

Redefining Innovation Processes: The Digital Designers at Work

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As design in digital innovation has become a thing, we highlight the inconclusive concepts that describe design activity in innovation processes. Proposing an alternative theoretical lens – a sociomaterial practice lens – we claim that this view can reveal the contribution of digital designers to the work of innovation. This paper draws on a research study with digital designers in the UK. At the same time as we begin to reconceptualise the ways digital design activity can be described, we also illustrate a theoretical framework based on 1) action and knowing as ordered by collectively produced objects, 2) sociomateriality and the configuration of human bodies and materials in action, 3) the co-emergence of objects and sociomaterial configurations where each is the condition of the other. This alternative way of looking at design activity may pose some challenges to the theoretical traditions in the field. We however believe that it contains immense potential too.

Design theory, Social practice, Methodology

1. INTRODUCTION

Digital technology has changed production landscapes, and design in innovation has become a thing which businesses talk about. As online purchases, mobile apps, and interconnected services define the market and promise a competitive edge, development teams are required to find new ways of working together. Questions of how to innovate and stay competitive, how to harness the creativity of the team, and how to navigate complex requirements, have created its own field in the literature. Design has hereby positioned itself as a special way of knowing, and as an integrative function in the innovation production process, as we are going to illustrate in the overview of the literature. But we would like to speak a word of caution, and draw attention to the inconclusive concepts of what design activity is, how it actually works, and how it may subsequently contribute to digital innovation. This paper draws on data collected during a research project which was conducted in the UK within the digital design community. The aim of the paper is not so much a new concept of design, but rather the proposal of a conceptual lens which allows an exploration of design activity in new ways. Most important to us at this stage is to present the methodological framework and how it may be used. Using an analytical lens describing social practices, we

assume a mutually constitutive relationship between the 'structure' and the 'action' of the practice. We take up two respective analytical viewpoints, to arrive at a description of design practice. This description differs from usual process descriptions in the design literature, and accounts for the messy environments within which innovation work is done. Following the sociologist Silvia Gherardi (2010, 2012), we describe in a 'reading from the outside' some of the ideas that the digital design community have constructed around their work, which we will describe as 'objects' of design. In the 'reading from the inside', a close up examination of the design activity, the everyday life of the designers within the production landscape, will be shown. We will do this through the fictional persona of Finn, a UX (user experience) designer working in London. Putting these two view points into relation, we will illustrate that design activity can be seen quite differently from currently prevailing accounts. Instead of describing a new or better design process, we show a view on innovation activity which makes sense of the tangled and often conflicting situations. The result is the illustration of design activity as a practice which relates the collective understandings (the objects) with the everyday performance of the activities of design work.

We will take the reader through a brief overview of positions in the design literature, leading to the research question of how we may better understand

design activity. The then following methodology section explains the framework, and the methods employed. The presentation of our exploratory results is structured according to the methodological framework and its analytical angles, it is split into subsections on the reading from the outside (the objects, or collective understandings), and the reading from the inside (the close-up view of the designer's position). In the discussion we bring those two analytical pillars into relation to describe the practice and its effects, and then outline some points of thought what this might mean for designers.

2. OVERVIEW AND RESEARCH QUESTIONS

First and foremost, it is important to explain what we mean by 'innovation'. With the rise of design thinking (see Brown, 2009; Martin, 2009; Stickdorn et al, 2011), and with the extending of the design task from individual designers towards multidisciplinary design teams (see Gothelf and Seiden, 2013; Knapp, Zeratsky and Kowitz, 2016; Ries, 2011), the term innovation has been claimed away from R&D departments, away from technologists, into the space of collaborative working. The profession of design has made the proposition to businesses that it is a knowledge production process which can tackle innovation in more useful ways than businesses were able to do with traditional processes. This claim spans the "introduction of new physical products" and "new sorts of processes, services, interactions, entertainment forms, and ways of communicating and collaborating" (Brown, 2009, pp7-8). To the designers, their processes have become the tools for innovation, and businesses have largely bought into this idea.

This idea that designing is a special kind of knowledge production activity, fit to be used by teams for innovation, needs to be unravelled a little. Historically, there have been many accounts of design activity. Design has been treated as a scientific process of rational reasoning (see Simon, 1996) producing objective truths (see Nielsen, 1994). Design has also been practiced as art and creativity (Julier, 2000) and as a process of intuition (see Alexander, 1964). In the design of technology, the human-centred idea has inspired a combination of approaches. HCI (human-computer interaction) has had a special relationship with design – as an "implicit design discipline" (Fallman, 2007), which does openly commit to both aspects – the scientific and the creative. Especially with the increasing importance of the experiential aspect of use (Hassenzahl, 2004), the design of technology has embraced both technology and the social of everyday life.

The Stanford d.school defined "design innovation" as the ideal product between the triad "*technology*",

"*human needs*", and "*business*" (Gardien, Deckers and Christiaansen, 2014). Along the same concept, Brown (2009) describes 'to design' as the ability to bring into "harmonious balance" the constraints of "*feasibility* (what is functionally possible within the foreseeable future); *viability* (what is likely to become part of a sustainable business model); and *desirability* (what makes sense to people and for people)" (p18). Several books on design in innovation have picked up this model: Lean UX (Gothelf and Seiden, 2013, pp5–6) and User Story Mapping (Patton, 2014, p156). Also Value Proposition Design (Osterwalder et al, 2014) talks of the successful integration of *technology*, *customer need*, and *business value*. Design literature in innovation has drawn up this picture of a designed solution made up of overlapping but distinct areas such as 'technology', 'human values', and 'business'.

The potential of design activity is hereby presented as the processing of a solution across these areas. This processing is described as a special form of knowledge which is neither entirely based on "*feeling, intuition, and inspiration*", nor on "*the rational and the analytical*", but assumes a "third way" of knowing, developed through *inspiration*, or problem setting, *ideation*, the generation of ideas, and *implementation*, the bringing these ideas to the market (Brown, 2009, p4, p16). Martin (2009) postulates a "reconciliation" of the *intuitive* and the *analytical* (pp5–6), and traces the transformation of knowledge in innovation from "*mystery*" to "*algorithm*" (pp7–9). More specifically, User-Centered Design standardises the process as "*understanding and specifying the context of use*", "*specifying the user requirements*", "*producing design solutions*", and "*evaluating the design*" (BSI, 2010). Along similar lines describes User Experience Design the process as consisting of "*Analysis, Design, Implementation and Deployment*" (UXPA, 2018). (All emphasis in the last two paragraphs are ours.)

These descriptions of design work conceptualise innovative solutions as made up of separate entities which need to be brought into a "harmonious balance" (Brown, 2009, p18), and this 'harmonising' works through combining the logical and the intuitive ways of knowing, carried out in separate steps that relate either to understanding/analysing/specifying, or to producing/implementing – ordering activities into 'thinking' and 'doing' ways of knowing. Design proposes itself as an alternative way of knowing, a new process of innovating, and it proposes an order to innovation whereby it positions itself as the integrative element (Bohemia, 2002).

However, there are several criticisms of presenting design processes and their promised function in this way. A separating out of 'thinking' and 'doing' does maintain traditional dichotomies rather than

reconciling them, and furthermore ignores all anthropological and sociological research questioning such separations (Kimbell, 2012). Gedenryd (1998), who researched architectural design work, argued that design work cannot be split into “analysis” and “synthesis”, and he traced back the “culprit” of this separation to the theories of the ancient Greeks. Thus it can be said that such separations between thinking and doing – or theory and practice – make up the dominant paradigm of today’s understanding of the world. Latour (1993) speaks of the “translation” work and the “purification” work which western societies have been practicing in parallel, with their neat separating of nature and humanity, of the natural and the artificial, in the same time as constructing hybrids linking all of these again tightly together. Interpreting Latour, humans are building complicated machines for purposes that serve human needs, in the same time as they are keeping things separately tucked away in finance departments, engineering divisions, and creative teams. People work away in multi-disciplinary teams on ground-breaking technology, trying to harness the magic of collective creativity, attempting to bridge engrained organisational structures, each person with different professional backgrounds, languages, cultures, and experiences. These local conditions of working are not considered in the conceptualisations of design activity (Kimbell, 2012). Innovation work does not take place in categories, and it does not follow repeatable steps in a process. Something else is going on, as both our experience and decades of research in sociology and anthropology suggest. A continuous social ordering is ongoing, just how we can make sense of it is in question.

How is design in innovation work ordered? And how does it do integration? Another open question is, where are the designers in this? Roger Martin places the particular ability ‘to design’ in the “predisposition and the capacity to hold in their heads two opposing ideas at once” (quoted in Kolko, 2014, p22). Brown urges designers to reinvent themselves as ‘design thinkers’ as they are otherwise “destined to live in the downstream world of design execution” (2009, p27). Where are these designers located in the diagrams and processes? The politics of imagining futures (Mazé, 2016) or of user participation (McCarthy and Wright, 2015) go unnoticed, just as the location of the designers in all of this (Suchman, 2002). Everything is neatly described in categories and processes, but the designers and the supposed acts of donating and facilitating their process go uncharted. We propose a conceptual lens which allows a view on these processes which are ongoing in innovation work; one that does not rely on such separations but that accounts for the entangled nature of design situations and its participants.

The problem with current accounts of design/innovation activity is that they are too neat, that they do not really explain what is going on and leave many questions open. We do not want to use traditional separations of technology and society, of intuition and logic, or of thinking and doing. Instead, we will introduce a framework that accounts for the complicated webs of relations in everyday activities. In the following section, we are going to trace concepts which show the co-emergence of local activities and the order of the activities.

3. METHODOLOGY AND ANALYTICAL FRAMEWORK

In this section we are going to frame our theoretical position with the help of concepts from anthropology, sociology, and science and technology studies, before developing the analytical framework, and outlining how we explore the data.

In some major anthropological work, counter to the understanding of cognitive science, Suchman (1987) argues that humans do not hold mental models of the world in their heads, which they synchronise with the ‘real world’. She shows in her research of users interacting with photocopier machines that human interaction is driven through mutually shared ways of expressing and understanding each other, rather than through computing actions in their minds. Humans express themselves in mutually shared ways that make them intelligible, so their expression may be understood and responded to. Thus it is the mutual intelligibility and understanding which informs action, and not goals or minds. Following Suchman, there is a significant difference between machines – which do have a computed model of the world – and humans, who don’t. The opposing notion of action can be illustrated by Norman’s goal-operated “seven stages of action” model (2013, pp40–44). Norman describes a reading person’s actions as the person notices that the light has become dimmer: *In order to continue reading, the person forms the goal to get more light. The person specifies how to move the body and then performs the action to turn on the lamp* (p46). The specification and execution of action are here determined by the goal — to get more light. In Suchman’s hands this example might read as the following: *The environment expresses dimness to the person reading, which she understands as such. She responds by switching on the light, because she is familiar with communicating with the lamp. The lamp, as always, responds with giving enough light.* In Suchman’s account the respective expressing and responding, amid mutual understanding, bypasses the mind and highlights the intelligibility of something, as well as the familiarity between people and things. Instead of a goal-operated body, people interpret and respond to each other and the environment in embodied, contingent, and situated actions (1987). Plans and goals would

here be merely produced in the moment – in a further action – to account for the previously happened action. But while Suchman's theory accounts for how interaction happens, it does not reveal how people *know* what to do in any given moment.

Gherardi's model of knowledge (2006) is based on social practices which organise activity. People operate within practices they are part of, for example the practice of 'lighting the home', which carries within it the knowledge of what it is, what it is for, and how to do it. People know what to do and how to do it because they are competent practitioners – they have been practicing the activity for a long time. How to proceed in any given moment is a collectively produced understanding (e.g. what 'lighting the home' is), and accordingly this understanding orders what needs to be done. Gherardi (2010, 2012) describes social life as a tightly woven fabric of practices which entails all human activity. In her account practices order actions, and the knowledge that these actions require. These practices may be lighting the home, driving a car, doing brain surgery, or designing a smart phone app. The emphasis is on the practical aspect of all activity, the collective shaping of practices by its participants (the readers, the drivers, the brain surgeons, the designers), and the ordering mechanism of practices to which the participants are subject to. According to Gherardi, practices are ordering devices in which the order of the practice (the objects, the understandings) and the possible actions co-emerge. Practices and its objects are made and maintained by its practitioners, over which they only have collective power. People take part in practices, and as they are influenced by the shared understandings (the objects) in what is possible for them to do, they also produce the objects through their doing. This is a very particular and distinctive account of knowledge, action, and expertise.

Designerly expertise is here organised in designers' practices, which can be analysed both as objects and as situated doings. The understandings of design in digital innovation are continuously re-made by the participants of the practice, and these understandings make certain actions for participants possible, and others not. What counts as design work in innovation is ordered by the shared understanding of the designers and other participants.

Furthermore, people and the material, such as the lamp, work together here in "sociomaterial" practices, which are in this theoretical viewpoint refused a separation between the social and the material (Gherardi, 2017; Orlikowski, 2007). The separation between the human and the material does not exist naturally but is man-made in our tradition of thinking about the world. "[The] boundaries between persons and machines [are]

discursively and materially enacted rather than naturally effected" (Suchman, 2006, p12). Thus, the relationship between humans and technology does not happen amid a social context, but produces the context itself in a practical, situated and mutually constitutive way (Gherardi, 2006, 2012, 2017; Schatzki, 2002; Shove, Pantzar and Watson, 2012; Shove et al, 2007). Materiality *is* social life (Latour, 2000). As Orlikowski (2007) describes, "there is no social that is not also material, and no material that is not also social". She uses the example of Google search technology which allows people to proceed in their lives differently according to which country in the world they are 'googling' from.

What this means for design activity and the ability of designers, is that there are shared understandings of what designers' work is about – an order – which influences how designers do their work. In their work designers reproduce these shared understandings. The practices which designers are part of – for example doing user research, or doing prototyping – shape the sociomaterial landscape within which designers are embedded, just as the sociomaterial participation shapes practices. And as Dourish (2017) points out, this sociomaterial landscape does not stop with the physical hardware of tables, keyboards and computers, but extends to the ecologies of communication networks such as the internet, or communication protocols made up of code. The digital and its "representational materialities" are direct participants in producing sociality (Dourish, 2017).

The key points from the review of these authors, to be used in the analytical framework, are 1) a practice view which does not separate thinking and doing, and which understands action and knowing as guided and ordered by the collectively produced objects, 2) sociomateriality which does not separate the human and the material, but accounts for the configuration of humans bodies and materials in action, 3) the co-emergence of objects and sociomaterial configurations where each is the condition of the other. Such an analytical treatment sheds light on both the local activities as well as on how the practice is ordered; it gives a view on both the action and the structuring mechanism of action, and how they relate. Thus, if we recall our questions (How is design in innovation work ordered, how does it integrate, and where are the designers in this?), this framework can help to answer the questions of the order of the practice (the objects), the local performance of the work (the sociomaterial configurations), and put these two in relation, which can also establish the location of the designer.

In this paper, we explore the data which has been produced during a research project, consisting of ethnographic interviews and observations with over 20 designers working in small, medium, and large companies in the UK digital industry. The data

further consists of two surveys with over 100 designers in total, as well as the content of books¹, websites², and LinkedIn³ profiles – resources which are used by the designers in their work. For describing a close-up view of the practice we mainly use the ethnographic data, and for describing the emerging objects of the practice we predominantly use the data from the surveys, books, websites, and LinkedIn profiles.

The framework for this analysis adopts Gherardi's three levels of readings (2010, 2012), which comprises of three analytical viewpoints the researcher adopts in order to arrive at a relational interpretation of the practice. (1) *The reading from the outside* looks at the order of the practice – the objects – as they are produced and recognised by the practitioners, and also from people 'outside' of the practice (2012, p161). Through a "typology of activities" a preliminary description of the emerging institutionalised shape of the practice is created (p161). (2) *The reading from the inside* investigates close up the sociomaterial connections in action; it sheds light on how the practice is performed (p161). Our angle here is that of the designers within their sociomaterial environments. This viewpoint gives us access to how the practice is performed and experienced by designers. Because of the limitations of the conference paper, we compress this data into a fictional persona called Finn. The compression is an interpretative representation of the data whereby empirical details are selected, mixed and assembled into a person that does not actually exist, but is illustrative of the situations that were encountered. This is clearly a simplification of a wealth of data. However, as we are currently more interested in demonstrating our approach to making sense of this kind of data, rather than the actual findings, this simplification may be forgiven. (3) *The third reading* – which will be our discussion of the results – is our own ordering of the practice into a tentative account of what the practice does (p168). We will put the previous two readings into relation in order to answer the questions of the order of the practice, the integration of it, and the location of the designers.

4. RESULTS

There are several themes that emerge when exploring the data: (1) Designers feel that technology is often so broken that it becomes hard for people to use⁴. There is a feeling of injustice when software engineers have the perceived power to make product decisions, simply because their processes are shielded amid technologist talk that no one can participate in⁵. (2) The processes of businesses are described as difficult. Traditional organisational processes, hierarchies and silos are perceived as not helpful. Management decisions often do not make sense for customer needs, for the ways how employees work, or for the technological

infrastructure to implement. Here designers in the field are scrambling to not be succumbed to the solutions managers dream up, and to not become mere puppets in the process of implementation⁶. (3) There is a strong desire amongst the design community to integrate the conflicting interests which are at play and which need to be negotiated. It is indeed a negotiating battle, and designers arm themselves with the soft skills they perceive to be the necessary advantage to facilitate the process⁷.

4.1. Reading #1: What do designers do?

The reading from the outside gives a view on the emerging objects of design – the ideas which designers have of their work, and the recognisable shape that appears of the practice. We will describe it here with a list of activities categorised around the emerging themes. The review of content that talks about digital designers' work allows to derive a list of activities which can be tentatively described as a figure of a three-fold emphasis: **human needs**, **technology**, and **business** (see Figure 1). This triad⁸ of valuable, usable, feasible, in other words, can be described as objects. Activities are either aimed towards a particular object within this triad, or towards connecting two or more objects, breaking down the silos and hierarchies.

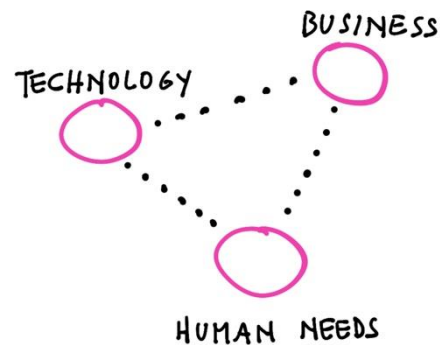


Figure 1: The three objects designers work with and connect: Human needs, Technology, Business

4.1.1. Activities aimed at a particular object:

Designers in digital innovation work with **human needs**. They:

- Understand how users feel and act
- Do user research
- Define positive and negative emotions
- Understand user goals

Designers work with **technology**. They:

- Understand technological constraints
- Liaise with developers
- Prototype with the technology in mind

Designers work with the **business**. They:

- Help define business goals
- Identify business opportunities

In the following, we extract the at least as extensive list of activities aimed at connecting those three objects.

4.1.2. Activities aimed at connecting objects:

- Devise product design processes from strategy to implementation
- Build multi-disciplinary design teams
- Find common language and tools
- Find common work spaces for collaboration
- User research questions / user tests with the technology in mind
- Include developers in user research
- Prototype with developers
- Include user research into the organisation-internal processes
- Negotiate projects with managers
- Champion the user within the company

The activities aimed at connecting objects – for example championing the user within the company – show the particular understanding of facilitating the connections between separated domains, such as the user and the business. The designers' collective idea about their work shapes up to be a reconciliation of organisational silos, and connecting businesses closer to the users, in an attempt to redefine innovation processes taking into consideration all these conflicting interests. Designers also try to break down traditional organisational hierarchies to achieve more useful outcomes in design. An institutionalised shape of the practice as reconciling separate entities appears. Here, we have used the reading from the outside to take a look at the emerging order, the shared understandings, the ideas which make up the objects the designers work towards.

4.2. Reading #2: How does Finn do it?

We now want to look at the daily performing of the work and the everyday experience of design practitioners. As a shortcut, we use the persona of Finn, to help us demonstrate the reading of data in a close-up view. Finn is a UX (user experience) designer in London. He works for a large company on a range of healthy life style apps and internet platforms. The products help people transition to a healthy life style. Finn, and the product he is working on, are fiction. We use Finn as an illustration to demonstrate the myriad small things that do influence the everyday lives of designers. It is the particular arrangement of elements which is made up for this paper, but the single elements are empirically based. For example, we made Finn

male since most designers are male (Design Council, 2015). Finn has a first degree in computer science and artificial intelligence. He did a second degree in HCI, and has about five years working experience. He likes his job, because it allows him to do something useful which helps improve people's lives.

In this particular work setup Finn works with four developers and one visual designer. He conducts user research, facilitates collaborative workshops, and he prototypes with code. The reason why he works with code is because he is familiar with it from his university projects, and he has been making websites and small robotic prototypes since he was a teenager. And he also believes that as a digital designer he needs to know the 'material' he works with – and in this field the material is computer code. He feels that the code is the functional backbone of the product, and much more important than the visual style. He wants to get away from the notion that design is about how something looks. Most important for Finn is the functionality, which the team work out in workshops together with product managers and with the developers, making sure it considers the users' experience. This is how Finn introduced UX to the company – as a process that considers the customers' experience from business strategy to technical implementation. The team dynamic between Finn and his developer colleagues is good, and he deems himself lucky – they speak the same language and the developers appreciate Finn's affinity to and understanding of the problems of working with computer code. Finn often feels good about the processes he has managed to put in place in the organisation, in particular the collaborative workshops. But he has two problems:

(A) Despite the thought-through, tested, and mutually agreed solutions created in collaborative workshops, managers frequently decide to make changes to product strategy on short notice because of a perceived better solution which has come their way. Or at least this is how it seems. Then the managers will ask Finn to "UX it" (their solution) so it may fit with customer needs. Finn is not happy about such "solutionising" that will turn him into a "UX monkey". He explains to the management of the company frequently that if a solution does not take into account the user and the technology in the first place, as well as the business idea, it is likely not the right solution. In his view, a 'siloed' approach – first coming up with a strategy, then making it fit with the user, and then developing it – is not the right way to go. With this view Finn has several supporters in the higher ranks of the company, but there seems to be always some manager who is successful in having their strategic idea heard, getting the go ahead by the management team to task the product design team with it.

(B) The other problem which the team experience is that they receive many bug reports relating to the user interface of the applications. When developing a new feature, it is often that something on the 'visual layer' of the application breaks. Andy, the visual designer, seems to be not so well integrated in the daily production routines. That Finn prototypes with code helps his direct work with the developers. But for Andy it means translating any prototype into mockups in his visual software – Sketch – and the developers then have to translate the mockups back into code. This is cumbersome for all sides, and it makes every task seem to take longer than necessary. On the other hand, that things need to "look good" is acknowledged by all team members. But Andy feels the visual aspect of their products is not taken seriously enough, and that his concerns are often treated secondary in tasks. "We'll make it pretty later". The other team members have suggested that he could style the user interface through code (the CSS style sheets). But Andy is strictly against that, finding his work in Sketch most suitable for what he is trying to do. Andy's responsibility is to build and retain the same visual patterns across all web and mobile platforms. He maintains a global pattern library in Sketch; it is a strategic tool he uses daily. Whenever he creates a new mockup, he uses the global styles. The developers maintain their own "functional pattern library" in code, from which they build the user interface. But through this translation, things are always a bit 'out'. Often things look odd on the websites, and the team receive bug reports. These everyday issues are corrosive to the team dynamic, and increasingly the days at the company are not happy for Finn.

5. READING #3: DISCUSSION

In the 'inside' reading there surface a range of conflicting ideas in the team work. On an organisational scale, managers undermine the collaborative workshops to reinforce their powerful positions in the company. There is the management's idea of what Finn's role is in innovation strategy, and there is a different understanding of it by Finn. Despite Finn's best attempts at introducing the UX ways of innovating in the company, and despite management support, there is still organisational resistance against such ways of going about product development. To ask Finn to "UX" something does not only undermine the very innovation process Finn is trying to bring to the company, it does also reinforce the boundaries of the 'business' domain, and maintain the separation and hierarchy between management and product development team, between strategy and implementation, or between thinking and doing.

Also amongst the two designers, there are different understandings. There is Finn's focus on the

'functional' and Andy's orientation towards the 'visual'. There are Finn's and the developers' ideas about smooth production processes which centre on the management of functionality, and there are the visual designer's ideas about his work which centre around the management of visual styles. What is important to the visual designer can best be done with Sketch software. What is important to the rest of the team can best be done through code. Finn's success is that he has made a very good connection with the developers. This relationship is notoriously conflicted (Cooper, 2004). This has been possible because of the personal history of Finn being familiar with computer science and code. The agency of the material allows certain pathways for action and not others (Dourish, 2017; Orlikowski, 2007). A pattern library in Sketch is materially different to a pattern library in code, and hence what the practitioners can do is different. The materialities of code and softwares, and the competence and familiarity with these, help shape what the designers deem suitable and allow participants to pursue practices in certain ways. These ways may conflict, as expressed in the disagreement how 'the visual' should fold into the team process. The unique positioning of each participant within their sociomaterial configurations, often also biographically established, inevitably sometimes leads to conflicts (Alkemeyer, Buschmann and Michaeler, 2016). This conflict shows the presence of the boundaries of these two practices – the 'visual' and the 'functional', and also the active reinforcement of these boundaries. That developers propose Andy may style the code (through CSS style sheets), suggests that the visual can be done after the functioning body is built. Not only does this maintain another 'siloes' approach, a separation between the 'functional' and the 'visual', it also creates a chronological prioritisation, and a hierarchy between the two 'silos'.

Besides the separate objects of technology, business, and the user within the organisational practices, Finn's design practice is also ordered by the objects of the 'functional' and the 'visual'. Finn and the materialities of his biography (the code), together with the current web of team relations, maintain a separation between the 'functional' and the 'visual' as separate objects.

And something else becomes visible: the practice of design in digital innovation has become its own object – that of integration and facilitation. This work is not happening through a special way of knowing, but it is happening through the understanding of designers as mediators of separate functions and knowledges. The understanding of what design can do (mediate) is produced by the practice of which Finn is part. It is made real by the collective maintaining of this idea, and its manifestations in sociomaterial connections in action (Gherardi, 2012). In this understanding, Finn tries to introduce

UX as a process of innovation in his company. But if Finn is the only one in the organisation sharing this understanding, then it remains what it is – his idea and his reality which he may share with the design/innovation community, but not with the practices of the organisation. The idea of mediating innovation processes is a collectively assembled object rather than a naturally 'better' way of innovating. Designerly ways of mediation are a particular understanding which is made by the practice of design in digital innovation and its participants. Any claim of it to be the 'right' way of innovating is only as true as it is practiced within the organisation.

Such a description of design practice as a sociomaterial practice may not at this moment help individual designers to achieve the changes they may want to see within knowledge production processes, but it can explain where conflicts come from and how they are produced. This lens describes the web of social practices, producing the social order within it; producing the constraints we work against. Some of these practices have a long history and participants have biographical connections to them, through professional or educational trajectories. Social life is a dense web of particularly organised connections that the participation in practices has created (Gherardi, 2012). Instead of any 'natural order' which the literature describes, made up of entities such as 'society', 'technology', and 'business', these understandings are co-produced and re-made in every day practices. They exist because they are made as objects.

If we adopt the view of co-emerging objects and possible actions, we may begin to see problematic side effects of the existence and maintenance of such practices of mediation. If the separate entities are objects made by participants of the practice, then the design work helps maintain the separation between entities. That is because the very understanding of separate entities justifies the existence of the practice of design. The practice maintains what it seeks to tear down. In understandings of design in digital innovation, designers are located 'outside' the separate entities, mediating these entities. What this does, is that it makes designers anonymous, unlocatable, and unaccountable. Designers are not 'outside', they are within. They are enmeshed in the sociomaterial practices of the organisations they are part of (Suchman, 1994). Designers help produce the objects of the practices, and they are influenced by the practices. The particular object of design as a new form of innovating pretends that designers are neutral mediators, and it hides the impact that designers do have from their locations within practices. Designers are located within. Just as researchers are .

6. CONCLUSION

We have attempted to provide a different view on design work in innovation – a practice which is on the rise in the current digital production landscape. With these previous two readings in mind – (1) the aspiring connecting work between silos, and the breaking down of hierarchies in the first reading, and (2) the messy enmeshment of participants in many different practices in the second reading – the conflicts and dynamics between the participants in innovation work become visible. We have explored how design in innovation work is ordered, and how the collectively assembled objects produce the recognisable shape of the practice. We have shown how these understandings orient practitioners in what they do, and in their sociomaterial relations, with partly biographically established materialities. Conflicts become explicable when locating practitioners within these practices, and their different orientations. This 'locating work' also says something to the question of how innovation work may be mediated, and brings the inevitable conclusion that it cannot be mediated – at least not as it seems to be envisaged by the practice of design – because designers are located within the organisational practices. A position as a neutral outsider would only be possible in other paradigms, such as objectivism (Knorr-Cetina, 1981). Such world views may be preferable to some, but they do not help explain designers' daily experience – for example why Finn struggles with the resistance of the organisation with the idea of UX and innovation, or why the visual styles across the healthy lifestyle apps keep braking.

The conceptual lens we have used – the world as a sociomaterial web of practices, within which a relationship between the shared orientation and the practical performance exists – enables us to explain the dynamic in digital innovation work. Furthermore, this model also shows the contribution designers do have in sociomaterial practices. It might, as Gherardi positively affirms (2006, p235), allow practitioners to gain more choice in the ways how they do participate in their practices.

What does this mean now for designers? The "implications for design", as Dourish (2006) has reminded us, is a mere trying to press "ways of approaching design" upon us. While it was not the aim of this paper to provide a plan or a blueprint of how to go about designing, we nevertheless point out how, through the particular lens of viewing design activity as practiced, things can suddenly look a bit different, might give us a new angle, and might give us a new awareness. A key insight which this view has provided is that what designers can do is limited. We orient ourselves towards the shared understanding of what is possible within our practice. Design practice is collectively organised, just as business practices, use practices, and

engineering practices. There is only collective power over changing a shared orientation. Another key insight is that 'to act' is not up to designers alone. Designers act as part of sociomaterial networks which determine what is possible to do. However, a sociomaterial practice lens provides the fascinating thought that with every doing and saying we help re-make the practice's understanding and order. This means that structures do not exist, but we make them, in every action, just as we make our possibilities. Constraints and possibilities co-emerge in the daily performing amid the understanding and ordering of the practice. There is nothing 'natural' in the way things are, but we collectively make them this way.

7. FOOTNOTES

¹ Including 'The Elements of User Experience Design' – Garrett, 'Lean UX' – Gothelf/Seiden, 'User Story Mapping' – Patton, 'The Design of Everyday things' – Norman, 'Change by Design' – Brown, and many more.

² Including the 'UXPA' website (<https://uxpa.org/>), the 'IxDA' website (<https://ixda.org/>), 'NNGroup' website (<https://www.nngroup.com/>)

³ LinkedIn, a website for professional networking, <https://uk.linkedin.com/>

⁴ The IxDA (Interaction Design Association) states that "We believe that the human condition is increasingly challenged by poor experiences." (<https://ixda.org/ixda-global/about-history/>)

⁵ Cooper is picking this up in 'The inmates are running the asylum'

⁶ Brown warns in his book 'Change by Design' that designers who do not embrace "design leadership" would be "destined to live in the downstream world of design execution" (p27)

⁷ At the 'People skills for UX' virtual conference, organised by Rosenfeld Media and Environments for Humans, in 2015, speakers talked about the skills of "negotiation", amongst the other themes of "facilitation", "listening", and "leadership".

⁸ Patton uses the language 'triad' (p158 in 'User Story Mapping'), leaning on the process he observed at Atlassian, an influential tech company

⁹ While insisting that designers are politically located within their practices, the irony doesn't escape us that we, the researchers, as part of our research design and writing practice, have had a significant hand in the assemblage of the findings in this paper, in particular in the assemblage of the persona of Finn. The use of empirically based, but nevertheless fictional, personas as a research method demonstrates better than anything that the authors are located somewhere within, and not outside.

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