, which means “to ‘draw a sign’”. Orlikowski (2004: 91) writes that the meaning of the word “designing” comes from the Latin *de - + signer*, which means “to denote, signify or show by a distinctive mark”. Orlikowski (2004: 91) summarizes this equation of the two terms by arguing that “(t)o design, thus, is to make representations of the world.”

Design by drawing, in Orlikowski’s words, by making representations of the world, is the common way in which designing is understood in the literature, particularly in the literature focused on designing products. Design by drawing is the central act of designing in such fields as engineering, architecture, product design, fashion or interior design. A number of advantages support its extensive use across fields of designing. One advantage of design by drawing is that designers have a ‘greater perceptual span’, namely that designers “can see and manipulate the design as a whole” (Jones 1980: 22). By means of drawing, designers are able to retain their ability to attend to many aspects of design at once and to work with ‘parallel lines of thought’ (Lawson 2006) without being limited by partial knowledge or by the costs of making drastic changes in the product itself. This stimulates design creativity and encourages

experimentation (Cross 2007) to a level that was unthinkable to a craftsman who created new products by making changes to the existing ones.

Another advantage is that by drawing, designers can reduce the complexity of the design situation to a manageable form. Cross (2011: 12) acknowledged that designing is too complex to be carried out “by purely internal mental processes; the designer needs to interact with an external representation” to make his ideas concrete. Lawson (2004: 52) argued that by drawing, designers are able to temporarily ‘freeze some features’, while exploring others in more detail. Cross (2011: 12) further argued that “(s)ketching provides a temporary, external store for tentative ideas, and supports the ‘dialog’ that the designer has between problem and solution.”

Many studies were focused on understanding how designers engage in the act of drawing and with what effects. Schön (1983), Schön (1992) and Schön and Wiggins (1992) talked about design by drawing as a means for reflection-in-action. They argued that through drawing, the designer engages in a ‘conversation with the materials of the design situation’. In these conversations, it is argued, the designed – in its represented state as a drawing - ‘speaks back’ to the designer by indicating what is missing in its current representation and what needs to be done to fill in this gap (cf. Ewenstein and Whyte 2009). The reflection-in-action implies a consideration of intended and unintended implications of a design decision. Through cycles of seeing-moving-seeing and appreciative judgments (Vickers 1965), the designer reflects on the design so far, examines the implications of the moves s/he makes and as a better informed designer is able to take the necessary action to complete the design (Schön and Wiggins 1992).

Other contemporary designers describe their use of drawing as a means of discovering new insights and exploring ideas. The British architect Richard MacCorman (cited in Lawson 2004: 53) argued that by sketching, he engages in ‘a process of criticism and discovery’: “I haven’t got an imagination that can tell me what I’ve got without drawing it...I use drawing as a process of criticism and discovery.” For the Spanish architect Santiago Calatrava, drawing is a journey of exploration in which each drawing builds on previous ones, as ideas take shape. Calatrava argued, cited in Cross (2011: 14), that through drawing:

“You are discovering the layers of your project... I mean to start with you see the thing in your mind and it doesn't exist on paper and then you start making simple sketches and organizing things and then you start doing layer after layer...it is very much a dialog.”

Other studies have examined drawing as a designer's means for design reasoning. From this perspective, the drawings designers produce in their work are seen as a record of design thinking and knowledge (Rowe 1987, Herbert 1993, Goel 1995, Lawson 2004). Goldschmidt (1991) talked about the 'dialectics of sketching' in which designers, while drawing, engage in a dialog between 'seeing that' – a reflective criticism and 'seeing as' – an analogical reasoning through which the sketch is reinterpreted in light of generating new alternatives (Schön and Wiggins 1992). Do and Gross (1996) analyzed what they called 'the acts of design reasoning' visible in drawing, such as attention: focusing and selection, perception – filtering, recognition and processing, refinement – evaluation and memory – finding references and drawing analogies (cf. Larkin and Simon 1987). Lawson (2004: 53) focused on the cognitive aspects of drawing and argued that “drawing is also the designer's way of making, recording and testing hypotheses”. Designers engage in testing hypotheses by continuously asking 'what if': what if we move the doors to the left, what if we make the handle smaller, and so on. Sketching allows designers to express these hypotheses and test them by asking questions, making moves and evaluating consequences of those moves. The final drawings present details of the aesthetics of the object to be built as well as the principles, rules and the knowledge needed by manufacturers to make a working, functioning object (Lawson 2004, Cross 2007).

While notwithstanding the great contributions such studies brought to our understanding of how designers engage in drawing products, we cannot fail to observe a number of limitations in light of designing without a product. First, drawings are a means of artificially stabilizing an otherwise fluid world. In sketching, designers take as a starting point the product requirements expressed by the client and work towards a solution that would satisfy those requirements. Jones (1980) brought this critique of stabilization when he argued that in the future, designers have few, if any, fixed points of departure. Requirements change all the time as new needs arise. Any stabilization would limit the possibilities of innovation 'at the scale of life' (Jones 1980). In designing without a product, Jones (1980: 33) argues, “to design is no

longer to increase the stability of the man-made world: it is to alter, for good or ill, things that determine the course of its development.”

Second, design by drawing focuses attention on just one element, a house, a car, a phone, from the extensive assemblage in which we live in. In the designers’ drawings, no indication is given about how that object is part and parcel of a ‘total situation’ (Jones 1980). From the drawings, we know how an object would work internally, how it would perform once built (Bucciarelli 1994, Lawson 2004), yet we know little of how it would work once it enters this assemblage. Third, it supports a view of designing in steps, a process in which designers draw first with the designed being realized later. It offers no place to consider designing as travelling, as designing over time, in which designers are always one step behind the designed. Last, it puts forward an image of designing as a detached practice, interested in matters of fact: in offering solutions to design problems, in building and testing hypotheses, in creating close-ended products. Drawings are external to the designer, are his/her means to simplify design situations and take decisions about their future function and form of products.

Design by drawing things together

In conceptualizing designing as drawing things together, I look for a deeper meaning of drawing, one that builds on the narrative of empathy, care and attachment. In the previous chapters, we have seen how the designers at the Amsterdam Museum are part and parcel of their design situation. Their design actions go towards initiating change in their own entanglements with the public, the museum collection, public stories and online communities. They do not work with a representation of the object to be designed, the museum as an online and offline meeting place. Rather, they work with the designed itself, with emerging exhibitions, online communities, neighborhood activities, and so on (Maris *et al.* 2012).

Following Latour (2008) and Oosterling (2009), who at their turn follow Heidegger and Sloterdijk, I conceptualize design not as dessin but as dasein. In other words, design is not about making drawings of the world, as much as about being in the world. The notion of dasein underlines the idea of existence as dependency, engagement, empathy and care. We observed this engagement and feelings of empathy and care between designers at the Amsterdam Museum and the object of their work. It follows that if design is dasein, namely

being in the world, then designing is not a matter of drawing and working with representations of the world. Rather, designing is a matter of drawing things together and working with the world itself, of which designers are a part too (Jones 1980).

To clarify the notion of ‘drawing things together’, I turn to the meaning of *to draw* as “to pull something across a space” or “to move somewhere slowly or smoothly” (Macmillan English Dictionary (2002)). To draw things together therefore is about bringing things together, about setting things in motion. Designing by drawing things together would build on this explanation as an activity in which different people and the objects they work with are brought together and set in motion in creating a new emerging arrangement, a new entanglement, a new assemblage. In contrast to design by drawing which stabilizes the world in representations, design by drawing things together is about destabilizing, about moving things around, opening things up and setting them in motion towards a desired goal.

We have seen in the previous chapter how in designing for the online community The Heart, the museum employees and web designers drew together different functionalities Mediamatic had in its collection, different topics for online discussions, different stories and pictures posted by different members. Museum employees further brought in objects from the museum collection through their daily blog posts about the ‘Object of the day’. They brought in money from public and private funds and set their colleagues and volunteers in motion to participate too in the community alongside the public. We have seen above how the ‘Johan and I’ exhibition was being created by drawing together different members of the public, fans of Johan Cruijff, different stories, pictures and objects, different organizations and their employees, different methods of preparing exhibitions and information technologies that mediate storytelling.

In order to fully understand designing by drawing things together, we need to make a drastic move. We need to de-materialize the practice of designing of its matters of fact and re-materialize it with matters of concern. This move is achieved by foregrounding and making explicit all the discussions, uncertainties and negotiations that previously went into the stabilization of matters of concern into matters of fact (Latour 2008). This move is vital because it helps us not to fall into the trap of objectification and stabilization that previous researchers did fall in when they talked about the product of designing as a stable entity, about design drawings as tools for communication and calculation, about designing as a linear

process, about design methods as producing results and about design knowledge as cognitive knowledge.

The result of drawing together matters of fact cannot be anything else than a matter of fact itself. We have seen in Chapter 3 that simply integrating an existing online community into the practice of the Amsterdam Museum cannot automatically make the museum an online and offline meeting place. The Amsterdam Museum would simply be a museum with an online community. And this is not interesting because it tells us nothing of the dilemmas of incorporating an online community in the museum practice in the first place, about the trouble of creating a sustainable online interactive place or about how the museum needs to change internally to accommodate the online community as part of its practice.

The outcome of drawing together matters of concern is a matter of concern itself. Developing an online community for the Amsterdam Museum and implementing it in the museum's practice is riddled with debates about how to create interactive spaces and how to integrate the two spheres into an online and offline meeting place. And this is very interesting because it tells us a lot about all the work that needs to be done to welcome people online and offline, all the uncertainties museum employees have of whether people would participate, and if they do participate what that would mean for the ways in which the museum functions, prepares exhibitions, and for the role the museum has in the local community and the national and international museum world.

Designing by drawing things together therefore, is a matter of destabilizing existing practices, of raising actors from their comfortable seats, of setting them in motion and bringing them together in a new arrangement. What that new arrangement would be, how it would look like and how it would work, is still uncertain. Designers embrace this uncertainty as an inherent part of their work (Cross 2011). We have seen in the previous chapter how in designing for the emergent online community The Heart, web designers and museum employees considered it necessary to redefine their roles from clients and contractors to design partners. That meant that web designers were no longer in control of their own design processes, that museum employees would take matters into their own hands and that they would share the responsibility for the well-being of the community (which was unthinkable under the previous service level agreement). Such a destabilization of the practice of developing online communities brought with it many discussions and negotiations about how the new roles

could be defined and what they would entail. That the outcome of these negotiations is uncertain, and that the designers embrace this uncertainty as an inherent part of their work was clear in the words of the e-culture department manager we read in the previous chapter:

“That’s really different; we change the formal aspects of the collaboration. And we try, because it’s new so there is not really a practice already, together we travel and make the rules, new rules, we do that on the go, while we are working.”

Similarly, at the Amsterdam Museum, museum employees are expected to engage with the public in a more personal manner than before. For instance, on the online community, they are required to post content and respond to the members’ comments using their own names rather than hiding under the museum logo. They are no longer sending information, but are communicating with the public. That means that their knowledge can be challenged. This plan has unsettled many museum employees who were used to talk to the public as experts, on behalf of the museum. Now they and their ideas are exposed. They are required to be more open to different perspectives and more flexible in the topics that are discussed online, because they are no longer the only discussion starters. Redefining the employees’ roles turned out to be a larger challenge for the museum than at first anticipated. As an employee explained:

“I think that most of my colleagues like it, but it’s also a bit more frightening because it’s much more personal than if you have a formal role and you know what you can and cannot do. Having formal roles is also easier for the museum because you know exactly what the co-workers will do and what they will not do. So this personal interaction is a much more mature way of working together and working with the public but it’s difficult to implement in the museum. It’s not easy to do.”

Making a product work; making an assemblage work

In design by drawing, the aim is to create the form and function of a material product which will be built, sold and used (preferably as intended by the designer). Central to design by drawing is the material, the product. The draftsmen are very careful that the product they draw will be feasible, pleasant and easy to use and that it will perform well internally. Consequence

is calculated in terms of performance. Unintended consequences, while acknowledged that they could appear, are preferably minimized through usability tests. This is a laudable practice in designing products or work schedules where control is encouraged. When we go to the train station, we want the ticket machine to perform the tasks we asked it and to give us the ticket with all the needed information printed on it. If the machine does anything that we do not ask, we panic. We want the train driver to drive the train according to the schedule and stop in the stations indicated in the itinerary. If he takes detours, we get annoyed. We want the train to run without problems. If it breaks, we get angry. The examples are endless.

In designing by drawing things together, the aim is to create an assemblage of people and the things they work and live with, in which alternative possibilities for actions are desired and even encouraged. This is central in the Amsterdam Museum project. On the online community, the web designers and museum employees try to facilitate different ways in which interested members can contribute, get in contact with each other and share stories about Amsterdam. Offline, in the museum, they try to create different possibilities for people to participate, be it in exhibitions by contributing stories, in neighborhood events by talking to the museum employees or in crowd funding activities by donating money. Consequence matters for the museum employees and that is visible in the uncertainties they have: would people participate, would they like to participate, would sharing stories bring them closer to their city, would exhibitions with public stories make our museum more open towards the local community?

As consequence matters, the designers' interest shifts from what would make a product work to what would make the emerging assemblage work. Creating alternative possibilities for action implies that many things need to be left open, that it becomes a matter of facilitating instead of dictating. Examples abound, such as allowing the public to participate online and offline as they seem comfortable doing: by posting stories, volunteering in the museum, donating money or simply visiting. Things are left open also in the collaboration between museum employees and web designers, for instance, they do not set in advance how many hours a web designer or a museum employee will spend on hosting the online community. Things are left open in preparing exhibitions too, in that an exhibition is planned based on expected contributions from the public instead of an existing collection of objects that can be brought in at any time.

Yet, leaving things open does not mean that there is no plan and that everything goes. On the contrary, throughout all the design meetings that were organized, all the debates and discussions that took place, it became clear that the designers at the Amsterdam Museum have a well-developed dream of what they want to achieve. They have a program of action (Latour 1994, Nickelson and Binder 2008) that includes their desired goals, their intensions as well as their beliefs of what would make the emerging assemblage - the museum as an online and offline meeting place work. Following Buchanan (1992: 8), I referred to this program of action in the Introduction of the thesis as “the plan, project or working hypotheses”. The elements of this program of action, or its working hypotheses, emerged across the chapters of this thesis. They represent the mini-theories of design that the designers engaged in the Amsterdam Museum project developed and negotiated together in practice. As for the museum employees and their collaborators designing is like travelling, this program of action can be seen as an itinerary for designing, for drawing things together and making them work. In Table 1 below, the elements of this program of action, of the design itinerary are outlined.

Table 1: The program of action and its working hypotheses in the Amsterdam Museum project.

Points of departure	Things needed for the journey	Desired destinations	Mini-theories, stories told during the journey
Create an environment where people feel at ease to share	Equality: working like partners	A participative museum practice A participative design practice	If you treat people like equal partners, they will not be afraid to bring their contributions and to participate.
Allow objects to load with stories and to unfold	Objects are always also epistemic objects: dynamic objects tie us together	An authentic museum practice An authentic design practice	If you encourage the public to add their stories to the objects in the collection, the museum will unfold into an authentic storyteller.
Allow people to chose their own courses of actions and their own objects to tell their story	Trust and empathy: being a host	A self-organizing museum practice A self-organizing design practice	If you facilitate that people can create their own projects online and offline, they will feel more confident to self-organize and be creative.
Keep possibilities open and understand that things can always be different	Embracing uncertainty: working like pioneers	A serendipitous museum practice A serendipitous design practice	If you are not afraid to stop controlling and telling people what to do, beautiful things can happen.

These working hypotheses have guided the design work of the museum employees and their collaborators across the entire project of transforming the museum into an online and offline meeting place. They were visible in the employees' collaboration with web designers, and in redefining the relationship among museum employees and between them and the members of the public. They were visible in how interactive exhibitions were approached and prepared, like *Johan and I*, in how the online community *The Heart* was approached, developed and hosted, in how neighborhood events or crowd funding activities were organized. They illustrate a designing without a product in that they put forward the worldview of a "shared imaginative living" (Jones 1980: xxxiv), in which people and objects can unfold together in unexpected and hopefully enriching assemblages.

Conclusions

In this chapter, I examined the nature of the acts of designing in designing products and in designing without a product. I illustrated how design by drawing, despite its great importance and usefulness in designing products, cannot be fully reconciled with designing without a product. I argued, following Latour (2008) that at the heart of this challenge lays the difference between two grand narratives about the designers' relationship to the world. One, seen in design by drawing, is that of mastery, detachment, control and problem solving. The other, seen in design by drawing things together, is that of empathy, attachment, care and advancements.

I elaborated in this chapter on the distinction between matters of fact and matters of concern. I illustrated how designing products is centred on matters of fact. Designing without a product is riddled with matters of concern, with things that are disputed, emerging and that can be other than they are. This underlies the argument that the subject matter of contemporary designing is indeterminate (Buchanan 1992, 1995). It cannot be drawn, stabilized in designs, in representations. In dealing with matters of concern, with indeterminate matters, designers engage in drawing things together. Drawing things together, as *dasein*, is a matter of destabilization, of bringing things together, of setting things in motion in an emerging assemblage towards a desired goal which in itself can move or shift as well. In drawing things together, the aim is not to make a product work, but to make the emerging assemblage work.

In advancing assemblages towards a desired and potentially shifting goal, designers' work is guided by a number of hypotheses they negotiate in practice about what they think would make their design work. These hypotheses are not fixed rules; they are working mini-theories of a 'shared imaginative living' (Jones 1980) in which people and things can unfold and enrich together.

In the Conclusions of the thesis, I will draw together the lessons I learned in exploring these four uncertainties about the nature of designing without a product. Based on these lessons I will engage in the project of reassembling design not as a mechanical art of design problem solving, but as a liberal art, an art of advancements. This in itself is a matter of great concern, because it brings designing very close to politics.

Conclusions: Beyond Design as Mechanical Art – Design as Liberal Art

My concern in this thesis has been quite specific and can be summarized in one question: “What is designing without a product and how can we begin to talk about it without restricting it to a mechanistic process of problem solving?”

Designing without a product has been expanding in the last decades to include more and more domains of our collective lives. Yet, we as researchers begin only now to grasp it. Jones (1980) introduced the notion of designing without a product to refer to a designing practiced ‘as a way of living’, ‘an end in itself’. It is concerned not with creating finite objects, but with ‘the design of all-things-together’ (Jones 1980). Studying this type of designing is highly relevant and actual, because unlike designing products which is the concern of professional draftsmen, engineers and industrial designers, designing without a product is everybody’s concern interested in changing their worlds for the better.

The value of studying this type of designing has been recognized by Buchanan too. In a recent interview given at the Kolding School of Design International Advisory Board (<http://www.designskolenkolding.dk/index.php?id=3469>, retrieved on 20 October 2013), Buchanan expressed his interest in what he called ‘the third order of design’ and in the emerging ‘fourth order of design’. In his words:

“I’m interested in what I call that “the third order of design”. The first order of design is communication with symbols and images. The second order of design is design of artefacts as in engineering, architecture, and mass production. In the middle of the 20th century we realized that we can also design activities and processes. We work progressively more with these activities and services. That’s the third order of design. In the beginning we called it Human Computer Interaction. Now we work with any

kind of interaction – it’s about how people relate to other people. We can design those relationships or the things that support them. It’s this interaction I’m after.”

[...]

“To me the fourth order of design is the design of the environments and systems within which all the other orders of design exist. Understanding how these systems work, what core ideas hold them together, what ideas and values – that’s a fourth order problem. Both the third and the fourth order are emerging now very strongly.”

I argued that we, as researchers, begin only now to explore and understand designing without a product, the fourth order of design, because our account of what designing is has been so far dominated by the design as process paradigm. This paradigm puts forward a view of design as problem solving by initiating change in a finite product or system. It draws extensively on the ethos of science. It puts forward an etic account of the design world, instead of allowing designers to tell, from an emic perspective, what their world is made of. The design as process paradigm provides an understanding of the design world as stabilized, consisting of structured or ill-structured problems for which solutions can be developed by means of rational thought, calculations, creative insights or a combination thereof (Lawson 2006). Designers are portrayed as detached professionals, in most cases solving a problem brought to them by a client; are highly skilled in the ‘techniques of the artificial’ (Cross 2001) and learn about their design situations by cognitive means and processes (Dorst 2010). Design is conceptualized as a mechanical art (Shiner 2003), an applied art which is goal oriented, which follows strict procedures of work and whose outcome is stable, unambiguous, uncontested and meant to be used as intended by designers.

This paradigm has been insightful for our understanding of designing material products and other finite solutions, such as work schedules, transportation itineraries or static websites. Design as a mechanical art is an integral part of our lives and will continue to be for years to come, seen in the great work done by engineers, industrial designers and architects (Lawson 2004, 2006). However, there is an increasing trend where architects are concerned not only with designing beautiful houses and offices, but also with designing spaces for living and working that facilitate interactions and learning (Margolin 2007). Their work is no longer a matter of creating a product but of advancing collective life. When we try to understand this

latter type of designing, namely designing for interaction and learning, which is a designing without a product, we are somewhat empty-headed because we do not have (yet) a well-developed vocabulary to talk about it. Designing without a product is not a mechanical art, an applied, goal oriented art. It is a different type of art, which is an ‘end in itself’ (Jones 1980), an art of living with others both human and non-human. I argue, following Buchanan (1992) that it is a liberal art, and of a particular type. But I need to make a small detour before being able to say anything new about design as a liberal art.

Deploying controversies in designing without a product

Let me first address the second half of my concern in this thesis, on the ways in which we can talk about designing without a product. This concern has been at the center of my first two research questions: How to deploy the many controversies about design without restricting designing in advance to a specific domain (individual or structural)? And, how to render fully traceable the means allowing designers to stabilize these controversies?

I argued that in order to achieve this we need to adopt a methodology for studying design that does not take a stabilized world as a starting point and that does not prioritize either structure or agency. Drawing inspiration from Latour (2005), I proposed an Actor Network Theory methodology for studying design. Ontologically, this methodology puts forward a view of the design world as *made by* a dynamic assemblage of people and the objects they live and work with. The design world is viewed as constantly negotiated, emerging and advancing out of the multiple interactions and performances of this heterogeneous assemblage. Through these negotiations, it is not only the designed which changes and is advanced. The designers and the practice of designing itself are transforming too.

Epistemologically, this methodology proposes a view of knowledge as co-created in practice, as integral to doing (Strati 2007, Gherardi 2009, 2010, 2012). Knowledge does not reside in individuals’ heads, nor is it a production factor which can be easily managed, stored and used strategically. Rather, knowledge is seen as “a collective, situated activity” (Gherardi 2012: 199). Knowing and learning is something people achieve together by engaging in collective action (Corradi *et al.* 2010, Nicolini 2011).

As the design world is constantly negotiated and discussed, then our best place to start exploring the nature of designing without a product are those instances where things are still being drawn together, where knowledge is still being negotiated and co-created, and where controversies about what needs to be done and how are yet unsettled (Venturini 2010). If design is deploying controversies, then research should not shy away from deploying controversies, together with the designers. This is the only way to proceed if we are to shed away our own taken for granted assumptions about design as a mechanical art, a goal oriented process.

I argued that if we are to feed off design controversies observed in practice and learn about what designing without a product has become in the designers' daily performances, we need to follow the designers themselves and see how they practice designing (Latour 2005, Gherardi 2010). We need to see how the designers themselves stabilize their design world, instead of stabilizing these controversies ourselves, by using a priori developed theories and conceptualizations of design (Latour 2005). I argued that we can render fully traceable how designers engage in stabilizing their design controversies by focusing on the moves they make in designing and their effects. In this thesis, I observed and analyzed the following moves:

- From a museum as a collection of historical objects that need to be preserved to a museum as a constitutive entanglement in which everything and everybody need to be taken into account in advancing the museum towards an online and offline meeting place. Designing is directed towards an all-encompassing transformation; the museum cannot become a sincere meeting place only by developing an online community while the museum stays the same. Designing becomes a matter of advancing constitutive entanglements.
- From historical, objective knowledge which is collected through research to taste making as a collective achievement among all those engaged in practice. Taste making becomes the means through which museum employees develop the identity of the museum as different from other museums in the Netherlands and the world; it is employed in practice as means for appraising and refining the practice. Designing becomes a matter of valuating, appreciating and sensible knowing by doing.

- From a structured process of collaboration and designing by means of standard methods to partnering and employing methods-in-practice in designing together for interaction and collaboration. Design is distributed across an assemblage of people and the objects they live and work with. It is directed towards arranging the practice. Designing becomes a matter of engaging, trusting, staying close to the community and reacting to its needs; a designing over time.
- From writing proposals, strategies and agreements to design by drawing things together. Design is centered on matters of concern which need to be carefully attended to. It is directed towards making assemblages of people and things, or constitutive entanglements work. Designers are an integral part of these assemblages too. Designing becomes a matter of being in the world.

Foundations of design as a liberal art of advancements

Let me now address the first part of my concern in this study, on what is the nature of designing without a product. This concern has been at the center of my entire research. A third research question I posted in this study was: Through which procedures it is possible to reassemble designing without a product not as a mechanical art of solving design problems but as a liberal art of advancements?

I argued that Gherardi's (2010) three readings of a practice are helpful in this task. A reading of practice from inside is concerned with identifying the elements composing a practice that make it recognizable as a practice to its practitioners and non-practitioners. This reading allowed me to examine the elements of the discipline of designing as problem solving and of the discipline of design as a liberal art, in terms of philosophical underpinnings, ontological perspectives, nature of design problems, task of designers, nature of design knowledge, design methodology, act of designing and evaluations and appraisal. The second reading of practice is conducted from the point of view of the activity being performed. I examined what the activity of designing consists of in designing as problem solving and in designing as a liberal art. I explored the nature of design knowledge in problem solving and in design as liberal art. The third reading of practice allowed me to explore the social effects of designing as it is

performed in contemporary society. I focus on the first two readings in this section, and elaborate on the third reading in the last section.

From deploying the controversies observed in the Amsterdam Museum project, I obtained a different view on designing than the literature puts forward. Designing without a product is not a goal oriented process, in which a detached designer solves problems by initiating change in a finite product or system. Rather, it is a matter of initiating advancements in wicked ‘constitutive entanglements’ (Orlikowski 2007), in assemblages of human and non-human actors, of which the designer and those concerned with the designed (‘the users’ in the design literature) are a part too (Maris *et al.* 2012). Designers engage not with singular, finite, agreed-upon matters of fact but with matters of concern which are multiple, ambiguous and debatable (Latour 2004). Designing without a product is performed by drawing things together, in which the designers’ concern is on how to make the emerging assemblage of people and things work. Design knowledge is a sensible knowing in practice, appraised and refined through taste making (Maris and Huizing 2012; see also Strati 2007 and Gherardi 2009). To design is no longer a way of mastering and controlling the world. It is a way of being in the world, a matter of engagement, empathy and care. As such, the designers’ concern is no longer of how to be good technicians or good researchers in user tests and parameters calculations; it is about how to be good participants in the world. Following Gherardi’s (2010) readings of practice, we begin to see the outlines of design as a liberal art, and of a particular type too.

Buchanan (1992, 1995, 2001) made the first steps towards thinking of design as a liberal art. He grounded his philosophical exploration in humanism, giving priority to human agency and individual thought in conceptualizing design as a liberal art. For Buchanan (1992), design as a liberal art is an integrative discipline of design thinking which brings together knowledge from diverse fields such as natural science, social science, behavioral science, fine arts and humanities to meet practical needs of our daily lives. Design is “an art of conceiving and planning all of the types of products that human beings are capable of making” (Buchanan 1995: 38). The range of products designers engage in conceiving and planning is increasing in the contemporary world and include objects of everyday use, built environments for living and working, organized services and means for communication (Buchanan 1992).

In exploring the nature of design as a liberal art, Buchanan (1995, 2001) drew on the principles of rhetoric. Rhetoric is considered to be one of the classical liberal arts, concerned with forethought in preparing public speeches, namely with the invention, judgment, disposition, delivery and expression of arguments. Drawing on insights from rhetoric, Buchanan (1995) conceptualized design as a liberal art of deliberation indispensable in all human activities, ranging from building theories to offer explanations and making policies to guide practical actions to creating objects for daily use and enjoyment. As an art of deliberation, designing produces arguments in the form of sketches, proposals, strategies and models which are used in understanding, practical action and production. For Buchanan (1995: 46):

“Design is the art of shaping arguments about the artificial or the man-made world, arguments which may be carried forward in the concrete activities of production in each of these areas, with objective results ultimately judged by individuals, groups and society.”

In departing from a view on design as a mechanical art towards a view on design as a liberal art, Buchanan’s (1992, 1995, 2001) ideas have been very insightful. Yet, I depart also from Buchanan’s view in three fundamental ways. First, I embed my examination in the philosophical underpinnings of post-humanism, made concrete in actor network theory (Latour 2005) and in sociomateriality approaches (Knorr Cetina and Bruegger 2002, Orlikowski 2007, Gherardi 2012). The principles of post-humanism reflect a view of humans as being constitutively entangled with the objects they live and work with and as such agency does not reside in humans only. Evidence from the Amsterdam Museum project indicates that agency in designing is distributed across an entire assemblage of human and non-human actors. For instance, a story posted online by a member of the public would enroll a curator to consider how can s/he prepare an exhibition in which that story has a meaningful place.

Second, I extend Buchanan (1992, 1995, 2001) understanding of design as liberal art by drawing on Gherardi’s (2009, 2010, 2012) notions of collective knowing in practice and taste making. Evidence indicates as well that we cannot separate thinking from doing (Gherardi 2012), in the sense that thinking is as much a matter of individual, private thought as a matter of collective performance. To draw again on the metaphor of designers as choreographers: just like choreographers develop a new dance by dancing and engaging the entire assemblage of

dancers and décor, so do designers develop a new design by designing and engaging the entire assemblage of people and objects they work with.

And third, I extend Buchanan’s focus on finite products (be they material objects, bundled services, intangible signs and software or systems for living) to include people’s ways of living, emergent designs and performances. Not only objects change in designing, but people and their ways of doing things change too. I draw on Jones’s (1980) view on designing as a way of living, and end in itself. This brings into the picture humans’ ways of living with things as central to designing, not as problems to be solved through ‘one shot’ operations, but as issues to be advanced one step at a time. We have seen how in designing emergent online communities, the museum employees and the web designers developed a new way of working together, more focused on partnering, caring and empathy than on strict contractual agreements. Through this partnering, both museum employees and web designers changed as they learned from each other about their different practices, museum practice and the web design practice.

Table 2 below offers an overview of the move I make from design as mechanical art to design as liberal art. It indicates how I build on Buchanan’s view in offering an understanding of design as a liberal art of advancements.

Table 2. Comparisons and points of departure from design as mechanical art to design as liberal art of advancements.

	Design as Mechanical Art	Design as Liberal Art of Deliberations	Design as Liberal Art of Advancements
Philosophical underpinning	Objectivism: the world is out there. The ingredients needed for change are in the object	Humanism: the designer has agency to change the world	Post-humanism: agency to change the world is distributed over an assemblage of people and things
Ontological perspective: what the design world is made of	Matters of fact: stable and understandable as facts of nature	Matters of choice: things that in designers’ minds may be other than they are	Matters of concern: things that are ontologically multiple, contested and open-ended

Nature of design problems	Structured or ill-structured: clear requirements and well defined conditions	Wicked problems: no definite conditions, confusing information and conflicting values	Wicked assemblages, issues: include diverse actors with different interests, boundaries impossible to set
Task of designers	Solving problems brought to them by others, by means of calculations and/or creative insights	Solving problems by means of 'one shot' operations	Advancing constitutive entanglements, of which they are a part, by implementing mechanisms that feed themselves
Nature of design knowledge	Scientific, abstracted in theories, principles and cognitive thought	Scientific, explored cognitively by designers through placements	Sensible knowledge, a knowing in practice acquired through the senses and collectively negotiated through taste making Creativity is a collective performance
Design methodology	Specialized techniques and methods, employed following a logical order, which bring about results	Systematic discipline of integrative thinking used to meet practical purposes	A shared imaginative living Methods-in-practice that focus on engagement, caring and empathy and which perform results
Act of designing	Design by drawing: making and changing representations of the world	Design by deliberation: shaping arguments about the human-made world	Design by drawing things together: design is deploying controversies about what needs to be done and how
Evaluation and appraisal	Evaluation done by designers related to the performance of a product, or the effectiveness of a solution	Evaluation done by individuals, groups or society, related to how well the product supports human action	Valuation/Appraisal performed in practice by all those engaged in designing or effected by the design, related to what makes the emergent assemblage work

Design as a liberal art of advancements is an art concerned with moving people and the things they live and work with forward. The move is not to a specific, agreed upon point in time and place under strict design requirements, but is seen as a journey taken together with all those concerned or affected by the design. It is an art of living, of being in the world that involves everybody and everything as equal partners in changing the world. It is an art interested in creating the circumstances that people and things can unfold in ever richer assemblages, in which people's horizons can be extended so that things can develop differently and in which things' horizons can be extended so that people can live differently. The Amsterdam Museum provided the example of such an assemblage that unfolds and moves forward. It is an assemblage in which museum employees and web designers learn to host and care for an evolving online and offline community and in which the museum's practice is changing so that employees and the public can tell together the story of Amsterdam. Engaging in designing without a product is performing designing as a liberal art, as an art of advancements.

Keeping things open

Through a third reading of practice, Gherardi (2010) and Corradi *et al.* (2010) theorized about the social effects of performing a practice. In this reading, they asked the question: what does doing the practice do? In a similar vein I ask the question about designing: what does doing designing do?

Doing designing creates a new order in people's lives with each other and with the objects they work and live with. When Apple designed the iPad, they did not only design a new type of computer, but they designed for a new way for people to interact with computers. When the Dutch government developed and implemented the new electronic patients' dossier, they created a new way for doctors, patients and insurance companies to work together, a much more decentralized and they argue, more transparent way that would be beneficial for all parties involved. At the Amsterdam Museum, transforming the museum into an online and offline meeting place is designing for a new way for museum employees and the public to interact and communicate. It sets the stage for a much more democratic participation of the public into history making by means of storytelling about their city and the people that live there (cf. Simon 2010, Odding 2011).

Designing is an ordering practice. This argument is even more compelling when we observe in practice that designing is a matter of drawing things together and making them work. It is an ordering practice for the designers, as they engage in arranging their practice, appraising and refining it. And, it is an ordering practice for those affected by the design, as their life worlds are shaken up and reassembled in new assemblages.

“Every practice creates its context” Gherardi (2010: 506) argues, and so does design. It engages in what Bourdieu (1977) called ‘circuits of reproduction’. Design by problem solving creates a stabilized world, to which it responds by means of interventions in finite products and systems. Design as a liberal art destabilizes the world to reconsider its components. New assemblages drawn together in designing bring about new concerns, wishes and ambitions. A predefined order might never be achieved as the ordering process, that of drawing things together, is continuous. The intended and unintended consequences of designing are part and parcel of drawing things together and making them work, they are the new materials designers draw together in the next step of designing.

But designing is an ordering practice in a different way too. And here lies the political project of design as a liberal art. If in drawing things together, controversies about what needs to be done and how are constantly ignited, then deploying controversies is a political process (Beck 2002, Latour 2008). And this political process is visible everywhere from discussing the details of colors of community pages, to discussing the composition of exhibitions. And it is visible in the society in general too, as political debates are constantly carried out about what the role of museums should be in contemporary world. It is a political debate carried out among different types of museums (art, community, crafts, historical museums), between museums and the public and between museums, the public and the government. For instance, we have seen in this study how the local government required museums to become more socially responsible if they are to continue to receive public funds.

And it is not always a democratic process as some interests would always be voiced stronger than others. Some museums with more famous collections are stronger in claiming relevance and funds than museums focusing on local history of a city or neighborhood. Also, we have seen in the Amsterdam Museum project how the emergent nature of online communities dictated a new way of collaborating between museum employees and web designers: more partnering than working based on service level agreements. The public is asking for a stronger

presence in museums, which dictates a new way of preparing exhibitions and a reconsideration of the role of museum objects in telling the story of Amsterdam. Deploying controversies is a matter of giving a public arena to all these political debates and interests (Latour 2008). It is in this public arena that what it means to live and work with objects is negotiated and defined.

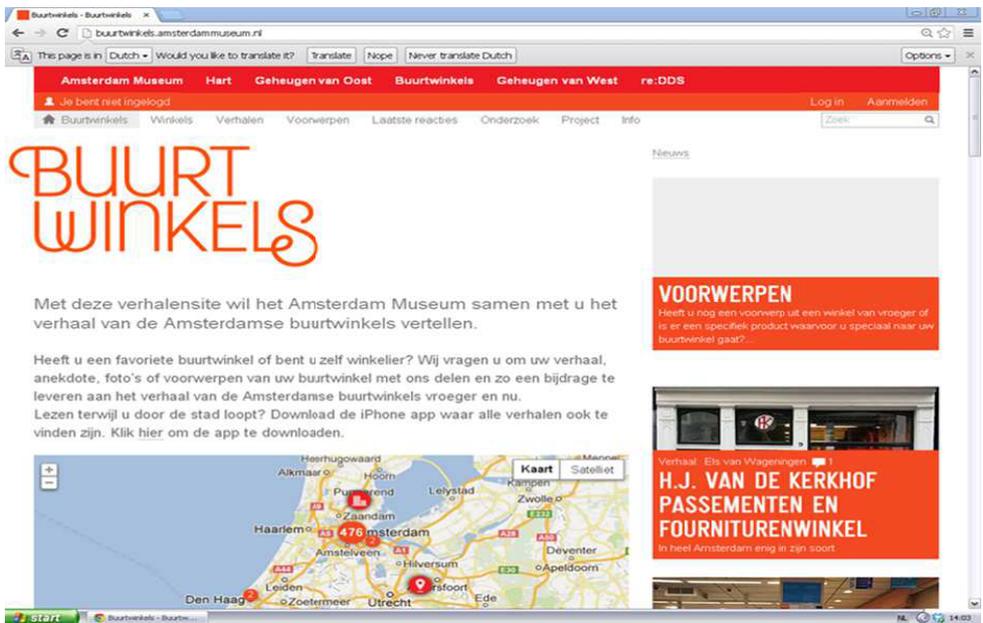
But we as researchers, through the research we conduct and through the controversies we deploy in our texts, we are also participating in this political process. Through the concepts we develop and the theories we put forward, we are contributing to the debates on how to lead our lives with the things we work and live with. We are ordering the practice of designing too in our concepts and theories, while at the same time we are ordering our practice of researching.

Our task as researchers is to keep the political process open, to continue to deploy, together with the designers themselves, the design controversies we observe in practice, rather than stabilizing them in our concepts and theories. That is why, I argue, the ideas I put forward in this thesis, of design as liberal art of advancements, are to be seen as a temporary stabilization which needs to be carried on. These concepts are only the outline of a design as a liberal art and they need to be deployed further and in other contexts than that of the museum examined here. Only then can we, together with the designers, continue the political debates on how we could live and improve our lives with the objects that enrich our existence.

Appendix

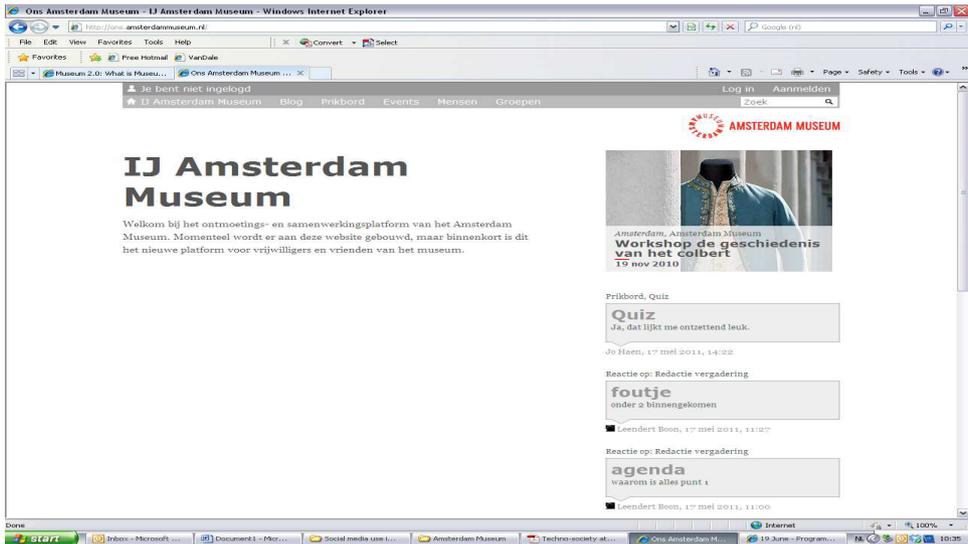
Appendix 1: Print screens of Amsterdam Museum's first online communities

Print screens of the sub-communities Memories from the East (above) and Neighborhood Shops (below). Retrieved on the 27th of May 2013.



Appendix 2a: Print screens of the first version of Amsterdam Museum's overarching online community The Heart

The welcome message reads: "Welcome to the meeting and collaboration platform of the Amsterdam Museum. We are currently working on this website but soon this will be the platform for the volunteers and friends of the Amsterdam Museum." Retrieved on 17 June 2011.



Appendix 2b: Print screen of the current form of Amsterdam Museum's overarching online community The Heart

The welcoming message reads: "Nice to see you! Welcome to the meeting and collaboration platform for volunteers and friends of the Amsterdam Museum". Retrieved on the 27th of May 2013.

The screenshot shows the website 'Hart Amsterdam Museum' with a red header. The main navigation bar includes 'Amsterdam Museum', 'Hart', 'Geheugen van Oost', 'Buurtwinkels', 'Geheugen van West', and 're:DDS'. A secondary bar features 'Je bent niet ingelogd', 'Facebook connect', 'Log In', and 'Aanmelden'. The main content area has a large red heading 'LEUK OM JE TE ZIEN!' followed by a welcome message: 'Welkom bij het ontmoetings- en samenwerkingsplatform voor vrijwilligers en vrienden van het Amsterdam Museum'. Below this is an article titled 'DE LANGSTE GRACHT' by Eivire Jansen, with the sub-headline 'Tekenen mee aan 400 meter gracht!'. The article text states: 'Gisteren is het project De Langste Gracht van start gegaan. Tijdens het project werken kinderen aan een grachtenantekening van 400 meter lang. Het is dit jaar 400 jaar geleden dat de grachtengordel is aangelegd. De mooie grachtenhuizen, pakhuizen, bomen, fietsen, auto's, dieren en mensen krijgen allemaal een plek op de lange tekening.' An image shows a group of children holding a long banner. To the right, there are sections for 'Direct naar' and 'Uitgelicht', with the latter featuring a graphic titled 'DE ZWARTE BLADZIJDE VAN DE GOUDEN EEUW'.

Appendix 3: Three interview protocols

1. Interview with members of the e-culture department

A. Insights into their work at the museum

1. Can you describe to me what you do here at the museum?
2. Can you describe to me a typical day of work, so that I can get some insight into how you work?

B. Changes in the museum practice

1. Do you see any concrete changes in the museum, in the way the museum does things?
2. How has the museum's relationship with the public been changing in the last years?
3. What do you think triggers these changes in the museum?
4. What do you see as the (current and future) role of the museum in Amsterdam and beyond?

C. The online community's presence in the museum:

1. More and more museums in the Netherlands are developing their own online community platforms for their public. What is your view on this?
2. With The Heart, what impact do you think it has on the way the museum does things internally and in public relations?

D. On the development of the new online community

1. Can you tell me about your role in the development of the new community site?
2. Where do you get your inspiration from when you work on this community site?
3. In the documents describing the plans for the new online community, the ideas of 'commitment' and 'engagement' are mentioned very often.
 - a. What do these ideas mean to you? How do you see them in relation to the new online community?
4. How do you go about designing for commitment and engagement? What challenges do you confront yourself with in designing for commitment and engagement?

E. Relationship/Collaboration with web designers

1. Can you please describe to me the work relationship that you have with the designers at Mediamatic and TDC lighthouse? Can you explain how, in your view, have these relationships changed over time?
2. Do you think that because you are doing this together, the roles are also changing, such as you become for like designers and they become more culturally oriented?
3. Can you tell me about the expectations you have from the designers of what you would like them to deliver. How do you negotiate these expectations?
4. How is your collaboration with the other designers' teams? Do they also think along like Mediamatic?
5. What difference and similarities do you see between your ways of working and thinking about online communities and the ways Mediamatic works and thinks about them?
6. From your meetings with the web designers, what lessons do you learn from them?

2. Interview with curators and other museum employees

A. Designing exhibitions and activities:

1. What was the design approach and process that was taken before and why doesn't it work now? What triggered this need for change?
2. What is different in the approach and in the process, the way of thinking about it? Do you start from a different starting point, perspective, etc?
3. Working with suppliers: how was it done, how it is done now, what's the idea behind it?
4. What challenges, negotiations, difficulties, uncertainties did you have in preparing this exhibition? Examples!
5. Balance between educating, entertaining, bonding and money making? How to, challenges, uncertainties?

B. Participation:

1. What is participation and why is participation of the public in the museum so important today? Different from engagement? How was it before?
2. It is a new way of interacting with the public - what challenges do you confront yourself with fostering participation: both from the public and the colleagues, critiques?
3. What, controversies, discussions and arguments are brought in the museum for and against public participation?
4. What uncertainties are there in the museum about fostering participation? (authority, knowledge, art)

C. The online community's presence in the museum:

1. More and more museums in the Netherlands are developing their own online community platforms for their public. What is your view on this?
2. With The Heart, what impact do you think it has on the way the museum does things internally and in public relations?
3. Do you see any concrete changes in the museum, in the way the museum does things and what is still done in the more traditional way of being a museum?

D. Museum social responsibility

1. There is this call in the museum now for being more socially responsible? What does that mean? Wasn't the museum socially responsible before?
2. Examples of situations where these discussions are really vivid.

E. The museum as 'a meeting place'

1. What does this mean for you?
2. How do employees in the museum relate to this? What is visibly changing in their ways of working? Uncertainties, challenges, controversies?

The online museum for the locals vs. onsite museum for tourists: how do the two combine? Challenges, uncertainties? The larger debates outside the museum.

- F. What are the **issues that remain unresolved** still in the museum's move towards public participation? What continues to be debated? What will continue to be uncertain?

3. Interview with web designers

A. Social media as mediator or technological platform

1. When you look at the way social media are used today (for example during the Arab revolutions in spring, or in the cultural sector like museums) what is it, in your view, that social media help achieve?
2. What is it in social media that makes it work for the people engaged in them? (what works, for whom and in what circumstances?)
3. How do you define an online community? What makes it social?
4. Do you see these online communities as new ways of being together online, new forms of togetherness? If yes, what is the nature of this new form of togetherness?

B. Design philosophy/guiding principles/design theory

1. What design philosophy(ies)/guiding principles do you employ in your work?
2. Do you have a personal design theory that you developed over the years? (how do you design for recurrent participating, collaboration and interaction)
3. Mediamatic designs community sites for different clients with different target groups. What does that mean for your design philosophy and how you put it in practice (how do you know what works for different target groups?)

C. On design knowing

1. One designer argued that “designing is knowing your materials”. What are the materials you are working with in designing social media sites and what do you need to know about them?
2. “designers know about design”. Can you explain this from your perspective?

D. Ways of working internally and with the clients

1. Can you describe to me your particular ways of working?
2. The nature of collaborations with clients: Amsterdam Museum vs. others
3. The toolbox of design methods at Mediamatic: is there a difference in methods for designing online communities and designing static websites?

E. The Amsterdam Museum online community project

1. What would be the object of design in the Amsterdam Museum project? Or is there a larger object of design that Mediamatic works on and the AM project is just one instance of?
2. When I look at the AM project, I see that the object of design is presenting itself to different people in different ways. To Rogier as webpages, to Arnold as modules, to Marijke as a new museum. What then makes the collective designing possible?

F. Wicked problems in design

1. Present Rittle’s 10 properties of wicked problems. Do you recognize these ideas in your way of thinking about design?
2. How would you describe designing, what is designing?

- G. When you look back at your own work, **what is that you do exactly?** What is it that you are working towards, what are you doing it for?

Appendix 4: Codes used in analyzing the empirical insights

Open and Axial Codes	Explanation
<p>(changing) Museum-public relationships</p> <ul style="list-style-type: none"> • (changing) young public's attitudes towards museums • foregrounding collaboration between employees and public • turn towards the local public • shared storytelling 	<p>These codes were used in coding data referring to how museum employees view the nature of the museum-public relationship, to what they see as changing in this relationship, what triggers these changes and how they view the development of these museum-public relationships in the future.</p>
<p>Dream of Amsterdam Museum</p> <ul style="list-style-type: none"> • collect and preserve object for posterity • engage a diverse public • improve relationship of inhabitants with the city • tell the story of Amsterdam • improve communication between the museum and the public • become a online and offline meeting place • 	<p>These codes were employed in coding data referring to the negotiated goal of the Amsterdam museum redesign project, what the museum wanted to achieve.</p>
<p>Designing in wicked situations</p> <ul style="list-style-type: none"> • keeping things open • (implementing) mechanisms that feed themselves • embracing uncertainty • advancing 	<p>These codes were used to code data referring to how museum employees and their collaborators approached designing in the complex and unique situation of the Amsterdam Museum, the focus being on how the managed the complexity of their design situation.</p>
<p>Design challenge in designing for interaction</p> <ul style="list-style-type: none"> • achieving order • being open to new collections / connections of objects • creating a fun and friendly environment • filtering and displaying information • attracting attention • finding balances • involving people • knowing your public • letting go of your preoccupations and imagination • making users return and spread the word • understanding what works for people • designing for non-participation, non-use 	<p>These codes were employed in coding data reflecting the challenges designers confronted themselves with in designing for online interaction on the online communities and in preparing interactive exhibitions offline.</p>

<p>Design methods-in-practice – collective performance</p> <ul style="list-style-type: none"> • participating in the system • being a host • observing users • reacting to users’ needs • being unobtrusive • keeping the users in mind 	<p>These codes were used to indicate the different methods–in-practice designers in this study employed both in designing online communities and in preparing interactive exhibitions offline.</p>
<p>Design by drawing things together</p> <ul style="list-style-type: none"> • by combining public stories and museum collection • by enrolling colleagues, partners, public • by including multimedia in exhibitions • by diffusing the online and offline in exhibitions • by drawing inspiration from different sources 	<p>These codes were employed in coding data referring to designing by drawing things together, what actions it consisted of, what was drawn together and how.</p>
<p>Evaluating design methods in practice</p> <ul style="list-style-type: none"> • exploratory methods (imagination, intuition, empathy, brainstorming with the client) • observation methods • building methods (sketching, mock-ups) • testing methods (usability studies) 	<p>These codes were used to code data illustrating the discussions centered on the nature and type of traditional design methods used in designing the online community platform.</p>
<p>Designing for emergence/advancements</p> <ul style="list-style-type: none"> • designing as travelling • designing over time • designing as caring • designing as deploying controversies • managing as designing 	<p>These codes were used in coding data illustrating the design approaches the museum employees and their collaborators took in designing online communities and offline activities that continue to develop, to advance. The focus here was on how the museum employees and their collaborators kept things opened to foster emergence and advancements.</p>
<p>Mediating objects, epistemic objects</p> <ul style="list-style-type: none"> • online community as unfolding object • objects that facilitate learning • objects that materialize thought • objects that inspire new ideas • objects that mediate collaboration • objects that bind different actors together 	<p>These codes were used to refer to all those non-human actors that facilitate, support, sustain human actions and activities; objects that bind people together; objects that trigger controversies; objects that give body to arguments, and so on.</p>
<p>(redefining) Work relationships between employees and web designers</p> <ul style="list-style-type: none"> • contract based client-supplier roles • redefining roles_working like partners • need for close contact • trust based designers collaboration • mutual inspiration and learning • shared creative process 	<p>These codes were employed to code the discussions centered on the nature of work relationships between museum employees and the web designers and other supplies of online technologies. Triggers for the need to change the existing work relationships were coded too.</p>

<ul style="list-style-type: none"> • sharing responsibility 	
<p>(redefining) Work relationships inside the museum</p> <ul style="list-style-type: none"> • working with volunteers and interns • project based working • reconsidering attitudes [towards public, suppliers, other employees, volunteers] • shifting responsibilities • shared authority 	<p>These codes were used to illustrate the changing nature of the work relationships inside the museum; on working with volunteers and interns, project based working and the accompanying shifts in responsibilities and work attitudes project based working brought about in the museum.</p>
<p>Role of online community in the museum</p> <ul style="list-style-type: none"> • Accommodates (changing) public attitudes towards museums • Means to foster public participation Means to open up the museum to the interested public • Marketing museum online presence • A new way of communication with the public • Technology facilitates public's self-expression • Technology facilitates learning 	<p>These codes were used to reflect the discussions that took place in the museum on the importance and value of new media technologies such as the online community, the website and offline interactive multimedia in the museum.</p>
<p>Principles for fostering interaction/collaboration</p> <ul style="list-style-type: none"> • facilitate sharing • unobtrusiveness (not controlling, hosting) • enable people to do things • encourage social involvement • give people incentives to participate • show traces of connections 	<p>These codes were employed to code data referring to the design principles the museum employees and their collaborators expressed in designing online communities and interactive offline events. The focus was on what designers believe triggers interaction and sustains online and offline.</p>
<p>Taste making</p> <ul style="list-style-type: none"> • vocabulary for appraisal • distinction_negotiating identity • appraising the self • appraising the practice 	<p>These codes were used to analyze all empirical insights related to taste making. I used these codes to code all the insights related to knowledge and knowing in practice and how designers negotiate knowledge. It used these codes to code all those instances where designers referred to valuating their practice and themselves as designers, as well as valuations of the museum practice compared to the practice of other museums.</p>
<p>Types of designing</p> <ul style="list-style-type: none"> • design as contributing to human values • design as drawing things together • design as hypothesis building • design as invention • design as problem solving 	<p>These codes were used to code the data illustrating the different types of designing the museum employees and their collaborators engaged in.</p>

<p>Sensible knowledge_learning</p> <ul style="list-style-type: none"> • learning by doing • learning by exploring • learning from old structures • feeling what is necessary 	<p>These codes were employed to code all those instances that refer to learning, to how designers learn in practice, by what means, what inspires them and provides them with new ideas. Using these codes, I coded all the insights referring to sensible knowledge, learning by doing, by being engaged in practice.</p>
<p>Museum practice as wicked</p> <ul style="list-style-type: none"> • the public voiceful in museum • communication, no information distribution • exhibitions stay alive online • personal stories alongside historical objects • changing/evolving museum roles • museums need to be entrepreneurial 	<p>These codes were used in coding empirical insights that indicated the increased complexity of the museum practice, in relation to the public, changing ways of communication and the increasing world trend in museum world towards fostering the development of interactive technologies and the public's participation in the museum practice.</p>
<p>Working ingredients_making assemblages work</p> <ul style="list-style-type: none"> • treating everybody like partners • empathy for the product • empathy for the community • connecting with community builders • encourage a practice to develop • allowing objects to unfold 	<p>These codes were employed in coding all insights that indicated how museum employees and their collaborators keep the design going, with a particular focus on their beliefs of what makes their design work.</p>

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