Infrastructuring Neighbourhood Publics. Local responses to infrastructural breakdown during the Covid-19 pandemic

Erkki Emanuel Hedenborg

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School of Architecture, Planning & Landscape
Newcastle University
Newcastle upon Tyne
United Kingdom

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Abstract

Digital civics is a research agenda for collaborative research together with citizens and community groups in North East England. Here, I apply this to work with a local collaborative of community groups and organisations. The collaborative works to mitigate the compounded impacts of the COVID-19 pandemic and public sector austerity on their neighbourhood. Publics are shared issues, a prism for understanding the work by the collaborative in a complex and heterogenous context. To the material theories of publics I contribute an analytical vocabulary based on Discourse Theory, for contextualising material practices, and understanding the affective drivers of collaboration. Infrastructuring is an analytical and designerly method, used to understand the response of the collaborative to the infrastructural breakdown induced by the pandemic. In addition, I structure a small-scale, remote infrastructuring process around a website, used as a playful trigger. I ask the following research questions: How does the collaborative infrastructure their responses to infrastructural breakdown? What shared issues can be identified through the prism of publics? Is infrastructuring publics a suitable frame for tracing and quilting shared issues? I find that the shifting configuration of human and non-human actors shapes the understanding of the shared issue of mutual aid in the neighbourhood, as a material public moves from from an ad-hoc, social media-based response to a classification infrastructure. Regarding the use of Zoom as a stand-in for face-to-face communication, I find that there is an affective lack in video calls for collaborative work, and a complex set of issues for different service users. I find that digital and non-digital practices are developed in response to issues with Zoom use. Some of these localised practices address social isolation, which is then contextualised within austerity localism. I find that this drives a key shared issue within the collaborative, (the avoidance of) duplication.

Covid-19 impact statement

As will become clear in throughout my thesis, the Covid-19 pandemic had an impact on planned research activities and content of the thesis, to the point where it became part of the adjusted plan. I work with a community partner, with whom I planned a case study that was due to begin in March 2020.

Disruptions caused by the Covid-19 restrictions include my initial planned research activities, which relied heavily on in-person interactions, and included workshops, interviews and a community festival planned for the summer of 2020. Thus, I had to restart from the planning stage, and all research for this thesis was conducted remotely from that point onwards.

Furthermore, at this early stage disruptions were caused by an (understandable) lack of policies from the university regarding ethical approval of remote field work, and the acceptable conditions for field work in general.

Despite adjustments, access to research participants was a challenge throughout, as they could only be contacted remotely. Under normal conditions, recruitment would have likely been easier, as I could have spoken to participants in-person at the regular meetings and events of my project partner.

Particularly in the early stages of the pandemic, disruptions were caused by caring responsibilities, as my partner was classed as clinically extremely vulnerable, and thus shielding - which again meant that I was working with remote methods only throughout.

The disrupted research activities would have contributed to the thesis through a better access to a broader group of participants through different in-person activities with my community partner. I discuss these in the limitations of research in my thesis. This could not have been mitigated against remotely, though I recruited from my project partner as actively as possible with the available means (e-mail and Zoom).

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Part I

Introduction

1 Introduction

This is a thesis in digital civics, which is both a research agenda (see Olivier and Wright, 2015), and an interdisciplinary research programme at Newcastle University (see 'About. Digital Civics', 2022). The research agenda targets collaborative research together with citizens and community groups within the North East region of England, with limited resources, and under conditions of public sector austerity. In the research programme, Human-Computer Interaction (HCI) is combined with one of several other fields of research for an interdisciplinary approach. In this case, that field is planning, specifically in relation to *austerity localism*. This is the formal starting point for my work with a local collaborative of community groups and organisations, which I present in this thesis.

Within HCI, the digital civics agenda has been referenced across a broad range of applied work concerned with cities, often in relation to data. Few of these projects, however, apply or develop the concepts of digital civics beyond its initial framing. This is addressed by Le Dantec, who argues that digital civics is about infrastructuring publics:

> "Digital civics is foremost concerned with supporting collective agency as people come together to address and redress present social conditions. These collectives, or what I have called publics […], form around shared issues and create socio-technical infrastructures to take action on those shared issues (Le Dantec, 2019, p. 170)."

This is a short conceptual framing of digital civics at local scale, and it sets the theoretical and methodological boundaries of this project. Publics, expressed through shared issues, are a prism for understanding the work by the collaborative in a complex, heterogenous and (particularly during the pandemic) fragmented context. Infrastructuring is a set of designerly and analytical methods regarding the articulation of shared issues, but it is also something done by users themselves, in their appropriation of different things into their work.

In my thesis, I contribute to the field of digital civics by expanding on these theoretical and methodological concepts and applying them to my case study. This is done to address a gap in previous work in digital civics. While Le Dantec correctly asserts collective agency around social conditions as the key shared issue of work in digital civics, the links to publics and infrastructuring are less clear, as there is a gap in the development of digital civics as a theory and practice of collective action. This is where my thesis contributes to digital civics.

Regarding the case study, *infrastructuring publics* appears a suitable framing for the work of the collaborative of community groups and organisations, as they seek more communication and collaboration on shared neighbourhood *issues* (meaning: publics). It also to a degree resonates with the digital civics research agenda, as they do so with limited

resources, under conditions of austerity. This collaborative includes around 25 community organisations and charities (membership fluctuates), ranging from youth services, to mental health services, to neighbourhood associations and cultural institutions.[1] Their mandate is to increase collaboration between local organisations, of which many are working to mitigate the impacts of the pandemic (and austerity) in a city in the North East region of England. Le Dantec's work on publics is situated in social service provision, an area that several member organisations of the collaborative operate in as well, making this a suitable starting point for a project in digital civics. In this context, Le Dantec (2016, p. 18) argues that publics provide a "stable theoretical frame around a dynamic context." Shared issues are shaped by actors attached to them, but also experienced differently by different actors, particularly in a heterogenous social context.

Le Dantec's framing of publics at community-scale draws on several theoretical and methodological perspectives, which I will discuss in greater detail in the respective frameworks. These frameworks expand on Le Dantec's initial framing of digital civics as the infrastructuring of publics at community-scale, through a detailed discussion of the underlying theories of publics and the methods of infrastructuring. In this thesis, I contribute a detailed reading of the infrastructuring of publics in particular related to the analytical capabilities of this framing. Discussed in the theoretical framework, the framing of publics draws from two theoretical traditions. One, the understanding of publics as shared issues is based on the pragmatist work of Dewey on the communicative *problem of the public*. This was developed further through Actor-Network Theory (ANT) by Marres as material publics and then Latour as *Dingpolitik*, both stressing the participation of non-human actors in addition to human actors in the formation of shared issues. Two, Le Dantec highlights the role of affective attachments between actors in the formation of publics, an aspect missing from ANT. This (broadly) Deleuzian affect is defined as an intensity that shapes a body's capability to act, and applied as affective attachments that contribute to the capability of a public to act on issues. This is where I introduce Discourse Theory (DT) to publics, as it is based on a number of concepts that serve (broadly) equivalent functions, but with a different emphasis. First, Dewey's *problem of the public* is inverted to Tarde's *problem of the crowd*, an alternative reading of the infrastructures of modernity. For Dewey, the expansion of the social world beyond local communities is a communicative challenge in which publics, no longer face-to-face, struggle to recognise themselves. For Tarde, this interaction at a distance enables publics to recognise themselves as they no longer follow the affective dynamics of a face-to-face crowd. Within the context of the pandemic, this emphasis on communicative challenges becomes relevant once more over a century later, as face-to-face communication becomes impossible. Where for Dewey and Tarde the communicative challenge focused on railways, newspapers and stadiums, it now focuses on the multitude of digital stand-ins for face-to-face interactions such as Zoom. Where HCI and ANT highlight the materiality of publics, DT sketches the formation of

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[1]The collaborative, its member organisations and its precise location are anonymised.

publics (or other collectivities) through a discursive sequence around shared, but rejected demands, represented here in a discursive, not necessarily material, object, and an affective investment in that object. While in a material public, the configuration of actors is constitutive of the shared issue, in the discursive sequence a chain of demands united by their rejection through a responsible institution is constitutive. In *Dingpolitik* an object represents a shared issue, while in DT that object is the empty signifier, elevated by a pre-discursive affective investment. This differs from Le Dantec's use of affective attachments, as affective investment is defined through the Lacanian concepts of lack and enjoyment. Thus, these approaches offer different perspectives on how shared issues constitute publics, and which material and/or discursive elements hold them together. As I will show, these are variations of similar concepts, allowing for a degree of flexibility and openness in the analysis of the issues shared within the collaborative.

I apply publics to develop further the digital civics agenda through an effort to understand the ad-hoc *infrastructuring* of publics by actors at neighbourhood scale (through the analytical methods of ANT and DT), as well as contribute to this (through the designerly and analytical methods of infrastructuring in PD). The notion of infrastructures, or more precisely *infrastructuring*, I will discuss in the methodological framework. Here, I draw on participatory design (PD), which highlights on *infrastructural breakdown* as the key moment for research into infrastructures, based on work by Bowker and Star in ANT. This is a suitable framing, although in this instance it is not the breakdown of a technical infrastructure, but a breakdown in the form of a global pandemic. This breakdown occurred at the start of my case study and remained an ongoing issue through (remote) field work, while my project partner worked to mitigate the local impacts of pandemic throughout that timeframe. From an ANT-shaped PD perspective, my project engages with *design-after-design* - the ongoing, non-linear appropriation of designed objects by users in their lifeworlds (based on Ehn, 2008, p. 92; and Björgvinsson, Ehn and Hillgren, 2012b). In plain terms, I am interested in the *infrastructuring* as a form of design work done by users themselves (*design-after-design*) and less in the preceding, linear design work done by designers/researchers (*use-before-use*). This focus is partly based on the timescale of this project, with design work and research conducted during the COVID-19[2] pandemic, but also because the collaborative had to *design* their own responses to *infrastructural breakdown*. In more general terms, PD adapts material publics into a normative perspective of the design process, and supplements it with Mouffe's theory of agonistic democracy, a perspective which is based on the work of Laclau and Mouffe on DT. Thus, PD employs ANT and DT as a normative frame for *infrastructuring*. Through its applications of ANT and DT, PD also engages with participatory planning practice, linking the fields of HCI and planning, and providing an interdisciplinary approach as envisioned in the digital civics research programme. As noted, much *infrastructuring* is not the work

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[2]I adhere to the official names of the disease, as declared in WHO technical guidance (World Health Organisation, 2020). "Severe acute respiratory syndrome coronavirus 2" is shortened to SARS-CoV-2, while the disease it causes is referred to as COVID-19.

of designers, particularly at moments of *infrastructural breakdown*, but of the users of infrastructures. Both ANT and DT are analytical frameworks, for the *tracing* of actors and movements within infrastructures (in ANT) and the *quilting* around affective attachments and empty signifiers (in DT). These analytical aspects are not fully utilised in neither in the methods of infrastructuring-based PD and the theory of publics in HCI. Thus, I aim to utilise them for understanding the *infrastructuring* done by the collaborative in response to the pandemic.

The research towards this goal consists of three stages. One, I ran remote workshops following an Appreciative Inquiry (AI) approach, planned and delivered together with the collaborative. These were planned before the pandemic, and then quickly transferred to a remote format, remnants of an action research (AR) approach started before the pandemic. These workshops provided the direction for further work during the pandemic. Second, I designed a website for the collaborative to address communicative issues articulated in the first workshops, but also as way of *making public* shared issues. It was also intended to act as an object for conducting research (remotely) during the pandemic, a variation on *use-before-use*, as instead of a prototype or mock-up a live website open to different potential directions was used. It was used in two workshops, and to provide an ongoing engagement with the collaborative. Thirdly, I conducted interviews with collaborative members, which provide the majority of the empirical material analysed in this thesis. The interviews were based on insights from the preceding two workshop stages. They adapt an ANT approach to interviews as research method to a remote format that also attempts to understand the role of non-human actors - in the infrastructuring done by the collaborative in the response to breakdown, and the articulation of shared issues. This is based on a set of heuristics for interviewing non-human actors, specifically digital objects, casting them as actors and co-researchers that shape research practices (Adams and Thompson, 2016, p. 93). In particular, DT and the elements of the discursive sequence are utilised as an analytical method, and less as the normative frame as agonistic public spaces, as is more common in PD.

Figure 1.1 summarises the above relationship of theories of publics in HCI, ANT and DT with the methods of infrastructuring in PD, as well as my extension of these designerly methods with the methods of ANT and DT for research and analysis for my case study - an analysis of infrastructuring as the articulation of shared issues, publics, under conditions of infrastructural breakdown.

In this thesis I ask the following questions:

1. How does the collaborative infrastructure their responses to infrastructural breakdown?
2. What shared issues can be identified through the prism of publics?
3. Is *infrastructuring publics* a suitable frame for tracing and quilting shared issues?

These research questions focus on the key concepts of digital civics as the infrastructuring of publics. The research questions move from, one, mapping the case study to,

Digital civics

as *infrastructuring*

Shared issues

Affective attachments

in ANT ⟸ **Publics** ⟹ **in DT**

The problem of the public

The problem of the crowd

Material publics

Discursive sequence

Dingpolitik

Affective investment

Infrastructuring

Design process

Design perspective

Infrastructural breakdown ⟶ *Workshops* ⟵ Agonistic publics spaces

Use-before-use ⟶ *Website* ⟵ Design-after-design

research method

analytical method

Heuristics ⟶ *Interviews* ⟵ Discourse analysis

Analysis

Figure 1.1: Infrastructuring material and discursive publics

two, analysing through the theoretical framework, before, three, assessing its application to the case study and here making a contribution to the field of digital civics.

I find that the shifting configuration of human and non-human actors shapes the understanding of the shared issue of mutual aid in the neighbourhood, as a material public moves from an ad-hoc, social media-based response to a classification infrastructure. Regarding the use of Zoom as a stand-in for face-to-face communication, I find that there is an affective lack in video calls for collaborative work, and a complex set of issues for different service users. I find that digital and non-digital practices are developed in response to issues with Zoom use. Some of these localised practices address social isolation, which is then contextualised within austerity localism. I find that this drives a key shared issue within the collaborative, (the avoidance of) of duplication.

Focusing on the relationship between the theoretical and methodological framework

and the case study, I make several contributions to digital civics through the concepts of publics and infrastructuring. I find that mutual aid shows how the configuration of actors around a shared issue (through infrastructuring) shifts the meaning of that shared issue. Mutual aid moves from survival work to non-emergency work, as the system of an ageing social enterprise is appropriated for mutual aid. Tracing the shifts to the configuration of actors and a classification infrastructure is a novel approach to the study of mutual aid during the pandemic, building on previous work. At smaller scale, a similar effect is observable for a broad range of material practices during the pandemic that address social isolation, which then becomes a partially empty signifier that represents a broad range of different localised practices, but also links to other shared issues such as an increased complexity in the issues that service users deal with. This links to the avoidance of duplication as one of the key drivers of collaborative work. All of these issues are set against austerity localism amplified by the pandemic, which thus acts as the constitutive Other in this chain of equivalence. Here, I contribute a novel reading of the empty signifier in DT, linking it to the *problem of difference* in ANT, thereby showing how the relationality of infrastructures produces different understandings of the same thing, as different, heterogenous groups of acts assemble around it - in this case, different configuration of collaborative members, things, and service users produce differentiated understandings of the shared issue of social isolation. To the study of work supported by video calls, I make a contribution that is partially novel, as I show how the concepts of early, experimental video calls still apply to current video call products such as Zoom, which I link to the concepts to affective attachments and investments in publics.

In this introduction, I will provide relevant context. First, for the digital civics agenda, as that is the specific starting point for my research into the infrastructuring of publics at neighbourhood scale. Second, I discuss the impact of the pandemic, as it relates to infrastructuring publics during emergency, and at neighbourhood scale. Written during the early stages of the pandemic, this is to contextualise the time period during which research for this thesis was conducted, an attempt to provide, as Le Dantec (2016, p. 18) puts it regarding publics, "a stable frame around a dynamic context."

1.1   Digital civics in North East England: the relational agenda

What is digital civics, and to what extent can it be applied to the context of neighbourhood publics? This will now be discussed in more detail to highlight connections between digital civics and the theoretical and methodological framework I am developing for infrastructuring neighbourhood publics. I will approach this question through unpacking the digital civics research agenda and relating its relational agenda to the material and/or discursive relationality of publics.

Digital civics is an agenda for HCI research that was first defined by Olivier and Wright in 2015 as a "local turn" in HCI, particularly for the North East of England under austerity. For them (2015, p. 62), "digital civics is about a new configuration of

government and citizenry, one that is relational rather than transactional, and in which political thinking and action can be co-produced and co-owned through dialogue across differences in experience, values, and knowledge." This is based on the notion of everyday politics, a democratic ideal that reclaims the commons as collectively constituted value, particularly relevant for the network society, where information flows are more suited to sharing, not selling (Boyte, 2004, p. 54). Implicitly, the notion of the relational state (and by extension complexity theory) can be identified as well. A critical digital civics had been defined several years before the digital civics agenda, unacknowledged by Olivier and Wright. This critical definition, however, shares some similarities with the empirical work that cites the digital civics agenda.

In the following sections, I show how the concept of publics is referenced in work that informs the digital civics research agenda of Olivier and Wright, who themselves do not reference publics directly. Following this, I discuss how work in critical and empirical digital civics applies the concept of publics. I show that while there is a conceptual link between digital civics and publics, it is (with the exception of Le Dantec's work) not systematically articulated. This is the gap where my thesis makes a contribution to digital civics.

1.1.1 *The relational state and the plurality of publics*

The relational digital civics agenda (Olivier and Wright, 2015) is described as a reaction to austerity policies and resulting budget cuts to publics services in the United Kingdom. The aim is to use "digital technologies to truly empower citizens" by changing the way in which citizens participate in public service provision. However, none of the relevant concepts such as neoliberalism, nor relational service delivery as reactions to neoliberalism have been defined clearly in the agenda - understandably so, for a short paper that presents a new research programme. In the research agenda, neoliberalism refers to existing austerity policies in the United Kingdom. The relational state is not further discussed, although it appears to be an influence on the agenda, as I will show below. The relational state refers to a concept popularised by think tanks affiliated with the Labour Party, such as the Institute for Public Policy Research (IPPR).

Muir (2014) defines a challenge similar to the digital civics agenda, but without privileging digital technologies. He argues that both bureaucratic and market-based ways of public service delivery are failing due to increasingly complex social problems, while not accounting for the demands of citizens. He argues that traditional ways of fostering social equality are overly transactional, and thus fail to foster direct relations between autonomous citizens and interconnected local services. In a report for the IPPR, Muir (Muir and Parker, 2014) argues for relational service delivery based on the assumption that complex problems cannot be solved by approaches driven by either markets or state bureaucracies. A complex problem has multiple, non-linear causes that are related in an unpredictable ways. In short, Muir proposes decentralisation and collaboration across

the public sector, for a better allocation of funding and knowledge to where they matter most. On the local level, relationship building is preferred over shallow transactions, as it is in the relational digital civics agenda. Institutions should help strengthen relationship between citizens so that they can address local problems collaboratively. Chandler (2014a) argues that the shift towards the relational state implies an ontological shift from liberal and neoliberal governance to 'resilience-thinking' among policymakers like the IPPR. Approaches like the relational state are attempts to govern a complex world by moving decision-making away from institutions that follow liberal or neoliberal notions of complexity. A liberal understanding of complexity assumes the possibility of knowing and understanding the laws and regularities relevant for governance, thus making decisions based on knowable linear causalities. A neoliberal understanding of complexity assumes that that there are knowledge gaps that cannot be accounted for through scientific methods by governments. Markets, however, have indirect access to the complexity of socio-economic life, governing it through pricing mechanisms. Both the liberal and neoliberal understanding see complexity as epistemological. From the third, resilience-thinking perspective, complexity is ontological, in that it is not just about what can be known about a complex world, but also about a radical uncertainty resulting from non-linear, unpredictable causalities, where small actions may or may not have effects in the future. Approaches like the relational state are attempts to govern such a world by moving decision-making away from institutions that follow liberal or neoliberal notions of complexity. Instead, decision-making should happen where the actors affected by the decisions are. According to Chandler, this is where the subject in the resilience-thinking perspective is located - not external to the problem at hand, but instead embedded in the problems, or objects, they attempt to govern. In the theoretical framework, I will discuss this through Marres' material publics, who argues that actors are "materially implicated" in shared issues, asking what material practices link actors to an issue, and which of these actors are placed to address them?

Elsewhere Chandler (2014b, p. 49) relates this to publics directly, and the Dewey-Lippmann debate that I will use to introduce the theoretical framework. He argues that both Dewey and Lippmann acknowledge non-linearity and social complexity and base their respective arguments on the problems of the public on this. For Lippmann, this complexity made the formation of publics impossible, while for Dewey it shifted the attention away from a monolithic public sphere to plural publics. Approaches such as the relational state are thus an expression of this non-linearity, in that they acknowledge the value of the everyday, and the plurality of publics (Chandler, 2014b, p. 45):

> "Democracy could be inculcated in 'everyday life', in families, communities and associative attachments, where local experiential knowledge was always superior to the distant dictates of majoritarian rule. Whereas linear reasoning operated on the fiction that a unitary public will could be constructed in the political sphere, non-linear reasoning sought to enable the empowerment of a

plurality of publics in the societal sphere (Chandler, 2014b, p. 50)."

1.1.2 Everyday politics: shifting relationality

Everyday politics is about renewing democracy through renegotiating the commons. Inspired by the New Deal[3] and the civil rights movements, this is done through public work, "the political activity of citizens as co-creators of democracy (Boyte, 2004, p. 59)." Citizens participate in the co-creation of democratic institutions and in the creation of public goods, in maintaining and steering commons. For example, the internet as a common is the result of a complex distribution of labour between government, higher education, entrepreneurs and so on, across changing identities and interests (Boyte, 2004, p. 166). There is, however, nothing intrinsically digital about public work and the related understanding of civics, nor do Olivier and Wright pick up on the commons as a key concept of everyday politics, despite emphasising co-creation.

Publics (as introduced later by Le Dantec) are not part of the relational digital civics agenda, but everyday politics provide a conceptual bridge. Boyte (2004, p. 30f.) highlights the shift in Dewey's thinking from expert-led policymaking based on positivist scientific methods towards publics that contribute other forms of knowledge from everyday, lived experience - this mirrors the shift from the liberal episteme to resilience-thinking discussed above. While the notion of everyday politics has been largely ignored in empirical digital civics that builds on the research agenda, several planning-related digital civics projects embrace a broadly similar view, where technology supports citizens in local policymaking (Manuel and Crivellaro, 2020, p. 1), and the articulation of local matters of concern (Johnson *et al.*, 2017, p. 1).

Furthermore, Boyte (2004, p. 116) highlights a relational understanding of knowledge construction in Dewey's work:

> "Dewey's basic argument, deeply democratic in its implications, is that all knowledge—"academic" no less than "practical"—is social knowledge, the product of an interplay of experience, testing and experiment, observation, reflection, and conversation. All have the capacity and right to participate in knowledge-creation."

However, Boyte (2004, p. 30f.) also highlights that Dewey did not fully commit to this epistemological break by continuing to privilege scientific and technological forms of knowledge. As Marres (2012, p. 17f.) highlights drawing from ANT, an "*empirical imagination of the public*" attempts to make fields such as science more democratic. It fails to do so if it only does this through scientific or technological means, excluding other

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[3]For a different read of the New Deal as a "war against the emergency" (Agamben, 2005, p. 21f.), see the following section on the COVID-19 pandemic as a state of exception that necessitates different forms of public work - such as the *survival work* done by mutual aid groups and collaborative members during the pandemic.

forms of articulation, and thus threatening a "technicalization of publics." She reiterates this point in 2018, when she focuses on the relationship of technology and public evidence, now in the era of *post-truth*. She highlights that prior to this era, an overemphasis on expert-led evidence was considered problematic, as it connected the validity of knowledge claims to authority (Marres, 2018b, p. 424). Marres calls for (at this point, experimental) ways through which knowledge can be validated from within publics, and not those outside of them (Marres, 2018b, p. 440f.). This also includes algorithmic actors, whose knowledge claims may be incommensurable with those of diverse publics, such as the fact checkers of social media that re-enforce a "logical-empiricist conception of knowledge (Marres, 2018b, p. 428)." Marres (2018a, p. 455) highlights several experimental responses to this crisis of knowledge construction - among them, Le Dantec and DiSalvo's work on infrastructuring, based on which Le Dantec later claimed that digital civics refers to the socio-technical infrastructuring of publics.

In applied digital civics, several projects put advocacy through data at its centre, which includes both the generation and interpretation of data (Peacock, Anderson and Crivellaro, 2018; Maskell *et al.*, 2018; Rodger *et al.*, 2019) - the generation and validation of knowledge from within publics. Asad and Le Dantec (2017) show how data can support advocacy around different concerns, across publics, through *connective design.* Their case study provides a bridge from the relational digital civics agenda to publics, in their shift from transactional, or logical-empiricist, civics to relational civics:

> "Being able to view data through multiple lenses was seen as very important as it enabled a connection between an empirical metric—in support of transactional civics—and a tool for empathy in understanding subjective experience— in support of relational civic interaction (Asad and Le Dantec, 2017, p. 6313)"

Boyte (2004, p. 15) argues for a form of citizenship that focuses on integrating "community, the theme of communitarians, with politics, the centerpiece of liberalism." The digital civics agenda, however, is situated in the context of austerity in the United Kingdom and its impacts on the scope and delivery of public services. Vlachokyriakos et al. (2016) expand on Olivier and Wright's agenda by pointing out that relational services not only grant citizens more agency through dialogue, but also make public service provision more resilient and sustainable through involving citizens in the design and delivery of such services. Additionally, they link digital civics to HCI's increasing concern with "supporting democratic practice and social justice" through emancipatory technologies that infrastructure political organisation and participation in debates and activism. In the digital civics agenda, relationality is thus a normative concept. Crivellaro et al. (2019) also link the digital civics agenda to design for social innovation, while remaining committed to the relational agenda - importantly, this expansion of the normative position of digital civics does not draw on work published as digital civics. It refers to a specific normative perspective of delivering public services, as I expanded upon in the discussion on the relational state.

In contrast, in the approaches to publics that I will discuss in my theoretical framework, relationality is not normative, but ontological. This, for Marres (2012, p. 140), leads to a definition of participation where "in terms of the challenge of establishing relations of relevance between different political, epistemic and participatory settings, it becomes crucial to investigate how different performances of participation relate to one another." Drawing from pragmatism, ANT and agonistic democracy, she shows how the *problem of the public* is ontological in Dewey's work, as the public struggles recognise itself, and how the *ontological trouble* that follows is both material and discursive, in that the objects, or shared issues, around which publicly may form are not clearly delineated in process or space, but are dynamic and contestable (Marres, 2012, p. 57f.). The reformulation of relationality informs the following the theoretical framework. As Marres points out, material publics need to be approached from both theoretical and empirical perspectives. The same theoretical strands that inform material publics are applied in PD, which I will discuss in my methodological framework as applied method. As both ANT and DT come with a rich analytical vocabulary, I develop this into an analytical framework for material publics. Finally, this also leads to reformulation of the normative aim at hand, as relationality is now the subject of the inquiry and not the aim (as it is in the digital civics agenda):

> "[I]f we are committed to recognizing that political conflict and strive unfold on the plane of objects, in what sense can this be understood as productive for democracy (Marres, 2012, p. 15)?"

1.1.3 Critical and empirical digital civics

It is worth noting that Zuckerman (2012) was the first to define a digital civics, or participatory civics, outside of HCI, preceding the agenda by several years. Here, it framed is a form of participation in post-representative democracy through digital media. This form of digital civics also relates to publics, in the Dewey-Lippmann debate (discussed in the following theoretical framework). Lippmann's fear that publics are easily manipulated by those in power, is contrasted with Dewey's reproach that free media can provide the information needed for publics to articulate their issues. For new media, this is updated to the notion of *interlocking publics* - a blend of professional and popular journalism that together bring to the fore relevant issues (Zuckerman, 2014, p. 165). Couldry (2015) emphasises that it is not fully clear how these forms of participation differ from more traditional forms. Shelton (2019) questions the democratising potential of digital civics. His definition mainly centres around the relationship of data practices and public participation, or "how we conceptualise and practice citizenship in the era of big data." Where Olivier and Wright (2015) call for relational public services and digital technologies that empower citizens, Shelton highlights the ways in which the use of geodata in civic processes tilts the balance from local government to the private sector and a privileged strata

of citizens, while at the same time making counter-hegemonic narratives possible. Shelton is concerned with issues that arise from "turning civic participation into a process defined by data". For him this leads to a spatialisation and a corporatisation of digital civics, the privileging of a scientific epistemology over the local knowledge(s) found in communities - echoing the Deweyan perspectives on publics of Boyte, Marres and Chandler that were highlighted above.

Shelton (2019) also highlights possibilities and concerns for data in digital civics. He highlights the spatialisation of digital civics which refers to the increasing importance in civic processes, with only a limited number of citizens able to strategically use geographic information in this context. The corporatisation of digital civics refers to the mapping industry, that provides both raw geodata and geodata analysis, increasing dependence on such external expertise in municipal governments. Geodata does, however, also have oppositional uses, here defined as the capability to provide counter-hegemonic narratives to social issues.

While not referenced by Le Dantec when arguing that digital civics is the infrastructuring of publics, his example of the *Cycle Atlanta* app can be read through critical digital civics. Some work in empirical digital civics does, however, draw from these strands in participatory design, which I will highlight in the following section. For Le Dantec (2019, p. 171), digital civics in practice is about is about smart cities and digital democracy, or how the multitudes of data in the urban environment intersect with new, digital sites of democracy. Data is seen as social, which to Le Dantec provides an alternative to neoliberal uses of data. This links to critical digital civics and civics smart cities discussed in the previous section, in acknowledging the potential of oppositional digital civics to provide counter-narratives against the corporatisation of digital civics. The case study of Le Dantec uses an example that highlights a tension between rational deliberation, "a desire for objective ground truth" and agonistic pluralism, "the pragmatic need for subjective accounts to support political action (Le Dantec, 2019, p. 179)", within data-centric digital civics, where digital modes of participation supplement traditional practices. He discusses the Cycle Atlanta smartphone app, which enables cyclists to feed back concerns about cycling infrastructure to the city, as they encounter them while using the cities cycling infrastructure. The sometimes ambiguous data was debated in a public hearings. For cyclists, it enabled advocacy through data that they themselves produced, while planners gained access to the tacit knowledge of the local cyclists. Le Dantec does acknowledge some concerns with the spatialisation of digital civics, the increased use of geodata in civic process. For instance, he acknowledges that Black communities were underrepresented in the data collected through the app, and that their views would be better represented through other means. He also acknowledges that non-participation may also be a form of protest against gentrification and displacement, and the state of public infrastructure in affected neighbourhoods (Le Dantec, 2019, p. 179f.). There are communities who cannot speak through the data, voice their concerns, or form publics around it. In the terms

of critical digital civics, this implies stopping at spatialisation, where privileged strata of citizens are able to use (geo-)data to their advance, while the data for oppositional use is never generated. It is worth repeating that Le Dantec points out that the "objective" data collected contributes to planning decisions around cycling infrastructure, but also that political interactions imply agonism, as they are "messy, subjective, and perpetually contested (Le Dantec, 2019, p. 179)."

Similar critical stances are found in the empirical digital civics work on the civic smart city, where the focus is on critically engaging with technocratic or neoliberal visions of the smart city. Instead of dismissing the idea of the smart city, they seek to redefine it (DiSalvo and Jenkins, 2017; Gooch *et al.*, 2018; Heath, Crivellaro and Coles-Kemp, 2019). Particularly relevant for the case at hand, Dickinson et al. (2019) apply asset-based design in a smart city project. This, they argue, is an inversion of typical design in HCI, which intervenes where a perceived need of the user (or citizen) is not being met. Crucially, the highlight a deficit in the theory of publics. Where publics focus on shared issues, they focus on a what is missing from a community, and not what is already there. Instead, what civic technology can offer is an infrastructure that allows for the creation of networks among neighbourhoods and communities, and a focus on assets and capabilities that are already present (Dickinson *et al.*, 2019, p. 123:15). This is the starting point for my case study as well, in the first set of AI workshops.

There are examples of work that utilise data for advocacy (Peacock, Anderson and Crivellaro, 2018; Maskell *et al.*, 2018; Bellini *et al.*, 2019; Rodger *et al.*, 2019), and work on data assemblages where the focus is less on the tools provided to communities by researchers for advocacy, but on analysing how data is generated and used by communities themselves (Regan *et al.*, 2015; Taylor *et al.*, 2015; Alvarado Garcia and Le Dantec, 2018; Mahyar *et al.*, 2019). In addition work engaging with contested (and contestable) data, there are several examples of work that is concerned with diverse forms of material or discursive participation outside of formal engagements with institutions, or data-centric practices (Richardson *et al.*, 2017, 2018; Taylor *et al.*, 2018; Reuter *et al.*, 2019). Directly related to publics, these include interactive performances to the subway, a novel approach, in which "socio- political issues of public concern are appropriated and tackled by artistic experiences (Rossitto, Normark and Barkhuus, 2017)." Other projects emphasise the role of power, conflict, and friction in the interactions between civic stakeholders (Dow, Comber and Vines, 2018), including the importance of contributing to links between publics their concerns (Asad *et al.*, 2017; Asad and Le Dantec, 2017), and how opening up for links between heterogenous publics opens up the design space for designing for contestation (Vlachokyriakos *et al.*, 2017).

Across these themes in empirical digital civics, there are a few acknowledgements of the relevance of publics, preceding Le Dantec's definition of digital civics as the infrastructuring of publics (Le Dantec, 2019, p. 170f). This is the gap where my thesis makes a contribution to digital civics, by clearly defining the theoretical and methodological con-

cepts of publics and infrastructuring and applying them at a local scale - as articulated in the digital civics agenda and much of the empirical work on digital civics. I show how the concepts of publics and infrastructuring are not only relevant for digital civics work driven by researchers but also for the analysis of infrastructuring done by publics themselves. In empirical digital civics work individual concepts are applied, but not developed systematically beyond the case study - this is not a critique of the work, but a research gap that I address in this thesis by first articulating theories on the formation of publics, followed by the methods of infrastructuring to do and the analytical terms for the analysis of infrastructuring that draw from the relevant theoretical approaches of ANT and DT.

For instance, Gooch et al. (2018) build their interpretation of digital civics in participatory design on the importance of combining both offline and online activities engaging marginalized citizens, to form connections with a community, in the context of a smart city project. In my case study, I use the analytical concepts from ANT and DT as applied in PD infrastructuring work to analyse how this form of infrastructuring is done by a community itself. Reuter et al. (2019) focus on civic participation through media technologies, in their case community radio for and by older adults. In my case, I analyse a similar example as a material practice that makes legible the shared issues of a public, showing how the concepts of publics provide analytical categories for understanding infrastructuring done by a community itself. Finally, Rossitto et al. (2017) focus on diversifying civic engagement outside of formal political arenas, through an app that allows citizens to reflect on specific shared issues (in this case a suburban riot in Sweden). They link digital civics to infrastructuring, design for friction, experiential design and design for societal change, and publics. Again, I look at how processes of shared issue articulation unfold within a community, with a smaller degree of researcher intervention.

To summarise, I make a contribution to the field of digital civics by building on Le Dantec's framing of digital civics as the infrastructuring of publics. I here address two gaps in existing work on digital civics. One, a systematic development of the underlying theoretical, methodological and analytical concepts that goes beyond reference to the digital civics agenda and, two, the application of these concepts to publics formation with limited researcher intervention, at a local scale, during infrastructural breakdown.

1.2 From emergency to emergence: infrastructuring and the state of exception

The field work for this PhD was conducted during the COVID-19 pandemic that began in late 2019 and is ongoing at the time of writing this section. This has had an impact on the practicalities of field work due to social distancing measures and lockdowns, but also on the greater social, political, and economic context in which the field work was conducted. The collaborative was active in the local response to COVID-19, and as the focus of my project is on shared local concerns, the concerns arising from the pandemic become a focus by necessity. Thus, there is a need to briefly discuss the changes to the context in

which the research was conducted. This leads to a key question: Is the normative focus on emergency, on what is happening during the pandemic, or on emergence, on what comes after this moment of dislocation? Beginning with a framing of the pandemic as a state of exception, I will differentiate biopolitical emergency infrastructuring at policy level and resulting infrastructural breakdown at local level, from the infrastructuring of emergence at local level. After addressing the relevance of infrastructuring in the context of the pandemic, I address the relevance of publics in this context. First, I discuss the neighbourhood during the pandemic, and a framing of publics through an *outbreak narrative*. This is concluded by a call for material publics that disconnects a democratic response to the pandemic from the discursive construct of the state of exception. It should be noted here that this section was largely written during the pandemic. It is included in this form, as the direction work during the pandemic is to a degree contextualised through the contributions discussed in this section.

An editorial in the British Medical Journal picks up Friedrich Engels' term of *social murder*, to "describe the lack of political attention to social determinants and inequities that exacerbate the pandemic." These inequities are part of the shared issues that the collaborative deals with, now with increased urgency. The editorial highlights flaws in the political system of the UK and its populist responses, where elected officials deny accountability for policy failures during the pandemic. To address this, the British Medical Journal (Abbasi, 2021) frames the response of the UK government as a form of *social murder*, calling for accountability through scientific public inquiry, voting and an extension of global governance to public health emergencies:

> "What's left in these circumstances is for citizens to lobby their political representatives for a rapid public inquiry; for professionals in law, science, medicine, and the media, as well as holders of public office, to put their duty to the public above their loyalty to politicians and to speak out, to dissent lawfully, to be active in their calls for justice, especially for disadvantaged groups (Abbasi, 2021, p. 2)."

This call for more democracy and accountability in the responses to the pandemic is understandable, as the initial policy response was governed by emergency powers, a state of exception. For example, in the UK, the powers granted to the police in the Coronavirus Bill are justified through emergency. Agamben (2005, p. 19) quotes Carl Schmitt:

> "Despite the name it bears, martial law is neither a right nor a law in this sense, but rather a proceeding guided essentially by the necessity of achieving a certain end."

Agamben goes on to explain that for Schmitt, the state of exception is a conflict over sovereign decision, and as such often linked to the language of war. For example, to justify unprecedented presidential control over the economy as part of the New Deal, President

Roosevelt described himself as a military commander, "waging war against the emergency (Agamben, 2005, p. 21f.)." Similarly, COVID-19 is also often described in war metaphors. Boris Johnson claims to head a "wartime government" in the fight against a deadly enemy (Rawlinson, 2020). At the outset of the pandemic, Agamben[4] (2020b) claimed that the pandemic did not warrant a state of exception in the form of lockdown measures. This prompted critical responses from, among others, Nancy (2020), who drew attention to the evident mortality rates of COVID-19 (pre-mutation and pre-vaccination). This, in turn, prompted a return to the language of war by Agamben (2020a), who claims that "a war against an invisible enemy that can nestle in any other human being is the most absurd of wars." Still, the pandemic state of exception has its own biopolitics. In his response to Agamben, Benvenuto (2020) contrasts the Italian state of exception with Boris Johnson's initial rhetoric, where he cautioned that people should be prepared to lose loved ones - a biopolitical manoeuvre that addresses those whose lives are unlikely to be threatened but excludes those whose lives are likely to be threatened.[5]

Beyond the state of exception, the pandemic prompted ad-hoc infrastructuring at local scale - my case study analyses an example of this, as the collaborative adapts their work to the infrastructural breakdown induced by the pandemic. Bratton adds to Agamben's analysis of the state of exception Foucault's notion of neoliberalism as a shift of sovereignty from states to markets. This shift is further articulated in the planetary-scale computation that threatens the geographic markers of state sovereignty. Here, a new form of platform sovereignty may emerge, defined by "shared physical postures of political subjects in relation to common infrastructure (Bratton, 2016, p. 21)." The pandemic state of exception contains different forms of sovereignty. Governments are declaring states of exception, with legislation justified by the emergency. COVID-19 mutual aid groups, on the other hand, are a form of platform sovereignty held together by a global patchwork infrastructure of shared documents, collaborative working platforms and social media. Emerging in communities around the world, these movements step in locally where the state does not (or before the state does so). Member organisations of the collaborative were also active in this, which is analysed in this case study.

Some not only focus on the crisis, but also on the future potentials emerging out of a "combined crisis of care, work and environment", collaboratively collecting resources on different forms of mutual aid and issues amplified by the crisis ('Flatten the curve, grow the care: What are we learning from Covid-19', 2020).[6] Thus, beyond the immediate response

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[4]Agamben's comments were published on February 26th, 2020, preceding the national lockdown in Italy which was implemented on March 9th, 2020.

[5]This of course is an inversion of the war rhetoric discussed above, as Johnson only calls for the sacrifice of the other, not the self.

[6]The platforms used for community responses to COVID-19 show different approaches - where most popular responses use tools by Google and Facebook that require little technical expertise, "Flatten the curve, grow the care" is built using open source static website tools such as git and hugo, which require some technical expertise, but make for a technically more accessible platform without the ethical concerns of Facebook use. The website that I developed with my collaborators uses some of the same open source tools.

are systemic interventions in emergence that require the designer and/or researcher to consider the sovereignties of declared states of exception critically:

> "[W]e should plot systemic interventions based on deeper scales of operation that might arrest the eventual immiseration of places, species, and landscapes by securing lines of flight for them. […] We hope that design can take on a different role from the agent of immunization-through-mitigation on behalf of a bad-faith sovereign and can instead work less in response to the exceptional emergency than on behalf of the emergence itself (Bratton, 2016, p. 104)."

What, then, are the platform sovereignties, patchwork infrastructures, and emergences in this particular case? In the context of my project, of the legitimacy of policies justified as response to the virus is not the main concern. Instead, the focus is the effect of such policies on neighbourhoods, and the limitations and possibilities of technology in that context, how infrastructural breakdowns induced by emergency infrastructuring shape the infrastructuring of emergence at local scale.

1.3 Neighbourhoods, publics, and the pandemic

After the previous section related planetary-scale states of exception to a normative stance for infrastructuring during the pandemic, I now discuss publics during the pandemic at a local scale. Neighbourhood publics, through social distancing and lockdown measures, now increasingly rely on technology to foster connections that previously would have been based on face-to-face interactions - this is one of the fields where an infrastructuring response is required, which I trace in this thesis. Writing on neighbourhoods in the pandemic, Wendy Chun notes:

> "In order for there to be networks, there must be gaps. Networks hollow clouds of uncertainty—that is, infrastructure and in/difference—in order to foreground clean connections across empty space (Chun, 2020, p. 107)."

She references these gaps because maintaining community now requires physical distance to help curb community transmission. Rather than focusing on the universality of terms such as community or neighbourhood, she highlights the in/difference felt with neighbours, subjects that might feel *boorish*, as the etymology of the term suggests, capable of evoking anything from hostility to ambivalence to empathy. She (2020, p. 109) calls for a focus on the infrastructures that maintain such heterogeneous, heterophilous networks.

This is also where neighbourhoods and the state of exception relate to each other, as Reinhard (2005) argues via Schmitt, Derrida, Freud, Lacan, and Badiou. He returns to Schmitt's political theology, highlighting that Schmitt moved from a rigid friend/enemy distinction to the state of exception which implies unstable borders between inside/outside. The sovereign shifts what is legal and what is not through deciding on a state an

exception. The capability to shift what is legal establishes them as the sovereign. I recall here my previous, if superficial, reading of the war rhetoric of the COVID-19 emergency as a state of exception. Reinhard (2005, p. 60) builds on Schmitt's political theology by introducing it to the psychoanalytical concept of the neighbour, in the end arriving at an understanding of the neighbour as "the exception to the exception, the interruption of sovereignty." In short, he argues with Schmitt and Derrida that the boundaries between friend/foe are unstable, and that the neighbour exists in that unstable moment between "friend/family/self and the enemy/stranger/other," and other dyads such as private/public and non-political/political. I recall here Chun's characterisation of neighbours as *boorish.* He then argues with Freud and Lacan that the neighbour is a *Nebenmensch,* a compound word which within the limits of the English language translates perhaps best to "person next to me."[7] This *Nebemensch* is not self, not other, but still constitutive of the subject, as the thing that is both present and absent (Reinhard, 2005, p. 32f.) - for example in their real or imagined adherence to social distancing guidelines. This highlights a tension beyond that of self and other, in the imagined enjoyment (*jouissance*) of the neighbour's *boorish* actions, that the self denies itself. From this, he argues with Badiou that neighbours stand beside each other, as mutually constituted subjects in a neighbourhood, but not through the inside/outside differentiation at play in logics of sovereignty - this is where the neighbour is the exception to the (state of) exception:

> "And what is a neighborhood? Rather than a definition based on topological nearness or shared points of identification, Badiou describes neighboring in terms of "openness." A neighborhood is an open area in a world: a place, subset, or element where there is no boundary, no difference, between the inside of the thing and the thing itself (Reinhard, 2005, p. 66)."

If a neighbourhood is neither defined by a shared identity nor a geographic demarcation but openness and ambivalence, then the infrastructures of networks play an important part in connecting them.

Using the discourse on "Saving the NHS" as an example, Chun (2020, p. 109) points out that "[c]alls for communal responsibility are mainly framed in terms of infrastructure: things that ground and touch us, even as we strive not to touch too many others." - an important note for infrastructuring during a pandemic. In her pre-pandemic work, Chun (2016, p. ix) focuses on the infrastructures of "wonderfully creepy" new media networks, which erode the distinction between public and private (almost like neighbours). This resonates with one of the key elements of infrastructuring during the pandemic by the collaborative, the transition to digital modes of communication. Their use of Zoom (and other video conferencing software), in particular, erodes the distinction between public and private, both within the collaborative and when engaging with service users. These networks survive through habitual repetition (or addressability, in terms relevant for video

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[7]My own translation.

conferencing). For Chun (2016, p. 16), understanding networks as habitual allows a move away from technological *outbreak narratives*. In an outbreak narrative, the containment of contagious disease focuses on identifying the networks of *patient zero*. Habitual repetition instead allows for a focus on the networks that make viral spread possible, such medical infrastructures and the mobility of globalisation - conditions that are ignored in the focus on the outbreak narratives.

Wald (2008, pp. 132–134) also highlights the parallels of the *outbreak narrative* to the theory on publics. She highlights how metaphors from bacteriology are employed to describe the formation of publics in early sociology. Regarding Dewey's publics, which developed further in ANT and HCI, she highlights that society is constituted through the *transmission* of shared experience *carried* by individuals. Regarding Tarde's publics, which are developed further in DT, she highlights the use of the term of *contagion* for both the invisible affective dynamics of face-to-face crowds, and the construction of publics through mass media. In outbreak narratives, discursive constructs of community are based on epidemiological concepts, such as herd immunity (Wald, 2008, p. 48f). This is relevant from a DT perspective. This construct, in turn is based on the ANT dialectic of invention rather than discovery, the social construction of knowledge (Wald, 2008, p. 278). The outbreak narrative thus offers some brief insight into the rationale for drawing from both material and discursive theories. I return to these concepts in my theoretical framework.

Regarding the responses to COVID-19, Žižek is the (unlikely) source of a response based on material publics, even linking material and discursive phenomena, as I will attempt in the theoretical framework. Drawing on Latour, Žižek (2020) links emergence to publics. I re-iterate here my earlier question on interventions in emergence during a state of exception: What, then, are the platform sovereignties, patchwork infrastructures, and emergences in this particular case? Žižek argues that COVID-19 is "part of a reality that can be dealt with only through science". It is not an enemy, as it is unable to recognise itself as such. The war metaphor is a discursive construct, but the virus is a material phenomenon (invented in the ANT sense, rather than discovered) that requires a scientific response. It does, however, link to discursive phenomena such as culture, capital, and ideology. Žižek (2020, p. 2) argues that publics include different forms of material bodies, linked together in larger assemblages:

> "[W]e should become more sensitive to the demands[8] of these publics and the reformulated sense of self-interest calls upon us to respond to their plight. Materiality, usually conceived as inert substance, should be rethought as a

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[8]As I do in the upcoming theoretical framework, Žižek is mixing theories here. His argument is rooted in Latour's *Dingpolitik*, where the equivalent category for a demand is the shared issue, or matter of concern. That Žižek speaks here of the demands instead may be entirely coincidental, although that seems unlikely given his strong opposition to Laclau's use of that category. As Žižek (2006, p. 558) rejects the demand due to both its lack of revolutionary applications and application to democracy-as-is, it is surprising that he uses it here. In the application of my theoretical framework, I use shared issues instead of demands, in line with *Dingpolitik* and other theories of publics with pragmatist roots. As the case study shows, this is more applicable at local scale.

plethora of things that form assemblages of human and nonhuman actors (actants). Humans are but one force in a potentially unbounded network of forces (Žižek, 2020, p. 2)."

COVID-19 has highlighted how local communities, neighbourhood publics, exist within such larger assemblages, as it prompted the emergence of mutual aid platform sovereignty. The need to respond to the crisis through science, a form of "transcultural universality", means that local communities need to work with a government that delivers policies based on science, despite an erosion of trust in government the wake of COVID-19 and climate change (Žižek, 2020, p. 5).

Part II

Theoretical and Methodological Framework

2 Theoretical Framework: The Prism(s) of Publics

"By shifting the focus to *infrastructuring*, infrastructures are viewed as practical achievements of various actors. Infrastructures are not simply in existence, but they are built, installed, maintained, repaired, used, worked around/against, appropriated and so on (Korn *et al.*, 2019, p. 17)."

In *Infrastructuring Publics*, Korn et al. (2019) summarise HCI research into infrastructures. Initially, infrastructures became relevant in social science and science and technology studies in the 1980s, when the study of technology increasingly focused on the functional integration of socio-technical networks. This developed into a relational view of infrastructures, where they are not only a seen as platform that enable social and technical relations but are constitutive to them. Infrastructures contribute to the formation of publics by mediating the formation of groups in different ways, from traditional public infrastructures like roads or electricity, to telecommunications, traditional news media distribution and new media. The move from infrastructures to infrastructuring is relational, in that the (intentional or unintentional) use of infrastructures entails constant processes of adaptation and contestation to technological and social changes in a system and related systems. They (Korn *et al.*, 2019, p. 24) argue that research into the intersection of infrastructuring and publics-making, or *infrastructuring publics*, sees social and material agencies as interrelated. Thus, such research examines the *how* infrastructural media is used and not just *what* content is articulated. They suggest a practice-oriented approach with a normative interest in making infrastructures for publics.

Regarding publics, Korn et al. (2019, pp. 18–21) describe a development from Habermas' bourgeois public sphere (Habermas, 1991), to multiple publics facilitated by new media, and the practices of public-making. To an extent, these shifts have been characterised as a shift from representation to participation. In the pre-mass media public sphere, only hegemonic groups with access to the infrastructures of the public sphere were represented, while mass media and new media provided potential spaces for broader representation of marginalised groups, (potentially) enabling increased participation. As new modes of producing media and network have emerged, the focus is now increasingly on participation over representation, and the process of making and sustaining publics. The practices they highlight here are diverse, and thus diverge from a narrow definition of participation as *political* participation. In the following, I examine the move to publics, as constituted through the infrastructures of modernity from several perspectives. I begin with Dewey's *problem of the public*, where publics are unable to recognise themselves due to the limits of mediated communication, referencing the influential Dewey-Lippmann debate. I then move to ANT, where the problem of the public developed by Marres to the *problem of relevance*, and by Latour to *Dingpolitik*. Then, I discuss an HCI perspective on

publics, which highlights the role of affective attachments specifically for the formation of publics at a local scale in social work. This could be seen as move back to the pre-modern, local public of Dewey, but now with a socio-technical approach to addressing the *problem of the public*. I also discuss the influence of ANT on HCI publics, by re-configuring the role of objects, *things*, in the process of forming publics. Finally, when discussing the move from crowd to public, in DT Laclau focuses on the role of affect in the construction of collective meaning, as well as the role of discursive signifiers.

2.1 Pragmatist publics: the problem of the public

In *The Phantom Public*, Walter Lippmann presents a sceptical view of publics as actors in representative democracy. He argues that the public does neither have the interest or expertise to participate in policy making, "as members of the public, who are the spectators of action, cannot successfully intervene in a controversy on the merits of the case (Lippmann, 1993, p. 93)." In short, Lippmann assumes that increasing complexity of society makes democratic governance impossible. Issues are addressed by different hegemonic groups such as political parties, labour organisations, lobbyists and so on, who claim to speak for publics, which may align themselves with these hegemonic groups. He argues that the democratic ideal of the public is based on obfuscation of the inside/outside distinction between those in power and the public. Those in power discursively include the public when it is opportune to do so. Only when the public happens to align itself with those in power, does the public exert any power in the political process. As societal complexity (and/or: attention to complexity) has only increased since *The Phantom Public* was published in 1926, this polemic still feels timely. For instance, do the efforts of the digital civics agenda for more democracy through technologically mediated relationality contribute to a similar obfuscation of power relations, by artificially flattening any hegemonic relations between citizens, local businesses, and government? In empirical digital civics this tends to be discussed more critically. Work around data assemblages, the civic smart city and data advocacy all focuses on how citizens (and by extension publics) can better understand complex processes, and act on them. Implicitly, this could be seen is an effort to address what Shelton (2019) called the corporatisation of digital civics, resulting from an increased importance of geodata in political processes, which is provided and processed by private sector actors with the required resources and expertise. Still, Lippmann's take on publics does share some normative assumptions with data-centric digital civics, though he argues for the existence of hierarchies in knowledge production and decision-making:

> "It is the task of the political scientist to devise the methods of sampling and to define the criteria of judgment. It is the task of civic education in a democracy to train the public in the use of these methods. It is the task of those who build institutions to take them into account (Lippmann, 1993, p. 135)."

In *The Public and its Problems*, Dewey responds with a more optimistic view, based on similar assumptions on the lack of expertise of the public. For Dewey (1946, p. 114), American democracy emerged from self-governing face-to-face communities, isolated from federal government through pre-modern conditions. The infrastructures of modernity, such as railways, telegraphs, industrialisation, and urbanisation enable the formation of nation-states containing heterogeneous groups, as the rapid circulation of information bridges across smaller communities. These infrastructures (and the increasing complexity they signify) have also led to an expansion of shared concerns beyond the local, and thus a multiplication of publics. By extension, publics are now unable to identify themselves due to the communicative gap resulting from the move away from local face-to-face communication to mediated communication, leading to political apathy among citizens from a lack of identification with concrete concerns (Dewey, 1946, pp. 126, 135). This, to a degree, is an issue of complexity:

> "An inchoate public is capable of organisation only when indirect consequences are perceived, and when it is possible to project agencies which order their occurrence (Dewey, 1946, p. 131)."

Dewey' concern is that the layperson has neither the time nor interest to understand these causalities. To an extent, this is where empirical digital civics around the themes data assemblages, the civic smart city and data advocacy pick up, as they try to make legible the data that governs decision-making, and thus increasing participation, and enabling a public to identify itself by bridging the communicative gap through technological means and highlighting the consequences of collective action. This focus on participation (over representation) is, again, what *The Phantom Public* cautions against. As stated above, both Dewey and Lippmann agree that increased participation (enabled through either modern or post-modern infrastructures) does not directly translate to increased power for publics in democratic processes. This is where I turn to Latour and Marres, as the theorists of publics in ANT. The processes of publics formation are not discussed by Lippmann or Dewey, but they do point out that publics are formed by real people. This point made by Marres is highlighted by Harmon, who also notes an affinity between Mouffe's agnostic pluralism, and Marres' material publics (and Latour's *Dingpolitik*), in the controversial nature of shared issues (Harman, 2014, pp. 168–170). This is the shortcut from pragmatism to the theories of publics in discussed in this theoretical framework. ANT provides a focus on the material things and non-humans actors in the formation of publics, while HCI concretely focuses on the people forming publics at a local scale. DT (of which agnostic pluralism is a normative extension) shows how to understand the role of strife and conflict in publics. Furthermore, both *Dingpolitik* and agonistic pluralism are typically part of the application of ANT and DT in PD, discussed in the following methodological framework. Callon et al. (2009, p. 241) find that while "[t]he creative and open dynamic described by Dewey contrasts with the managerial, closed logic of crisis management imagined by Lippman[n]", Dewey does not offer any procedures for the

formation of publics. In the following sections I will discuss three approaches that do so. Approaches in ANT and HCI do so while drawing the pragmatist origins of publics, while the final approach of DT is the application of a theory of collective mobilisation to the formation of publics.

2.2   Material publics: the problem of relevance in Actor-Network Theory

In this section, I will expand on the pragmatist origins of publics through the work of Marres on material publics, and the work of Latour on object-oriented publics and *Dingpolitik*. I focus here on the concept of publics, their definition, and the *problem* of publics, as understood from this perspective. I discuss ANT as the underlying approach to a material understanding of publics, but the focus is narrowed to the key concepts relevant to infrastructuring publics. Both Marres and Latour take the Dewey-Lippmann polemic described above as their starting point for defining publics. How they operationalise the analysis of the formation of publics will be discussed in the chapter on methodology, as will the methodological application of ANT in PD.

Marres develops her theory of material publics from a pragmatist starting point. As defined by Dewey above, this problem relates to a political community being affected, *"materially implicated"*, by an issue, but unable to articulate it as a shared issue, as it "finds itself at a remove from the platforms that are in place to address them (Marres, 2012, pp. 31, 39)." This, from a material view, includes non-human objects in addition to human subjects, as actors whose entanglement in an issue is to an extent undetermined and undeterminable. For Marres (2012, p. 42), Dewey's pragmatism provides a constructivist ontology in which material dynamics constitute publics. Here, she distinguishes between two problems of the public. One, the *problem of affectedness* where a public, a collective of actors linked through and affected by a shared issue, does not have the rights to participate in decisions to address the issue. From this instrumentalist perspective, participation is a matter of communication and representation, to be made possible by an appropriate institutional framework that affords those affected by an issue participation in processes of issue formation (Marres, 2012, p. 52). Two, the *problem of relevance*, which rejects the notion that publics are out there, but just not adequately represented. In this post-instrumentalist reading of pragmatist publics, the problem not one of representation, but of articulation, in that "the public consists of actors who are intimately affected by issues, yet are not participants in the networks, platforms and vocabularies of issue articulation." This goes beyond simply assuming that there is a public affected by an issue out there that can be included in the processes of issue formation. Instead, the very formation of that public is the problem, and the process of defining how actors are linked to an issue and how they articulate a public are constitutive of each other (Marres, 2012, p. 52).

Here, Marres also briefly highlights an affinity between pragmatism and Mouffe's agonistic pluralism, in the role afforded to conflict and lack. In a following section, I expand

upon this affinity by drawing from the DT of Laclau and Mouffe, which, in the broadest sense is a theory of issue formation around conflict and lack. To translate (again, broadly) to the vocabulary of DT, a collectivity (=public) is constituted through the articulation of shared demands (=issues) around empty signifiers (=objects), through antagonistic frontiers (=conflict) and affective investment (=lack) - as this largely unfolds on the ontological plane, the pragmatist attention to the *problem of relevance* draws attention the challenges of articulating this in practice, and to the constitutive role of that articulatory process to the shape of a public.

We may also, in the broadest sense, link this to the pandemic and the notion of *infrastructural breakdown*. This is the starting point for a PD inquiry into infrastructuring which I discuss in the methodological framework. As Marres (2012, p. 56f.) puts it:

> "Lippmann and Dewey insist that publics come into play when institutional habits of problem-solving falter: when the issues are most obscure, when no one knows what to do, when unprecedented kinds of consequences make themselves felt, this is when publics may or must intervene."

We may view the pandemic as a moment when institutional problem-solving fails, thus prompting an intervention by publics to address emerging shared issues, through the formation of new networks, which in turn shape the issues. In my case study, I discuss mutual aid in the neighbourhood from such a perspective, focusing on the processes that define a public and its issues, and the shifts in those definitions as the scope of those actors entangled in the issue expands.

The distinction between instrumentalist and post-instrumentalist is relevant for any socio-technical intervention that draws on the notion of publics, as I will show in the following section on publics in HCI. Marres provides some cues on why the concept is relevant for HCI as a form of device-centric participation. What it offers is the possibility to turn everyday practices into forms of political participation. However, Marres also maintain to that material publics should continue to be problematised, by highlighting that publics come into being through the material practices of defining them. I recall here the *Cycle Atlanta* app used for highlighting issues with cycling infrastructure. The material practices afforded through that app were incapable of grasping certain shared concerns around cycling infrastructure, thus directly shaping the publics that it can help *infrastructure*. Marres here highlights the role of everyday material practices, a device-centric view of participation, which, in line with Dewey, centres on what people do. As such, it can link to other forms of action, and the critical task becomes investigating this "phenomenon of the co-articulation of participation (Marres, 2012, p. 63)." Another relevant example are social movements such as hacktivism and critical making, where technological practices shape their public and their normative horizons (see Breyman *et al.*, 2017). Concretely, in an anthropological study on geek culture, Kelty (2005, p. 185) coins the term of the *recursive public*, as "a group constituted by a shared, profound concern for the technical and legal conditions of possibility for their own association",

through the ways in which technological concepts (as material practices) such as openness, scalability or security also shape the normative horizon of the *recursive public.* Returning to Marres, the focus is on how participation is performed by actors, and of which actors become responsible for addressing a shared issue. In empirical work, the role of technology in organising such practices matters.

Elsewhere, Marres defines the normative task for a digital sociology around publics:

> "[H]ow to combine diverse ways of knowing? How to practise social enquiry
> in more responsive ways and still advance knowledge? How to configure the
> interactivity of digital participation in ways that serve the ends of both knowl-
> edge and democracy well (Marres, 2017, p. 172)?"

The specific sociological approach here is ANT, as it focuses on how actors are embedded in an issue, and how their participation in an issue is configured, and how it *should* be configured. From this perspective, the shape that spaces for participation should take is relational. Here, this refers to a space where the developing relations between involved actors shape the articulation of concerns, and who is articulating them (Marres, 2012, p. 152f.). As an example from ANT, Callon et al. (2009, p. 10) describe the hybrid forum as space for bringing together those entangled in an issue, from locals, to scientists, to government. Instead of seeking consensus, the focus is on processes that enable decision-making under conditions of complexity, where effects and outcomes cannot be fully understood, by neither layperson, science nor government, but all actors contribute relevant, different forms of knowledge to the shared concerns. To contrast, the digital civics agenda offers a different relational perspective on how participation should be configured. This is an instrumentalist view of participation, as citizens, local businesses and local government are assumed to be affected by an issue, and digital technology could afford appropriate spaces for participation. A post-instrumentalist perspective rephrases this problem: What material practices link actors to an issue, and which of these actors are placed to address them? The problem of relevance thus highlights an important gap in relational digital civics as a research agenda - before participation can be configured to be more relational, the relations, or material practices, between actors that constitute a public need to be understood.

Latour, too, focuses on the problems identified by Lippmann and Dewey. The *phantom* of the public is not a problem of participation, but a problem of representation of different collectives. As society has been assumed to be a pre-exisiting totality, it has been impossible to represent different collectives (Latour, 2005b, p. 162f.). In relation to publics, the task is now tracing the associations around objects:

> "It's clear that each object – each issue – generates a different pattern of
> emotions and disruptions, of disagreements and agreements. There might be
> no continuity, no coherence in our opinions, but there is a hidden continuity
> and a hidden coherence in what we are attached to. Each object gathers

around itself a different assembly of relevant parties. Each object triggers new occasions to passionately differ and dispute. Each object may also offer new ways of achieving closure without having to agree on much else. In other words, objects – taken as so many issues – bind all of us in ways that map out a public space profoundly different from what is usually recognized under the label of "the political" (Latour, 2005a, p. 5).

Latour names this object-centred understanding of the political *Dingpolitik*, differentiating it from the materialism of *Realpolitik*. He draws on two etymologies for the thing. One, the German *Ding*, which translates to thing (or object). Two, the word for different forms of assembly in old German and Scandinavian languages, such as the Icelandic *Althing*. Furthermore, Latour (2005a, p. 31) here notes that "[o]bjects become things, that is, when matters of fact give way to their complicated entanglements and become matters of concern". This neologism contains most of what Marres described in the problem of relevance. The things that publics are concerned with are constructed through assembly. Thus, Latour asks a similar question: "What are the various shapes of the *assemblies* that can make sense of all those *assemblages*? (Latour, 2005a, p. 12f.)" This is where PD draws from ANT concepts, and I return to this in my methodological framework.

It is worth nothing here that the key concepts to agonistic democracy are found in *Dingpolitik* as well, what is different is the focal point of affect and disagreement. Thus, it is understandable that contemporary PD approaches diverge here into object-centred and agonism-centred approaches. Thus, before discussing PD methods, I will discuss the agonism-centred publics in the following section on DT, as it addresses some of the gaps in HCI publics research. I will argue that this is, to a degree a semantic differentiation. DT draws heavily from the post-structuralist tradition. Law argues that ANT does the same, drawing from Foucault's definition of discourse:

> "Precarious relations, the making of the bits and pieces in those relations, a logic of translation, a concern with materials of different kinds, with how it is that everything hangs together if it does, such are the intellectual concerns of the actor network tradition. However, this is a combination of concerns also found in parts of poststructuralism. My final contextual suggestion is that actor network theory can also be understood as an empirical version of poststructuralism (Law, 2009, p. 146)."

The starting for DT is a different type of object, the *objet petit a* of Lacanian psychoanalysis. In DT, a collectivity assembles around an empty signifier (the *objet petit a*), a political demand that is capable of representing a number of heterogenous demands through discursive inclusion/exclusion - a rhetoric manoeuvre that becomes possible if a number of demands are made equivalent in their rejection by responsible institutions. As Law points out, a logic of equivalence in ANT is described through the process of translation through which relations between nonhuman and human actors are defined

and ordered (Law, 2009, p. 144f.). Thus, *Dingpolitk* and *Signifiantpolitk* offer alternative readings of the processes that constitute a public around a shared issues - is it the thing or the signifier that unites a public, do material practices contribute to the articulation of a signifier, are things stand-ins for signifiers? Having discussed *Dingpolitk* in detail, I return to *Signifikantpolitik* in the following section on DT.

What, then, about infrastructuring publics from an ANT perspective? Or, more precisely, the problem of infrastructuring publics? If we follow Marres, we now know that it is necessary to take a step back from the digital civics agenda, and focus on the problem of relevance, to understand what material practices link actors and issues, and how a public is articulated. As Latour puts it for ANT more broadly, the focus is on actors (re)-assembling into new collectives, and their connections as the "continuity of any course of action will rarely consist of human-to- human connections […] or of object-object connections, but will probably zigzag from one to the other (2005b, p. 75)." Stäheli (2012, p. 113) traces the infrastructures of different forms of collectivity in ANT, identifying an important gap that is, to an extent, addressed in the following discussion of publics in HCI, and the infrastructuring through socio-technical interventions. He points out that the collective is a modern concept, in that its relies on modern infrastructures to enable its (re)-assembly - the problem of the public, as articulated by Dewey. The classic example in ANT is the scientific laboratory, through which scientific knowledge is assembled, acting as a space that stabilises the assemblage. As Law (2009, p. 144) describes it, the production of scientific knowledge is the result of heterogenous relations between actors, not just a scientific process. A finding publishable in a scientific journal is the result of informal conversations and suggestions, but is described through scientific method, masking the social and material relations that produce a scientific finding. Stäheli argues that ANT misses out on role of infrastructures as affective technologies, through its focus on the stabilising effects of infrastructures. This critique is useful for evaluating infrastructuring efforts in HCI as well. Stäheli defines infrastructures broadly, including not just material and virtual structures that enable assemblies, but also the protocols that make movement - and repetition of that movement - through these infrastructures possible - public transport cannot function without a schedule. Thus, he contrasts Latour's directive to follow the actors with the directive to follow the movement. In this movement through an infrastructure, a temporary collective can form, an affective experience of collectivity. How a collective forms cannot be deducted from material or virtual structures, but only traced through the emergence of if a temporary collective - following the movement of actors through infrastructure. In some cases, the infrastructures themselves become stand-ins to describe a collective, such as, for example, Occupy Wall Street, the appropriation of public infrastructures in service of an affective, collective experience. This focus on affect is one of the key concepts for publics in HCI, while the process of naming (not necessarily after infrastructures), of a rhetorical stand-in to represent a broad political movement, is key to DT.

2.3 Community publics: issues and attachments in HCI

In HCI, the concept of publics in the pragmatist tradition has been applied in empirical work. Its influence on PD will be discussed in the methodological framework. The focus here is on work that develops a theory of publics in HCI, which links it to the concept of infrastructuring. I draw here on the work of Le Dantec on Deweyan publics, which also draws on ANT to an extent. The focus here is on the concept of issue formation, to which non-human, computational actors contribute as nodes of object-oriented publics. As I noted in the previous section, Stäheli points out that ANT does not capture the affective dynamics in the formation of temporary collectives. Le Dantec addresses this a degree through the concept of affective attachments. The notions of agonism and affect will be discussed in the following section on DT, providing an alternative reading of issue formation and affective attachment.

For Le Dantec (2016, p. 62), publics are defined as commitments and dependencies between actors, artefacts, and institutions around shared issues. To articulate this definition, he draws from Dewey, Latour and Mouffe. Here, it is worth repeating the link between digital civics and publics:

> "Digital civics is foremost concerned with supporting collective agency as people come together to address and redress present social conditions. These collectives, or what I have called publics […], form around shared issues and create socio-technical infrastructures to take action on those shared issues (Le Dantec, 2019, p. 170)."

For Le Dantec, the task is co-designing community technologies that support a collective capability to act, since the key challenge in forming publics is communicative. This echoes Dewey's framing of the *problem of the public*. As society becomes more complex, a public is not able to identify itself through the means provided by modern infrastructures. Le Dantec extends this to the context of community-based projects, providing thus a relevant starting point for the collaborative as a case study. He differentiates this from design spaces such as the workplace, for which HCI (including PD) provides established methods. He argues that issues provide a focal point for understanding the context and practices of a community, as the dynamics of community projects are more heterogenous and complex, compared to a workplace and its specialised workforce (Le Dantec, 2016, p. 35). Additionally, he draws on ANT, describing issues that constitute a public as a network of actors, artefacts, and institutions across multiple sites, with diverse ways of knowing. Le Dantec also describes issues as antagonistic, which I will pick up on in the following section on DT. As actors are connected across multiple sites, it is necessary to design for this plurality, not to obscure it (Le Dantec, 2016, p. 38). In this context, design "actively participates in enacting those issues through methods of intervention, generation, and resolutions (Le Dantec, 2016, p. 36)." In other words, design becomes

entangled with those issues through its way(s) of knowing. Designerly methods generate an understanding of the issue, but also shape how other actors understand an issue, through different ways of structuring knowledge around the issue. The website I used as *playful trigger* in workshops is an attempt to do just this, discussed in more detail in the methodological framework.

In this emphasis on the role of design (and co-design), the role of the public itself is neglected to a degree. Going back to Dewey for instance, the emphasis is on how a public itself attempts to address the communicative *problem of the public.* Arguing with Marres, this problem is extended to the formation (and not just recognition) of a public, in which the shared issue changes as the scope of actors entangled in the issue expands. Designerly methods are but one of the actors involved with this, and much of the *problem* is addressed by other entangled actors. To state it clearly, it is, for the most part, other actors who "create socio-technical infrastructures to take action on those shared issues." As noted before, this case study looks at publics at an exceptional (*a state of exception*) moment, during a global pandemic, and the *infrastructural breakdowns* that induces. As the collaborative responds to this by necessity faster than any designerly methods could, the focus in the case study is on what publics themself do to create and maintain the socio-technical infrastructures for articulating and addressing shared issues, and how that, in turn, shapes issues. Thus, I will focus on these aspects in Le Dantec's work that are relevant for the analysing publics, and less on those aspects that are more relevant to designing with and for publics.

This extends to the methodological framework as well, where I focus on infrastructuring. This too, is usually the task of the (co-)designer, but PD work on the topic also includes relevant analytical concepts on infrastructuring done by other actors as well. Again, the focus is more on the analysis, than the design, on the infrastructuring done by other actors.

2.3.1 Reorienting the object: HCI and Actor-Network Theory

Le Dantec's understanding of design as epistemological process differs from how design as it is typically understood in HCI. According to Dourish (2017, pp. 34–38), HCI is "primarily focused on the relationship between interactive technologies and human experience," which in applied work often leads to an *a priori* ontological differentiation of the digital and the material, which is equated to the physical. This implies a narrow focus on making the digital material, by expressing it through tangible, physical materials and objects. Dourish thus suggests that HCI research moves away from its traditional focus on designing new objects, particularly objects that strive to represent the digital in the material. Instead, he suggests a focus on the already existing materiality of the digital, by drawing from ANT and its focus on the agency of material objects - an agency acquired through their interactions in a network of humans and non-humans. He highlights here Latour's differentiation between matters of fact and matters of concern, implicitly

providing a link between publics in ANT and publics in HCI.

In HCI, Jenkins et al. (2016) develop the notion of material publics to object-oriented publics, regarding the role of computing as an actor in publics. Like Le Dantec, they reference the Cycle Atlanta app. They argue that that app is the object around which a public forms to take action on an issue, a *Ding* in Latour's terms. The app also participates in the public as an actor through its capabilities to sense and produce data and shape the actions of human actors (Jenkins *et al.*, 2016, p. 830f.). As such it is part of a material public in which the configuration of actors around an issue shapes the understanding of that issue. Without Cycle Atlanta, concerns related to cycling would be understood differently. Thus, the app is the assemblage of cycling infrastructure planning, but not the assembly through which a publics makes sense of it, a *Thing* in Latour's terms. Such an assembly is present in their second example of issue-oriented hackathons, where implicated human actors make sense of technology use in a social context, in this case food access. The process of defining the nodes of this food network by including computational actors brings to the fore the issues surrounding food access in this context, an assembly to better understand an assemblage (Jenkins *et al.*, 2016, p. 830f.). They use these case studies to highlight nonhuman agency in the formation of publics, with agency defined as the capability for action within a network, in this case the "complementary ways in which specific computational capabilities enable new capacities for action and for new publics to convene; and where the particular arrangements of publics enable new computational possibilities to emerge (Jenkins *et al.*, 2016, p. 829)." Like Dourish, they argue that flattening the differentiation between the digital and the material allows research into the network of humans and nonhumans, where computational objects not just seen as the platform for publics, but as constitutive elements of networked publics.

Davis (2020, p. 53) agrees with this contribution of ANT, as "the practice of placing people and things on equal ground effectively communicates that technologies impose on, but do not determine, social and behavioural outcomes." Davis, however, argues that the relationship between people and things is not equivalent, as ANT does not account for power - this is why I will in the following section articulate an approach to publics that draws on Laclau's theory of hegemony. She proposes a *materialised action* approach, which recasts agency as a human capacity, linked to the ability take *intentional* action, while recognising that objects or technologies do act, but not with *intent* - any intent is the materialisation of politics and values. However, technologies may also act in unintentional ways, for instance in the appropriation of social media by social movements, where they act as infrastructure that facilitates rapid growth, but not aid in resolving disagreements or sustaining a movement (Davis, 2020, p. 58). Davis (2020, p. 54) uses the often cited example by Winner (1980), who noted that the low bridges of the Long Island Parkway were too low for New York public buses - making Long Island inaccessible to those served by buses, and thus maintaining exclusions based on class and race.[1]

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[1] According to Woolgar and Cooper (1999) there is some controversy regarding the accuracy of Winner's account, regarding the exclusionary intent of the design, and if the bridges actually constitute an obstacle

To an extent, Davis (2020, p. 29f.) relates this to classic definitions of affordances by both Gibson and Norman. For Gibson, these are potential actions arising from the interaction of objects and subjects in a social context, while for Norman it is less relational, and more about the actions intended for a thing. Applications of the latter definition have been critiqued for a binary view of affordances that only asks what actions are afforded (or not) by things. Davis (2020, p. 11) instead proposes to apply the "concept of affordance such that how, for whom, and under what circumstances [is] incorporated into a concise analytic tool." In line with the focus of ANT on the *tracing* of actors and movements within infrastructures, the use of the term affordances refers to this relational perspective.

Another example from planning, before returning to technology, is the Camden bench. Wakkary (2021, p. 106) uses the Camden Bench to highlight human agencies, as well as the mechanisms of exclusion at work. The Camden Bench is a concrete bench designed to a brief to curb antisocial behaviour, as requested by Camden council in London. The designers claim that the shape is inclusive of users of different sizes, while preventing its use for sleeping, skateboarding, or graffiti. Its weight also allows it to act as a physical barrier against some forms of terrorist attacks.[2] For Wakkary, objects such as the Camden Bench are examples of anti-biographies, in "the construction of the exclusionary design problem, a severely constricted design world that has literally choked out the very life and politics of the world it is designing within." This is where he returns to Latour's matters of fact and matters of concern, with anti-biographies as a design strategy to exclude or obscure *Dingpolitik* - the design is done before actants, including objects participate. Infrastructuring publics, particularly in PD, is a democratic anti-thesis to anti-biographies, as design is seen to an ongoing process in which things are opened to contestation by all actors involved, as matters of concern (Wakkary, 2021, pp. 112–114). This does not only include human participation, but also the participation of things. A designer will have often move to another project before things have had their say - again leading to anti-biographies (Wakkary, 2021, p. 118). I return to infrastructuring publics in PD in the methodological framework.

2.3.2 Agonism and affect: HCI and Discourse Theory

In this focus on contestation, I can also highlight the contribution of DT, which I will discuss in the following section. As should be clear for Wakkary's description of the Camden Bench, a number of discourses and antagonistic relations are inscribed in this object,

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to buses in practice. They (1999, p. 442) claim that Winner's account is an "urban legend" in the field of STS, repeated uncritically due to its capability to illustrate key STS concepts. Joerges (1999), in turn, rebukes this reading of the bridges as unattributable, unverifiable urban legend, arguing instead that "an alternative to Winner is not to look for the power of things in their material form, but in the words of those who speak for them." Elsewhere, he (1995) uses the concept of *prosopopoietische Systeme - systems of prosopopoeia* - to describe instances in which the technological is afforded or described through human characteristics - a relevant concept when discussing the role of technology as actor in publics, and the agency of objects in ANT.

[2] As Wakkary notes, the Camden Bench is not an object designed with affordances for unintentional use - he cites the modular AR-15 assault rifle as an example for that.

an example of hostile design - as Rosenberger (2020, p. 888) argues, anti-homeless design must be analysed through a broad set of local laws, regulation and services, including (but not limited to) public housing, mental health services, racism and a city's vision. Thus, the Camden Bench is the signifier (foreshadowing the following section) that links to a multitude of issues and discourses that are not related, except in their expression through this *thing*. Inclusive design and ergonomics are unrelated to the threat of terrorism, yet they are both expressed in the issues regarding the bench. In either case, the Camden Bench can be characterised as an antagonistic object.

Returning to technological things, Crawford discusses if algorithms, as employed by social media companies, can be agonistic, and how they function in publics. This links to the final theoretical current (in addition pragmatism and ANT) of publics in HCI: agonistic pluralism. Crawford (2016) highlights that different algorithms are antagonistic, as, say, the algorithms of Twitter and Facebook follow different knowledge logics (generally obscured to human users). These logics are to a degree antagonistic, in that they compete with each other, not only economic terms, but also in the *calculated publics* they both create and represent. Calculated publics are relational, in that they are the result of algorithmic actors aggregating the relations between humans actors. As the work of creating these relations is largely obscured, narratives become necessary to explain these relations, thus moving from the (assumed) rationality of algorithms to affective discourses (Crawford, 2016, p. 86). Crawford here draws on DiSalvo's notion of *adversarial design*, which, in turn, draws from Mouffe's notion of agonistic pluralism. She also briefly hints at the affective nature of calculated publics as collective identity, again drawing from Mouffe, and providing here the impetus to examine computational objects not only for their place in a network, but for their attributes in democratic politics. In defining his notion of *adversarial design*, DiSalvo (2012, p. 23f.) references Winner's work on the Long Island Parkway, here to highlight the "relations between design, power, and the built environment," which also he also extends to technological objects. He then argues that adversarial design is an application of *Dingpolitik*, by looking at agonistic attributes of objects, and thus their contestational and affective potential. DiSalvo thus shifts the focus towards agonistic attributes of objects - as Crawford does for algorithms. In the process, they articulate a link between DT and ANT.

As highlighted by Dourish, ANT affords a perspective in which objects not just the result of research and design, but as constitutive elements of networked publics. As highlighted by Wakkary, objects become anti-biographical if they are not open to contestation by all actors in a network. Similarly, DiSalvo (2012, p. 124f.) highlights the role of PD, and its focus on infrastructuring publics, as an alternative to creating objects. Marres, Latour, Dourish and Wakkary show this if justifiable from an ANT perspective. PD moves a step further towards a specific normative perspective for publics. HCI work on publics provides a novel approach to combining the concept of publics derived from pragmatism and ANT with the theory of agonistic pluralism in a novel, practical approach to

facilitating social and political movements at community-scale. I will discuss the method-
ological implications of this in the following chapter on PD, as well develop the potential
of ANT and DT as an analytical framework - applying the same theoretical framework to
both the practical and analytical components of my case study. Outside of HCI and PD,
there are few example of dialogue or synthesis between ANT and DT.[3] As DiSalvo briefly
highlights, both ANT and DT focus on understanding the relations between elements in
a collective - between nonhuman and human actors in ANT, and discursive elements in
DT - the implications on this focus on design work, meaning infrastructuring publics, but
less so on the analytical work, be it in networks or discourses. As I briefly aimed to show
for the Camden bench, this allows for different analytical focal points.

What, then is agonistic democracy? In its Habermasian iteration (see for example
Habermas, 1999), deliberative democracy strives for consensus, on the assumption of
communicative rationality. Agonistic democracy, according to Mouffe (2013, p. 7), is
an understanding of democratic politics in which participants agree on shared principles,
such as "liberty and equality for all", but interpret them from different subject positions,
as adversaries, accepting that power is only ever held temporarily. Additionally, Mouffe
(2005a, pp. 6, 71) critiques rationalism on the grounds that it neglects the "the affective
dimension mobilized by collective identifications", thus limiting the scope of democratic
politics, but also potentially leading to the emergence of radical movements centred around
antagonistic passions, as contrary to political parties of the centre, they do cater to the
affective dimension. Crawford (2016, p. 84) highlights the role of such affects in the
algorithms of Reddit, as they shape how an event unfolds and a collective narrative is
constructed - in this case, the hunt for the perpetrators of the Boston Marathon bombing
in 2013, which lead to the death of a university student wrongly suspected to be one of
the perpetrators.

In computing, affect exists as broader concept:

> "While defining, classifying, creating logical structure for, and understanding
> the relationship of rationality to emotions can be useful exercises, bringing
> with them the pleasures of both computability and scientific respectability,
> we believe this mindset is in danger of missing a fundamental point: affect is
> not just a formal, computational construct, but also a human, rich, enigmatic,
> complex, and ill-defined experience. Rationalizing it may be necessary to
> make it computable, but an affective computation that truly inspires and
> incorporates human emotion must include a broader cultural perspective, in
> which the elusive and nonrational character of emotion does not need to be
> explained away (Sengers *et al.*, 2002, p. 88)."

Related to the above quote, Sengers et al. (2002) call for a form of computing at

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[3]In her contribution to *Making Things Public*, Mouffe (2005b) misses an opportunity to relate agonistic
democracy to *things*, despite *Dingpolitk* being the key theme of the collection. When discussing the public,
Mouffe understands this as a multitude of public spaces, without considering whether this space itself is
a constitutive element of a public - as I have shown, a key theme for both ANT and HCI.

odds with the rationalist paradigms of the discipline, instead highlighting the role of affect, that which cannot be classified, in an interactive installation that allows users to explore open, emotional soundscapes. As highlighted before, Laclau, too, endorses a view of affect as that which cannot be explained - in this case, signification. While computing and post-structural theory may be disciplines with little in common, affect theory provides a conceptual bridge here. As Gilbert (2004) highlights, affect has been applied as a useful concept to explain certain attachments that cannot be understood through signification only. He, too, uses music as an example of affective forces, using the rationally inexplicable popularity of Public Enemy with white, middle class youth as an example - as the radical politics of the group were far removed from the conservative and suburban lifeworlds of their listeners, other forces had to be at play. This, in short, is an open definition of affect, as that which cannot be understood rationally (in computing) or discursively (in post-structuralism). Anderson (2006, p. 734) notes differences in the vocabularies of the Spinozean and Lacanian traditions of affect theory, yet highlights a "family resemblance" in the understanding of affect as excess (or surplus, residue, that which cannot be grasped), a drive towards a form of closure in the future. This, I argue, is the common ground between affective attachments when working together to address shared issues, and the affective investment into a shared issue that represents a chain of issues.

At community-scale, Le Dantec formulates a less antagonistic version of affective attachments. This is where HCI publics theory diverges from ANT. As Stäheli pointed out, ANT does not capture the affective dynamics in the formation of temporary collectives. Le Dantec addresses this a degree through the notion of attachment. The motivations in forming these attachments are affective, in the sense that attachments rely on a shared feeling between actors to be able to address an issue. Attachments are of course not only formed by mediated communication, but by direct action. This can further contribute to the shared feeling of being able to address concerns together. As for shared issues, there is an element of ANT in this, as, attachments are defined through the relations between actors, artefacts, and institutions. Here, Le Dantec also highlights an affective dimension that, as Stäheli noted, is missing from ANT. Le Dantec's framing of affect is Deleuzian, as an intensity that shapes a body's capability to act. Affective interactions then contribute to forming attachments, as commitments and dependencies between actors, that contribute to the capability of a public to act on issues (Le Dantec, 2016, p. 62f.). As Le Dantec (2016, p. 62) puts it "[w]ithout attachments, and the motivating affective interactions, the formation of a public as an entity capable of co-constructing material responses to shared issues fails." In DT, Laclau theorises affect as a pre-discursive affective investment in a signifier, defined through the Lacanian concepts of lack and enjoyment. For agonistic democracy, Mouffe argues for democratic passions, against both rational deliberation and antagonistic mobilisation. In the section that follows, I will expand on this reading of the key concepts of publics through DT.

2.4   Discursive publics: affective investment and agonism in Discourse Theory

> "Thus it has been formed, by the joint action of three inventions interacting with each other, the printing press, railways, telegraph, the formidable power of the press, this prodigious telephone which has so incredibly enlarged the old audience of tribunes and preachers. […] It is the age of the public or publics, which is very different (Laclau, 2005, p. 45; citing Tarde, 1989, p. 38)."

Like Dewey, Laclau (see 2005, p. 45f.) traces the emergence of publics to the emergence of modern infrastructures (in transportation and communication), drawing from the work of Tarde, who frames it as the shift from crowds to publics. There is, however, a key difference, which extends throughout the argument in this chapter. For Dewey, the *problem of the public* arises when modern infrastructures expand the social world beyond local communities and functional local democracy, with publics now struggling to identify themselves with the multitude of emerging issues. Laclau arrives at a similar notion of fragmented publics from an almost diametrically opposed persecutive through Tarde. Before the infrastructures of modernity allowed for fragmented publics outside of urban centres, there were crowds. Crowds were unable to articulate difference, lacking access to the infrastructures of modernity. Like Dewey, Tarde observes a shift from face-to-face interaction to interaction at a distance. Contrary to Dewey, Tarde's approach is psychological. He sees crowds as an affective mass following a charismatic leader (an empty signifier, as Laclau argues). In the face-to-face crowd, an affective logic is at play, represented in the affective (even violent) investment in a charismatic leader. In the move to heterogeneous publics, the need arises to construct links between publics, now diffused and differentiated through modern infrastructures. Contrary to Dewey, Tarde argues that the infrastructures of modernity enable publics to identify themselves. This process of identification is Laclau's focus in his theory of the discursive sequences by which a political group constitutes itself. This is the focus of this chapter.

Discourse Theory (DT) is a strand of post-structuralist political theory initially developed by Ernesto Laclau and Chantal Mouffe. Based on the ontological assumptions of DT, Laclau developed a theory of populism, or more precisely a theory of political mobilisation, while Mouffe developed the theory of agonistic democracy, which has been applied in PD. In this chapter, I contrast the ANT/HCI readings of publics with a reading that draws on DT and (to a lesser degree) agonistic democracy. For Laclau, issue formation is centred around shared demands, an as an alternative framing of shared issues. Contrary to ANT, there is a stronger focus on discursive form, instead of network nodes. The challenge, however is similar: the formation of collectives across a heterogenous social field, centred around an object that represents issues or demands. Additionally, DT provides an alternative reading of affect and attachment, thus developing the HCI reading of publics further. In this chapter, I will describe the discursive sequence for articulating shared de-

mands, focusing on how empty signifiers as an alternative expression of the shared issues in ANT/HCI publics. I expand on the role of affect, and its role as the force/commitment to a collective demand, in contrast to the affective attachment of HCI publics. I return to the affective infrastructures of publics, and highlight the concepts of agonistic democracy, as foundation for my discussion of agonistic participatory design. This provides the theoretical rationale for my methodological framework, where I introduce the analytical methods of ANT and DT to the designerly methods of PD on infrastructuring publics. These PD methods draw from both ANT and agonistic democracy, which is based on DT. Some PD accounts combine these approaches, but do not develop the theoretical links. I develop an argument that a closer reading of the underlying sociological and political theory enables a more precise analysis of the designerly work of infrastructuring publics, by designers and/or users.

Before discussing DT, I summarise the key theoretical concepts discussed in the previous chapters, where I traced the concept of publics from its pragmatist origins in the Lippmann-Dewey debate to its applications in ANT and HCI. The Lippmann-Dewey debate highlights *the problem of publics* as one of hegemony (for Lippmann) and one of communication and shared identification (for Dewey). Marres (2012, p. 52f.) develops this into the problem of relevance, arguing that the process defining how actors are linked to an issue and how they articulate a public are constitutive of each other. Here, a gap in the digital civics agenda is identified, as before participation can be configured to be more relational, the relations, or material practices, between actors that constitute a public need to be understood. Latour argues for object-oriented publics, where a material thing serves as the focal point around which concerned human and non-human actors assemble, constituting a public through the process of assembly. He names this *Dingpolitk*, an understanding of the political in which objects (representing issues) provide the focal point for affective agreement and disagreement, stabilising a particular assembly of actors around them. This is where DT comes in, as an alternative reading of the processes that constitute a public around a shared issues. These shared issues are understood as different types of demands that groups address to relevant institutions. How institutions respond opens up pathways for different discursive sequences, which are the focus of this chapter, where I supplement *Dingpolitk* with *Signifikantpolitik*.

In HCI, Le Dantec returns publics to their Deweyan roots, in that they are framed as a communicative challenge, here addressed through co-designing community technologies that support a collective capability to act. This perspective still draws from ANT in the framing of the issues that constitute a public as a network of actors, artefacts and institutions across multiple sites, but it has a distinctly local focus. HCI publics diverge from ANT in the focus on affective attachment - though Latour, as pointed out above, acknowledges the role of affect to a degree. I also highlighted the work of Stäheli, who discussed the role of affect in temporary collectives facilitated by infrastructures. In HCI, affective attachments between actors in a public shape their capability to act collectively.

Le Dantec draws here from Deleuze, on which I will expand in this chapter, and contrast with the role of affect in DT, as an affective investment in an empty signifier that represents a chain of demands - the category that is an expression of what is defined as shared issues in ANT and HCI.

2.4.1 The discursive sequence: From demands to shared issues

> "[W]hat matters is the determination of the discursive sequences through which a social force or movement carries out its overall political performance (Laclau, 2005, p. 13)."

The purpose of this chapter is not to trace the full theoretical (post-)foundation of the DT that Laclau and Mouffe developed over several publications, but to highlight key theoretical concepts that can contribute to the empirical analysis of the formation of publics, complementing the concepts of material publics in ANT, community publics in HCI, and the applications of ANT and DT (in the form agonistic pluralism) in PD, as described in the following methodological framework. The key concepts of DT all link together in what Laclau calls a discursive sequence.

The key category of these sequences is the demand, which I argue is to a degree equivalent to the shared issue in the three approaches to publics discussed previously. While both categories are similar, the demand has a performativity and direction towards the institution that it addressed to (Žižek, 2006, p. 558) and thus may not apply at local scale. For clarity, I will not resolve this here, and discuss Laclau's discursive sequence through demands. In the case study, I will evaluate which category applies and how. Laclau focuses on how different shared demands link together in a discursive sequence, or, put differently, how actors are linked to an issue and how they articulate a public and links between publics. Now, I will elaborate on three versions of the discursive sequence: One, a sequence where separate demands are made by separate groups and addressed appropriately by responsible institutions. Two, a sequence of separate demands that are made by separate groups, but *not* addressed by responsible institutions. Now, these separate demands are equivalent in their rejection, despite not being related in content. Three, as the demands are rejected, an antagonistic frontier is constructed, with, for example, the responsible institution as the constitutive Other that denies the fulfilment of demands. As this frontier is constructed, one of the rejected demands becomes a stand-in for the chain of rejected demands that are only related in their rejection, a particular element representing a totality. In this third sequence, the key categories of DT are discussed, as a reading of publics that highlights the role of affect, and the logics of equivalence and difference in the construction of shared issues.

First, we have a sequence of differential demands, following a logic of difference. The other two sequences follow under certain conditions - second, in the rejection of demands, and third, in the construction of an antagonistic frontier. While Laclau develops his theory

for larger, totalising movements that often claim to speak for "the people" as a whole, he uses a fictional example at city-scale to develop his argument, imagining a developing city into which migrants are moving from the periphery (see Laclau, 2005, p. 73). Now, this city has the issue of insufficient housing to address. The migrants sharing this issue address it to the relevant public institutions, in the form of a demand for housing. Other demands arise as well, linked perhaps to the provision of public health services or schools. If these demands are addressed, they remain separate, *differential*, as figure 2.1 shows.

Differential demand 1

Differential demand 2 $\longrightarrow$ Responsible institution

Differential demand 3
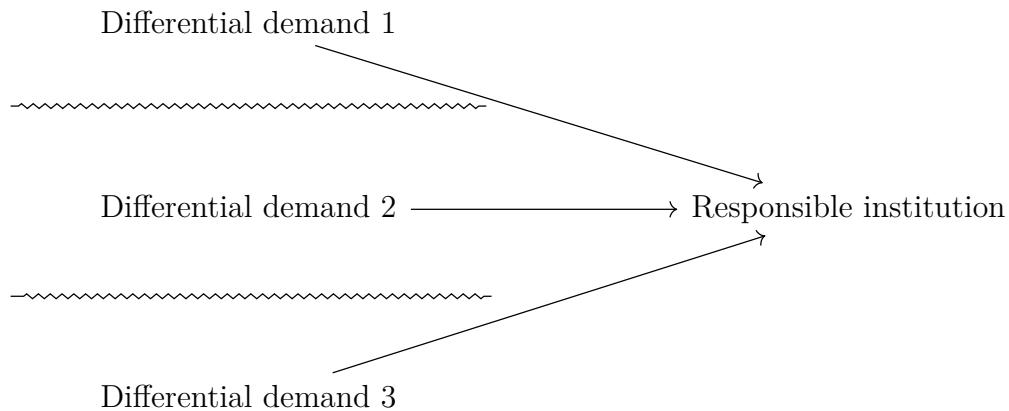
Figure 2.1: A sequence of differential demands, addressed separately

Second, there is the possibility that a number of those demands are rejected by responsible institutions. For the purposes of this example, perhaps these institutions are overwhelmed by an unexpected, exponential increase in migration (or just unwilling to address the demands). Now, the separate demands have something in common. They become *equivalential* in their rejection, despite not being (directly) related in content. As these demands now represent the several groups (or: publics), they become *popular demands*, in their shared rejection and their shared antagonistic frontier, following a logic of equivalence (Laclau, 2005, p. 44). This second sequence is shown in figure 2.2.

For the third discursive sequence several theoretical concepts need to be introduced, to (temporarily) order the chain of demands that were made equivalential in their rejection in the second sequence. One, the empty signifier, which represents a chain of equivalential demands, and an (always impossible) full identity. Two, the antagonistic frontier, against what prevents the discursive closure of a full identity. Three, the drive for that discursive closure is affective, based on the psychoanalytical concept of an experience of lack, which makes an affective investment into an empty signifier possible. The first two sequences could be described through an example. For the third sequence in figure 2.3, a brief ontological interlude is necessary, which shows the underlying operations of signification that I aimed to highlight in the three discursive sequences.

For Latour, *Dingpolitik* is an understanding of the political where an object represents

Equivalential demand 1 ⟶

Equivalential demand 2 ⟶   Responsible institution

Equivalential demand 3 ⟶
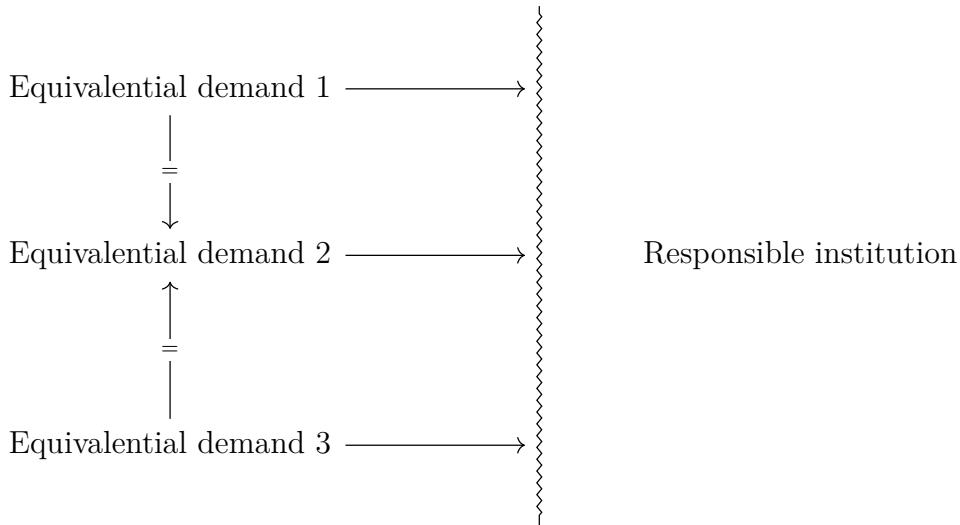
Figure 2.2: A sequence of popular demands made equivalent in their rejection

Equivalential demand 1 ⟶

Affective investment

Empty signifier ⟶   Responsible institution

Affective investment

Equivalential demand 3 ⟶
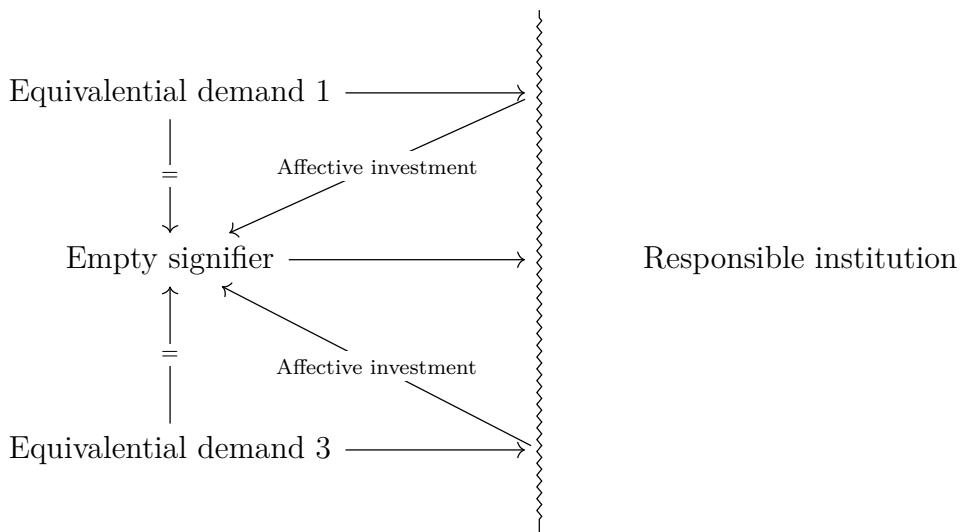
Figure 2.3: A sequence of popular demands represented by an empty signifier

a shared issue. In DT, that object is the empty signifier, which represents a chain of equivalential demands, as "an element which gives coherence to the [equivalential] chain by signifying it as a totality (Laclau, 2005, p. 44)." Laclau (2005, p. 13) refers to "structured totalities made of both linguistic and non-linguistic demands" as discourses. Elements within such a totality follow a logic of difference, with the first discursive sequences a concrete example. This can be traced to linguistic structuralism where, what a term (=signifier) means (=signifies) is determined through differentiation, by what it is not. Based on the ontological assumption that all signifying elements[4] are constituted

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[4]In the discursive sequences, the demands are the concrete expression of the discursive element.

through difference, Laclau argues that the totality of these signifying elements can only be represented through difference. Thus, an element differentiated from all other elements is required, which leads to (a logic of) equivalence between all other elements, as they, as part of that totality are now differentiated from the same element. The second discursive sequence is an example of this. In the third discursive sequence, the concepts of the empty signifier and an affective investment in that empty signifier are introduced, which result from the tension between difference and equivalence. This tension refers to the impossibility of fully representing a totality, which results from the necessity of an excluded element to constitute that totality through differentiation (Laclau, 2005, pp. 69–71).

How, then, to represent this impossible, yet necessary totality, if every element inside of it is differentiated from the other elements, equivalent only in their shared differentiation from the element that is excluded from the totality in order to constitute it? This is where Laclau draws on Lacanian psychoanalysis, in the concept of the empty signifier as the element representing a totality, and an affective investment in that signifier that results from the impossibility of constituting that totality. Here, we return to demands addressed towards an unresponsive institution, which are only equivalent in their rejection. Now, the problem is their representation, as the more heterogenous they are, the less likely they can be represented within a shared totality (Laclau, 2005, p. 98) - this is a practical problem for any social movement. In order to unite these differential demands (and they must remain differential, as argued above), a demand has to step in to represent them as a totality, otherwise their equivalential relations remain too loose to constitute a public (or any other form of totality). The empty signifier fulfils this function as it enables naming the totality, and the construction of links between demands:

> "[T]he unity of the object is a retroactive effect of naming it. Two consequences follow: first, the name, once it has become the signifier of what is heterogeneous and excessive in a particular society, will have an irresistible attraction over any demand which is lived as unfulfilled and, as such, as excessive and heterogeneous vis-à-vis the existing symbolic framework; second, since the name – in order to play that constitutive role – has to be an empty signifier, it is ultimately unable to determine what kind of demands enter into the equivalential chain (Laclau, 2005, p. 108)."

Thus, the empty signifier acts as the object around which a public is constituted. In that, *Signifikantpolitik* provides an alternative reading of Latour's *Dingpolitik*, or object-oriented, material publics. In theorising demands through the logics of equivalence and difference, Laclau highlights the necessary play of inclusion/exclusion or equivalence/difference in the constitution of publics. In *quilting* a discourse, empty signifiers become embedded in material practices (Laclau, 2005, p. 106).

Latour briefly highlights the affective nature of *Dingpolitik*, and Laclau agrees. Stavrakakis (2007, p. 16) goes even further, arguing that Lacanian concepts such as

jouissance can be central in interpreting the shared issues of publics, partially when dealing with discursive dislocations, and "paradoxical objects which disturb any fantasy of absolute representation, control and predictability." For Latour, this is the concrete shift from *matters of fact* to *matters of concerns*, from well-defined objects with clear boundaries, to objects that cannot be represented as such (Stavrakakis, 2007, p. 7). For Laclau, it is the move from *differential demands* to *equivalential demands* in which the impossibility (and necessity) of representation becomes clear. In drawing from Lacanian theory, he, too, aims to account for the what cannot be explained through representation/signification. Elevating a particular discursive element to the empty signifier that represents a chain of equivalential demands is not only a discursive operation of (partially) emptying a signifier of meaning so that it can represent heterogenous demands, but a "performative operation" (Laclau, 2005, p. 97) that requires an affective force, as the empty signifier acts as the "rallying point of passionate attachments." In the previous discussion on the necessity and impossibility of representing a totality (such as a public), Laclau provides an ontological argument *why* controversy emerges, and he theorisers this further through the experience of lack - *the thing(s) that we demand, but they deny us / if they did not deny us the thing(s), we would not be.* To Laclau, this makes clear that there a non-discursive force at play, which, helps quilts together a loose association of rejected demands into a totality, as there is no ontological ground from which particular signifier attains their function as the part that represents the (always incomplete) whole. This is theorised through the Lacanian concept of *jouissance*, enjoyment (and the lack thereof), defined by Laclau (2005, p. 116) as "the imagination of enjoyment as fullness, which promises to bring something irretrievably lost through socialisation." In Lacanian psychoanalysis, Laclau again identifies the logics of difference and equivalence which he first discussed from a structuralist starting point,[5] in that a partial object represents a movement towards an impossible totality.[6] What psychoanalysis adds here is a drive towards a "mythical fullness", which results in an investment in a signifier based on sublimation - making concrete the unattainable through a partial object. Here, Laclau cites Copjec, who articulates the representation of the whole through a part through the Freudian concept of the *Nebenmensch*, here as a split between the unattainable *Ding* (as with Latour, the specific object remains untranslated, so that the specific properties of the *Ding* are not lost in translation) and its substitution with another object (Laclau, 2005, p. 112f.). This affective drive to return to a whole that is unattainable translates into the affective investment in a signifier.

 I recall here my previous discussion of neighbourhoods during the pandemic, which

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[5]It should be noted here that introduction of Lacanian psychoanalysis to DT is fairly recent, and Laclau's claim that the psychoanalytical approach is equivalent to the pre-existing post-structuralist approach is contested to some degree (see Stavrakakis, 2007, p. 82 - 87). I refrain here from further theoretical discussion, as the focus is on the application of DT to the concept of publics, and thus a discussion of affect as it relates to that.

[6]This is also the move beyond and against Marxist epistemology and essentialism in Laclau, as Marxism traditionally articulated a system closed and determined through the economy, suspending the logic of difference, and overcoming the impossibility of discursive closure (Laclau, 2005, p. 116).

highlights this affective logic at play. I drew on Reinhard's reading of the *Nebenmensch*, as a neighbour that is neither *us* nor *them*, yet still constitutive of the subject. For Reinhard, this leads to an understanding of the neighbourhood as a space where differential logics are suspended - yet there remains an affective tension, in the imagined enjoyment of the neighbour's *boorish* actions, which, we now know through Laclau, can force an affective investment in either *us* or *them* - either way, the neighbour remains within the totality of the neighbourhood. I repeat my conclusion from that section: If a neighbourhood is neither defined by a shared identity or simple geographic demarcations, but openness and ambivalence, then the infrastructures of networks play an important part in connecting them. To this, I now add that a significatory logic can bridge that ambivalence to a degree, as we now know that a shared identity is not a number of positive traits, but the equivalence between particular demands made by heterogenous groups, united in their rejection, and potentially represented by an empty signifier that may represent a neighbourhood public through articulating what it is lacking.

Following this ontological interlude, it may be helpful to discuss an example. Following Gunder and Hillier (2016, p. 4), planning is a contested term, as its historical meaning shifted from addressing issues arising from industrialisation (as in Laclau's example), to positivist models of planning in modernity, to a challenge of that worldview in academia. In that sense, it is an empty signifier, as it holds several meanings that are to a degree contested, and in contradiction to each other. The historical signifier of planning quilted discursive links between diverse demands arising from rapid industrialisation, while a later positivist understanding of planning was only capable of including demands that could be articulated within scientific rationality, excluding others, and thus allowing for the construction of an antagonistic frontier, and an equivalence between such demands rejected on ontological grounds.

For the concept of affect, Gunder and Hillier (2016, p. 24f.) provide an example from planning, where a "lack of *order*, or, perhaps *security* and the subsequent hegemonic articulation of its resolution, provides a powerful and emotive political tool" - signifiers such as (a lack of) sustainability or regional competitiveness are articulated as non-political, universal concerns, but translated by a planning system into particular actions, through the logics of difference/equivalence, expressed in material exclusion/inclusion. Gunder and Hillier draw on Laclau when highlighting that any universal construct is universal in its emptiness, allowing different hegemonic forces to latch on to it, leading to particular, contestable solutions. It is easy to think of examples where sustainability can be a driver in gentrification, or where urban greening initiatives displace residents (see for examples Gould and Lewis, 2016; and Bunce, 2009). This leads to a final point on affect. A signifier such as sustainability comes with visions and plans for the future, adding a temporal dimensions to the lack it promises to overcome. As Gunder and Hillier (2016, p. 56) put it:

"In achieving the good, healthy city, our symbolic systems need anchoring

points or points of fixation of meaning, even if 'empty', to quilt social reality
and its actants. […] They are always meanings-yet-to-come of the good, guar-
anteed by the big Other, and accordingly able to consolidate the social field
and its constituting subjects towards that which is yet to be: the future."

This fantasmatic logic is a type of affective enjoyment. It is at play, for example, in
discourses of consumerism, where the desire for a commodity is not fulfilled by acquiring
it (Stavrakakis, 2007, p. 243) (Žižek on Coca-Cola is the classic example), or on national
identity, where the fulfilment of that identity is denied by the Other (Stavrakakis, 2007,
p. 200). It is a drive or desire towards "recapturing our lost/ impossible enjoyment that
provides, above all, the fantasy support for many of our political projects and choices."
As such it relates to identification, but also the experience of enjoyment in the process
(Stavrakakis, 2007, p. 196f). Laclau focuses mostly on identification, in the affective
investment in an empty signifier, constructed against an antagonistic frontier. Stavrakakis
uses Greece during 2004 Olympics as an example. Here, the opening ceremony highlighted
markers of Greek civilisation, thus relating on identification, while the closing ceremony
provided an affective experience through showcasing everyday customs and traditions in
dance and song (Stavrakakis, 2007, p. 204). While the Greek example looks to the past
(which of course is irretrievably lost, despite being a reference point for present collective
identity), the local, future-oriented reading of affect and signification provided by Gunder
and Hillier above is relevant for the case study. Furthermore, the fantasmatic logic is
factor in the functioning of affect in a local context, in the aspirations that are attached
to a place, its future, and what threatens that future (Jabareen and Eizenberg, 2020, p.
11) - *What are the things that threaten the future of our neighbourhood, that stand in
the way of its wholeness?* This is where this discussion tracks back to my case study,
a collaborative working towards a *better* future for their neighbourhood, which at this
tangible scale also relates to the experience of enjoyment in the process of doing so.

3 Methodological Framework: Participatory Design and Infrastructuring

My project not only seeks to analyse the formation of neighbourhood publics through ANT and DT, but actively work with community partners, as is characteristic of empirical work in digital civics. In this chapter, I will discuss methods from such a designerly perspective. The focus here is on PD methods, as this approach focuses on infrastructuring. In recent iterations, PD also and draws from ANT and DT, often combining them to a practical approach for *infrastructuring publics* at local scale. First, I discuss the relationship of PD to the concept of infrastructuring, before discussing it in relation to both ANT and DT in the following sections.

I note here that this is a discussion of PD as it relates to publics and infrastructuring, and thus by extension to digital civics. Thus, I do not review here the field of participatory design, but how it relates to infrastructuring through the two theoretical lenses for publics introduced in the previous chapter. As Spinuzzi (2005, p. 163) notes, PD is often understood as a field or an approach to design. Due to its traditional emphasis on gathering tacit, invisible knowledge throughout the design process it can however also be understood as a research methodology. This focus on gathering tacit knowledge should become clear through the following methodological discussion, as the focus is on infrastructuring mostly for its analytical capacity during infrastructural breakdown, and less as a frame for design. Bridging from participants' tacit knowledge to analytical knowledge is a methodological goal of PD (2005, p. 164) - in this case, the analysis of an ad-hoc infrastructuring process in response to infrastructural breakdown. Thus, the focus is specifically on this bridging, methodological goal of PD, which is why it here understood as a method to gather and analyse the tacit knowledge(s) of the collaborative during the pandemic.

PD emerged in the 1980s as a collaborative practice between trade unions and design researchers in Scandinavia (see Ehn, 1992). Initially, PD was concerned with industrial democracy and power relations in the workplace. In short, the goal was to involve skilled workers in the design of new computer systems that were being introduced to the workplace. Already at this early stage, disagreement was a key element of PD since it rejected rationalist views of design and emphasised the unity of the workforce over management-driven approaches to workers' welfare. Early approaches drew from Wittgenstein, in that they were attentive to the language users use to describe the systems that they use. Design artefacts were used to elicit such descriptions, which then informed the design of systems. For example, Ehn used a mock-up laser printer to elicit responses from typographers on the future of their profession, and the systems that facilitate their work (Ehn, 1992, p. 66f.). In this early practice, Björgvinsson et al. (2012b, p. 105) later identify a Latourian focus on *matters of concern*, as the focus was on objects that allowed users to come together to articulate heterogenous perspectives on technology use in the workplace.

I add here that this orientation towards language games also foreshadows my introduction of DT into PD, and the focus on *both* material and discursive practices, as articulated in the dual focus on ANT and DT in both theoretical and methodological frameworks. As Laclau (2005, p. 106) notes:

> "The articulation between universality and particularity which is constitutively inherent to the construction of a 'people' is not something which takes place just at the level of words and images: it is also sedimented in practices and institutions. [O]ur notion of 'discourse' – which is close to Wittgenstein's 'language games' – involves the articulation of words and actions, so that the quilting function is never a merely verbal operation but is embedded in material practices which can acquire institutional fixity."

Moving on from the industrial, unionised workplaces of Scandinavia, PD is now conducted at different scales. As Simonsen and Hertzum (2012, p. 11) point out in their review of PD literature, most PD projects focus on researcher-driven, small-scale systems. They develop a sustained PD approach, that builds on the smaller-scale iterative approach, through continuing beyond the initial, iterative design cycle. My project, of course, is small-scale and researcher-driven to a degree. It is set in a different workplace environment, with different practical constraints. Dalsgaard (2012, p. 42) highlights the heterogeneity of the social when moving from the traditional workplace setting of PD, to a large-scale, public sector project, in their case the design of a new library that involves a multitude of stakeholders. As Le Dantec points out, however, the community-level is heterogenous as well. Shared issues help to map different subjectivities across a context more heterogenous than the historical sites of inquiry of PD or HCI, such as the workplace (Le Dantec, 2016, p. 35). This focus on different subject positions gathered around a shared issue (be that a matter of concern and/or an empty signifier) draws attention to the different epistemologies at play. In following chapters, I will unpack two of these, in the contributions of ANT and DT to PD.

I elaborated on the key theories of pragmatism, ANT, and DT in my theoretical framework, and I will discuss in this methodological framework how they inform PD infrastructuring, in particular at community-scale. In PD, they are often used for their normative perspective, such as agonistic public spaces, which sets specific parameters for infrastructuring. This is also the case for the concept of *design-after-design*, informed by Latour's *Dingpolitik*. Crucially, this concept draws attention to the infrastructuring done by users themselves, and this is my focus regarding the work of the collaborative as well. Through my focus on infrastructural breakdown, I apply infrastructuring (mostly) in an analytical capacity by applying the analytical frames of ANT and DT, and less in a generative capacity for design. As the Wittgenstein parallel between DT and PD shows, there is common ground, and I apply this discursive approach to the analysis of design-after-design in the case study.

3.1 From infrastructures to infrastructuring

In infrastructuring, Karasti et al. (2018) see a potential return to the focus on power (infra-)structures of industrial PD. They call for a relational view of infrastructuring, as a political perspective that highlights concerns with participation when non-human agencies are at play. As discussed in the theoretical framework, both ANT and DT can provide perspectives to this question, further guided by their application in PD, as discussed in the following sections. This focus on the politics of participation is necessary due to the diverse range of practices that infrastructuring in PD now encompasses:

> "[T]he repertoire of activities considered in relation to infrastructuring has expanded to include tailoring, appropriating, tuning, modifying, tweaking, making, fixing, monitoring, maintaining, repairing, hacking, and vandalizing. This points to a rich set of intentionalities and interventions with different political connotations that incrementally shape infrastructures (Karasti *et al.*, 2018, p. 2)."

To this we can now add the *tracing* of ANT (of actors and movements within infrastructures) and the *quilting* of DT (around affective attachments and empty signifiers), informing the discussions in the following sections.

Elsewhere, Karasti reviews the application of the concept of infrastructuring within PD. The concept of infrastructures was introduced through large-scale library systems, drawing from the STS concept of information infrastructure, where the nodes of this infrastructure and its users are relational, encompassing the diverse relationships to the objects of that infrastructure - designers, administrators, and users approach the same object from different subject positions (Karasti, 2014, p. 141f.). I recall here my discussion of ANT as tracing the actors, extended to tracing the (affective) movement through an infrastructure. Clement et al. provide a helpful delineation between infrastructuring and infrastructures, highlighting the institutionalising effect of infrastructuring (as Laclau above and Karasti et al. do as well):

> "By using (the verb) infrastructuring we are emphasizing the possibility of making visible, actively designing and using a system that may later become entrenched and installed as infrastructure (the noun) (Clement *et al.*, 2012, p. 1)."

In the PD literature, Karasti (see 2014, pp. 142–145) identifies a move from infrastructure to infrastructuring, as the alignment between these diverse actors is ongoing, and information infrastructure is thus at all times in a process of becoming. Infrastructuring is defined as a process of alignment of an information infrastructure with actors in relation to it. This developed from infrastructuring in the workplace, to infrastructuring in communities, focused on *things* (as in *Dingpolitik*) and/or publics, often *agonistic*. In the

workplace, the focus was on organisational IT, which should be designed and implemented by its users, building on existing systems. They defined infrastructures as the collective of users, artefacts and technologies working towards a certain organisational goal, and thus with defined boundaries. Infrastructuring can occur where infrastructures become visible through either failure or innovation, becoming potential focal points for improvement through design. Infrastructuring *things* as a PD perspective focuses on the long-term design processes, as designing an environment for ongoing, future-focused use, as opposed to, say, delivering a finished system through prototyping, testing, and developing in a fixed time frame. This *thing*, in line with ANT, includes not just the object of design, but the network of human and non-human actors interacting with it, and thus shaping it and being shaped by it. This was further developed to infrastructuring *agonistic public spaces*, though a normative focus on Dewey's publics and Mouffe's agonistic democracy, which is based on DT. Infrastructuring *publics* focuses specifically on the attachments of actors to a shared issues. As with agonistic public spaces there is a political focus on mechanisms of inclusion/exclusion. When moving from the workplace to communities, the boundaries of infrastructures become less defined, in line with the normative focus on open, heterogenous, and democratic PD, and a constructivist ontology. I note here that community infrastructuring draws on the theories that I discussed in detail before, expanding on the normative focus.

3.2 Infrastructural breakdown and inversion

While the focus here is on the strands of infrastructuring that are applied in a community context, the initial work on information infrastructures provides several useful concepts. As noted by Karasti, infrastructures become visible upon breakdown or innovation. A global pandemic, with far-reaching implications for the work of my community partners, thus represents such a moment of dislocation, where infrastructures that support their work and network are shifted by necessity.

Simonsen et al. (2020, pp. 122–123) use the concept of *infrastructural inversion*, drawing attention to mundane processes that enable infrastructures to function, the subtle, often invisible mechanisms that make connections between actors possible. This is done following several methodological approaches, from (initially) a conceptual-analytic approach for stable systems (such as workplace IT) to ethnographic and generative approaches. The latter two are more relevant here. The ethnographic approach focuses on infrastructural breakdowns as they occur in practice, in systems used before the researcher intervenes. It can highlight the work actors (human and non-human) do to maintain functioning networks. A particular focus is on *infrastructural allies*, actors who already contribute to maintaining infrastructure and addressing breakdown. Building on this, infrastructural inversion can be a generative approach for design, through designing for friction. This is also where infrastructural inversion becomes relevant in a civic context, as contestational design that incorporates the theory of agonistic democracy (and a

focus on everyday politics similar to the digital civics agenda). While there is a continued focus on infrastructural breakdown, stable infrastructures are now appropriated for infrastructuring that enables a plurality of subject positions to be articulated and enables reflection on infrastructural power (Korn and Voida, 2015, p. 153).

Blomberg and Karasti define the role of ethnography in PD. For them, it is an established part of PD, but still often seen as secondary to design activities with participants. Particularly for an infrastructuring context, they argue that reflexive ethnography is suitable to engage with diverse subject positions of participants, and to retrieve some of the democratic perspective of early workplace PD (Blomberg and Karasti, 2013, p. 89; see also Ehn, 1992). The importance of acknowledging different subject positions and epistemologies was highlighted in all theoretical approaches to publics discussed in previous chapters. Returning to traditional PD, ethnography was used either reflexively with PD, with ethnography used to construct an understanding of present socio-technical practices, and PD to re-construct them into future practices. Elsewhere, ethnographic methods were integrated into PD methodology, again in an effort to understand present conditions, but shifting between ethnography and intervention. This integration led to designers participating in the ethnographic field work, whole elsewhere again ethnography work and design work was split between respective practitioners, with design choices based on ethnographic analysis (Blomberg and Karasti, 2013, p. 93f.). In more recent work, Blomberg and Karasti find a deeper integration of ethnography in the practice of (participatory) design, in contrast to the earlier separation, where ethnography mainly informed design. This also offers the possibility of critical reflection that not only includes participants, technology, and their shared setting, but also the researcher, and their subject position (Blomberg and Karasti, 2013, p. 93f.).

What, then, of ethnographic PD for infrastructuring publics? Regarding the relationship of infrastructuring and ethnography, Karasti and Blomberg (2018, p. 244) highlight the concept of *co-presence* as an infrastructural approach to field work, as a socio-technical extension of the spatial concept of co-location. Where co-presence refers to a relationship between researcher and participants that has spatial boundaries, co-presence opens up this relationship to both online and offline interactions, with more open boundaries. For Karasti and Blomberg (2018, p. 245), co-presence is a thus a methodological approach to tracing the *actors*, and tracing the *movement* through infrastructures, as from this perspective infrastructures are the sum of actors engaging with them over time, their composition contingent. It is also discursive, in that the online and offline interactions facilitated through an infrastructure are not only foster connections between nodes, but also processes of constructing meaning. As I argued in my theoretical framework from both the perspectives of ANT and DT, the social world is heterogenous, contingent, and never whole (although striving for it). Thus, Karasti and Blomberg (2018, p. 248) draw attention to the *seams* where infrastructures overlap or contradict, necessitating (co-)presence on several ethnographic sites:

> "The researcher constructs the practical ontology together with the participants, which requires flexibility and attentiveness, as well as ongoing inclusion of informants in these processes."

Drawing on Law's discussion of methodology in ANT, they highlight the research methods entail processes of inclusion/exclusion through the choices the researcher makes, as methods actively contribute to the construction of the social world. Thus, reflectivity and co-presence are relevant concepts for defining processes of infrastructuring, as they open up the construction of that social world to those in it (Karasti and Blomberg, 2018, p. 250), thus widening to scope of research beyond (designerly) activities of infrastructuring to the shape of particular infrastructures (Karasti and Blomberg, 2018, p. 254).

This focus on inclusion and exclusion is already present in the early ethnographic work on information infrastructures. While infrastructures are relational, this is not an open relation, but one that entails mechanisms of material power in the hidden, seemingly seamless interactions with infrastructure. Drawing on Latour, Star (1999, p. 379) states:

> "Study the city and neglect its sewers and power supplies (as many have) and you miss essential aspects of distributional justice and planning power. [...] Perhaps if we stopped thinking of computers as information highways and began to think of them more modestly as symbolic sewers, this realm would open up a bit."

Infrastructures are also discursive, in that mechanisms of publics formation through inclusion/exclusion and hegemony apply (as discussed regarding DT). Star (1999, p. 384f.) highlights the need to identify in ethnographic practice how these mechanisms are inscribed in relational infrastructures. She uses Latour's work on a failed public transit system as an example, which ran counter to the hegemonic discourse of the car-centric American family. She highlights a focus on particularities claiming to represent totalities, again drawing on discursive mechanism identified in STS and ANT, such as hegemonic appeals to *the* science or *the* data, which imply consensus and authority, glossing over debate and uncertainty (and thus foreclosing their articulation through publics, as matters of concern). Relevant for the methodological discussion here, she not only draws attention to discourse and material modes of othering, but also the infrastructural inversions mentioned previously. This, for Star, also includes identifying the "invisible work" that makes an infrastructure work, which is excluded from the formal model of an infrastructure. For example, Star (1999, p. 386f.) wanted to include secretaries in her work on the communication flows of a biology lab, which was resisted by biologists and developers, who argued that secretaries do not directly contribute to "real science" (again, a seemingly closed totality, a discursive exclusion). As I highlighted before, ANT provides the analytical language for understanding the socio-technical production of knowledge - a process that involves relational infrastructures. Finally, and she highlights the notion of

the "paradoxes of infrastructure", the small obstacles that make a system more challenging to use. This includes the users' interaction with the systems (the visible and invisible work), and, more relevant to larger-scale information systems, the stack of background tasks set in motion by these interactions.

How then, do these methodological concerns with organisational power structure, invisible work and infrastructural paradoxes, these *problems of inversion*, relate to publics? Clement et al. (2012, p. 3) argue that they relate to the Dewey's problem of the public in that different, sizeable groups should be involved in making decisions about concerns they are affected by (here: public infrastructures). I note here that the *problem* they describe may be closer to Lippmann's problem, in that the public may neither be interested nor skilled to articulate concerns about socio-technical infrastructures. Still, Clement et al. argue that the PD applications of Latour's notion of object-oriented democracy, *Dingpolitik*, and Mouffe's notion of agonism provide avenues to address infrastructural concerns in a participatory manner. Their work, for example, deals with the information infrastructures of identification, such as ID cards or driver's licenses. Discourses on technologies such biometric ID or RFID focus on privacy or surveillance. They link to databases and technologies of security agencies and large private corporations, largely obscured to the holder of the ID, and not necessarily part of democratic, public discourse. Depending on location, counter-terrorism (such as in the post-9/11 USA), or existing norms (such as in the UK) shape debate. Thus, Clement et al. stage different participatory activities that, through different ID-related objects, made legible hidden aspects of ID infrastructures, and thus opened them up for contestation. Here, the infrastructure itself was the shared concern, and infrastructuring the process of making visible (through objects) that infrastructure and engaging with it (agonistically).

Moving on from the infrastructures of large-scale information systems, an example of an ethnographic approach to infrastructuring in a community context is a hybrid approach by Mosconi et al. (2017). They follow a *networked public* in their attempt to improve their neighbourhood through Facebook groups, as well as face-to face interventions. They follow Le Dantec's approach to publics through a focus on attachments to shared issues. It is worth noting here that Di Salvo et al. (2013, p. 183f.) provide an alternative delineation of community. They point out that it is not possible to neatly separate a workplace setting from a non-workplace community setting, as communities exist within formal work setting, and workplace-like communities exist outside formal work settings. Instead, they highlight definitions of community constructed through place, identity, or practice. Publics provide another definition, as "a kind of community that is identified with and constituted by an issue (DiSalvo, Clement and Pipek, 2013, p. 200)." Thus, they argue that the definition of community should remain open and contingent, which extends to PD methods in working with communities. Drawing on Akama and Ivanka (see 2010), they highlight the importance of operationalising the concept of community in way that does not negate the heterogeneity of that community. They use *playful*

triggers, everyday object that can be used to render visible tacit knowledge in workshops. In their case, they apply this to a *community of place*, the temporary and permanent residents of an area that with high bushfire risk (Akama and Ivanka, 2010, p. 16). Agid and Akama (2020, p. 164) suggest turning to methods that help understand how a (heterogenous) collectivity is constructed on different infrastructural scales. They use the method of *practice notation* to understand how communities at a local scale intersect with larger-scale systems, based on interviews and field notes. This method aims to capture that moment of intersection in a movement across intersecting scales, "to mark a local infrastructuring process, looking at the intertwining of time, people, materials, and structures in specific moments, as well as changes across and through them." Similar to musical notation, practice notation is a means of capturing movements, events, and their relations. Agid and Agama argue that practice notation helps them to trace the concerns of their collaborators, the infrastructures they build in response to those concerns, and how these local concerns and infrastructures link to larger-scale socio-political infrastructures. Practice notation is a method for reflective, non-linear textual analysis of participants' accounts (2020, p. 164).

In my case study, I work with community-based organisations. Di Salvo et al. (2013, p. 185) highlight several relevant factors for PD (and by extension infrastructuring) with such organisations. Compared to the traditional workplace setting, this includes limited resources and limited use of technology, but also a set of shared values and flatter organisational hierarchies. Thus, they may be more agreeable to participatory approaches. They may also be interested in better or increased use of technology for communication.

> "In her paper,"P for Political," Beck poses the question: "What constitutes political action through computing?" Certainly, the history and range of contemporary projects in Participatory Design provide a rich and varied set of answers to that question. To those answers, we would like to propose two others: prompting critical engagements with technology and enabling people to use technology to produce creative expressions about issues of concern (DiSalvo *et al.*, 2012, p. 48)."

This, then is key to the application of publics in community-based PD.

3.3 Participatory *Dingpolitik*

In this section, I will discuss PD work that draws on ANT, PD work that draws from both ANT and Mouffe's theory of agonistic pluralism, including concrete methods of ANT-influenced PD. The application of ANT to PD has been the subject of several workshops within PD, where the focus was its contribution to the toolbox of participatory methods in for "techno-democracy processes" (Storni *et al.*, 2012, p. 145). These workshops also highlight the introduction of agonistic pluralism into *Thing*-oriented PD, as it shares with

an understanding of democracy that highlights the role of contention (Hansson *et al.*, 2016).

When applying ANT to PD, the key concept is Latour's *Dingpolitik*, which refers to the constitution of publics, and the representation of such collectives around shared issues. In PD, it is translated to a shift from designing objects to designing *things* as "socio-material assemblies", a shift from design-before-use to design-during-use. Infrastructuring is one of the methods to achieve this, through "[t]hings that modifying the space of interactions and performance and may be explored as socio-material frames for controversies, opening up new ways of thinking and behaving, ready for unexpected use (Björgvinsson, Ehn and Hillgren, 2012b, p. 101f.)" From this perspective, design is not only the delivery of an object through the iterative phases of a design project, but the alignment of actors (human and non-human, of course) in language-games in which they can articulate matters of concern. Objects act as both a thing and the *Thing* (Björgvinsson, Ehn and Hillgren, 2012b, p. 106), which, in the language of *Dingpolitik*, means that that they may act as both part of the public and the object around which a public assembles. This is a differentiation between participatory design, as "use-before-use", and meta design, as "design-after-design". In figure 3.1 I visualise the relationship between these approaches, with infrastructuring as the method that ties them together (based on Ehn, 2008, p. 92; and Björgvinsson, Ehn and Hillgren, 2012b). Key is the shift from the temporal linearity of designing an object (use-before-use) to the ongoing, non-linear appropriation of that object by users in their lifeworlds (design-after-design). For Ehn (2008, p. 92f.), the function of the object is to shape interactions between users, designers, and objects, to facilitate the articulation of matters of concerns and of new, potentially unexpected, ways of acting and thinking. In use-before-use, the object acts as a *boundary object* utilised in different design-games - such as the mock-up printers used to elicit responses from typographers on the future of their profession. In design-during-design, the object may become a design *Thing* as it is appropriated by users in their lifeworlds, who now act as designers. Infrastructuring is the process of aligning these two stages of design, for both designers and users, for example through the configuration of different design games at both stages (Ehn, 2008, p. 97). Björgvinsson et al. (2012b, p. 108) expand on this, highlighting the specific methods of infrastructuring. In use-before-use, material representations of the object-to-be are employed in design methods with human participants that emphasise doing and/or playing. Material participation (as an actor) becomes possible once a design object is embedded into human lifeworlds and appropriated by users. When it brings together different actors in the articulation of matters of concern it becomes a design *Thing* in the Latourian sense, where objects become things in "complicated entanglements (Latour, 2005a, p. 31)." They also draw from the information infrastructure approach (discussed above), in that they see infrastructure as relational - thus, a design object only becomes a design *Thing* in relation to other actors, as it is embedded in their everyday lifeworlds, and thus stabilised to a degree.
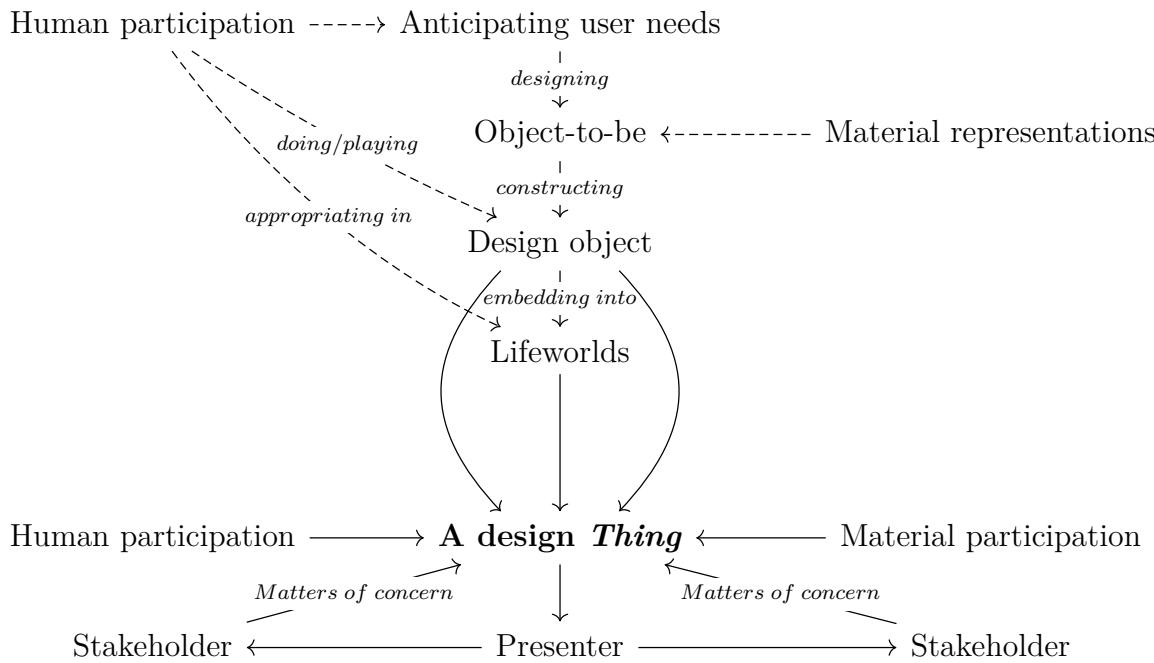
Figure 3.1: From linear use-before-use to continuous design-after-design

While I have discussed above both analytical and generative approaches to infrastructures and infrastructuring, the emphasis in my project is on the former, not only due to the key moment in the information infrastructure approach, one that needs to be accounted for in a project set during the outbreak and progress of a global pandemic: infrastructural breakdown. The above figure 3.1, too, differentiates between analytical and generative focal points. Use-before-use is largely generative, as it centres on linear design processes together with users. Design-after-design is largely done by users, and thus provides a focal point for analysis, which I here combine with the previously discussed emphasis on research at moments of infrastructural breakdown. In short, I am interested here in design by users themselves, in their appropriation of different things into their work, as they respond to the pandemic.

3.3.1   Matters of concern and method

As shown, ANT allows a re-configuration of the PD process from objects to *Things*, through infrastructuring methods. What, then, of publics, from this perspective? In line with Latourian *Dingpolitik,* Björgvinsson et al. (2012b, p. 104f.) ask:

> "How are the objects of design and matters of concern made into public Things and opened to controversies among participants, both in the project and outside it (e.g., negotiations, workshops, exhibitions, public debate)?"

They briefly highlight Dewey's understanding of publics as heterogenous and contestational (Björgvinsson, Ehn and Hillgren, 2012b, p. 116), while Ehn (2008, pp. 94, 99) notes parallels between design-games and Deweyan pragmatism in the understanding that

constituting publics is a communicative challenge. This *public* articulation of matters of concern is a key methodological consideration here, but it also constitutes a slight shift in focus from the design *Thing* to the articulation of matters of concern. Storni (2015, p. 168), for instance, notes that "*re-presenting* and *making public* is one of the core challenges of design: to shape a new aesthetic of matters of concern, to devise new ways to problematise and be interested and to represent and being re-presented." He (2015, p. 173) highlights relational mapping (perhaps as a *Thing*) as a concrete methodological contribution of ANT to PD, with the aim of making visible disagreement. Mapping here is collaborative effort, in what Latour calls *collective experimentation*, in which all actors concerned may contribute to the elements represented in the map. This can be seen as an effort to articulate shared issues, and in the process constitute a public. This follows a tradition of *controversy mapping* in ANT, applied by Venturini et al. (2015. p. 76) to the design of maps that engage with publics. They draw on Lippmann's critical framing of *phantom publics*, who sees publics as too fragmented to recognise themselves (and, I add here, not knowledgeable and/or interested enough in the issues that concern them). Mapping thus is not only a question of both sufficiently legible and complex representation, but of representing controversy. Among several steps, they (Venturini *et al.*, 2015. pp. 78-82) apply the concepts of *use-before-use* and *design-after-design*. First, they conduct an initial mapping of complexity in which they aim to understand debates, the actors involved in them, and the networks that connect them. Then, they observe *issue experts*, in order to develop relevant question from which sketch a map. These were then further developed through a workshop with a relevant publics. In use, they highlight the relevance of openness and interactivity, to allow for design-after-design by publics. Their work deals with large-scale scientific controversy, and they expand on Dewey's *problem of affectedness* by stating that the "public of a controversy is nothing other than the assemblage of the actors interested in the debate (Venturini *et al.*, 2015. p. 86)." Mapping, then, acts to shape the representation of controversy, and thus the public(s) that form around it.

In the broader sense, such an open framing of publics resonates with Andersen et al.'s framing of participation itself as a matter of concern. They (2015, pp. 251, 254) introduce two analytical concepts. One, that participation is *partially existent*, meaning that participation is not only linked to the specific design events, but carries on in a mediated way throughout a project. Two, participation is *overtaken*, as the contributions of participants are translated into other things, such as prototypes, reports, or policy. Participation viewed a matter of concern draws attention the processes involved that make participation happen. Poderi et al. apply the concept of matters of concern as method, generating *user stories* that represent matters of concern, again, first with issue experts and then branching out to interested actors (Poderi *et al.*, 2020). This is based on a co-design method which applies storytelling as an alternative to traditional sketching methods, as they may be more accessible to some stakeholders (Kankainen *et al.*, 2012,

p. 223).

While Storni (2015, p. 172) criticises the "traditional translation model" as hierarchical, Palmås and von Busch (2015, p. 241f.) employ it as part of a critique of participatory urban planning - in a sense to identify hierarchies. Contrary to the examples discussed above, they use ANT to analyse power relations, through the concept of *translation*. In their analysis of a PD process that they participated in as designers and experts, they find material agency at play, shaping the outcome of the project. As findings and designs are translated through inscriptions in different media, they *drift*, moving away from intended perspectives (of designers and participants). Following *protocol*, planners are unwilling to take on "political" proposals, subtly manifested in how they approve of certain proposals and discard others, at different stages of translation. Designers and design *Things* may act as *collaborateurs*, not collaborators in this process of goal translation (Palmås and von Busch, 2015, p. 245). They also highlight this as a potential issue with the AI method, adopted at an early stage of my research project (Palmås and von Busch, 2015, p. 243). The key point here, however, is the capability of ANT to not only help shape the ontological and methodological framework of PD. This example show that ANT does not only link to the process infrastructuring in PD, but also an analytical vocabulary for the evaluation of PD efforts as well. Storni (2015) highlights this as well, that ANT is "an approach, a language and a series of foundational principles to produce descriptions of them." While he develops this into a co-design framework, my project (and its design efforts) focus on the analytical potential, utilising a boundary object for the co-production of descriptions together with participants, a hybrid between analytical ANT, and ANT-derived PD. I adopt the methods of infrastructuring to do this, as an object-orientation both in the sense as applied by DT - the design *Thing* - and Latour - the object as shared issue.

This closer focus on ANT as research method, not design method is mirrored in the following section on *Signifikantpolitik*. As with ANT, DT is applied more as normative framework, in the form of agonistic pluralism, then for its analytical reach. Several of projects discussed in this chapter do so as well, but to a lesser degree - ANT is not just reduced to *Dingpolitik*, but DT is reduced to agonistic pluralism. Thus, I will briefly discuss this move from ANT to DT, before focusing on the latter in the following section.

In the theoretical framework, I highlighted *Dingpolitk* and *Signifikantpolitik* as alternative reading of the process that constitute a public around shared issues, through the process of translation in ANT and the logic of equivalence in DT. In PD, we find a practical application of this, in the supplementation of *matters of concern* with the notion of *agonistic pluralism*. The theoretical implications of this are not further unpacked in PD, which is understandable for the context. I aimed to provide a contribution to this discussion in the theoretical framework through different readings of the concept of publics. Here, it is worth noting that in practical terms, specifically for a design context, synthesis between the two theoretical strands is possible. As Harman (2014, p. 160), in broad strokes, notes:

"The difference between Latour and Mouffe, like the difference between Latour and pretty much any other intellectual neighbor, stems from Latour's greater concern to incorporate nonhuman entities into his theory."

In PD, we find an application of the theoretical parallels that Harman points out between Dewey/Latour and Laclau/Mouffe, in a concern with overdetermined (not pre-given) identities, and the radical contingency of hegemonic relations (Harman, 2014, p. 159).

3.4   Agonistic public spaces: Participatory design and Discourse Theory

Mirroring the shift from Marxist to post-Marxist thinking in Laclau and Mouffe's work, Björgvinsson et al. (2012a) shift the focus of participatory design from industrial labour to projects such as the *Malmö Living Labs*, which aim to foster long term-term collaborations between diverse stakeholders, including marginalised social movements. Here, they draw on Dewey's notion of publics as the groups that emerge around a shared concern and Mouffe's notion of agonistic pluralism, to describe the agonistic public spaces where publics gather to challenge hegemonic relations. The task for the designer, then, is *infrastructuring* these agonistic public spaces. Here, infrastructuring is the ongoing process of aligning technologies used with wider socio-material relations. What, then, is agonistic pluralism?

Through populisms emerging from the post-political condition, Mouffe's theory of democracy ties into Laclau's work, who focuses on the construction of collective identity through us/them dichotomies, and affective investment - as discussed in the theoretical framework. For Mouffe, this affective element of populism is at the heart of a democracy:

"Democratic politics cannot be limited to establishing compromises among interests or values or to deliberation about the common good; it needs to have a real purchase on people's desires and fantasies. To be able to mobilize passions towards democratic designs, democratic politics must have a partisan character (Mouffe, 2005a, p. 6)."

Agonism pluralism, then, is the confrontation between adversaries who agree on a shared set of rules, a diffusion of populist antagonism towards democratic ends. This, in the broadest terms is the normative perspective adopted by PD. In this section, I will discuss three aspects of this. One, the notion of agonistic public spaces, where the Mouffe's normative perspective of agonistic pluralism is operationalised. Two, PD work that engages with the post-political condition, which builds on Mouffe's critique of deliberative democracy, and thus extends towards a counter-hegemonic PD that takes into account the political, as defined by Mouffe. Three, taking into account the affective dimension of the political, I incorporate DT into a PD framework concerned with the constitution of publics around shared issues.

3.4.1 Participatory design and agonistic public spaces

"This shift towards publics is a movement away from design projects and towards processes and strategies of aligning different contexts and their representatives, where differences between current issues and how the future can unfold can be made visible, performed and debated as a kind of 'agonism' (Björgvinsson, Ehn and Hillgren, 2012a, p. 127f.)."

As briefly highlighted before, PD work that draws on ANT invokes Mouffe's notion of agonistic democracy when expanding on the role of conflict and contention in *matters of concern*. Agonistic democracy provides a normative framework for design. Much of the work discussed here focuses on the concrete case of the Malmö Living Labs.

In this work, direct links between Deweyan publics and discourse theory can be observed. Here, Hansson et al. (2018, p. 4) highlight the role of Deweyan publics in critical and/or reflective PD, in which the goal is to *spark* a public into being. They point out that this process may involve different sets of norms and rules - among them, agonistic pluralism. Björgvinsson et al. operationalise agonistic pluralism through the concept of agonistic public spaces. Here, they draw on both Deweyan publics and previous work on ANT and PD (as discussed in the previous section), arguing that the diffusion of antagonism into controversies around conflicting, yet equally legitimate matters of concerns is a key democratic challenge for public spaces (Björgvinsson, Ehn and Hillgren, 2012a, p. 129). Thus, they endorse a particular form of *Dingpolitik*, in which socio-material assemblies (and related design objects) are geared towards an agonistic negotiation of matters of concern. Björgvinsson et al. (2012b, p. 108) drew on Latour when arguing for infrastructuring as design-after-design, in which design *Things* act to bring together different actors in the processes of articulating a public. Now, they supplement this first meaning of the thing in *Dingpolitik*, the object (of shared concern) with the second meaning, different forms of assembly - as Marres pointed out, the things that publics are concerned with are constructed through assembly. Björgvinsson et al. facilitate a particular form of publics, agonistic public spaces, through ongoing infrastructuring (as in the information infrastructures approach) and agonistic *thinging* activities. This is where they supplement Latour's Dingpolitik with Mouffe's understanding of agonistic democracy. This is a practical understanding of agonism, as methods include *thinging* workshops where adversaries (in the agonistic understanding) can articulate their different understands of issues - in their case, an incubator for social innovation. The focus here is on counter-hegemonic articulations of issues, as more marginalised future users (such as grassroots community groups) of the incubator were given central roles, while powerful actors (such as the municipality) were relegated to supporting roles (Björgvinsson, Ehn and Hillgren, 2012a, p. 138f).

This agonistic, object-oriented approach to PD was picked up, among others, by Hernberg and Mazé (2018), who apply this to the temporary use of urban spaces. They thus

link PD to debates in participatory planning; unfolding along the spectrum of deliberative and agonistic democracy. They draw parallels between the concepts of agonism and Lefebvre's understanding of temporary uses of urban space, where such can help highlight contestation and conflict, as well as counter-hegemonic understandings of planning decisions.

Hillgren et al. explore the role of infrastructuring in urban planning as well. They draw on a critique of translation in ANT from the information infrastructures approach, where the focus is on powerful actors, with the heterogenous positions of marginal actors sidelined in both practice and subsequent design. They highlight the challenges of agonistic infrastructuring in their own work with an immigrant NGO (again, in the context of *Malmö Living Labs*). First, they identified and collaborated with marginalised actors, but struggled to move the work forward when attempting to connect with powerful actors in an agonistic space (Hillgren, Seravalli and Eriksen, 2016, p. 96).

Kraff provides another critical perspective on agonism in PD, specifically in a community context. She highlights not only the challenges of engaging with powerful actors, but also of the transferability of agonistic processes. Working with an ecotourism project in Kenya, she finds that participants from the community may not be willing to freely voice agonistic concerns, as they do not want to be perceived as an obstacle to development. Providing an agonistic, yet safe space is a challenge. She also questions the transferability of Eurocentric approaches to democratic discourse such as agonism and highlights the need to take into account local epistemologies (Kraff, 2020, p. 35f). Frauenberger et al. apply agonistic PD to work with neurodiverse children, focusing on the role of disagreement and controversy when working with a heterogenous group of participants. They (2019, p. 9f) formulate implication for agonistic workshop design, towards "democratising technological innovation towards an understanding of design as an opportunity to create agonistic spaces in which constructive conflict is nurtured." Reflecting on the role of conflict in workshops, they highlight the need to provide space for these to emerge, while *infrastructuring* agonistic (not antagonistic) struggle through the (still contingent) affordances of design objects. Concretely, this reconfigures the role of the designers as mediator of consensus to the facilitator of (infra-)structures in which different subject positions can be articulated and maintained. Thus, the application of agonism in PD is not straightforward - in my project, however, it is mostly employed as an analytical strategy for the formation of publics, through the underlying discursive sequence discussed in the theoretical framework.

3.4.2   Participatory design and the post-political

In the previous section, I discussed PD projects that draw on agonistic pluralism as a normative framework for the design of processes, spaces, and objects. In the following, the focus is on PD work that draws on Mouffe's reading of the post-political condition. In the previous section I discussed the work of Palmås and von Busch who used the concept

of *translation* to show how they, as designers, were co-opted into post-political planning, with political proposal from participants filtered out. In several fields, this post-political condition is often discussed through Mouffe, who sees the post-political condition as responsible for the emergence of right-wing populism in Europe. The deliberative-rationalist modes of governance of established political parties fail to offer differentiated, political alternatives beyond neoliberalism, thus driving the electorate towards the populists who do (2005a, p. 71). Writing in 2005, Mouffe highlighted the dangers of demagogic populism that could result from New Labour vacating the Left, and thus ceasing to represent a significant proportion of their electorate. Beyond Brexit a decade later, this has been visible in local planning policy. Drawing on Mouffe, Allemendinger and Haughton (2012, p. 100f.) argue that spatial planning has been post-politicised through mechanisms for generating consensus at the expense of antagonistic or agonistic issues (or: *matters of concern*). Lord and Tewdwr-Jones (2018, pp. 237–240) expand on this, arguing that that the *decontestation* of the planning system is the result of ongoing neoliberal policies, beginning in the Thatcherite era. In the post-political, planning is increasingly excluded from key issues (such as smart cities), as planning is no longer afforded a role in advancing progressive, social objectives.

Huybrechts et al. (2017, p. 150f) attempt to recover PD form such a post-political condition, through an explicitly agonistic engagement with institutions (avoiding, perhaps, issues of *translation*). They argue that that previous work from Björgvinsson et al. in the *Malmö Living Labs* at community scale neglects macro political aspects on the formation of collectives - an aspect I am attempting here to introduce to community scale through publics of material and/or discursive issue-orientation. This focus on community scale leads to a lack of agonistic engagement with institutions, as "[p]ublic and private entities engaged in participatory work outside of institutional contexts can unintentionally support neoliberal ideals of individualisation and depoliticisation". As highlighted in the previous section, public institutions may be resistant specifically to agonistic engagement. Kaethler et al. (2017) articulate a strategy for PD based on ambiguity, allowing for a degree of resistance against becoming *collaborateurs* (as discussed previously in Palmås and von Busch, 2015) in post-political planning practice. They propose ambiguity as strategy for participatory planning practisers to engage in formal decision-making, while remaining critical. They point out that Habermas' notion of communicative rationality has shaped how participatory planning processes are communicated as clear and transparent (2017, p. 184; referring to Tewdwr-Jones and Allmendinger, 1998). Communicative processes are, however, not necessarily enough to change subject positions established through existing power relations (Tewdwr-Jones and Allmendinger, 1998, p. 1983). Ambiguity can thus serve as tool to gain access and build relationships with influential stakeholders (2017, p. 184) - potentially avoiding some of the issues with a direct, agonistic engagement highlighted in the previous section.

As with agonistic public spaces, Lefebvre's reading of urban space is relevant again.

In this case, Sawhney and Tran link it to the *right to the city*, and conflicts that occur in attempts by different stakeholders to shape and transform neighbourhoods (Sawhney and Tran, 2020, p. 174). In order to understand agency and power at different scales from such an antagonistic ontological starting point, they draw on participatory action research (PAR), as well as agonistic PD - this is similar to my (pre-pandemic) methodological starting point, discussed below. Their ecologies approach brings to the fore both material and discursive power relations. In a project related to the transformation of a street through public art, they find that an ongoing PD process brought to the fore antagonisms between artists, city, and residents, for example when the materials of the installation had to be re-negotiated to ensure accessibility. The resulting concrete construction invited skateboarding, and further traffic barriers from the city, which led conflict between city, police, residents, and designers regarding legal jurisdictions, noise complaints and the values embodied in the installation (Sawhney and Tran, 2020, p. 179) - recalling what Wakkary called anti-biographies.

Issues with *translation* have been noted in several projects, as a methodological challenge when aiming to focus on marginalised actors, and a practical challenge when collaborating with public and private institutions. Additionally, the notion of agonism may become lost in translation, with participants and other stakeholders. Malazita highlights the role of affect as an important factor in translation. As I have discussed previously, affective investment is a key factor in the collective identification with an empty signifier, as well as an important factor in publics at community scale. Below I expand on the relationship of affect and agonistic PD, what Mouffe called *democratic passions*. Malazita (2018, p. 97f) draws on speculative and critical design (SCD), and its capability to create "affective and epistemological tension in its audiences", to argue for the design of material/agonistic platforms with affordances for political design. Applying this to engineering education, this includes affordances for translation for fields that may be averse to agonism. Applying agonism to SCD means providing spaces for articulating a multitude of different futures, which may be incompatible, embracing different epistemologies. Malazita here hints at an affective dimension that Laclau discusses through the Lacanian concept of *lack*, which, I argue, can not only contribute to the analysis of the formation of issue-oriented publics, but also to a speculative, future-oriented PD.

As discussed before, affect is an important element in both HCI and DT theories of publics, albeit with different framings. In PD, there are few examples that utilise affect in design, despite its importance to agnostic pluralism and DT. In HCI, Le Dantec already has shown the relevance of affective attachments for publics at community scale, arguing that "[a]ttachments are critical as they build out the collective capacities to act on issues (Le Dantec, 2016, p. 63)." As highlighted in the theoretical framework, this Spinozean-Deleuzian understanding of affect as the capability to act can be supplemented by DT, which focuses on affect at a different moment in the sequence of group formation around shared issues. Le Dantec opts for a Latourian understanding of issues as *matters*

of concern, which does not directly link to affect theory. Still, this supplemented with affective attachments observed between the non-human and human members of publics at community scale. Laclau, on the other hand, employs affect as a key element of the discursive sequence around the articulation of shared issues, through the Lacanian concept of affect as lack, "making an object the embodiment of a mythical fullness" in the drive towards (impossible) closure (Laclau, 2005, p. 116).

Previous sections in this chapter discussed agonism as a normative framework for PD at community scale, and a critical perspective on the post-political condition. In the latter, there are traces towards the importance of affect, as the post-political, for Mouffe, denies the affective dimension of the political. While Mouffe utilises affect as a normative category for agonistic pluralism, Laclau focuses on its role as an affective investment into an empty signifier. In PD, Frauenberger et al. (2018, p. 1) argue for the role of affect in developing PD further towards "democratic visions of technological futures that connect to people's hearts, acknowledging that decisions are often made irrationally and unconsciously." They acknowledge both the role of affect as a "democratic passion", and its role as an affective investment - in this case the issue is the future of the discipline of PD. They discuss the role of scale, relevant to the previous discussions on agonistic public spaces, and the transition towards a critical engagement with the post-political. For them, transferring the situated knowledge produced through PD is a key challenge of scale. Infrastructuring is an attempt to address this through its attention on design *Things* in continuous use (Frauenberger, Foth and Fitzpatrick, 2018, p. 4). They build on the agonistic dimension of design *Things*, but supplement this with a focus on futures crafted by participants through methods such as future workshops, in a shift towards critical, speculative dialectics. A focus on affect follows from this, as the articulation of future visions, or shared issues, entails responses driven by emotional and rational considerations. How, then, do they frame affect in this context? Curiously, they first argue that affect forecloses deliberative and rational decision-making, thus preventing collectively positive design outcomes for participants to a degree. They cite examples unrelated to PD, such as the affective dynamics of Brexit or Trumpism. For PD, they call on a Spinozian understanding of affect in which positive affect, such as care, precedes rational decision-making - thus enabling positive design outcomes for participants (Frauenberger, Foth and Fitzpatrick, 2018, p. 8f.). This association of rationalism and positive affect with positive outcomes may be an issue from the perspective of affect theory, especially when considering power relations. As Massumi (2015, p. 85) notes, condensing the link between affect and hegemonic discourse:

> "The structure of ideas must be insulated without making it explicit. The reigning rationality must be transmitted, but occulted, hidden, distorted. To do this, it must pass through another medium: it must be translated onto an affective register. [...] This is most effective done by weaving ways of feeling and acting that are in consonance with the power structure of society into the

habitual fabric of everyday life, where they go on working unexamined."

Thus conscious of the risk of becoming *collaborateurs*, affect should be considered in the PD process, not just as a factor in design outcomes, even when designing for positive affects. In a project similar to mine, related to the infrastructuring of publics, under conditions of austerity in North-East England, Prost et al. (2019, p. 2) work with "central Participatory Design (PD) concepts, in particular Things as socio-material assemblages and agonistic and pluralistic publics as spaces for shared matters of concern and care."

Mouffe channels affective attachments into a theory of democracy in which hegemonic (and counter-hegemonic) collectives are mobilised around "democratic passions". Pierri (2018, p. 29) notes that Mouffe does not fully articulate how *enjoyment* (as previously discussed through Laclau) leads to mobilisation, while avoiding exclusion. This is a relevant gap for both agonistic PD, and the theory of agonistic democracy. As I have shown, neither agonistic publics spaces, nor the critique of the post-political through PD account for the affective dimension. However, the previously discussed perspectives of publics in HCI and DT provide relevant perspectives on this, through affective attachments and affective investments. Whitney et al. (Whitney *et al.*, 2021, p. 11) utilise agonism to facilitate strong collectives, in addition to agonistic spaces. As researchers, they worked with a community to further highlight the issues articulated by that community. For instance, they argued together with that community against the local police force, which claimed that increased surveillance improved public safety - an app built by the researchers demonstrated otherwise and supported the claims of the community. They highlight the affective dimension of agonistic participation itself, as it can take an "emotional toll and require spaces of support, joy and healing." Along similar lines, Dourish et al. (2020) highlight the affective demands of participation in design processes on participants, as many design methodologies rely on iterative cycles which rely on participants to engage with incomplete design objects, which is an issue for marginalised participants confronted with incomplete solutions to their issues in their everyday lives. Like Massumi, they highlight the "structures of feeling" that maintain hegemonic relations through affective attachment (Dourish *et al.*, 2020, p. 4).

4 Methods: Infrastructuring during Infrastructural Breakdown

I have to this point discussed the relationship of methods of infrastructuring in participatory design with the theories of publics in Actor-Network Theory and Discourse Theory, retracing the relationship of infrastructuring and publics through the prism of these theories. In doing so, I have highlighted a broad range of designerly and analytical methods relevant to publics. Now, it is time to refocus to the case at hand and discuss how infrastructuring is applied in this context. As Le Dantec (2016, p. 18) argued, publics provide a "stable theoretical frame around a dynamic context." In that dynamic context is field work during the pandemic, where the pandemic, university field work guidelines, and government rules on social distancing dictate what can be done, while the resources of the collaborative are tied up in their shared and individual responses to new and/or amplified issues of the pandemic. All three stages of field work were conducted remotely, as shifting rules and infection rates meant that planning of in-person activities was not feasible. Field work was conducted between March 2020 and June 2022.

Table 4.1: Research activities and data collected

Research activity	Participants	Data
Appreciative Inquiry workshop 1	5	Audio recording and transcript, Miro whiteboard
Appreciative Inquiry workshop 2	4	Audio recording and transcript, Miro whiteboard
Website workshop 1	2	Audio recording and transcript
Website workshop 1	2	Audio recording and transcript
Interviews	10	Audio recording and transcript
Additional material		
Website-in-use	4	Blog posts and other content on website
Mutual Aid Facebook page	-	Posts, comments, forms and meeting minutes
Mutual Aid supplementary	-	Blog posts and articles on local Mutual Aid

The three stages of field work are based on adapting the project to this dynamic context. Table 4.1 shows the research activities for the three stages of the project and the data collected in those stages. First, I conducted remote workshops following an Appreciative Inquiry approach, planned and delivered together with the collaborative, with collaborative member organisations as participants. These were planned before the pandemic, and then quickly transferred to a remote format, remnants of an action research approach started briefly before the pandemic. Second, I designed a website for the collaborative to address communicative issues articulated in the first workshops, but also as way of *making public* shared issues. It was also intended to act as an object for conducting research (remotely) during the pandemic. It was initially intended as an (asynchronous) long-term engagement following the initial action research approach, but later as a *playful trigger* in two workshops, transitioning towards an analytical infrastructuring approach. Third, I conducted interviews with collaborative members, which provide most of the empirical material analysed in this thesis. Table 4.2 focuses on the interviews with collaborative

Table 4.2: Organisations and roles of interview participants

Organisation	Role	Length of interview
Collaborative	Community Worker	69
Collaborative	Executive	48
Mental Health Organisation	Director	33
Women's Charity	Worker	30
Multicultural Arts Organisation	Director	33
Community Centre / Mutual Aid	Manager / Coordinator	56
Carer Organisation	Digital Manager	40
Community Recording Studio	Coordinator	44
Church	Pastor	57
Singing Group	Organiser	34

members, showing their organisations, their roles (annoymised, without specific job), and the length of each interview in minutes. The interviews were based on insights from the preceding two workshop stages. They adapt an ANT approach to interviews to a remote format that also attempt to understand the role of non-human actors - in the infrastructuring done by the collaborative in the response to breakdown, and the articulation of shared issues.

All audio recordings of workshops and interviews were transcribed to text and then coded. The approach to the analysis of the empirical material is based on Laclau's discourse theory, which can be adapted to a method of discourse analysis by using the concepts introduced in the theoretical framework for DT and publics, and expanded in the methodological framework to the relationship of DT and infrastructuring in PD. In parallel, I articulated an object-oriented, material framework for ANT and publics, and the relationship between ANT and infrastructuring in PD. This application to infrastructuring is a necessary step to adapt DT and ANT be an appropriate analytical approach to the case study - as Jørgensen and Phillips (2002, p. 54f.) point out, DT is less prescriptive in how discourse analysis is conducted in comparison to other approaches such as Critical Discourse Analysis. Thus infrastructuring provides the analytical focus that is not articulated in DT itself. As previously summarised in figure 1.1, this is the analysis of infrastructuring as the articulation of shared issues, publics, under conditions of infrastructural breakdown. As I have previously highlighted in figure 2.3, the key focus of DT is on a discursive sequence that centred on the articulation of inclusionary and exclusionary relationships between things:

> "Now we have reached a first entry point for concrete discourse analysis. Discourse theory suggests that we focus on the specific expressions in their capacity as articulations: what meanings do they establish by positioning elements in particular relationships with one other, and what meaning potentials do they exclude (Jørgensen and Phillips, 2002, p. 30)?"

These relationships guide the discourse analysis I conducted, with the concrete terms

not only drawing from DT, but also from ANT, and the respective definitions of publics and infrastructuring, for example in the following analysis of material practices. As argued previously, both ANT and DT are analytical frameworks, for the *tracing* of actors and movements within infrastructures and the *quilting* around affective attachments and empty signifiers in DT. The following themes emerge from a discourse analysis guided by these two principles.

4.1 Pre-pandemic action research

Before the pandemic, I planned to pursue an action research (AR) approach, as even in its initial articulation by Lewin in 1946 it focused on the relations between different, heterogenous communities in a process that involved a series of workshops and evaluations with community representatives and organisations. In the language of infrastructuring publics this could be described as a process where a group forms affective attachments while identify shared concerns:

> "As I watched, during the workshop, the delegates from different towns all over Connecticut transform from a multitude of unrelated individuals, frequently opposed in their outlook and their interests, into cooperative teams not on the basis of sweetness but on the basis of readiness to face difficulties realistically, to apply honest fact-finding, and to work together to overcome them [...] when I heard the delegates and teams of delegates from various towns present their plans for city workshops and a number of other projects to go into realization immediately, I could not help but feel that the close integration of action, training, and research holds tremendous possibilities for the field of intergroup relations. I would like to pass on this feeling to you (Lewin, 1946, p. 42)."

He introduced an AR approach to address a broader set of research objectives. One, he argued that positivist, quantitative methods such as surveys were insufficient to understand the specifics of a case. Two, not only were they insufficient to understand a case, they were also not positioned to test different ways of enacting change. For Lewin AR was not only required to understand relations between heterogenous communities, but also to test ways to improve these relations (Lewin, 1946, p. 36f.).[1]

More recently, action research has become is an increasingly common approach in HCI, particularly where there is an attempt to enact social change, for instance in work of Prost on infrastructuring a democratic food platform.[2] He constructs a similar link between infrastructuring, publics and DT but does not delineate between the underlying

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[1]As such a project implies a communicative challenge, it is not surprising that some affinities between Dewey and Lewin have been noted both in for contemporary (Stark, 2014, p. 90) and current sources (Colucci and Colombo, 2018).

[2]It is important to note here that shared concern of the food hub is the public that is being infrastructured (Prost *et al.*, 2019, p. 14). This differs from the approach in my project, where the infrastructuring focuses on the process of articulating concerns, and linking them to other, related concerns, as a form of connective design. For Prost, it is about forming attachments to the particular, pre-identified concern

ontologies of PD methods in ANT, for *thinging*, and DT, for *agonistic spaces*. As this is fairly common in the previous discussed PD methods as well, I attempted to unpack this in more detail in the framework above. The analytical frame focuses on affective attachments and matters of care (Prost *et al.*, 2019, p. 3). For Prost, PD *infrastructures* such affective attachments, thus supporting the formation of publics. This focus on affects also necessitates an AR approach, as its "socio-technical activities bring forward attached heterogenous emotions, beliefs, and desires, while also struggling with processes of marginalisation and exclusion." He centres the infrastructuring process around the long-term, collaborate design-action-reflection cycles of action research (Prost *et al.*, 2019, p. 6).

Neither ANT nor DT focus on generating data in collaboration, and thus do not formulate guidelines for collaborative research. Thus, AR provides a complementary framework for generating knowledge together with communities. The focus is on this collaborative process, and not on the product or service designed as the result of that process. It is this focus on process that makes the perspective of AR an important intermediate steps between the ontologies of ANT and DT, and the respective analytical and designerly methodology. Hayes (2014, p. 51) outlines the steps of an HCI AR project are as follows:

1. **Building a relationship with community partner**, either through existing links, or a recruitment process from either side. The initial contact is informal, for example discussing previous work, existing challenges, or just ideas for collaboration.

2. **Formulating questions and problems**. In this step, research questions and the problems they relate to are developed together with the collaborators, for example through longer-term field work. Research questions are understood more broadly and related to process and outcomes that are relevant to the community partner, not just academic outputs. They can also be phrased through vision statements and operational statements.

3. **Socio-technical intervention.** Assuming that the social and technological concerns of a partner organisations are inter-related, interventions are designed in collaboration. As in the digital civics agenda, knowledge is co-constructed with participants through action. The goal is understanding the context for design through a long-term engagement.

4. **Evaluation**. In this step, the outcomes are evaluated against their value to stakeholders, not any pre-defined criteria typical for project evaluation. Again, this is a process where meaning is co-constructed with participants, who can share concerns, discuss collected data and results, as well as point out future steps, or unresolved conners. The researcher needs to be conscious of their own positions, as pressure

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of the food hub. Relevant for this project, he argues that infrastructuring, as "a process of supporting the formation of publics" is compatible with action research, as it too focuses on supporting participants knowledge production.

to publish in a certain field such as HCI can guide evaluation towards criteria that not relevant to community partners, who are the main priority of an AR project.

5. **Dissemination and documentation** includes not just academic outputs, but also reports for to for the community partners, written together with them. Writing serves several purposes. It is an opportunity for reflection, presentation, and accountability for example to funding organisations.

6. Finally, when the research facilitators **leave the site**, the goal is sustainable change that can be maintained even after departure. This is particularly relevant for any technical infrastructures left behind.

This, of course, is an idealised guide, as collaborative work can take many shapes in the process, and there can be case-specific practical limitations to individual steps, not only due to unforeseen events, such as a global pandemic. I will briefly recount here how I adapted the steps to AR in the initial process. I lean on HCI AR to define the concrete steps of my work with the collaborative, before turning to participatory design for collaborative and designerly methods and returning to ANT and DT for analytical methods.

The first step of an HCI action research project is informal relationship building. This stage of the research process was started before the pandemic, and then continued through the early stages of the pandemic in the spring of 2020, with the added communicative challenges introduced by social distancing. In the autumn of 2019, I developed an initial research plan out of a contact between Open Lab and a local organisation, a charity which, in this context, aims to help organisations in the neighbourhood learn, share, and collaborate more effectively. I got involved due to my previous work in the area with a smaller neighbourhood group. I then proceeded to plan for this project, from the perspective of neighbourhood publics with shared concerns. A kick-off meeting in December 2019 followed, organised and led by the charity, with Open Lab members invited. The meeting participants included a broad range of local organisations from the neighbourhood, as well as representations of the local council and police. The meeting highlighted the need for a different approach, as it showed the importance of the collaborative (my project partner). Their absence from the meeting was noted by participants who considered them an umbrella organisation for the area. This delayed the start of the project somewhat. I noted that there appeared to be a degree of tacit knowledge of the important actors and issues in the area, with links between actors not legible to an outsider. There also appeared to be a degree of fragmentation concerning collaborative or collective action, which again pointed towards publics, and the value of articulating shared issues.

The second step of an action research project consists of formulating questions a defining problems together with collaborators. As the first step discussed above mostly pointed me towards the relevant actors in the neighbourhood, I proceeded with the second step of formulating research questions before concluding the first step of relationship building. I formulated my initial research questions on my own, instead of together with

collaborators, as the relationship building was still ongoing. This highlights a tension between idealised action research, and the temporal, formal and disciplinary requirements of a PhD project that make it necessary to predefine certain things such as research questions, to conform to disciplinary expectations, as in the case of digital civics.[3]

In late February, I had a meeting with the charity. They had restructured the project together with the collaborative, the previously absent umbrella organisation. They were interested in applying technologies developed at Open Lab in the project, for cross-organisational and cross-sectoral collaboration, and I presented my initial plans. Here, another strand of inquiry was addressed. The charity was intending to collect stories from local organisations and residents, a place-based inquiry into local concerns. This links into my discussion of digital civics as socio-technically linked networks of publics. By using a co-research tool developed at Open Lab, I aimed to facilitate a process that supports the formation of neighbourhood publics through helping identify local issues and concerns.[4]

In early March 2020 (at this point, dates are becoming increasingly more important), I followed up with a meeting with the collaborative and the charity. Here, a collaborative research plan for community story collection was developed and agreed upon, addressing, and matching up interests of all involved parties. In short, collaborative and the charity shared an interest in collecting community stories from the neighbourhood. A selection of these stories would be presented (in some form) at a local community festival in August. For them, this linked to how their respective missions are defined. Their own mandates focus on increasing collaboration between local organisations. I was tasked with mapping the plan leading up to the neighbourhood event in August. The project was set to begin with a workshop in April, inviting members organisations of the collaborative. This was to be run jointly by a representative of the collaborative and me. The collaborative would employ the appreciative inquiry method, while I would follow use participatory design methods in order to develop how community groups would like to use a co-research tool in this context. This was to be followed by the collection of community stories, with an emphasis understand local concerns and use technology as way to draw link between them (this is where it ties in with my research on publics). Community groups would be able to gather evidence that can be helpful for evaluation and funding applications. A number of stories would be presented at a community festival in August, providing residents with an opportunity to engage with them. Finally, an evaluation workshop would be organised, with sessions from the story collection applied to developing further collaboration across

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[3]This *drift* has been identified in PD, as the goals of a project are translated to institutionalised requirements (Palmås and von Busch, 2015).

[4]In the initial plan, the collaborative aimed to apply these steps to the workshop with community groups, while I intended to use a co- research and recording tool to first identify local concerns and then facilitate connections between them through interviews conducted by community groups. Social distancing, however, made the use of this tool impossible, as it was devised for face-to-face interviews. It records interviews on a smartphone app, which are then made available on a website. The app only provides prompts for interviews questions, which, when selected, provide timestamps that make analysing the interviews through the website easier. Crucially, its use case involves two people face-to-face with a phone (or tablet) placed between them.

local organisations.

4.2   Ad-hoc infrastructuring: Appreciative Inquiry workshops

With the pandemic making the initial plan impossible, I returned to the second step of an action research project, formulating questions, and defining problems together with the community partner. Only weeks after the in-person meeting at the new community space of the collaborative in early March 2020 we agreed to wait and see how the uncertain situation develops. A few weeks later, we decided to carry on with the planned appreciative inquiry workshops remotely, as England was now in lockdown. The technological focus of my project began shifting from the systematic implantation of a tools to the analysis of the ad-hoc use of existing tools in responding to the crisis: *infrastructuring* done by the collaborative itself, in response to *infrastructural breakdown.* This also led a reconfiguration of roles in the collaboration with the collaborative, as my collaborators saw my (perceived) expertise with digital technology as a PhD student in HCI as an asset for migrating online. Given the importance of the work of the collaborative during this time (my personal assessment), I was happy to volunteer for this.

The initial plan for the workshop was developed in collaboration between the collaborative and me, with workshop facilitation split between the collaborative and me as well. The collaborative have run workshops using the AI method before and intended to do so here well. AI is a method of asset-based community development (ABCD), which aims to identity positive things in a community. AI is usually conducted as a four stage process from discovery, to dream, to design, to delivery. In the discovery stage, strengths are identified through interviews where participants take the role of both interviewers and interviewees. In the dream stage, common aspirations are identified, at this point at a more abstract symbolic level. In the design stage, participants work in thematic groups to develop design proposals. Here, AI intersects with the IDEO brand of design thinking, for example through with rapid prototyping methods. Finally, the delivery stage focuses on the implementation of insights from the design stage. The form of this is contested by AI practitioners (summary of AI based on Bushe, 2011).

I worked with the collaborative to transfer their planned AI workshop online. A remote workshop can be run (for example) asynchronously through the typical affordances of social media and web-based document processors such as Google Docs, or synchronously through video conferencing software - or any combination thereof. Reyes et al. (2012) highlight some participatory design methods for social media that could be adapted to the limitations of this project. This is an important contributions as much participatory design work relies heavily on face-to-face settings, such as workshops. Still, they argue that PD and social media share the ability to amplify the voices of publics. Instead of attempting to replicate traditional face-to-face methods of participatory design, they focus on distributed, asynchronous engagement. They highlight the issue of a missing feeling

of community.[5] In the language of HCI publics, the formation of affective attachments is more challenging without face-to-face interaction. In their asynchronous workshop (around heritage photography), they tried to amend this by heavily emphasising the steps of the design process, setting out the tasks at hand for each step in detail. They did this through banners in a Facebook group. I add here that this highlights the limitations of Facebook further, as a group banner is one of the few moments that allow the user to override the Facebook UI and place their content above it. Still, the heavy emphasis on process and tasks is an important consideration to create a sense of community, through putting all participants in the same "problematic situation".

In this instance, we attempted to create such "problematic situation" synchronously through video conferencing software by focusing on the present problematic situation: The focus of the AI was understanding how assets in the community can be used to help the community during the pandemic (and how that was done, in the second run of the workshop). In this case, we developed a practical plan for conducting workshop remotely synchronously, though some forms of asynchronous participation were discussed prior to the workshops with the facilitators from collaborative, such as the use of forms to collect input from participants prior to the workshop. For my co-facilitators, the goal was to replicate a face-to-face workshop. We agreed to split the workshop into two parts, due to the practical limitations. This linked to the stages of AI, which relied on sorting sticky notes and whiteboard content of participant input between stages the dream and delivery stage. Additionally, we agreed to run the initial workshop twice, to accommodate for the challenges of facilitating group work through Zoom. This would also give an opportunity to iterate on the workshop content, if required. Drawing on the experience of Reyes et al. (2012), I signposted the stages of my workshop activities on a Miro board, setting out the tasks at hand in detail.

The first workshop was attended by five participants, and three facilitators, including myself. The second workshop was attended by four participants, and the same team of facilitators. The participants were representatives from member organisations, recruited through a mailing list, and informal direct invitations.

The facilitators began by presenting AI as a method of asset-based community development that developed from methods of organisational development. They referenced the work of Cooperrider (2012), who argued that good organisations have an understanding of the things they do well, and thus should work focus on developing those things further, while also identifying what they do not do well. The facilitators acknowledge criticism of AI for being vague but argued that it can be conducted in practical and well-defined way, if following the cycle of an AI (as defined by Cooperrider). They also argued that there is also value in an open process, where things are initially undefined, if they become clearer throughout the process. As they presented it, an AI starts with a key question

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[5]My findings below are somewhat different, as participants highlight a missing feeling of community with synchronous engagement on Zoom, while asynchronous engagement helps recover some of that feeling.

that is developed in cooperation with the community whose assets are being mapped. The community is asked about important positive developments, for example. This was the first adjustment to conducting the AI remotely, as the definition was set by the workshop facilitators. They acknowledged the novelty and value of Zoom and other digital tools for an AI, asking whether these technologies will continue to be valuable after the crisis. This links to my contribution the workshop, which investigated new technology use prompted by the pandemic. The timing of the workshops (May and June 2020, during the lockdown that began in March 2020) did not allow for a workshop with the community. The key question for the discover phase was:

> How can we do more of the thing that are supporting people in [neighbourhood] through the COVID-19 crisis?

In the second workshop the facilitators added another, related question:

> How can we collect stories of how people supported each other during the COVID-19 crisis, so we can do more of the good things that come out of it?

This was the general focus of the discovery and dream stages, in addition to questions that focused on the participants' experience and contributions to positive change in the neighbourhood (unrelated to the pandemic). Prior to the workshop, I discussed the content of an AI with the facilitators. They explained how they usually conduct asset-mapping using sticky notes to write down and organise local assets, organisations, and associations. We also agreed on the theme of potential positive change. I created a board using the web application Miro. This application loosely replicates a whiteboard, on which sticky notes, text, and shapes such as arrows can be added. Additionally, images and documents can be added. There are also chat and comment functions, as it is intended to be used as a collaborative tool. Templates provided by Miro focus on project management and creative methods, providing another a cue towards its intended use. In this instance, we agreed to use Miro to facilitate a conversation. Thus, contributions from participants would be added to the Miro board by me, so that participants could focus on content. For now, my collaborators and I decided that this would be detrimental to the workshop experience, as participants may not know how to use another tool, and there may be technical limitations depending on the devices they use to participate in the remote workshop. The Miro board was screen-shared through Zoom, so that real-time updates to the board would be visible to all participants. This decision was taken due to the challenge of running several applications simultaneously during an ongoing Zoom call, as well at barriers involved with signing up to and learning to use a new application in real-time. Finally, participants on mobile devices would not have been able to use two applications at the same time, and we did not know what hardware was used by participants. Here, it is worth noting that during the COVID-19 pandemic, digital divides become even more pressing issues. Without diving into the deeper implications,

for participation in a remote workshop, a participant requires a device capable of running the video conferencing tool, sufficient internet bandwidth, and the skills to use these tools - the final aspect is the only one within control of the project. Thus, the facilitators aim to make participation as easy as possible, for example by designating a note-taker for creative tasks, such as the dream stage.

For the task, I asked participants about their work with community members before, during and after the pandemic, and how their use of technology in this context has changed:

1. **Before** the pandemic

    1. Where did you work with community members?
    2. What issues did you have reaching them?

2. **During** the pandemic

    1. What new tools did you start using to work with community members?
    2. Did you learn anything new doing so?
    3. What issues did you have reaching them?

3. **After** the pandemic

    1. What new tools do you want to keep using?

        1. What tools could be helpful for collecting community stories?
        2. What tools could be helpful for sharing stories?

I will here briefly highlight the themes from both workshops together, as they are relevant for the next stages. Three themes could be identified from the workshops. One, an increase in **inter-organisational communication and the cooperative networks**, as a result of the increased use of digital technologies in the communication within the collaborative during the pandemic. Participants also find that they want to develop their digital skills further, as they find them useful for reaching certain groups within the neighbourhood. Two, some groups cannot be reached via digital means. As one participant put it "**Digital is not enough**". There is a continued digital divide in the area, and this extends to many of the digital tools used due to social distancing. Three, **politics of necessity**, an understanding that there's no other way to tackle the pandemic, that there is little alternative to neoliberalism, as the pandemic leads to a focus on economic necessities, not the articulation of political alternatives.

4.3 *Use-during-use:* **website workshops**

In an HCI action research project, the third step after formulating questions and problems is a socio-technological intervention. As stated before, such an intervention is designed in collaboration with the partner organisations, with knowledge co-constructed through

action. The goal is understanding the context for design through a long-term engagement. This is where I diverge from the path of AR to a degree and move towards PD, as maintaining a long-term engagement appeared challenging under social distancing. The community space used by to collaborative, for instance, was closed throughout the pandemic. Thus, participants would only be available through remote modes of communication such as e-mail or video calls, all of which detract from their limited time. Thus, I built a website for them, to use as asynchronous, remote long-term engagement through *design-after-design* during the pandemic. As such, there was an experimental element to this, as the website was deliberately designed in such a way that the collaborative could easily adapt it for their purposes. Indeed, one of its main practical contributions was an appropriation of the contact form I included. The collaborative distributed small grants of money for small-scale community projects, and I proposed a contact form for that. Several thousand British Pounds were distributed through the grants form, while the contact form enabled new groups to contact the collaborative and work with them. For religious reasons, social media sites were inaccessible to some of these new groups, and the website was (entirely accidentally) accessible to them.

As the pandemic limited my access to members of the collaborative, I decided to create a *thing* to use as the focal point of my research, that would also provide an incentive to participate in my research due to tangible outcomes that would (hopefully) benefit the member organisations. As the collaborative did not have a website, I decided to make that the focal point of a participatory design process that would help make legible the shared concerns of the member organisations and the residents they represent - although the third stage of interviews that follows would also be required for that. For the organisations, the benefits would include an increased online presence, and a better understanding of the people who use their services, what their concerns are, and how these can be partially addressed through technology. To articulate these concerns, I focused on the production of content. This is done through different modes of digital media production, including blogging, podcasting, and videos. This is based on the first theme of the AI workshops, the notions that organisations communicate more, use digital technology more to communicate with certain groups, and want to develop that digital skillset. I designed a set of workshops to address this theme, which the aim of producing content for the collaborative website.

This part of the work is an effort at designerly infrastructuring, although at small scale, as the emphasis is on infrastructuring by the collaborative, researched mainly through the third stage of my field work, the interviews. To reiterate, I visualise the relationship between *use-before-use* and *design-after-design* in figure 3.1. *Use-before-use* refers to the linear design process for an object, while *design-after-design* refers to the ongoing, non-linear appropriation of that object by users in their lifeworlds. Infrastructuring is the process of aligning these two stages of design for example through the configuration of different design games at both stages (Ehn, 2008, p. 97). The function of the design object

is to shape interactions between users, designers, and objects, to facilitate the articulation of matters of concerns and of new, potentially unexpected, ways of acting and thinking (Ehn, 2008, p. 92f.). Unexpected, in this instance, was the usefulness of the simple contact form. In this instance, the prototyping stage *use-before-use* was adapted to a *use-during-use* stage, as project timeframe and pandemic requirements made an iterative design process challenging. Thus, a live website was used as the boundary object in design games during two workshops - although care was taken to emphasise the openness of the website to different design and content. For my research, the goal was to use the website as a *playful trigger*, an everyday object that can be used to render visible tacit knowledge in workshops. This was done through discussions on potential content for the, which in process may facilitate the articulation of matters of concern. Regarding non-linear *design-after-design*, the website was handed over for use by the collaborative, stressing that I would adapt it to any use they see fit. In practical terms, a local freelance copy writer was tasked by the collaborative with producing and editing content. Several new sections were added to the website, as requested by the collaborative, while the website was also appropriated for the distribution of small grants. In this close cooperation on the website, I sought to emulate *co-presence* as an infrastructural approach to field work, as it allowed me to contribute to the everyday work of the collaborative, in an effort to understand their concerns.

I ran the workshop twice. Both were attended by two participants, with me acting as facilitator. The participants were representatives from member organisations, recruited through a mailing list, and a remote collaborative meeting that I joined to introduce the website and my work.

4.3.1 Building a Thing: *designerly and technical considerations*

The technical details of the website are not the main focus of this project. It is, however, necessary to describe them, as they formed the basis of the workshops on the content of the website. The visual layout of the website is based on a previous workshop that the collaborative organised with a local graphic designer. Based on that, the designer provided them with comprehensive branding guidelines, including logos, colours, and fonts. I implemented these in the design of the website. As the branding was already developed through a collaborative workshop, there was no need to duplicate this stage. I then presented several designs to two members of the collaborative who were tasked to work with me on this project (a degree of *co-presence*, as noted above). I also worked with them to explain the key technical details for maintaining the website, in preparation of handing it over for their use after my exit from the project. The website is built be largely maintenance free, with main requirement for maintenance a number of passwords to different external services used by the website. In line with the final step of an HCI AR approach, the technical infrastructure left at the (virtual) site can be maintained by the collaborative after my departure.

The collaborative website is a static website built using Hugo, an open source website generator. A static website is pre-rendered, which makes it fast and accessible, as it omits the use of databases.[6] Additionally, a static website is secure and, relevant for handing over the project, fairly future-proof. This is important as the typical workflow of a static website usually omits a content management system. Typically, a user would draft a post in text editor using the markdown markup language, and then run a build command in their command line interface to build the website locally. Then, they would push the website to GitHub, or another platform used for hosting it. The steep learning curve of this workflow was prohibitive. Thus, I automated all steps to add and edit content to the website. The source code is hosted on GitHub, and the website is rendered and hosted by Netlify. New content is added using Forestry.io, a browser-based content management system for static websites, which provides a text editor interface, with markup options familiar to anyone who has used a WYSIWYG (What You See Is What You Get) editor such as Microsoft Word before. This makes editing the website easy, without the need for coding skills. When a new post is added through the Forestry.io text editor, this is pushed as a markdown file to the website's GitHub repository. When Netlify detects a change in that repository, it runs the Hugo build command, and displays an updated website with the new post to the user accessing the website through their browser.

Different components are used for interactive elements, such as a comment section by Disqus and forms by Formspree. Following the first website workshop, I developed a shortcode for embedding podcasts hosed on anchor.fm, a podcasting platform owned by Spotify. This platform also allows the distribution of podcasts through a number of other major podcast platforms, so that listeners can access the podcasts through the services they already use. A shortcode allows the embedding of certain types of content with preset style parameters, without having to use full iFrames.[7] This ensures consistent styling and makes it easier for users to embed external content (such as a Tweet, Instagram post, or YouTube video) in the right format. All services used are free, but the collaborative is paying for the domain, and made a one-time payment for the fonts specified by the branding guidelines so that they could use them on the web. In the workshops, I presented design iterations of the website (all based on the branding guidelines), the sections of the website, and the backend services responsible for different elements of the website, but the main focus was on content and the main sections.

The website has three main sections. One, a landing page, which includes a field that the collaborative can use to briefly describe itself. Two, a blog section, that the

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[6]In the interviews, several member organisations highlight that their services users may not have unlimited access to data. I chose a static website under the assumption that this may be an issue, as it only needs to load a small text file of a few kilobytes. Multimedia content such as videos or images are, however, equivalent to a database-based website built on WordPress, for example.

[7]An iFrame is an inline HTML element embedded into a website from another website. A typical example is an embedded Tweet or YouTube video that can be viewed directly, say, from within an article they are embedded in. An embed link typically contains HTML code, defining, for example, the width and height of the frame. In a shortcode, these are pre-defined, making the embedding of an inline element significantly easier to the user.

collaborative can use to add blog posts. A member of the collaborative acts as the editor, together with a local freelance journalist hired by the collaborative to write and edit content. Three, a form page that residents can use to apply for small grants that the collaborative provides. The contents of a form are emailed to the member of the collaborative who is responsible for the website. Four, a general contact form for inquiries about the collaborative, again linked to the email of the collaborative member. Additionally, as an outcome of the workshops described below, a temporary section on local support during the COVID-19 pandemic was added, which was maintained by the collaborative. Thus, new sections could be added to website as needed.

4.3.2   Workshop structure

I organised two workshops related to the website. Both workshops followed the same structure, with minor iterations based on feedback from the first workshop. There, participants discussed the medium of podcasts, and asked whether that could be implemented on the website. I did so, using Anchor.fm as described above, and adapted the second workshop to specifically address podcasts. For the first workshop, participants were recruited through the mailing list of the collaborative. The invite was drafted by me and sent by a member of the collaborative. For the second workshop, I sent the invite to the mailing list directly, after presenting findings from the workshop and the goals of the workshop to the collaborative in their monthly meeting (on Zoom, of course). The first workshop had four participants, while the second workshop had two participants. While the workshops provided a direction for the website, recruitment of participants was challenging, despite a degree of interest and enthusiasm when I presented the work on the website in the monthly meeting. Thus, I decided to redirect my efforts to engage with the collaborative to interviews, combined with a collection of information for the website, based on results of the workshops. When planning the workshop, I attempted to frame the requirements for the website as openly and inclusively as possible, using phrases such as "this workshop is about what we want to share and who we want to share it with" and "the blog is open to any content that is relevant for member organisations and/or residents". in the slides shared with participants.

I divided the web design workshops into 4 parts:

1. **Technical details**: I briefly presented how the website works and what functionalities it supports, similar to the description of the website in the previous section.
2. **Introductions and current projects**: I asked participants to introduce themselves, by asking what they are working on and what they are excited about in their work.
3. **Member organisations** and customer journey mapping: I asked participants to develop customer journeys for potential users of the website.
4. **Blog (and podcast) content**: I asked participants about different forms of digital

media they engage with, and what concerns they would like to see highlighted on the blog section of the website.

I presented the task of the workshop to the participants with the following statement, a communicative challenge (see: *the problem of the public*):

> This workshop is about what we want to share and who we want to share it with.

I presented two overarching questions for the content of the website:

1. What things matter most to member organisations?
2. What things matter most to [neighbourhood] residents?

Additionally, I presented this in a Venn-diagram where the things that matter to the website are the things where the answers for the two questions above overlap. If a thing matters to both member organisations and residents, it matters to the website. Or, in the language of publics, the shared concerns, their representation and their articulation through socio-technical means. This also extended to the other sections of the workshop. When asking participants to introduce themselves, I asked about what they value in their current work, and what current projects they are excited about. In practical terms, the goal was to better understand what information about member organisations needs to be on the website, by developing questions for the individual pages of member organisations, to be as a resource for members organisations and residents. In the language of interaction design, this is an exercise in understanding the needs of the user. Thus, I approached this using customer journey mapping, an interaction design method where a persona with certain expectations interacts with a service in a certain scenario. I modified a customer journey template for this task, asking participants to develop personas that interact with the collaborative website. A customer journey is often used in the development of a new service, as a way to understand the goals and exceptions of a customer, and the thought and emotions that go into achieving these goals. I asked participants to develop a persona and map their interactions with the collaborative website. This persona is a resident of the area who finds the page of a member organisation on website. I asked who this persona is, why they found the page of a member organisations, and what their goal in that scenario would be:

- **A [neighbourhood] resident:** In short, who (typically) interacts with your organisation?

- **Scenario:** A [neighbourhood] resident finds your page on the [collaborative] website. What are they looking for?

- **Goals & Expectations:** Why are they looking for from your organisation? What information and next steps do they expect?

When working with persona-based methods, it is important to highlight their limitations, particularly when using to them as composite proxies for vulnerable populations. One participant, for example, noted their concerns with data protection laws, even when creating anonymised composites. Personas as interaction design method were formalised by Cooper, who argued that designers should emphasise with users through using composite personas of users at the centre, instead of edge cases (Cooper, 1999). Costanza-chock highlights that design teams, even with members from marginalised groups, tend to base their assumption on such a (perceived) centre user, reproducing existing hegemonic relations. For example, they assume that users have broadband, they assume that users are heterosexual, they assume that users are able-bodied, they assume that users are white and male (Costanza-Chock, 2020, p. 47). This use of personas is critiqued by Cutting and Hedenborg[8] from a biopolitical perspective as an exclusionary mechanism. This is based on Bratton's (2016, p. 254) critique of the user as a "shadowy hypothetical identity". These user personas arise from biopolitical processes, as they are an attempt to fix identities of real people into fictional composites, resulting in the regulation of life through fictional life (Cutting and Hedenborg, 2019). If we follow ANT, then it is necessary to acknowledge the hypothetical users have agency through the networks into which they are embedded as composite users, "not just a dummy sovereign held in an empty (if also supervisory) position at the head of a table with words put in its mouth", as Bratton (2016, p. 255) puts it. Both Costanza-Chock and Bratton critique personas as they are used by designers. Cutting and Hedenborg, on the other hand, look at participatory persona creation, as conducted by a national charity for young people with experience of homelessness. They find a gulf in the personas created in a workshop by the practitioners from the charity and young people with experience of homelessness. They find that personas created represented the concerns of many practitioners, but with significant exceptions that would be excluded from any design efforts that follow based on these personas, as they narrow down the heterogeneous lived experiences of both practitioners and young people. However, when discussing the persona method, Cutting and Hedenborg focus on the limits of design methods on participation, but highlight that the value of them might be what they reveal about the value systems and practices of participants (Cutting and Hedenborg, 2019). Leong et al. (2021) extend this to *experiential personas*, a form of experiential design (see McCarthy and Wright, 2015) in which the lifeworld's of personas (see Cutting and Hedenborg, 2019) are made partially experienceable through a selection of material artefacts. Similarly, I later analyse material practices of collaborative member organisations, in which a different artefacts provide views into their understanding of shared issues.

Finally, the workshops covered content for the blog, again with the aim to identify shared concerns. I stated that blog is open to any content that is relevant for member organisations and/or residents. Then, I asked participants about their favourite blog/pod-

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[8]The present author.

cast/article series/social media feed and what makes them special to them. This was an attempt to understand affective connections to forms of digital media, in addition to the affective attachments within a group, as Le Dantec argues. Participants enjoy learning about new cultures, political economy, and history, and this could be transferred to the local context.

In the first workshop, I continued with the following question:

> From your perspective, what is the most important concern or issue for the [neighbourhood] right now?

As the participants in the first workshop showed an interest in podcasting, which was then incorporated into the website, I replaced the question above with the following scenario:

> You're participating in a podcast for the [collaborative] website. What concern, issue, or change for the [neighbourhood] would you want to talk about? Who else would you invite to talk about it?

As should be obvious, this was an attempt at understanding shared issues through *playful triggers*: the (real, not mocked-up) possibility to articulate them through the affordances of the website. As Dourish et al. (2020, p. 4) argue, iteration places affective demands on participants, as they are confronted with something that is not quite ready yet, which in is an issue in particular with marginalised groups confronted with other promises of things that are not quite ready yet. Thus, my improvised, intermediary stage of *use-during-use* addressed this issue to a degree. The questions above, again fairly obviously, were prompts to participants to articulate shared issues, and, for the second questions, draw connections based on those issues.

4.4 Interviews

I follow two goals in my interviews with the collaborative and its member organisations. I attempt to draw together the (initially) ad-hoc work at the beginning of the COVID-19 pandemic, and the theoretical framework based on publics in digital civics, drawing on ANT and DT, and their methodological application in PD. This initial participatory stage led to the development of a website, a design *Thing* allowing for the articulation of shared concerns at a time when face-to-face interaction was limited. The interviews follow up on this in three ways. The positioning of the interviews is based on how interviews are treated in DT and ANT. One, part of the questions is used to develop potential content for the website, while at the same time identifying and articulating further shared concerns and how they link actors in discursive and material networks. In DT, interviews provide self-representations of actors within discourses, here elicited through the website as *playful trigger*, asking member organisation what they do, what they would want to share, and

who their service users are. This was initiated through the persona-based methods in the website workshops. Thus, part of the questions follows up on themes identified through the workshops conducted. Two, regarding ANT I follow interview heuristics aimed at *following the actors*, which includes non-human actors as well. Given that interviewees (usually) are human, non-human actors are interviewed through human actors. Three, I follow up on themes identified in the AI workshops where relevant - these interviews were conducted in a semi-structured way, and questions were asked in an order that followed the conversation with the interviewee. Interviewees were recruited and scheduled via e-mail through a mailing list provided to me by the collaborative. Two reminders were sent if there was no response. Interviews are conducted on Zoom, taking around an hour. I conducted 10 interviews for around 25 member organisations (including the collaborative itself).

In ANT (as in DT), interviews are not a typical method, as the researcher becomes an active part of the actor-network, and as interviews are typically conducted with human actors only. To address this, Adams and Thompson introduce a set of heuristics for interviewing non-human actors, through the interview responses of human actors. I adapt these heuristics to the context of publics at community scale, at a moment of infrastructural breakdown - as shown before, the concept of infrastructural breakdown draws from ANT, and is adapted in PD as a key moment for in infrastructuring. Here, it is one of the heuristics. These heuristics are the focus of the second section the interviews, in which I ask participants about the role of digital technologies (as non-human actors) in addressing issues in the neighbourhood, particularly at the moment of infrastructural breakdown caused by the pandemic. This section builds on the AI workshops, where I followed a similar line of questioning during the initial stages of the pandemic, identifying two themes which led to the development of the website of the collaborative. I further investigate inter-organisational communication and cooperative networks is operation here through the heuristics of *gathering anecdotes* and *following the actors*, while technology use se during the pandemic is operationalised through the heuristics of "invitational quality" and "studying breakdowns." Below, I discuss this in more detail, after linking the method of interviews to DT and ANT, respectively.

4.4.1 Interviews and discourse theory: self-representations of actors

DT is traditionally applied post-hoc to case studies dealing with a corpus of text, although discourses contain both "linguistic and non-linguistic (Laclau, 2005, p. 13)" elements. In the PD work that draws on ANT, for instance, I have highlighted several examples where theoretical concepts provide an analytical framework for design efforts. I argue that DT can make a similar contribution to PD, particularly in relationship to publics, as it provides an analytical vocabulary for the formation of collectives around shared issues, including an extension of the affective component highlighted by Le Dantec at community-scale. DT does not, however, provide any concrete insights into the collection of empirical

material. In a study related to local perceptions of places, Cruickshank (2012) highlights several aspects overlooked by DT in relation to qualitative interviews - although the same consideration may apply to designerly work as well. They highlight that from a post-structuralist perspective, an interview provides representations of subjects as they see themselves embedded in discourses. Interviews can provide insights into the affective, but also the habitual - thus they should not be treated as "flat" text, a transcript to be analysed. They (2012, p. 42) ask: "What is lost in discourse theoretical analysis if the researcher does not enter into a direct dialogue with the actors or influence the reality under study?" Furthermore, they (2012, pp. 43, 49) highlight that the qualitative interview can be performed in a way that can affect analysis positively, for example by including participants in the process of analysis, and group interviews. This, I argue, can be addressed to through the combination designerly and analytical methods, in which the researcher directly engages with actors through design *Things*. Finally, they borrow a metaphor from Latour to describe the contribution of DT:

> "Discourse theory can make it evident that something is constructed and it can make visible the way it was constructed. Discourse theoretical studies, assuming that society is constructed, thus could be likened to a visit to a construction site, and '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' (Cruickshank, 2012, p. 49; citing Latour, 2005b, p. 89)."

In line with such a post-structuralist perspective, I ask actors about how they see themselves and their work, both regarding service users and the collaborative. Incorporating the agonistic focus on disagreement, I inquire about collaboration and conflict within the collaborative. I do so referencing work on the website of the collaborative (continuing its use as a playful trigger), thus building on preceding *use-during-use* work, and providing a concrete, practical focal point for the questions, and entering a dialogue with interviewees. Furthermore, these questions relate to shared issues:

1. What services does your organisation provide and to whom?
2. Who (typically) interacts with your organisation?
3. What are they looking for from your organisation? What information and next steps do they expect?
4. What things matter most to your organisation:

    1. What **issues** are you trying to address as an organisation?
    2. What **issues** are you trying to address together with the [collaborative]?

5. Do you have an image available for use on the website?

    1. What does it depict?

    2. Is it a meaningful representation of you? If so, how/why?

  6. What is the best way for service users to contact you?

    1. Has this changed during the pandemic?

  7. Describe collaboration with the [collaborative] from your perspective.

    1. What appeals to you about it?
    2. Are there conflicts and how are they resolved?
    3. Do you think that anybody is excluded from this?

4.4.2   Interviews and Actor-Network Theory: heuristics for non-humans

In ANT, Law treats interviews in as part of the mess of research. He (2004, p. 144) views this through the post-structuralist play of inclusion/exclusion that is also central to a DT approach:

> "More specifically, it is the crafting, bundling, or gathering of relations in three parts: (a) whatever is in-here or present (for instance a representation or an object); (b) whatever is absent but also manifest (it can be seen, is described, is manifestly relevant to presence); and (c) whatever is absent but is Other because, while necessary to presence, it is also hidden, repressed or uninteresting. The issue, then, becomes one of imagining – or describing – possible ways of crafting method, obvious and otherwise."

    Concretely, interviews may seem at odds with ANT, where both non-human and human actors are considered equally. Demant and Rain (2020, pp. 350–353), however, highlight several consideration for using interviews in this context. One, open interviews can elicit rich descriptions of actors within networks, filling gaps left by simply *tracing actors* (or, as I argued, *tracing movement* through infrastructure). They highlight particularly the combination of interviews with creative methods which aid with the construction of an actor-network. In this case, I incorporate this through a practical focus on generating content for the website of the collaborative, as well as the openness of methods employed in the workshops. Two, they highlight through Latour that the value of different analytical categories must be demonstrated in how they *act* within the statements of interviewees. Three, interviews in ANT aim to understand the position of the actor within the relevant material network - as shown above, interviews in DT focus on interviewees' self-representations, their positions within a discursive network. Demant and Rain focus on interviews with human actors exclusively, while being aware that ANT is committed to the symmetry between human and non-human actors.

    Adams and Thompson (2016, p. 93) develop a set of heuristics for interviewing non-human actors, specifically digital objects, casting them through ANT as actors and co-researchers that shape research practices (the website for the collaborative is an example of

this). Interviewing the qualitative research software NVivo, they find that it *affords* the amplification/reduction of text (or as Law puts it above: inclusion/exclusion) through coding, at the expense of qualitative research practices not compatible with the affordances of NVivo. These heuristics provide helpful guidelines for listening to non-human actors through human actors - as they draw on key ANT concepts, they can be modified to the specific digital objects of publics. These heuristics align with work on infrastructuring in PD through their focus on concepts such as infrastructural breakdown and inclusion/exclusion, among other heuristics:

> "For example, studying breakdowns and accidents tends to reveal taken-for-granted human-technology-world background relations, and may also serve to uncover hidden details of a technology's amplification/reduction structure (Adams and Thompson, 2016, p. 20)."

Thus, they are applied, slightly modified, to the interviews with human actors in this case study. Specifically, I apply the heuristics that are relevant to a case study on infrastructuring during a moment of infrastructural breakdown, with an emphasis on *Thinging*, and an understanding of publics as shared issues constituted both materially and discursively. The purpose of the first set of four heuristics is to identify and listen to objects within practices. The second set offers different heuristics for reflecting on these technological objects (Adams and Thompson, 2016, p. 58). The questions related to these heuristics have been incorporated into my interview script, in addition to questions related to the website, which at the same time elicit descriptions from actors on self and other, in line with a discourse theoretical approach to interviews. Of the eight heuristics, I apply the first four as follows:

1. "Gathering anecdotes" (Adams and Thompson, 2016, p. 24ff)

    1. What new (digital) things did you start using during the pandemic?
    2. Do you have a concrete example of their use in practice?

2. "Following the actors" (Adams and Thompson, 2016, p. 33f)

    1. What changed in practice when you started using them?

3. "Listening for the invitational quality of things" (Adams and Thompson, 2016, p. 40f)

    1. How did [this thing] help you work with the community?
    2. How did [this thing] make it harder?

4. "Studying breakdowns, accidents and anomalies" (Adams and Thompson, 2016, p. 49f)

    1. Did you have any practical issues with [this thing]?
    2. How did it help or hinder your [main practices]?
    3. Did those practice change through using [this thing?]

4.4.3   Following up on the Appreciative Inquiry

Finally, I follow up on themes identified in the AI workshops early in the pandemic where applicable, prompted by the interviewee discussing similar things. To reiterate, in the AI workshops, the were three key themes. One, inter-organisational communication, which also relates to the heuristics above, as the questions elicit descriptions of networks with human and non-human actors. In particular, I relate this to "gathering anecdotes" and "following the actors." Two, digital is not enough, which again relates to the other two heuristics, in the "invitational quality of things" and "studying infrastructural breakdowns." Three, the *discourse of necessity* relates to the economic necessities of the pandemic, and how this constraints alternate visions of the future. I invert this here, asking about the economic impacts, and alternative futures on a practical level. These question are thus supplementary to the questions above:

1. Inter-organisational communication

   1. In your opinion, has communication between member organisations increased during the pandemic?
   2. Which digital tools have you continued to use more after the lockdowns?
   3. Have you improved your digital skills during the pandemic?
   4. Has this helped address shared issues together? If so, which ones?

2. Digital is not enough

   1. In your work, when switching to more digital tools, do you see issues with digital inclusion?
   2. Have you made efforts to reach those in the community without access to digital tools?
   3. Have you replicated activities from physical spaces to digital spaces?
   4. Are some community members you work with more vulnerable in a digital setting?
   5. Did this shift introduce new shared issues for the [collaborative] and the neighbourhood?

3. Discourse of Necessity

   1. From your perspective, how would you characterise the economic impact of the pandemic on your work?
   2. From your perspective, how would you characterise the economic impact of the pandemic on the local community?
   3. Has the pandemic highlighted to you new ways of helping the community?

Part III

Case Study

5 Case Study

In this case study, I present the results of the three stages of research (or remote field work) introduced above. One, I discuss the AI workshops conducted early in the pandemic, two, the workshops on the website I built for the collaborative, and, three, the interviews conducted with collaborative members. Regarding the AI workshops, I identify three themes, which are incorporated in both the website workshops and the interviews. At an early stage in the pandemic, the participants note that inter-organisational communication has increased, and that they want to develop the digital skills acquired in the process further. I apply this in the workshops on the website. They note that digital-only service delivery is not sufficient for their services users, which resonates with many of the material practices discussed in the interviews. Finally, they highlight a *discourse of necessity*, in which the economic response to the pandemic takes precedence over other responses. In the website workshops, I develop potential content with participants, in the process gaining a better understanding of the things that matter to collaborative members. Evaluating the website later, I find that it was in particular useful as way for new organisations (in particular from a large religious group) to reach out to the collaborative, and that in contributed to the distribution of small grants for work in the neighbourhood. The interviews form the most important element of my case work, and participants articulate a broad range of shared issues, including an affective lack in the use of Zoom for collaborative work, and complex practical issues when working with service users. Different material practices are then used to respond to that, in particular in relation to social isolation. I *trace* these issues through practices and things, and *quilt* them into a discursive sequence that centres around the issue of social isolation, which is part of a complex set of issues that many service users of collaborative member organisations face, and that the collaborative addresses through working towards avoiding duplication. All of these issues relate to austerity, the impacts of which are amplified by the pandemic. Standing apart is the theme of mutual aid as a material public, where I discuss shifts to that shared issue through shifts to the configuration of implicated actors, as the mutual aid group adopts the classification infrastructure of an ageing social enterprise for their work.

5.1 Appreciative Inquiry workshops

In this section, I will discuss findings from the first two AI workshops, as these are the empirical foundation for the following designerly infrastructuring through the website, and the analysis of infrastructuring during infrastructural breakdown through the interviews. I will not got through the individual steps of the AI and my contribution, but instead discuss themes that were discussed at several points at the workshops, as the activities

build on each other. I will follow this with a brief analysis, which forms the basis of my socio-technical intervention in the form of a website for the community collaborative, and of a qualitative study based on interviews with member organisations.

First, what is AI in this context? According to Ennis and West, AI is an approach to working with communities, where, contrary to needs-based approaches, practitioners aim to harness the strengths and assets found in communities. It has been widely adopted in community development practices in different contexts. While not a fully developed theoretical framework, it can broadly be split into internal and external approaches to understanding strengths. In sociological terms, internal approaches focus on agency and constructing meaning and narratives within communities, while external approaches focus on structures that negatively impact communities. As a process, it aims to map different internal and external "building blocks", or assets, in a community, before (ideally) mobilising the community for sustainable, positive change (Ennis and Deborah West, 2010, p. 405f.). ABCD has however been criticised as "neoliberalism with a community face", as it picks up on a notion of community empowerment in line with the Big Society discourse, where a local community steps in to provide the services that pre-austerity were seen as the responsibility of the welfare state. ABCD operates in this void, and is, at its American roots, opposed to state interventions. When put into practice, ABCD can be a tool in democratic, collective action, but it also serves (intentionally or unintentionally) to privatise publics concerns such as inequality or poverty (MacLeod and Emejulu, 2014, p. 446). This is relevant when operationalising ABCD in a workshop as well.

In digital civics, Dickinson et al. (2019) offer an HCI perspective on ABCD. They argue that it provides an inversion of design work as it is typically done in HCI, which focuses on the perceived needs of a user. This can lead to a transactional approach that does not support existing and developing relationships between local governments and citizens. Instead, participants in their study tended to understand technology as relational means to "facilitate connections among existing local assets -community capital- in order to support the diversity of urban experiences and to confront uneven distribution of public resources and entrenched distrust of municipal institutions." The authors conclude that future research should focus on how assets-based methods employing civic technology can address local issues. They also set an assets-based approach against a publics-based approach, which in its emphasis on shared issues focus on what is missing from a community, and not what is already there. In my case study, I do combine these two perspectives to a degree, as I focus on the one hand on the *infrastructuring* done by the collaborative, using assets at their disposal, while also highlighting what is missing - as this is an affective drive for shared action. This is discussed in both the theoretical framework, and in the interviews analysis below. Regarding AI specifically, Palmas' and von Busch's (2015, p. 243) critique such consensus-oriented design methods which do not make sufficient affordances for critique, strife or dissensus by only focusing on positives or appreciation - highlighting thus the relevance of things that are missing.

Three themes could be identified from the workshops. One, an increase in **inter-organisational communication and cooperation**, as a result of the increased use of digital technologies in the communication within the collaborative during the pandemic. Participants also find that they want to develop their digital skills further, as they find them useful for reaching certain groups within the neighbourhood. This prompted the development of a website for the collaborative, with affordances for a broad range of media. Two, some groups cannot be reached via digital means. As one participant put it "**Digital is not enough**". There is a continued digital divide in the area, and many of the digital tools used due to social distancing do not reach people. This is a recurring theme at different points of the interviews, through a number of material practices developed as responses to complex and specific issues with socially-distanced modes of digital communication such as Zoom. Three, **politics of necessity**, an understanding that there's no other way to tackle the pandemic, that there is little alternative to neoliberalism, as the pandemic leads to a focus on economic necessities, not the articulation of political alternatives. An engagement with austerity, amplified by the pandemic, follows in the interviews below, as one of the key shared issues of the collaborative.

The two workshops covered the first two stages of an AI, discovery and dream. The design and delivery stages were be done as 3-4 separate, smaller workshops, mostly to account for different time management expectations between workshops formats. Typically, these stages would be done after a longer break, and some thematic analysis of dreams by facilitators while participants take a mid-workshop break. The design stage is fairly open to different approaches of interaction design with users, as borrowed from IDEO's handbook of design thinking, which I here appropriated to a digital whiteboard on Miro. The remote delivery of the workshops had an impact on creative expression by participants, though the exact impact on the workshops is of hard to define. What is clear that any technical tools such as Miro have a fairly steep learning curve. Miro replicates *designerly* ways of working, implicitly informed by the IDEO brand of design thinking, and visualisation practices in business, particularly project management. Thus, a familiarity with these methods, and their visual metaphors is helpful when working with Miro. For instance, adding a "sticky note" with text requires placing that note on the board in the right place (via keyboard and/or mouse) and some typing. This can interrupt the flow of discussion. For this reason, I took over adding notes to the Miro board, as discussions among participants developed. This adds an interpretative layer, as I was trying to summarise the key points made by participants and placing them on the virtual board. As the board was visible to all through screen-sharing, participants were able to contest specific interpretations. In the early stages of the pandemic, this seemed the most suitable approach, as the use of Zoom was new to most participants, and all were unfamiliar with Miro.

The first theme focuses on inter-organisational communication and the extension of communication to new networks of local volunteers and mutual aid groups. This is result

of the increased use of digital technologies in the communication within the collaborative during the pandemic. Participants also find that they want to develop their digital skills further, as they find them useful for reaching certain groups within the neighbourhood. Based on this theme, I developed a website for the collaborative, in a process that included two workshops. These will be discussed in the following chapter. The limitations of technology in this context are discussed in the theme "Digital is not enough."

In the responses of their organisations to COVID-19, a participant acknowledged the ongoing challenge of getting local organisations to communicate but pointed out that the pandemic has led to increased communication between organisations. A facilitator agreed with this as well, noting that new organisations have joined the collaborative during the pandemic. They reasoned that this was because they are able to allocate smaller parts of their work days to join meetings remotely, instead of having to allocate more time for traveling to face-to-face meetings. For one facilitator, this is a momentum that should be maintained. In the "dream stage", participants were asked to formulate "dreams" for the neighbourhood, ignoring costs, bureaucracy, or any other constraints. Here, a participant wanted more collaboration between organisations as the new norm, while another participant was more sceptical. They point to the increased level of communication within the collaborative, and the tangible benefits of their activities to the community. While the team at the collaborative has increasingly started using instant messaging and video call apps during the pandemic, this participant was also sceptical that this will continue after the pandemic.

Participants also expressed that they want to improve their digital skills. A participant discussed how they did not have much experience with social media before the pandemic, but now produces YouTube videos for the local football club. Having received positive feedback, they have started enjoying these activities. They saw digital technology as a way to reach young people they work with and aim to continue using digital technology for this purpose. While the local football club have increased their use of digital media such as Twitter and YouTube, they have also started a phone service for older adults who may be isolated during the pandemic, and coordinated food donations, parcels, and deliveries. They have also increased their outreach to refugees living in the neighbourhood. These are examples of material practices in response to the pandemic, and I provide more detailed examples of this in the analysis of the interviews below. Two participants also stated that they would like to develop their social media skills further. Another participant works with charity for young parents. They were forced to transfer their weekly activities to Zoom, which led to some issues with access to Zoom for participants - this links to the second theme, "digital is not enough". Another participant agreed, stressing the importance of digital inclusion, and making sure that people are not left behind as the importance of the digital accelerates. This is the focus of the second theme.

The second theme is related to the first theme, in that the focus is on a concern arising from a move to more digital modes of working during the pandemic. As the first

theme showed, participants see the benefits of digital tools mostly for their own, internal work, and to work with certain groups that they see as users of digital communication. They see other groups as excluded through digital communication, leading to the notion that just digital is not enough. Some participants also highlighted the limits of digital communication for the articulation of vulnerability, or sensitive concerns - this becomes clearer in the interviews, where *zooming* into the homes of services users eroded the required privacy to discuss sensitive concerns, which in turn prompted alternative material practices such as care packages.

Before the pandemic, a participant worked on creative activities with the local community, due to his creative background. They worked across the neighbourhood, finding suitable places for individual projects in places as cafes, public spaces, parks, or the spaces of different organisations they were collaborating with. Prior the pandemic, they realised that digital is not always the answer. They deliberately did not focus on digital projects, or projects with digital outputs, which has changed during the pandemic. For after the pandemic, they pointed out that for an area like this, just digital outputs are not enough. Physical presence is a necessity, as the people they want to reach are not necessarily able to access digital platforms and tools. They found that physical community work remains most important. A facilitator chimed in that lockdown (May 2020, at this point) has particularly affected vulnerable people in the community. Their needs, such as food parcels, or laptops for school access, are not met by digital-only services. They argue, however, that lockdowns have also made it easier to reach vulnerable community members through the provision of these needs. This connection should be built upon. A lack of access to digital communication is also a concern. A participant works with young parents. Before the pandemic, they had a weekly meeting, with quiz nights, bowling, paint ball, food nights, courses, and so on. During the pandemic, they transferred suitable activities to a weekly Zoom meeting. They struggled to get some participants to a Zoom call due to a lack of suitable equipment but have been able to provide some participants with equipment, including mobile Wi-Fi and data. They feel that they have lost touch with some people due to this. They plan to return to the pre-pandemic setup, as their group was about face-to-face interactions.

This links to the second part of this theme, online vulnerability. One participant is used to engaging with members of the community face-to-face. Similarly, for another participant all pre-pandemic work was face-to-face. They focus on digital inclusion and making sure that people are not left behind as the importance of the digital accelerates. They met with various interest groups, including for crafting, a commission on local poverty, and domestic abuse groups:

> "I used to spend no time before the computer, which I loved, and now I spend all my time in front of a computer"

The points made by this participants all resurface during the analysis of the interviews, including material practices in response to issues with Zoom, the shared issue of social

isolation, and the affordances of Zoom for collaborative work. During the pandemic, they relied on phone calls to keep in touch with members of these groups. They pointed out that isolated people might feel even more alone after a Zoom call ends. For dealing with sensitive topics, they found face-to-face interaction to be more suitable than Zoom, as people are more vulnerable online. Group Zoom meetings with the commission on local poverty were challenging to establish. They are characterised as social events, without getting much work done, but the calls have become an important to members of the group. They also point out that those that have transitioned to Zoom and similar have acquired technological skills that could prove valuable in the future, linking to the first theme. This resonates with findings on Zoom use from the interviews, where it is contrasted with in in-person meetings, although most interviewees find Zoom more formal in a workplace context.

The third theme has an economic focus. It links to the impact of austerity on the neighbourhood, combined with the economic impacts of the pandemic, and the perception that the true economic impact will be felt after the pandemic is over. Participants feel that the pandemic constrains the possibilities of articulating alternative policies, as economic necessities become the key focus. This disciplinary power of the pandemic is embodied in a discourse of necessity. This refers to the necessary things that need to be done to control the pandemic, articulated with a certainty that suggest that there is no other way. As Alloa (2020) argues, this constitutes a sacrifice of the democratic value of contingency, or the notion that an alternative response is possible. Such an alternative response is articulated to a degree by the local mutual aid group, discussed in the following interview section - although the emphasis of this mutual aid group is first on *survival work* and then non-emergency support, and less on social change.

A participant points towards the support of key workers and the NHS, particularly in light of the cuts to the NHS in recent decades. They hope for renewed support for vulnerable community members through public services. He too sees volunteering as way to support these community members. The notion of volunteering sparked a discussion on the terminology used to describe it. A facilitator points out that volunteering is reciprocal, and can be done with even small time commitments, as a form of what they call "active citizenship." Another participant suggests "community spirit", due to its focus on community, such as in the work of mutual aid groups. Another participant highlights mutual aid volunteer networks as a novel form of volunteering where people offer their skills to help vulnerable members of the community. The participant then asks how to do hold on to those new volunteers when things return to normal. A facilitator notes here that a return to the "old normal" is not desirable, but that the pandemic presents a chance for positive change in working with volunteers, even just in learning to work better with digital tools.

This facilitator prefaces the "dream" question with an observation that could be related to complexity and the relational state. They argue that local government lacks the

required local knowledge to effectively intervene where required, as they do not know where to intervene. This is where charities and the voluntary sector step in, as they have local knowledge. They point out that this has increased during the pandemic, as for example the distribution of food has allowed them to have conversations with the members of community that they delivered food to. This facilitator argues that the collaborative is positioned to have conversations with and within the local community, instead of a top-down approach from councils and other local authorities. For councils but the current situation the financial implications of the pandemic are not the time to have open, visionary conversations - this is the *discourse of necessity* at play.

5.2 Website workshops

In this section, I will discuss findings from designerly *infrastructuring* through the website. This includes both the *use-during-use* stage covered through two workshops, as well the *design-after-design*. As such thee focus is on understanding matters of concern, as well as how (and if) the website is incorporated into the work and practices of the collaborative. In the methodological framework, I visualised the relationship between these approaches, with infrastructuring as the method that ties them together.[1] As noted, I adapted the linear *use-before-use* to *use-during-use* stage for practical reasons. During the design stage for the website, I consulted with workers from the collaborative, so that a live website was available as a *boundary object* and *playful trigger* for use in the workshops. In this case, this is a fairly minor shift, as the difference between material representation of the object-to-be and the object-as-is is minor. A clickable mock-up of a website is not all that different from a clickable website. Having anticipated user needs with the collaborative in the design stage, I now invited further human participation in the object, through its use as a *playful trigger*, an everyday object that can be used to render visible tacit knowledge in workshops. This is a process of *infrastructuring*, as the goal was providing directions for the next stage, *design-after-design*, in which the collaborative (hopefully) incorporates the website into their practice.

In the workshops, I asked the participants to develop personas for their service users, in a scenario where the persona finds information on the member organisation on the collaborative website. I asked what information and next steps the service users would expect. Each participant developed a customer journey for a user of the collaborative website:

1. A **mother of several children** is struggling financially in the current situation (lockdowns etc). Their goal is to find need immediate, practical support, and often would want to speak to somebody as quickly as possible, ideally on the phone. They expect to find this information quickly on the website. They found the website because they have seen the collaborative's branding elsewhere, such as the newsletter,

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[1]See figure 3.1 in the section on participatory *Dingpolitik*.

or around the neighbourhood.

2. A **local group** is looking for a positive activity, such as gardening. They have some organisational skills and a neighbourhood network, but need some help getting started, such as with funding or communication with council and services, or just positive encouragement. They found the website because they were referred from another organisation or through word of mouth. The website can provide them with a small grant to get started, contacts to relevant member organisations, and a place to promote their activity. They expect help jumping through the first hoops such as permits and location and need some encouragement to get started. The website can provide information on projects that are happening.

3. A **member organisation** needs to reach out to other organisations, to make them aware of their services. They need to show other organisations the potential for cooperation. They need the website to show relevant information on the work of other member organisations, so that they can connect and collaborate. For example, the book charity has books to distribute on many relevant topics, such as the local gardening group, or to cooking classes run by the collaborative. Organisations need new things to teach when they get in touch with the book charity.

4. A **potential volunteer** is looking for volunteering opportunities in the area because they want to make a positive impact. They find the collaborative website due to its links to the area. The website could provide an overview of volunteering opportunities with member organisations, including short description of the organisations, so that user would be able to find something suitable, as they do not want to search and read through many websites of organisations. The website would then provide contact points to the different organisations offering volunteering opportunities.

These personas cover the broad range of issues that the collaborative works on, much of which foreshadows things that are articulated in more detail in the following interview stage. The first persona, for instance, highlights the role of the collaborative in crisis support in the neighbourhood, while the second persona highlights the more urbanist dimensions of the collaborative's work. The third persona highlights the benefits and needs for further collaboration and promoted discussions on potential content. For example, *making public* the work of the book charity on the blog would be beneficial to many collaborative members, as noted by a participant. Finally, the fourth person relates to mutual aid, in that there was an influx of volunteering during the pandemic, with many residents looking for opportunities to do so.

In the case of the customer journey mapping, personas are only one part of the activity. When analysing the four journeys above, participants focused less on the details of the personas, but more on their goals and needs. To an extent, I reason that this is because they acknowledge that many different people can share the same concerns. For example, the first persona of a mother struggling during the lockdown can be seen as representative of different economic concerns and needs that residents of the neighbourhood face in this

situation. The second persona focused on groups, which by definition contains multiple subjects sharing an interest, in this case the goal to organise positive activities in the area. Thus, the customer journey mapping revealed the need for several forms of practical support, and more would have emerged if the task would have been repeated with more groups of participants. Participants also highlighted how these different use cases connect to their networks of activities. What is missing at this stage, is the perspective of the actual, non-composite users.

Finally, the workshop covered content for the blog, again with the aim to identify shared concerns, as I attempted to understand shared issues through *playful triggers*, through the possibility to articulate these concerns on the website. These concerns resonate with themes from the following interviews, which provide more detailed insights into these issues. At small scale, the workshops highlight what the issues are, while the interviews allow *tracing* material practices related to issues and *quilting* them into a discursive articulations.

A participant started by pointing out that there are many issues to address, while acknowledging that their concerns might be different from people living in the area. Their own priority is addressing economic impacts in the area:

> "We do it in the way we've always done it. […] We mess around at the edges, we get funding, you know, we do small bits and pieces. Unless there's some much bigger issues to address, and that's mainly about the economy and how the economy impacts on communities, you know, for the majority of people in areas like [neighbourhood]. And that's just such a huge challenge and, you know what, I don't have the answer. But I think it's going to take more than just some really well-meaning projects, and people like me doing stuff. It's gonna take action at a much higher level if it's ever gonna be any different."

They stated that they would like to highlight this through the website, but also state that organisations have to be careful to not to be seen as too "political" in what they do. They suggest, however, that locals could contribute to the blog with writing on the lived experience of economic inequality in the area. Another participant agreed that levelling out inequality in the area is the main concern, which relates to the next concern as well. One of the shared issues identified through the interviews is the local impact of austerity policies, discussed there in greater detail. For now, I will summarise that the economic impacts of austerity policies are disproportionally felt in deprived neighbourhood such as the one that the collaborative operates in. Due to cuts, organisations such as the collaborative have less funding available to them, despite being tasked with absorbing many impacts of cuts to public services. Under these conditions, interviewees stress the value of collaboration over (neoliberal) competition for funding, arguing that the issues caused by austerity to their service users are complex. The interviewee also points out a disciplinary discourse, in being aware of what causes issues, but not being able to articulate this as it would be seen as political - despite the political roots of the issue. Following

this, they also note that it is "gonna take action at a much higher level", which again emphasises the disciplinary and political logic of austerity. Later, I asked the collaborative to prepare a short text for the landing page of their website. The first line resonates with the above:

> "The [collaborative] is committed to improving life and challenging unfairness and inequity in [neighbourhood]."

Another participant felt that the biggest issue (in November 2020) was the COVID-19 pandemic, which also affects other related issues negatively. They felt that the pandemic had a negative impact on equality and employment. Social isolation and related mental health issues are of increasing concern. For families where children now spend more time at home, as schools are closed and extracurricular activities suspended, domestic family life becomes more challenging. Here, participants proposed adding local resources for help during the pandemic to the website, which was done after the workshop. This, too, relates to interview findings, where many interviewees note that the pandemic has amplified pre-existing inequalities. This relates mental health to issues such as social isolation, addressed by several organisations through a diverse range of material practices.

As the participants in the first workshop showed an interest in podcasting, I modified the question, to which issues they would like to discuss on a podcast, and who they would invite to do so - an attempt to situate the issue within a network. One participant discussed a survey their organisation recently completed. It focuses on the issues carers in the city that the neighbourhood is in face, which would make a suitable conversation topic for a podcast. They would reach out to a national organisation in aging, as one of their key findings is that carers are getting older and caring for longer, an attempt to shift the issue through reconfiguring the actors implicated in it. This participant went on to record a series of podcasts with carers, discussed again in the following interviews. This, for example, is one of the material practices used to address social isolation.

What, then, of *design-after-design*? How was the website incorporated into the practices of the collaborative? Firstly, a community worker of the collaborative managed the website and its content. In the first months, several blog posts were made, written by a freelance copy writer or members of the collaborative. These cover local jobs available during the pandemic, a call to contributions for a larger, lottery-funded gardening project, a discussion of asset-based community development (based on a previous report), an article about book poverty in the city, an issue in the city. Thus, the blog was not used much by the collaborative, which I evaluate with a community worker in an interview.

The community worker notes that the initial support from me in generating content through workshops was useful and that they missed this after the handover of the website - still, some of the content was uploaded in the months following handover. The issue was a lack of time:

> "It's just other things have took over, and I think with kind of when you were supporting us on that there was that, like, push, that motivation to put

> content on there, and everything else just kind of took over, I think. And
> I'm not even sure if I was doing the newsletter when we got the website. Or
> sorted to the point of putting content on. And so started putting out that
> monthly newsletter and then that just sort of I guess that took over a bit.
> Another thing like just being busy really with - the job took over a bit. So
> yes, definitely an opportunity that I haven't like followed up on as much as I
> should have done. and the reason that, like, I guess, I haven't looked at the
> stats for like visits to the website, but the reason that I know that people look
> at it is because we've had quite a few inquiries through the form."

However, the website became part of the collaborative *lifeworld* (perhaps: *workworld*?)
in a slightly unexpected and accidental way, in the way it is appropriated by the collaborative. This where it becomes a small design *Thing*, as it does contribute together new actors
to work together on shared issues. When designing the website, I added a simple contact
form that forwards a message to the collaborative's email account, based experience from
the early, pre-pandemic stages of AR, in attempt to *make public* the collaborative, and
provide a way to work with them. This form enabled a religious community to get in
touch with the collaborative online, and a further form was added to distribute small
grants for community projects later.

The community worker notes the contact forms were useful, in particular for other
organisation contacting them:

> "I'd say yeah more organisations and professionals than residents, though
> we've had a few from residents. [...] So yeah, but I guess website's more kind
> of formal, isn't it? So I guess you kind of get less of that stuff and I know
> that we do get those kind of inquiries through Facebook."

Thus, the website is seen as an avenue for more formal inquiries from organisations,
or those seeking to set an organisation up. Inquiries from individual residents offered or
inquired about support through volunteering or donating, but there were no requests for
help. Such requests arrive usually through the Facebook page of the collaborative, which
is managed by a different community worker, who is described as more comfortable with
social media.

The interviewed collaborative members shared a diverse range of examples, but in
particular highlighted that both the contact form was used by members of a large religious
group to get work with the collaborative:

> "The [religious] community's preference is they ask for advice if they want
> it but they very much like to do their own thing. And that's fine and it's
> appropriate for them to run their own services. In the way that that's best
> for their community and their residents. And that's very much the relationship
> and the communication isn't always easy. It's not always particularly natural.

> So I think, yes, it was, it has been a standout feature, if you like, that it's
> been a way for people in the [religious] community who wanted to do things,
> to make that inquiry with us in a way that worked for them."

Representatives from the collaborative perceive this religious community as one that governs itself, which for them is not an issue. This statement is perhaps an example of the neighbour as *Nebenmensch*: not self, not other, but still constitutive to the neighbourhood through their presence. The provision of a communicative link through the website to them is seen as the "standout feature" of the website. Parts of that feature were accidental, and not considered at an earlier design stage. In the experience of the interviewed workers from the collaborative, Internet use within that community is limited, with access restrictions placed on many forms of social media. The new website, however, appeared not to be affected by these, thus leading to several inquiries. The contact form was thus the feature of the website that contributed to both new connections by forwarding an email of the inquiry to a community work of the collaborative.

I also set up a form for a small grants scheme on the website, based on that same mechanism. The responses to the forms were directed immediately to an e-mail of the collaborative, and I had no access to the content of the forms. The collaborative were the intended recipients of the inquires, and the only ones who could see them. Thus, I rely here on their recollections of the grants scheme. This feature was implemented as a "standard" feature of a website, without any deeper consideration, yet it was one of the key benefits of the website for the collaborative, as grants of £200-£250 were distributed to around 12 projects and groups of residents, for a broad range of activities:

> "The small grants more generally have been highly successful. […] The whole
> of the budget that we had for small grants was used up, and thinking across
> how much we had, we gave I think 12 or 13 grants of approximately 200 to 250
> pounds and to all manner of projects. Everything from you know, providing
> food for people who couldn't afford it, through to a whole street of neighbours
> who'll start to all garden together in their front gardens. And you know and
> just about everything in between, sports activities, you know, activities for
> youth groups, creative stuff. So yeah lots of stuff."

The unintended usefulness of a simple contact form is in the new connections that it facilitated for the collaborative, a small example of a design *Thing* that enabled actors to connect around shared issues.

5.3 Interviews

As noted previously, in these interviews I discuss four themes. One, mutual aid as a material public, in which the configuration of actors shifts the meaning of mutual aid. Two, the affective lack of Zoom for collaborative work, with complex practical issues when

working with service users. Three, material practices that respond to that, in particular the shared issue of social isolation. Four, the shared issues of austerity localism and the avoidance of duplication, a reading of publics through DT. Here, I analyse these themes individually, drawing on relevant literature from a broad range of fields that I relate to infrastructuring and publics. In the discussion, I *quilt* these themes into a discursive sequence, making a novel contribution to the study of publics in the *problem of difference*: the configuration of actors around different instances of the shared issue of social isolation shows that the same signifier signifies a broad range of issues under the same name. It acts as partially empty signifier, in Laclau's terminology, applied through the prism of material publics. In the theme of mutual aid, this is also visible at a larger scale, as the meaning of mutual aid shifts through the configuration of actors implicated in that issue.

5.3.1 *Mutual aid and material publics*

The concept of mutual aid precedes the COVID-19 pandemic. The term mutual aid can be traced to the anarchist Kropotkin. He (2021, p. 33) adapted it from a lecture in 1880, where the zoologist Kessler described mutual aid as a key evolutionary factor among animals, in contrast to a Darwinist view. In 1902, Kropotkin (2021, p. 164) then described federations such as the medieval Hanseatic unions as mutual aid, along other historical associations that support each other through "an immense amount of voluntary, unambitious, and unpaid or underpaid work", while opposing top-down organisation through state or church (Kropotkin, 2021, p. 212). Contained here are the constants of mutual aid: solidarity and support within a group that strives for social change.

Recently, mutual aid groups have been active during several natural disasters in the US, but it could be argued that the pandemic was when it entered a mainstream discourse for the first time. Mutual aid groups responded to both the pandemic and to the simultaneous Black Lives Matter protests (Littman *et al.*, 2022, p. 90). The concept became a catch-all term for many forms of grassroots support to communities, as it for the first time received large-scale, mainstream media attention (Bender *et al.*, 2021, p. 280). As Bender et al. find, there is no clear definition of mutual aid in the US media (Bender *et al.*, 2021, p. 286). In response, some problematise the current use of the term, reminding us of its anarchist etymology (Preston and Firth, 2020), and contextualising it within broader antiauthoritarian community activism during other disasters (Spade, 2020). There are also a number of empirical studies on mutual aid during the pandemic, of which I will highlight some that are relevant for the specific context of this study (Travlou, 2021; Chevée, 2022). Finally, I reflect on HCI literature on mutual aid, before proceeding to its application by members of the collaborative in my case study.[2]

The pandemic prompted a discursive shift in the meaning of the term mutual aid, with mutual aid becoming a *floating signifier*. According to Laclau (2005, p. 132), this occurs in

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[2]As should be obvious, mutual aid during the pandemic is a recent field of research. Given the pace of academic publishing, it is likely that key contributions published in the near future are missing here.

"periods of organic crisis, when the symbolic system needs to be radically recast." This is a reference to Antonio Gramsci, describing a "weakening of the relational system defining the identities of a given social or political space (see Laclau and Mouffe, 2001, p. 136f.)." In crises, antagonistic frontiers may be redrawn, allowing discursive elements to *float* across antagonistic frontiers, attaching to different chains of equivalence. To translate: Mutual aid was, until recently, a leftist signifier with anarchist roots, representing demands of solidarity and social change. Now, mutual aid is compatible with rightist discourse of the *Big Society*, or just general *neighbourliness*. I expand on this below.

This shift in the meaning of mutual aid can also be viewed through the lens of the material public, as a process in which the issue is shaped by the configuration of actors attached to it - for mutual aid, it is clear that this configuration shifted during the pandemic. I recall Marres' *problem of relevance* for material publics: how to assemble actors around a shared issue, when they are not part of issue articulation networks - particularly relevant for the pandemic, where publics intervene to address emerging shared issues in response to *infrastructural breakdown*, through the formation of new networks. There are examples of this for other disasters, such as wildfires in the US and the Fukushima nuclear accident, where laypersons come together to make public and legible data related to these events Here, Marres (2017, p. 154) notes that "digital knowledge technologies can be re-configured as instruments of participation in collective enquiry." This case study goes beyond collating and sharing information in response to disaster, and looks at the collective action through digital knowledge technologies. I will focus on the processes that define a public and its issues, and the shifts in those definitions as the scope of those actors entangled in the issue expands: mutual aid as a heterogenous assemblage, where the developing relations between involved actors shape the articulation of concerns. This is the problem of relevance, where "the process of the specification of issues and the organization of actors into issue assemblages go hand in hand (Marres, 2012, p. 53)." Material publics provide the theoretical lens for this analysis of mutual aid, with the tracing of infrastructural breakdown and the resulting design-after-design the method. I also recall here the definition of publics in HCI as commitments and dependencies between actors, artefacts, and institutions around shared issues, and the extension of this into a co-design brief for designing technologies that support a collective capability to act. In this case, the task is taken up by the entangled communities themselves, as they build, expand, and maintain their capability of addressing the shared issues that arise from the pandemic and the associated policy responses. This is *design-after-design*, the appropriation of existing technologies into their lifeworlds.

If the discursive meaning of mutual aid has been *floated* during the COVID-19 pandemic, how has it been defined? For Spade, it is "survival work" that strives for social and political transformation, while responding to emergency - not just the COVID-19 *state of exception*, but other crises such as the climate emergency, inequality, as well as race and gender violence (Spade, 2020, p. 1f.). As it was for Kropotkin, mutual aid remains

a counter-hegemonic project. In the context of the COVID-19 pandemic, it is at risk of being co-opted by government and corporations as merely a complementary effort for volunteering (Spade, 2020, p. 33). Thus, mutual aid may become "a depoliticised form of relief and reconstruction that is almost entirely compatible with neoliberal capitalism and its institutions, functioning to restore 'normality' (or an even more terrifying 'new normal') in a context of the withdrawal of state welfare functions (Preston and Firth, 2020, p. 57f.)."[3] To counter this, mutual aid is defined through solidarity, on acting on shared issues that can be (materially and/or discursively) articulated through the signifier of solidarity. As with publics, the articulation of shared issues enables action by heterogenous groups:

> "Solidarity across issues and populations is what makes movements big and powerful. Without that connection, we end up with disconnected groups, working in their issue silos, undermining each other, competing for attention and funding, not backing each other up and not building power. Mutual aid projects, by creating spaces where people come together on the basis of some shared need or concern in spite of their different lived experience, cultivate solidarity (Spade, 2020, p. 15)."

This emphasis on solidarity was visible during the pandemic. For example, Chevée (2022, p. 416f.) highlights that mutual aid groups in north London frequently used the phrase "Solidarity not Charity" on their Facebook groups, thus differentiating themselves from traditional charities. Similar to my case study, they experimented with a number of different platforms to facilitate action during lockdowns and stepped in even before the UK government announced that it would implement any policies in response to the pandemic (Chevée, 2022, p. 414f.). In later lockdowns, local councils acknowledged the mutual aid groups in different forms - either by highlighting and/or supporting their services or offering similar services themselves (Chevée, 2022, p. 417). In Scotland, Rendall et al. (2022, p. 14) categorise the relationships of mutual aid groups with councils as supplementary, complementary and/or adversarial, with potential changes to that relationship throughout different phases of the pandemic. They find that mutual aid groups supplemented services where they were not provided by the public sector (resonating with visions of the *Big Society*) and complemented publics services through collaboration and coordination of efforts. In some cases, public sector and mutual aid groups had an adversarial relationship, with mutual aid groups unwilling to collaborate with slow and bureaucratic services, while councils opposed activities perceived as risky during the pandemic. While the previous two studies highlight the detailed development of a number of mutual aid efforts in the UK, participation in mutual aid on Facebook

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[3]Public health is a relevant example for this withdrawal. After over a decade of austerity, during which the annual changes to NHS funding were outpaced by GDP growth (Froud *et al.*, 2020, p. 82), the breakdowns in the NHS during the pandemic can be defined as *normal accidents*: disruptions to complex systems that are to be expected when they operate without buffer or backup (Froud *et al.*, 2020, p. 3f.).

groups in the UK decreased sharply from its peak in March 2020 to April 2020, and then steadily continued to decrease (Ntontis *et al.*, 2022, p. 6).

The tools of mutual aid are described as a concrete "way to build the infrastructure we need to decrease harm now, and to prepare for future natural and political disasters and the eroding of infrastructure (BIG DOOR BRIGADE, no date)." In an example from Athens (fittingly named Kropotkin-19), this is done through affective infrastructures. Travlou describes a resurgence of dormant solidarity networks[4] in response to the social and economic inequalities and injustices deepened by the COVID-19 pandemic (Travlou, 2021, p. 69f.). This involves what she terms "affective infrastructures" [5] - here, the network of mutual aid groups in Athens working in solidarity, as part an "expansive (transglobal) network [...] that has emerged during the current health crisis (Travlou, 2021, p. 75)." I would argue here that this is an example of *design-after-design*, in that existing technologies are appropriated into the lifeworlds and praxis of Kropotkin-19, in the form of digital communications (social media and video conferencing) and a website which contributed to the coordination of mutual aid across Athens - a concrete effort of *infrastructuring* not by designers, but by users, of *platform sovereignty* for the emergence of new economic structures.

These not only included the appropriation of existing tools, but also the creation of new, open-source tools. An example is Helpful Engineering in New York, which provides relevant medical supplies and supports an app for connecting volunteers with those in need of aid. They, too, appropriated existing tools such as GitHub, Slack and Google products for this (Hultquist and Tubbeh, 2022, p. 4). The organisation of mutual aid was often done online, yet Wilson et al. find that this did not inhabit relationship building and care within the mutual aid communities they analysed in the US (Wilson, Roskill and Mahr, 2022, p. 272).

Den Broeder et al. analyse the impact of such community ties on health outcomes during the pandemic in deprived neighbourhoods, including one in the UK. They find that community engagement helps build community resilience, helps with access to vulnerable groups, and allows for better communication of public health programs. Mutual aid (which includes community-based organisations) is an important factor in this, thus extending the relevance of the concept to public health in deprived neighbourhoods (den Broeder *et al.*, 2022, p. 7). Furthermore, the impacts of COVID-19 are amplified by deprivation. As Munford et al. (2022, p. 9) find, the most deprived areas in England suffered far higher mortality rates from COVID-19 than the least deprived areas in England. Deprived areas in the north of England suffered higher mortality rates compared to deprived areas in the rest of the country. The neighbourhood in the north of England

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[4]Vlachokyriakos et al. (2017) discuss digital civics and solidarity networks, applying agonistic pluralism to the infrastructuring of alternative economic networks in response to public sector austerity.

[5]Citing here Berlant (2016, p. 394), who draws here on both Spinozean-Deleuzian and Lacanian strands of affect literature when describing the large scale "infrastructural breakdown of modernist practices, social relation, and affective continuity" as the result of austerity policies. Affective infrastructures can contribute to decoupling community care from such discourses (Berlant, 2016, p. 414).

that the collaborative works in is classed as a deprived neighbourhood as well, showing the importance of their work within the local mutual aid group during the pandemic. That work is the focus of this section.

If the use of digital technologies is a key element of mutual aid during the pandemic, how does HCI address mutual aid? Firstly, there are examples of design-centric approaches, in which mutual aid is used in its current, *floating* form. For example, an application for the exchange of goods and services within a neighbourhood is described as mutual aid (Sun, Li and Wei, 2022), despite referencing neither survival work nor social change.[6]

Secondly, there are examples of mutual aid that employ a more narrow definition in the context of the COVID-19 pandemic (and other disasters), as "localized, grassroots community-based disaster relief where people exchange information, ask for various kinds of help, and offer to provide help for others, often born from the realization that current top-down systems are not meeting the needs of the community (Knearem, Jo and Carroll, 2021, p. 104)." As for my case study, this includes the provision of food aid. Interviewing mutual aid activists, Knearem et al. (2021, p. 106) find that food was distributed online through social media (such as Facebook groups), with the extension into offline activities strengthening community ties, and in the process helping to develop long-term food security and self-sufficiency in communities.[78] In this context, there are also design-centric approaches, for example for an app that supports self-organisation of communities during crises through decentralised communications, in case existing telecommunications break down (Haesler *et al.*, 2021). In the broader sense, the research into digital emergency responses is relevant for mutual aid, as Norris et al. claim for their work on crowdsourced, temporal sensemaking in the context of natural disasters (Norris, Voida and Voida, 2022, p. 108:20). This contributes to one of the two key constants of mutual aid: survival work.

Thirdly, there are example that do reference the history and definitions of mutual aid, covering both survival work and social change, in the context of self-organised mutual aid during the pandemic. Using HCI methods such as scenarios, the use of both adapted (Facebook and Google Docs) and bespoke platforms for mutual aid is evaluated. Relevant for the case study at hand, the authors find that design for mutual aid should consider "support request standardization and balanced visibility alongside validation and conversational interaction (Knearem *et al.*, 2021, p. 38)." In this case, an infrastructure for request standardisation was put into place.

Another study draws on interviews with mutual aid organisers during the pandemic, situating it not only within mutual aid, but also crisis informatics and community responses to emergencies. They find that organisers face a number of "dilemmas" in sus-

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[6]This is not a critique of the application or the work itself, but only an example for the use of the term mutual aid removed from its original context.

[7]In digital civics, Prost et al. (2019) draw from infrastructuring when discussing the formation of a food hub in a deprived neighbourhood.

[8]Lofton et al. (2022) discuss the relationship of mutual aid and a community food infrastructure in Black and Hispanic communities in Chicago.

taining their work during overlapping, ongoing crises, while maintaining the focus on social change in mutual aid (Soden and Owen, 2021, p. 475:16). These dilemmas include inclusion and exclusion in mutual aid, the tension between providing aid and working towards longer-term change, relationships to government aid, and the lifespan of mutual aid groups.

Not limited to the Global North, another study highlights how mutual aid networks of platform economy workers under precarious, non-unionised working conditions in Jakarta provided support during the pandemic. Crucially, these solidarity networks preceded the pandemic, and in both cases supported its members where state, employers, and unions did not. While exclusionary to a degree, these networks showed the transformative powers of mutual aid, in the platform economy where the potential of worker power has been seen as fairly low due to challenges to unionising (Qadri, 2021, p. 419:16).

Along similar lines before the pandemic, Irani and Silberman (2013, p. 719) argued that by "creating infrastructures for mutual aid, we bolster the social interchange and interdependency that can become a foundation for a more issue-oriented public." Their long-term project of Turkopticon, a platform for Amazon Mechanical Turk workers for evaluating their employers, is an example of this, as it allows a heterogenous group of independent workers to come together around shared issues regarding their work. They do not offer a specific definition of mutual aid and thus do not fit this third category. I include them here as they do provide a focus on worker solidarity and antiauthoritarian social change, although survival work is missing here. What they contribute is a perspective on the link between mutual aid and issue-oriented publics, one which to a degree is also visible in the case study at hand.

Mutual aid and solidarity were also present in new finance practices during the pandemic, where services such as PayPal were used to deliver aid across borders. The "Accountable" initiative in the UK provided informal mutual aid groups with a platform for their accounting and finance needs. They find that this is as odds with the HCI literature on publics,[9] which focuses on previously unknown issues. Instead, they draw attention to counter-publics, on how known issues are addressed through counter-institutions. If their emphasis differs from my project here, their aim is similar, in that they aim to "better identify entry points and sites for radically transforming institutional contexts derived from a community's own actions and practices (Prendeville *et al.*, 2022, p. 225)." In my case study, a large charity is used to deal with the need for accounting related to providing food aid through volunteers, and their involvement shapes how the shared issue is understood.

Somewhat unusual for HCI, most examples discussed focus on mutual aid by communities themselves, and not, say, the design and evaluation of mutual aid platforms by

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[9]They refer to Le Dantec's work, discussed at lengths in the theoretical framework, and augmented with DT - which is as much a theory of hegemony as it is a theory of counter-hegemony. Where they claim that publics form around known issues, Marres claims that the issue is shaped by the actors assembled around it, while Latour focuses on the controversial (and thus to a degree counter-hegemonic) representations of publics.

researchers/designers - this is research into *design-after-design*, not *use-before-use.* While it can be assumed that this is to a degree the result of the pace at which the pandemic developed and thus outpaced academia, it shows the value of research into *infrastructural breakdowns,* and its implications for design. When it comes to mutual aid, there is still a normative gap to address, as Rosner and Rosner (2020, p. 77) call for design in HCI to be shaped by solidarity, as "one of several sites for opening a conversation across dynamic and uneven geographies of difference."

Mapping three stages of mutual aid in the neighbourhood

In March 2020, before the first national lockdown in the UK, but during the first lockdowns in Europe, a Facebook group is set up for mutual aid in the neighbourhood, with a call for volunteers and mutual aid organisers. This is one of several groups for individual neighbourhoods in the city, in addition to a city-wide group. The city-wide groups attracts the largest number of followers on Facebook. The collaboration with the local department of a large, nationwide ageing social enterprise is set up with that city-wide group, but extended to many of the neighbourhood groups, including the one in which the collaborative operates. The focus here is on how this collaboration unfolded between the local mutual aid group and the social enterprise. There is clear overlap between organisers of the mutual aid group and members of the neighbourhood collaborative. They were interviewed for this case study, prompting the discussion of this mutual aid effort as a *material public.* The Facebook groups for both neighbourhood and city provide additional empirical material and were used to trace and validate claims made in the interviews. Finally, several short blog posts were published on the collaboration for mutual aid and are used as empirical material as well.

One of the organisers claims that over 100 volunteers were recruited in the neighbourhood. The ageing social enterprise claims over 1800 volunteers recruited city-wide by the summer of 2020. Collaborative members observed a greater willingness to volunteer in response to the threat posed by the pandemic. The mutual aid groups in the area facilitated much of the volunteering. How, then did mutual aid in the neighbourhood develop from its informal beginnings to adapting the formal systems of a nationwide social enterprise to coordinate a large group of volunteers?

I will now map out this system through three key phases, characterised by the expansion of the mutual aid network through *design-after-design*:

1. *Infrastructural breakdown*: Social media groups in the early pandemic

2. *Ad-hoc infrastructuring*: Messengers, video calls, and forms

3. *Socio-technical infrastructures*: Collaborating with social enterprise

This mapping is descriptive, not analytical. The goal is to condense the development of the mutual aid system into stages, as reference for the following analysis. These stages

are visualised in figure 5.1. The following key question for analysis is this: As the mutual aid network grows, how does the inclusion of new actors shape the issues of this material public?

Phase 1   **Phase 2**   **Phase 3**

Infrastructural breakdown   *Ad-hoc infrastructuring*   *Socio-technical infrastructures*
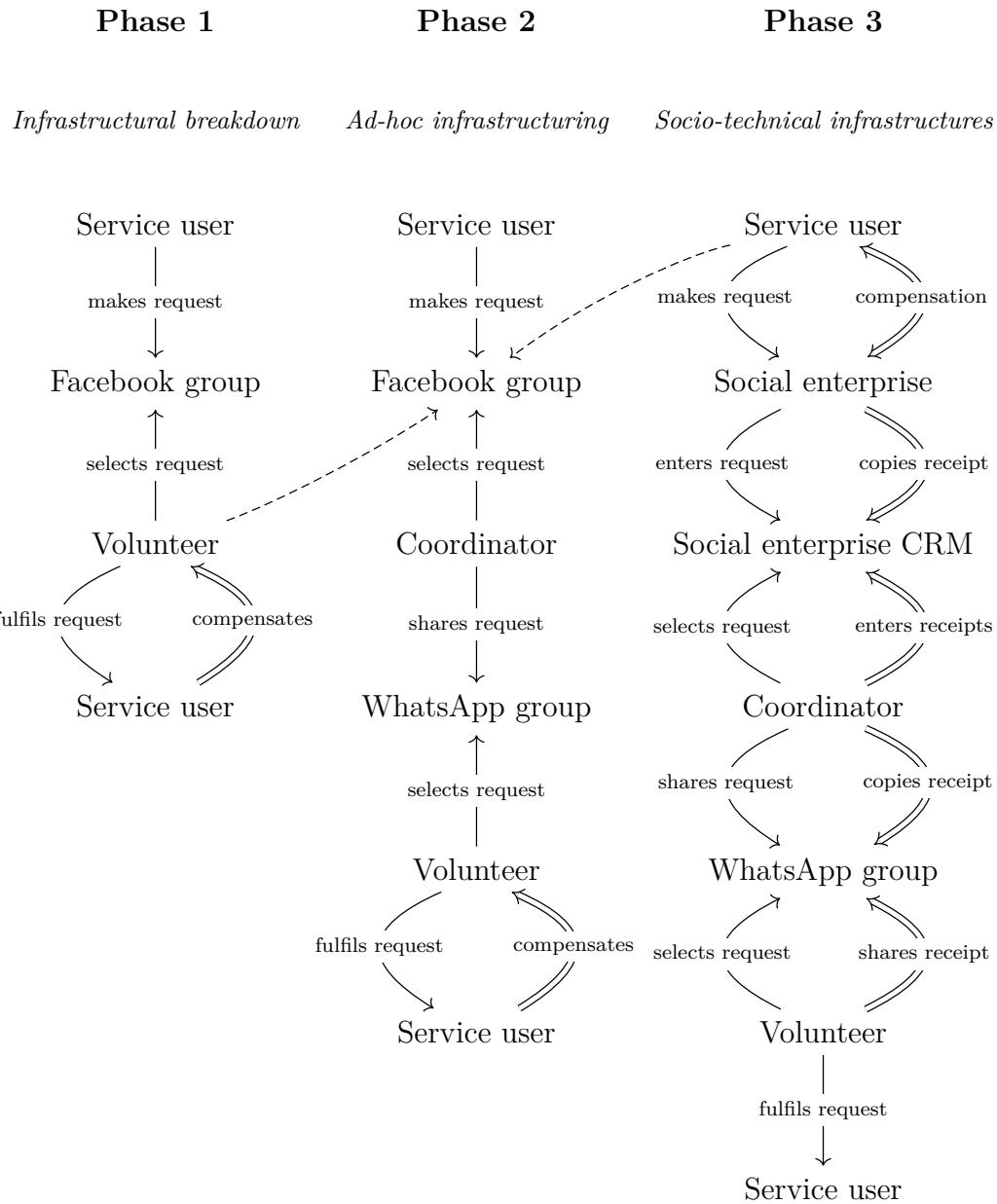
Figure 5.1: Increasing complexity of the mutual aid network

In the first phase of mutual aid in the neighbourhood, a mutual aid group is set up as a Facebook group. This happens in mid-March before the first national lockdown in late March 2020, at a time when the UK government is advising voluntary social distancing, in particular for vulnerable populations. At this point, several other countries have already implemented lockdown policies, and the UK is reporting its first cases, hospitalisations, and deaths from COVID-19. In mid-March, the local council reports a first positive test in the city but reassures the public that the risk is low at the time. In this first phase, the configuration of actors and their movement through the mutual aid infrastructure is straightforward. Volunteers join the Facebook group and monitor it for requests. A

resident ("service user") makes a request for aid in the Facebook group. A volunteer selects that request from the Facebook group. When the volunteer fulfils the request, the service user compensates the volunteer directly. Requests include different forms of aid, such as grocery shopping or the delivery of prescription medication - this remains constant throughout the three phases.

In the second phase in late March 2020, the fully informal system is adapted to the influx of volunteers and service users, extending the network by setting up a sign-up procedure for volunteers, and a group chat to coordinate requests. A Google form is set up for new volunteers, available on the Facebook group.[10] After filling out that form, volunteers are added to a WhatsApp group, which is then used to coordinate requests from service users. A service user makes a request for aid in the Facebook group. A coordinator (among them several members of the collaborative) selects that request from the Facebook group and shares that request with volunteers in the WhatsApp group. A volunteer selects that request from the WhatsApp group. As in the first phase, when the volunteer fulfils the request, the service user compensates the volunteer directly. At times, volunteers still follow the first phase process, and select requests to fulfil directly from the Facebook group.

In the third phase in April 2020, the system is fully formalised as a socio-technical infrastructure. In this phase, the Facebook group is no longer central to requests for aid, although it remains available. Service users may still make requests there, as they did in the first and second phase. Now, a service user makes a request for aid to the ageing social enterprise, via phone or online form. At the social enterprise, this request is entered into their CRM system,[11] where a mutual aid coordinator selects a request to share in the WhatsApp group. As in the second phase, a volunteer selects that request from the WhatsApp group. When the volunteer fulfils that request, they are no longer compensated directly by the service user, as in the first and second phase. Instead, the volunteer shares the relevant receipt in the WhatsApp group. That receipt is copied by the coordinator who enters it into the CRM system. The social enterprise copies that receipt, and requests and receives compensation from the service user. The social enterprise also reimburses the volunteer.

Thus, the complexity of the mutual aid system increased as the system was scaled to coordinate a larger network of requests, service users and volunteers. For the service users, however, it remained a fairly simple process throughout the three phases. In the first two stages, they interacted with the Facebook group to make a request, and the volunteer who fulfilled it. For the service user, the third stage is only marginally more complex. Instead of the Facebook group, they make their request to the ageing social enterprise. They

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[10]This form is no longer available online publicly. Another form was used for the second major national lockdown in the autumn of 2020, which is likely similar to the first form. This form was still available to view at the time of writing and asks volunteers for contact information.

[11]Customer Relationship Management (CRM) is a process by which an organisation deals with customer interactions. It is often a software that is capable of managing a large number of interactions across a number of communication channels such as phone, social media, or e-mail.

still interact with the volunteer who fulfils their request, but payment is handled through the ageing social enterprise. To handle this payment, complexity increased to a degree for the volunteers and coordinators, in passing a receipt for the request on to the social enterprise. To a degree, however, the third phase reduced complexity, as it introduced a system for coordinating incoming requests and related payments, which coordinators saw as a necessity, as the formal system made the number of requests manageable and traceable.

Infrastructural breakdown, inversion, and allies

Having mapped out (and in the process simplified) the three stages of mutual aid in the neighbourhood, it is now possible to analyse the changing composition of this material public in more detail. To reiterate, the focus is on how the configuration of actors shapes the shared issues, as that configuration changes through the phases. Related to infrastructural breakdown is infrastructural inversion, the mundane processes that enable infrastructures to function, the subtle, often invisible mechanisms that make connections between actors possible, before intervention by researchers and/or designers. In particular, the focus is on the work that (human and non-human) actors do to maintain functioning networks, as infrastructural allies - much of this section is based on interviews with collaborative members doing just that.

In the first stage the configuration of actors was straightforward, although it needs to expanded to include those absent: the UK government, and the local council. At this early stage of the pandemic, they qualify as actors through their inactions, as this prompts other actors to respond and form mutual aid groups - actors are "materially entangled beings [...], implicated in public affairs by material means (Marres, 2012, p. 11)." At this stage, we differentiate between mutual aid recipients, volunteers, and coordinators, coming together in public-facing Facebook groups and private chats in messenger apps. The issue that the human actors share at this stage is not clearly defined - which is in this case the issue. The issue is not unknown, but *the* unknown:

> "[W]e had an amazing response from the public, who would be able to take advantage of that, thanking us for doing that and, being aware when there was very mixed messages coming from the government about what they could do, and what they couldn't do. And you know, that was way before anybody was wearing masks or, there were any sort of restrictions - only that you couldn't go out. But that was the basis, you have to stay in your house, you know, especially if you're vulnerable and there was an awful lot of fear among people about, you know, the vulnerabilities of not only themselves, but of their families and, you know, who's going to look after their mother who lived 30 miles away. So there was all sorts of things and we just responded to that in the way that, in the best way that we could, by just being there and doing responding and helping and doings with things to people."

To paraphrase, vulnerable service users at this stage do not know exactly who to turn to for help, as national and local policies have not been put into place and communicated to the public yet. A multitude of new issues becomes apparent first through a lack of restrictions, then through strict restrictions. The first direct government support to vulnerable people begins on 29 March 2020 and scales up in following weeks (Ministry of Housing, Communities & Local Government and Jenrick, 2020). This support is only extended to those identified as clinically extremely vulnerable. Furthermore, the COVID-19 virus is largely an unknown factor at this stage, regarding transmission risk and mortality. As noted before, two weeks before the national lockdown, the local council stated the risk from the virus to the general public was low. Volunteers and coordinators of mutual aid deal with that same uncertainty, but with the initial absence of government response driving and validating their actions, as the first stage of mutual aid is set up before any lockdown policies.

During this time of uncertainty, several collaborative members respond to an initial call for organisers on that Facebook group in mid-March 2020. The brief at this stage is broad and flexible, with a focus "reinforcing our community bonds and communication routes" and defining mutual aid "as we grow and our circumstances/government policy change". In this statement they (implicitly, without using the language of publics) acknowledge that the configuration of actors changes what mutual aid is. At this stage, the goals include helping vulnerable people access food and medication, as well as provide errands, repairs, child care, legal aid, and translation help (Facebook, March 15th).

A Facebook Messenger group chat is set up and used to coordinate a call for volunteers. A few days before the first national lockdown, these first 38 volunteers distribute leaflets throughout the area. The response to these leaflets is positive. On the neighbourhood mutual aid Facebook group, residents share their support. Many people who are self-isolating voice their approval, while others sign up to volunteer. According to one of the coordinators, they immediately begin receiving phone calls from people asking for support. This is the "amazing response from the public" (see quote above) felt by of the mutual aid coordinators, for providing support to people at a time when "there was very mixed messages from the government." The mutual aid group thus responds to the threat of the pandemic before government actors do. As they put in relation to local government:

> "[T]here was the council who came to the party very late. [...] I think the first lockdown was over by the time they set up [their resources], so you know all those people would have starved."

Relating this to definitions of mutual aid, there is an emphasis on survival work, in the reference to starvation. In their group description, it is clear that they describe to a narrow definition of mutual aid on their Facebook "About" page, focused on short-term survival work, but not longer-term social change, which could be understood as "political":

> "We will be looking to help people access food, complete errands (shopping,

dog walks, gas and electricity top ups and more). We are particularly conscious of those who are elderly, disabled and/or immunocompromised. This is not a political group, only posts related to organising support or local updates will be permitted."

This focus on survival work does change to a degree throughout the phases, as the new actors such as the council and the social enterprise are added to the network. As in other case studies, the council later acknowledges mutual aid groups in different forms. They promote the mutual groups in their COVID-19 resources and collaborate with them through the ageing social enterprise.

Still, in the slower government response an initially somewhat adversarial relationship with government and local council can be identified, but only in the sense that mutual aid coordinators responded faster than the council - they are not opposed to working with the council but were able to coordinate a faster response. Later, this relationship becomes complementary, after the collaboration with the ageing social enterprise is established. To a degree, we can identify here an issue that cuts across themes, with the council seen as bureaucratic and somewhat slow, in contrast to community- or collaborative-led efforts, which are seen as unbureaucratic and swift, thus providing the basis for an antagonistic frontier based on the pace at which local government responds to issues:

"Right, [mutual aid] was very, very quick, very responsive. It was, you know, within hours if the announcement, we were getting phone calls from people.[...] - We didn't find the need to really have people CRB-cleared[12] or anything like that, we didn't. We didn't need to sit underneath the barriers of any sort of bureaucracy, because of the way things were done, you know."

The second phase is largely an extension of the first phase. To deal with the scale of both demand for services and supply of volunteers, a number of layers are added, with coordinators mediating between them. This phase only continues for a few weeks, before the collaboration with the ageing social enterprise (and by extension the local council) is announced. As shown before, requests coming in via phone or Facebook group are now added to Google spreadsheets for tracking, and then distributed to WhatsApp groups for volunteers. This represents a scaling of the initial response to infrastructural breakdown. This is *design-after-design*, in which a number of technological tools are appropriated into mutual aid use, with humans mediating between them. Facebook group and phone number provide the public-facing interface, Google Sheets is used as a database for tracking requests, and WhatsApp for coordinating requests - members of WhatsApp groups were added using a Google Form shared via the Facebook group. Thus, the second stage introduced a number of technological actors to help manage human actors and

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[12]This is reference to a DBS check (formerly known as CRB), which is a criminal record check that is required for some jobs with vulnerable people. Under ordinary circumstances, a job similar to the ones done by mutual aid volunteers would likely require such a check.

stabilise associations between them. This continued in the third phase, but now with more significant shifts to the issue, which in this second stage is still survival work. Furthermore, technological actors stabilised associations between volunteers, coordinators, and service users to a point where the same networks were later easily utilised by the collaborative. Here, infrastructural allies take a stronger role to coordinate mutual aid efforts, which includes several members of the collaborative.

Infrastructural allies are actors whose (often invisible) activities support an infrastructure (Simonsen, Karasti and Hertzum, 2020, p. 123). This relates to infrastructural inversion, an inversion in focus from the activities supported by an infrastructure to the activities enabling an infrastructure. In this case, I am tracing how infrastructural allies enable the expansion of the mutual aid network, how their activities enable the appropriation of technological infrastructures for the expansion of mutual aid activities. The specific activities supported by that infrastructure are of lesser concern here, as these could not be supported without the work done by infrastructural allies. This work can be characterised as infrastructuring, but it is possible to go back to the ANT roots of that concept in PD, the information infrastructures approach of Bowker and Star. I return to this later, as it relates mostly to the third phase. In short, particularly that phase involves classification work, as mutual aid tasks are rendered compatible with the CRM system of the ageing social enterprise. One of the infrastructural allies is a community worker who was employed directly by the collaborative shortly before the pandemic. During the pandemic, their job is extended to coordinating mutual aid in the neighbourhood:

> "I came in my job like two weeks before the pandemic. It was already going to be a bit of a - it was the job already was a bit of a kind of "you know just get stuck in and it is what you make of it" kind of job. But then obviously the pandemic came along, and that just was kind of more so. I think and there wasn't really time to make a plan for what we were doing so I got quite involved with the mutual aid groups and doing sort of some of the background support for the volunteers so that was like quite interesting. It all like changed so fast and just keeping up with it, and nobody really knew who was in charge, and it was all kind of - "Is it going to be really informal is it going to be a bit more formalised?" But I ended up like coordinating a team of volunteers, who coordinated the requests coming in, for shopping and like medical prescription pickups. And then they would send those jobs out to the team of volunteers who are doing the driving and the drops and the pickups and stuff. So that was quite a mega sort of part of what I was doing."

In the third phase, a formal collaboration is announced, between three initially simultaneous but separate pandemic responses. On March 23rd, the beginning of the first national lockdown, the ageing social enterprise opens up their services to everyone, whereas they previously had an age restriction.[13] Through their support phone number,

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[13]This is based on a blog post interviewing the CEO of the ageing social enterprise. The reference is

they offer food and prescription delivery. This is shared by a mutual aid coordinator in late March, before government support for vulnerable people is announced. A week later, another mutual aid collaborator announces the formal collaboration. This is an extension of the second phase, as the mutual aid group plans to use their second phase volunteer database (in short, a Google Sheet based on Google Forms filled out by volunteers) to fulfil request coming from the ageing social enterprise and allocate them based on their local knowledge. At this stage, they also announce discussions with the council on potential collaboration. Contrary to perceptions, the council appears to have acted fairly swiftly. By March 31st (a week into the first national lockdown), they have identified a large number of vulnerable people. Another week later, they have split the city into several areas, in which they support people with emergency needs. The mutual aid group, too, has now coordinated with the council. Non-emergency requests are asked to go through the ageing social enterprise, while emergency needs are now directed towards the council. The expansion of the network changes the shared issue: survival work in the strictest sense is delegated to the council, once a system was set up for that. This shifts the relationship of mutual aid to the council from adversarial to complementary, as responsibilities have been distributed among the concerned actors, by splitting between emergency and non-emergency support.

To commence this collaboration, mutual aid coordinators are offered training in the CRM system of the ageing social enterprise. Across the city, 18 mutual aid coordinators are trained in the use of the system, and volunteer lists are transferred into it. Over 1000 volunteers are added at this stage.[14] This was not a straightforward process, as the system was not designed for the task, and training was done remotely.

> "And so we went through their CRM system and learned how to use their CRM system remotely, with difficulty. Very, very complicated! Learned how to use their CRM system to find people who needed support, to get shopping lists of people and they set up the payment methods for doing that, you know."

> "God I can't remember it's like a blur. I think it was quite buggy. And, obviously, it was trying to take something that hadn't been designed for that and make it like fit for purpose for the actual situation."

Whereas previously infrastructural allies facilitated the mutual aid response through the appropriation of freely available and accessible tools, now they are confronted with a more complex tool. While the CRM was designed to handle specific customer requests, there were initially issues with the scale and diversity of the mutual aid requests:

> "But when the shopping trips and stuff got a bit more formalised it was done by [ageing social enterprise] and [...] they already had an online system

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withheld to maintain anonymity.

[14]This is based on a blog post interviewing the CEO of the ageing social enterprise. The reference is withheld to maintain anonymity.

for somewhere like older people could ring in and ask somebody to like pick them up a prescription or some shopping or like request to a welfare call. [...][O]bviously that system hadn't been built to handle you know hundreds of requests like, you know. But in the end, [...] they took that system, upgraded it, and made it work for the current situation."

Infrastructural allies are called upon to keep the system working, as they adapt to the classification infrastructure of the CRM. Indeed, the ageing social enterprise maintains that mutual aid coordinators make autonomous decisions, further emphasising the importance of infrastructural allies.[15] There is some strife within the mutual aid group when moving to the third phase, as new actors become attached to the issue. With survival work delegated to the council, the issue of what mutual aid is (or should be) surfaces:

"Yeah there was [...] like a vocal minority who wanted to keep it like informal, like so you can just message on WhatsApp, so you can just message the mutual aid Facebook page saying"Can somebody do this for me?". And then somebody else picks that up on Facebook. Like the volume of requests was pretty big. So I kind of feel like that would have become kind of unworkable, with the amount of posts that would have been, but also really like way more open to people taking advantage, because through the [ageing social enterprise] system, there was a record of every request made and there was a record of every volunteer who picked up that request."

Despite this conflict, the mutual aid coordinator argues that the ageing social enterprise system made the number of requests manageable and traceable, which became a necessity due to the exponential growth of the mutual aid network in the first months of the pandemic. Indeed, the development of the collaboration echoes many of the recommendations made by Knearem et al. for the design of mutual aid platforms. Their scenario-based work starts from mutual aid organised via Facebook group and Google forms, and ends with a number of recommendations, including features for request standardisation (Knearem *et al.*, 2021, p. 42). From an HCI perspective, this is what the third phase of mutual aid provides. The use of the CRM system allows channelling requests through a template that contains relevant information and makes visible the status of requests. Knearem et al. also recommend some social features, such as user profiles and mechanisms for dialogue. These are to a degree removed in the third phase, when moving from informal requests through the Facebook group to standardised requests via the channels of the social enterprise. One mutual aid coordinator feels that this leads to a disconnect between the local community and the mutual aid volunteers:

"I think having that like sort of couple of degrees of separation between whoever took the call and took the order for the shopping or the prescription

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[15]This is based on a blog post interviewing the CEO of the ageing social enterprise. The reference is withheld to maintain anonymity.

would be a different person to somebody like myself who would assign the
task to yet another person who would actually do the shopping and drop it
off. So maybe for the people who are accessing the service they don't have
that sort of connection that they've got in touch with somebody and that per-
son has done the job for them. But yeah I mean yeah. Amazing the [ageing
social enterprise] managed to put it together and make it happen, and I don't
think there's that many places in the country where something like that was
set up."

As mutual aid traditionally is counter-hegemonic, it is worth asking here if the specific
configuration of complementary non-emergency aid channelled through the CRM of an es-
tablished social enterprise curbed the counter-hegemonic element, as the focus on request
standardisation over social features limited the affordances for articulating a more critical
public. To a degree, this is a speculative question, as the limited resources were used for
aid, not debate. Other mutual aid groups, however, maintained a counter-hegemonic ele-
ment by channelling their finances through initiatives such as Accountable, which allowed
the groups to continue independently without association with traditional third sector
organisations (Prendeville *et al.*, 2022, p. 475:16).

Still, the coordinator points out that the system was a rare example of collaboration
between councils, charities, and mutual aid groups. In the first three months, over 1800
volunteers signed up, over 5800 food shops and over 1800 prescriptions were delivered.
Extending the scope of mutual aid survival work (and to a degree eroding the differen-
tiation between emergency and non-emergency work introduced with the collaboration),
a large number of welfare calls were made, including some suicide interventions. While
this work (particularly by infrastructural allies) can be characterised as infrastructuring,
for analysis and summary it is helpful here to go back to ANT roots of that concept as
applied in PD, the information infrastructures approach of Bowker and Star. They anal-
yse classification systems, which they define as "a set of boxes (metaphorical or literal)
into which things can be put to then do some kind of work (Bowker and Star, 1999, p.
10)." In the first phase, there is no classification system, as there are ad-hoc requests and
responses on Facebook. In the second phase, coordinators file and share requests through
a shared spreadsheet. In the third phase, the work of infrastructural allies is most visible:
they transfer their database of volunteers to the social enterprise system and learn to
use a CRM system created for responding to the requests of a specific group for a much
broader range of requests - which in the process must be classified. Now, the work is
organised to include an accounting scheme, with a greater emphasis on keeping records
such as receipts for fulfilled requests. Payments from service users and to volunteers are
processed through the infrastructure as well. The socio-technical infrastructure of mutual
aid is also a classification infrastructure (Bowker and Star, 1999, p. 230). Where previ-
ously coordination was decentralised through private WhatsApp groups, as the result of
classification the ageing social enterprise can provide clear numbers for the different cat-

egories of requests. The scale of mutual aid only becomes visible through classifying and tracking it, while accounting introduces a degree of control over the processes of mutual aid.

After the first national lockdown ended, in the summer of 2020, the mutual aid group expanded the scope of issues that they were aiming to address, now including social activities, youth engagement, land use and social isolation.[16] This shows the link between mutual aid and publics as articulated by Irani and Silberman: the social links fostered through the mutual aid infrastructure allow for the articulation of issue-oriented publics. Citing Haraway, they point towards the importance of common cause and partial connections over shared identity (Irani and Silberman, 2013, p. 619). This applies well to mutual aid during the pandemic as this somewhat *floating* iteration of mutual aid does not focus on the shared identity of an antagonistic, counter-hegemonic project, but on large-scale delivery of aid to an open group of service users, by a large (and thus likely heterogenous) group of volunteers. What partially connected them was the infrastructure of mutual aid, but with the immediate threat of the pandemic easing and most survival work delegated to the council, the mutual aid group now focuses on the second historical constant of mutual aid: social change. Contradicting Kropotkin, this became possible once a complementary, non-adversarial relationship to those in power was established. Particularly social isolation relates to the shared issues identified and addressed by the collaborative outside of mutual aid, showing the close associations between the projects. I return to these shared issues in a later section. As one of the coordinators notes:

> "I think that [...] network did overlap with most of the [collaborative] organisations in some way, but how they were kind of interacting with it might have been different from, you know, we were in... I suppose officially, like, my [collaborative] role didn't officially include being like a mutual aid coordinator."

In the autumn of 2020, the network is scaled up again when a regional (and later national) lockdown looms after a rise in COVID-19 cases in the area. The coordinators contact existing volunteers and recruit new ones through the Facebook group. With end of the furlough scheme and other work-related restrictions, volunteer availability is lower compared to the first lockdown. Still, the network continues to provide a fairly stable infrastructure for volunteering in the neighbourhood, with the collaborative using the volunteer WhatsApp groups to get help with a number of projects into at least Spring 2022 (when the below interview quote was collected):

> "Yeah and you know we still use that mechanism to communicate for particularly the volunteer drivers who take food and meals and things around for us."

> "And, you know, we recruited number of people into some of our activities at the time and they just stuck."

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[16]These issues were articulated in a meeting of the mutual aid group, to which the minutes were public.

Mutual aid thus provided the collaborative with a fairly stable socio-technical infrastructure for coordinating volunteering. Both human and non-human actors were key here, as highlighted in the mediating role of infrastructural allies. Looking ahead to the following themes, it is useful here to highlight the role of the *addressing system*, affording the network effects on different platforms (Evans, 2020). A network effect is a term from economics that refers to the relationship between the value of a network to a user with the number of users. Put simply, the more users there are in a network, the more valuable a network is to its users. To a degree, this is translated to the value of a product - a social media network with a larger and/or growing user base is likely valued higher that one with a smaller and/or declining user base. In this case, coordinators use their contact list with the phone numbers of volunteers for WhatsApp group chats. They utilise the addressing system of the telephone network as appropriated by WhatsApp, to create and maintain fairly stable networks of volunteers that are individually identifiable and addressable through their phone numbers. In simple terms, membership in a WhatsApp group chat is ongoing, unless a user leaves or is removed by an administrator.

During the pandemic, video conferencing apps such as Zoom were highly relevant for the work of the collaborative (as they were for many other forms of work), and the mutual aid group purchased and used an account as well. As Evans (2020) points out, one of the innovations of Zoom is that it relinquishes networks effects. Its addressing system is based on unique URLs combined with a set meeting time (and later, an optional password). Typically, users use their own calendar applications as the aggregating layer, for storing the URL and time. Thus, any coordination of users must be done outside of Zoom as well, and any network assembled is temporary, limited to a specific point in time. It is the network itself that is identifiable and addressable, and not its users (as would be the case for a WhatsApp group). Thus, another address system is required, as none is provided by the platform - this requires specific practices. In the next section I discuss the role of Zoom as a material practice in the work of the collaborative during the pandemic.

5.3.2 *What Zoom is lacking: affective attachments and investments*

For mutual aid, the key technological shifts was the use of a CRM for logging requests that were distributed on WhatsApp by infrastructural allies. They did, however, also use video calls, and received funding for a Zoom account. Zoom and other video conferencing applications were important to the work of many collaborative member organisations during the pandemic. This may represent the key shift in technology use during this period for the collaborative. This is perhaps unsurprising, as working from home was either mandatory or recommended throughout much of the pandemic. For all interviewees, it was the first time that video conferencing was a meaningful part of their working life, as most work by the collaborative and its members is done in-person under normal circumstances. Thus, when asked about the digital tools they started using during the pandemic, Zoom was most often the answer. As one interviewee put it:

"I've never used Zoom in my life before! [...] I guess, we had to adapt and respond really quickly [...]."

As with mutual aid, this adaptation of technologies is a response to infrastructural breakdown - although the use of Zoom for video calls for collaborative work and customer meetings is, of course, well within the intended use cases of Zoom. Most interviewees highlight the use of Zoom for internal communication. It was often incorporated into new work routines, such as regular daily or weekly meetings with staff. As Le Dantec however notes, the context of community-based projects is complex, with more heterogenous dynamics in comparison to a workplace with a specialised workforce. Thus, the notion of shared issue provides a focal point of understanding the context and practices of a community (Le Dantec, 2016, p. 35) - this the framing of a publics-based approach. To reiterate, the focus in the case study is on what publics themself do to create and maintain the socio-technical infrastructures for articulating and addressing shared issues, and how that, in turn, shapes issues. These shared issues are the focus of the following sections, in their material and discursive representations. Here, this added complexity impacts how Zoom is used, and what it is suitable or unsuitable for in the context of a community-based project.

In qualitative terms, it is possible to differentiate between two types of Zoom use, which will structure this theme. One, the use of Zoom within the collaborative, for communication between member organisations, and two, the use of Zoom in the work with service users. In both cases, I will discuss the affordances of Zoom, as well as the affective dimension of Zoom use. These two elements are related: I find that participants associate Zoom with a certain lack, in its impossibility to replicate in-person interactions. From the perspective of publics in HCI, this has consequences, as the collaboratives does use Zoom as a socio-technical infrastructure to articulate shared issues, but the infrastructure lacks the affordances to form or maintain the affective attachments necessary for collective action. Within the collaborative, the affective gap of Zoom is more pronounced than for work with service users. Zoom is compared to in-person meetings and found lacking in affective attachments, but also in the affective investment necessary for a shared purpose. When working with service users, organisations implemented other material practices, often in response to Zoom lacking the affordances required for the provision of digital stand-ins for the in-person services usually provided by member organisations. These practices are the focus of the next theme. At the same time, participants also note positive impacts of Zoom, such as increased efficiency in scheduling and how it allowed organisations to keep working during the pandemic.

In HCI, there has been work on video calls and video conferencing, either focusing on technical elements, social elements, or a combination thereof. Most relevant here is work on the social elements. Technically-focused work is looking at how Skype (the first proprietary eponym for video conferencing, before Zoom) deals with bandwidth variations (De Cicco, Mascolo and Palmisano, 2008), or identifies traffic (Perényi and Molnár, 2007).

There is some combined work that focuses on technology use to alter social settings, such as eye gaze correction for video conferencing (Jerald and Daily, 2002; Vertegaal *et al.*, 2003). Recent work on this starts from the hypothesis that video communication is less engaging than face-to-face communication, as technical limitations such as lack of eye contact decrease feedback between participants (Hsu *et al.*, 2019), requiring a correction of the eye gaze direction (Kjeldskov *et al.*, 2014), for example through a bespoke system that uses cameras embedded in the screen (Kobayashi *et al.*, 2017). In my case study, the focus is on a case of *infrastructural breakdown*, where users work with what they have available, and adjust for any shortcomings (eye gaze direction or otherwise) through their own practices, as they "had to adapt and respond really quickly." Thus, the social elements is most relevant.

In the combined work above, communicative issues highlighted in some of the early work on video calls can be identified, in the attempts to overcome the asymmetries of technical limitations. Focusing on the social elements, early work (Heath and Luff, 1991, p. 102) on video communication for collaborative work highlights how video calls transforms non-verbal and verbal communication and introduces communicative asymmetries. As the participant in a video call only sees head and shoulders of the other participant,[17] non-verbal communication does not enter the field of vision, but thus must be adapted to the video frame. This points towards an asymmetry unique to video calls, as people still respond to the conduct of participants visible on screen (including themselves):

> "Thus in articulating a range of actions and activities speakers remain sensitive to the visual conduct of the recipient and yet the performative impact of their nonverbal behaviour becomes problematic. Participants are aware of each other's presence and appearance but insensitive to aspects of the visual conduct of the other (Heath and Luff, 1991, p. 102)."

In other words, participants know something is *lacking*. Other early work (Dourish and Bly, 1992, p. 541) attempts to move from active video calls to passive video, a "porthole" that fosters an awareness of what is happening in the workplace, fostering connection between workers, as "members of the group gather for meetings, check their mail, collect coffee, etc." Following up on these, Gaver et al. (1993, p. 338) argue that multiple cameras are necessary for workplace collaboration, in order to deal with the limitation of the single camera framing a talking head. They find that participants rarely chose to use the talking head view for collaborative tasks, choosing an instead camera focused on objects relevant to the tasks.[18] Recent work continues to address this through video calls that expand the field of vision for a broader range of experiences that can be shared

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[17]Thus, the main difference between Xerox in 1991 and Zoom in 2023 appears to be the potential number of heads visible to a participant.

[18]In 2023, Apple caught up with 1993 Xerox, introducing a feature that allowed alternative camera angles in video calls, using an iPhone as a supplementary camera that captures the desk just below the camera, and in front of the talking head. The promotional material is object-oriented as well, showing for example sketching or assembly on a workbench as the supplementary angle.

from outside the home (Inkpen *et al.*, 2013, p. 1339). Inkpen et al. (2013, p. 1330) find that this is key to the lack articulated in relation to Zoom use by the collaborative, and also echoes findings of early work on video calls in the workplace. Other recent work outside the home looks at the potential of video call interactions between dispatchers and firefighters (Neustaedter, McGee and Dash, 2019), or video calls as a way of providing remote human assistance to people with visual impairments (Ravindran *et al.*, 2019). During a pandemic, work on video calls within the home is perhaps more relevant. Kirk et al. (2010, p. 143) look at use of video conferencing in the home, identifying several of the issues that collaborative members highlight in their work with service users. They ask where video calls are placed in the "moral order of the home", highlighting the potential erosion of intimate boundaries in the domestic space. Still, they find that video calls are suitable medium for personal and intimate communication in a domestic setting.

A study on subjective user experience of video conferencing draws relevant conclusions for work practices involving video conferencing, as it notes that "that group-level mutual affect and implicit beliefs on one's ability (e.g., whether intelligence is fixed or malleable) are strong predictors of system usability and acceptability judgments (Yamauchi *et al.*, 2012, p. 187)." Here, college students were split into two groups and asked to solve two problems together using a video conferencing system. The study found that a positive mutual affect leads to greater product acceptance of the system, while mutual affect is reinforced by collectively addressing a problem. From this, one can conclude that the system itself is secondary if there is mutual affect between participants, which is increased in the process of solving a problem together. Affect, of course, is an important element of publics. Many interviewees discuss the use of Zoom as compared to in-person interactions, and what it is *lacking* on an affective scale; in how participants feel that working together on Zoom lacks certain, partially intangible qualities of working together in-person. Thus, this is one of the focal points of this section. As highlighted above, the address system of Zoom employs URLs, not contacts, thus requiring social practices to achieve networks effects. These practices are the other focal point of this section. Marres (2012, p. 61) refers to "material artefacts that embody particular empirical and experimental methods of engagement" as *methodological instruments* for participation. Building on her focus on everyday material practices, I view Zoom (and the non-Zoom artefacts of the following section) as such an artefact. As in many other fields, Zoom became an everyday part of the work of collaborative members, and as such contributed to how participation in the collaborative and the services of its member organisations unfolded. Zoom's (intentional) omission of network effects points towards the need to perform that participation. As Marres notes, the focus should not just on materiality, but on how participation is materialised (Marres, 2012, p. 65). In the case of the collaborative, I will highlight these practices of participation, before discussing what is *not* materialised, what is lacking.

To do so, I will briefly summarise here from the theoretical framework the relationship

of different publics with affect. As argued there, both HCI and DT diverge from ANT publics in their focus of affect. In HCI, Le Dantec argues for the importance of affective attachments between members of a public, as this enables collective action on shared issues. While this is grounded in empirical findings related to social work (with similarities to some of the collaborative member organisations), this is a broadly Deleuzian-Spinozean reading of affect, in that affect is framed as an intensity that shapes one's capability to act. In the language of publics, as actors come together they may form affective attachments that help them address an issue together. In DT, affect is a pre-discursive investment in a signifier, defined through lack and (lack of) enjoyment. These help quilt together a loose association of rejected demands, and thus in practical terms again contribute to actors addressing issues together. There is "family resemblance" between these vocabularies of affect, in the presence or absence of joy/enjoyment and I will trace here how (and if) they apply to the case study a hand. While there is an affective component to *Dingpolitik* in ANT, I highlighted Stäheli's work on infrastructures as affective technologies, a changing directive from following the actors to following the movement through infrastructures. From this perspective the focus is not on the stabilising effects of infrastructure, but the structures and protocols that make repeated movements through an infrastructure possible - say, an addressing system. Here, temporary collectives can form based on shared affective experience - what, then, if that experience is lacking?

The affordances of Zoom for the collaborative

The collaborative purchased a Zoom membership after running workshops early in the pandemic with my support. As this was an attempt to transfer previously planned in-person workshops to a remote format with limited planning time, Zoom was chosen simply due to being available at the time. Other alternatives were not considered, as my university provided Zoom premium accounts with unlimited call time, and the screen sharing feature.[19] For both my research and the work of the collaborative, there was a sense of urgency, for reconfiguring the work and research to social distancing and lockdown, for which the was no definitive end in sight during the early stages of the pandemic. After that, however, Zoom became a part of the everyday practices of the collaborative, including daily staff meetings and a monthly meeting of the collaborative. This format was maintained throughout the pandemic, with a return to in-person meetings in the spring of 2022. Thus, Zoom was an important part of the collaborative's work for just over two years. To a point, Zoom here is an eponymous stand-in for several similar video conferencing applications. As one collaborative member (and mutual aid coordinator) puts it:

> "Then I was using Google Meets because there were people who couldn't access
> Teams and couldn't access the Zoom, and so we use Google Meet, so I had four

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[19]At the time, Zoom limited call time and blocked the screen sharing feature for free users hosting a meeting.

> different ways of having video calls, well five because I had WhatsApp, I had
> Facebook Messenger, I had FaceTime, I had Zoom, I had Meets, I had Teams
> [laughing]. They were coming at you with all sorts of different questions and
> ideas. [...] They all do the same thing, and it was just about you know,"Where
> would you like to meet?" 'Which platform do you want to meet on, I'll be
> there!' "

Thus, much if this discussion would apply to other video call applications (as listed in the quote above) as well, as the affordances are similar.

Interviewees highlight several practices supported positively by Zoom. In a broadest sense, Zoom allowed organisations to continue working, to adapt to infrastructural breakdown, and maintain a degree of collaboration and information sharing:

> "It helped us to keep going in the most awkward situations when where we
> wouldn't have, you know, and I think that that was the biggest benefit with
> it, it allowed organisations to continue. And to continue their business, you
> know, and I think that some organisations that didn't do that really, really
> suffered."

Interviewees point out that Zoom increased efficiency, as they did not have to account for travel time between meetings:

> "Look I'm really efficient here, I can have like three meetings back to back,
> in an hour, in my morning and like get this, this, this, and this done face-
> to-face, well not is not face-to-face but. [...] So for me, it's definitely upped
> the efficiency a lot and it's also that I'd say attendance of meetings is higher
> because everyone can just do it from wherever."

The removal of travel time was also useful to member organisations working with their service users. Outside the neighbourhood, a creative arts organisation ran a large scale art programme with health workers in rural areas from minority backgrounds. This programme could not have been delivered in-person due to the large distances. Within the city, an organisation that supports carers found that Zoom allowed them to reach more carers with their support, as was easier to schedule remote meetings flexibly when carers did not have to travel. Before the pandemic, they also ran "carer cafes" in different parts of the city on different days, which in some areas only had limited uptake. On Zoom, this geographical limitation was not an issue. The organisation welcomed the comparably larger Zoom online sessions that introduced several new regular participants. Zoom here also enabled them to work together with other member organisations of the collaborative, in order to offer to carers "essentially new groups, new things to do, and keep everything fresh." This was done to tackle the shared issue of social isolation, here among carers, and Zoom enabled them to offer a much wider range of topics for their groups. This is also the

case for a singing group initially funded and supported by the collaborative that moved their meetings to Zoom. Not having to account for travel, Zoom allowed them to schedule more flexibly, for example if a participant was running late. For a local church, Zoom enabled the regular participants of an evening prayer to join in easily without having to travel. In line with social distancing regulations for social gatherings, the Sunday service was in-person (or hybrid), while the coffee after was on Zoom. However, the interviewee felt that there was a mixed response to this:

> "And I felt that in our church there was a mixed - I think there's mixed response. People liked it at first, but as soon as they could get back to church they didn't join."

While these organisations were able to provide their services to a larger number of users, other struggled with the removal of practical travel distances to their spaces. For a mental health organisation, this was an issue as their work was funded for a specific area (including the neighbourhood), which on Zoom could not be demarcated as precisely:

> "We want to tie it to the local and the physical, and yet the digital is, kinda, could be anyone from anywhere."

They struggled with the influx of new service users as they moved to Zoom, creating an imbalance between in-person and online service delivery:

> "We don't really deliver an awful lot digital. We did early on in the pandemic to mixed results. It's not our forte. [...] And it's quite hard as well to - yeah we did almost double in size, because we switched people to delivering online from in person work to delivering online we cannot maintain that level of online delivery doing in-person work. Our heart lies in the in-person work."

This compounded their preference for in-person work, which has an affective dimension discussed below.

The monthly collaborative meeting is used to share news and updates from member organisations. As this was an important element of the collaborative for both sharing information and developing projects, interviewees frequently reference this meeting in relation to Zoom. An interviewee from the collaborative describe them as informal, but also notes that the Zoom meetings tend to be quite passive, with few open discussions. Another interviewee from the collaborative argues that the meetings are more formal in comparison to in-person meetings, "just a little less natural than we're used to." Similar points are made by most interviewees, and this will be analysed as an affective lack below. For now, the focus on the affordances of Zoom, which is entangled with that affective lack where it relates to the social norms of communication on Zoom.

For example, what collaborative members find lacking are the informal interactions and chats of a face-to-face meeting, before the meeting begins or after it ends, instead focusing mostly on the business at hand:

> "I think there was always a sort of feeling of like we had to keep to the business, so the small talk so it seemed to disappear be you know, apart from a few jokes about you know"I'm sure you've got your pyjamas on." There was sort of little in-jokes like that and the time that we would normally spend just checking in with each other, how are you doing, you know, what's going on, and you know, is your family okay, you know how are you coping, is there anything you need. That was sort of perfunctory and we would just keep to the main thrust of the conversation, so I think there was less time for that more social and important information really, because we felt as if we restricted in terms of our time, we could only have meetings for an hour, you know, even something like that, so had to keep to the business. Yeah so, so I think that was the big thing that I missed. Plus just like just the sharing and, you know, who's making the tea, you know, who brought the biscuits, you know what I mean."

From this lack of informal interactions follows a passivity in larger meetings, with participants only contributing when prompted to:

> "Definitely, and I think particularly larger meetings can be a little difficult. And I suppose that they're probably a little more formal. At a face-to-face meeting people have a chat with a coffee before the thing starts and I just think there's a little more - there's more of a natural connection and natural interaction and probably just feels a bit more formal. People tend to just, you know, give their update and that's it and then, you know, there's a round-up and we all leave the meeting and when it's when it's via Zoom or Teams, or some other digital...your facilitator of that. Just a little less natural than we're used to, I think."

Above Zoom is often characterised as a "less natural" form of communication, while some even find it awkward:

> "Yeah, even if you say, would you just stay on the call afterwards it's like a bit awkward because, you know, everybody can hear, but whoever is hosting it has stay on as well, or whatever."

Another participants observes that nuanced body language is not transmitted:

> "The little nuances of like, the odd wink even, just to say I'm listening to you, I'm hearing you, I'm feeling what you're saying."

This lack of body language transmission is an issue for a muliticultural arts organisation. An interviewee here discussed group sessions run on Zoom with their service users. Due to body language not being transmitted through Zoom, they struggle to respond to challenging situations in group sessions, as they are unable to recognise the situation quickly enough. Their organisation prepared guidance to support staff in responding to individual crisis in a group setting:

"Yeah I think what's wrong with Zoom, it's quite transactional, do you know what I mean? [...][E]ven within a creative arts project, you know, there's so many other conversations that kind of happen when it's live, and you know it's a bit more tactile and you can respond quickly, the body language is that the other. [...] [P]eople are less inclined to, I guess, divulge, you know, other things on Zoom. And if they do that, [what] you're sort of scared of is if you can react to that very quickly enough, you know what I mean, because if someone is going through some sort of trauma at the time as well, [...] how do you get to that person?"

Thus, observations by participants resonate with the findings of early work on the social elements of video calls, despite technological advances of the medium in the three decades since. One aspect unchanged is the talking heads, although now there is potentially more than just one talking head on the screen. Heath's (1991, p. 102) finding of communicative asymmetries still applies, as one participant notes that non-verbal communication through body language is not transmitted, obscuring "aspects of the visual conduct of the other." The participant recounts a joke, "I'm sure you've got your pyjamas on", that indicates that they are aware that some things outside of the video frame are not visible to them. For the creative arts organisation, this becomes an issue when they are not able to respond quickly enough to challenging situations. Resonating with the concept of "portholes" (Dourish and Bly, 1992, p. 541), where passive video streams were used to foster awareness of small everyday activities, participants miss things like a cup of coffee before a meeting, or a one-to-one conversation after, outside of the active meeting time, which they find constraining. The later assertion made by Inkpen et al. (2013, p. 1330) that traditional video conferencing systems do not support natural social interactions beyond face-to-face conversation appears to be apt for the Zoom use of the collaborative as well.

While most interviewees highlight the differences between Zoom meetings and in-person meetings, an organisation working with carers finds that Zoom group sessions were similar to in-person meetings, but its affordances made possible different forms of informal interactions, through sharing a link (or a screen) to a YouTube video, for example. The adjustments this organisation made are an example of infrastructuring as the result of infrastructural breakdown, as services first moved to Zoom out of necessity, then adapted to the affordances, and were later incorporated into routine work such as support plans made for individual carers. However, one of the main issues is highlighted, in that Zoom does not allow for several conversations at a time. This is where the affordances of Zoom clash with social norms. In this case, this was mitigated through preparing topics for a meeting in advance. The affordances of Zoom thus directly structure how interaction unfolds:

"[...][O]bviously you can't really have multiple conversations going on at one time, but as long, we got around that by implementing essentially talking

points and topics where some things a bit more of a show and tell kind of
thing or something along those lines. So that is something that is a little
different them from doing it in person, but for the most part, no, everyone is
very casual."

Thus, HCI attempts to address this awkwardness through technology are understandable. If abstracting to a technical issue, what matters here is the live processing of voice and video that prioritises a single speaker at a time - individual conversations are not practical while remaining in the same "room". For the purposes of this case study, it is not relevant whether this could or should be done differently,[20] but what this affordance does to the materialisation of participation on Zoom. As such, I draw now from the somewhat limited informations infrastructure and ANT literature on video conferencing.

If the affordances of Zoom prioritise a single speaker at a time and this shapes how interactions on Zoom unfold, then the Zoom algorithm for processing and prioritising speech could be defined an actor, also contributing to the affective lack discussed below. I define this algorithm, as well as the small front-facing camera (and microphone) ubiquitous to current phones, tablets, and laptops, as an actor, because other actors align their practices to it as a form of design-after-design. Other actors also highlight where Zoom could not be aligned with their social practices, as certain desired social interactions were not possible within the affordances of Zoom. In 2003, Aanestad (2003) analysed the role of video conferencing cameras as design-after-design in telemedicine. Cameras, microphones and speakers were installed in a surgical operating theatre, allowing surgeries to be broadcast to different professional audiences. In 2003, this infrastructure for videoconferencing was significantly more complex to set up and use than it would be using today's everyday devices, and the work of hospital staff in a surgical theatre of course differs from the diverse work of the collaborative and its member organisations. Aanestad employs a compatible analytical language in an information infrastructures approach drawing form ANT, and thus the differences arising from work place setting and technological configuration may be illustrative. A key difference are the demands of the technology itself. Setting up the system in the surgical theatre significantly shifted work practices of the nurses, while logging into a Zoom meeting was generally possible and straightforward on the work devices of the collaborative and its members. For the hospital, video conferencing did not shape the focus of the work itself, as it did not change significantly how surgery itself was performed. For the collaborative, Zoom made work possible where it otherwise would not have been possible due to pandemic restrictions. Based on the surgeons' verbal cues, a technician select the appropriate video image from several cameras. Zoom automates this selection and becomes an actor in the process, as its choice of speaker and associated

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[20]Perhaps the concept of telepresence here that would be relevant for a normative or speculative discussion. For example, there is applied work on telepresence as it was before the ubiquity of small front-facing cameras (see Rae *et al.*, 2015). Due to this ubiquity, the more speculative work on telepresence and holograms (Pates, 2019) would perhaps be more relevant, as it speculates on a different speech situation that does more than extend telephony to multi-party video calls.

video stream shapes how discussions unfold, one speaker at a time. This is a less open form of video conferencing, with the role of human actors in the alignment of the system diminished. Contrary to the hospital, infrastructural allies such as nurses, surgeons and technicians are not required for Zoom. Set up and use of the system are automated, but rigid. Human actors thus align with the closed system of Zoom, while the open system in the hospital aligned with its users through a number of incremental changes to the system. In the affordances of Zoom, there is far less scope for design-after-design, while it is a key element in the hospital. In the hospital, there is a stronger emphasis on infrastructural inversion, as far more activity is required to enable a video call infrastructure. On Zoom, a degree of work is required due to the addressing system, but interviewees focus more on what activities this video call infrastructure supports or does not support. Still, infrastructural inversion, as the subtle mechanisms that make connections between actors possible (Simonsen, Karasti and Hertzum, 2020, p. 123), remains relevant, even if the work required to make connections between actors possible is less involved. With an infrastructure fairly firmly in place, it is possible to focus on how that infrastructure facilitates connections - which in many instances has an affective dimension, as discussed in the next section.

Following Le Dantec, Zoom could be read as obstacle to the formation of publics, as it lacks the affordances for the formation of attachments between actors. Furthermore, if there is a lack of affective affordance, this would also have implications for a DT reading of publics, as affective investments into a shared issue are a key element here. Is this the case, then, for the collaborative, and its use of Zoom during the pandemic? And if so, how? This is the focus of the following section.

The affective lack of Zoom

As discussed in the theoretical framework and noted above, theories of publics distinguish between two forms of affect that a share family resemblance: the more positive, joyous affective attachment in HCI, and the more negative, lacking affective investment as lack in DT. Drawing from both approaches thus allows for a discussion of different types of affect, relevant in different ways for the formation of publics. The family resemblance becomes visible in in this case study, as it appears that participants articulate a lack - as in DT - but that lack is specifically about the challenges of forming attachments through the fairly rigid infrastructure of Zoom. As noted before, there is communicative asymmetry in the framing of the single-speaker video stream, and human actors align themselves with Zoom, as there is limited scope for design-after-design. It is possible to highlight the role of affect as a driver for collaboration both within and between member organisations, which echoes the notion of affective attachments in publics, as defined by Le Dantec (2016, p. 62). The (perceived) impossibility of forming such attachments echoes the notion of lack as affective investment, as this also relates to the challenge of articulating a shared purpose.

There are three elements to this. One, a participant highlights the joy of working together in the collaborative, highlighting the role of positive affective attachments. Two, participants highlight affective investments in their everyday work, showing that the affective gap of Zoom goes beyond the affordances of the single-speaker video stream. This second element picks up on the lack of "portholes" identified in the previous section. Three, participants highlight the value of a shared purpose, which can be read as affective investment, as the shared purpose is not defined. On Zoom, realising that shared purpose is challenging as it is lacking in affective, everyday, informal interactions.

First, affective attachments between actors help them address an issue together. Drawing on Marres, they are defined by Le Dantec (2016, p. 62) as commitments and dependencies on between actors. The role of such positive affective attachments is legible when a participant highlight the joy of working together in the collaborative in general terms, and not in the specific context of Zoom:

> "And it's kind of how we've always done things. It makes life a lot easier if you're sharing resources, skills, sharing risk as well. But also on a day-to-day working level it's nice just to see other people with ideas, rather than working in your own bubble. What we found over the years is that if you just give out, then you get back. Hardly revolutionary, but it, you know, if you're nice to other people they end up being nice back to you, and this is, isn't that a pleasant way of doing business?"

Second, affective investments in everyday work. This picks up on the preceding section, where I noted the communicative asymmetry of Zoom, in that instance focused on the affordances of Zoom. Now, it goes beyond that, in dealing with the expectations that participants have of their everyday work interactions, and the lost potential for forming affective attachments. To structure, I move from things that may be possible within the video calls, such as nuanced body language, to what is not, such as actual physical presence and the interactions enabled by that. This is relevant is participants articulate their issues with Zoom through what it is *lacking* in comparison to in-person interactions. As such, the concept of affective lack and enjoyment become relevant. As noted before, Zoom lacks affordances for nuanced body language, which were discussed above for a creative arts organisation struggling to intervene in challenging situations with service users, but also as a more general issue in collaborative meetings. This communicative asymmetry also has affective consequences, as an interviewee finds themselves unable to articulate non-verbal, feeling responses:

> "The little nuances of like, the odd wink even, just to say I'm listening to you, I'm hearing you, I'm feeling what you're saying."

This participant views community as a tangible, physical thing, connected to small, everyday interactions and objects that cannot be reproduced on Zoom (but perhaps could with "portholes"):

> "Plus just the sharing and, you know, who's making the tea, you know, who brought the biscuits, you know what I mean. That whole thing about just being a community in the physical sense."

In noting that community is a physical thing, they highlight a perceived impossibility of forming a community on Zoom, as it is not the real thing:

> "So yeah it worked, it wasn't - It will never replace the real thing, right, I think I think there is nothing like meeting somebody in person yeah and. But it's less - there is less room for misunderstanding, I think on the video call and what there is in an email or even in a text message."

In this reference towards the *real*, there is unintentional cue towards affect theory, in the Lacanian sense. The *real* is "the alienating limit of construction and signification", which is also expressed in in notion of an enjoyment that is not fully representable through meaning (for more detail see Stavrakakis, 2007, p. 71). The above quotes can be read from this perspective through Laclau's work, in his use of the notion of enjoyment. Here, the drive towards a "mythical fullness" relates to the force of an affective investment in a signifier, which is an object that makes concrete that unattainable fullness (Laclau, 2005, p. 116). In this instance, the "mythical fullness" refers to a community that is unattainable, as it is tangible and physical. Regarding communication, feeling what other parties are saying through body language is not seen as possible. In that sense, the notion of communicative asymmetry resonates with affect as well, as it expresses the impossibility of a full range of non-verbal and verbal communication on a video call, while still being aware that that communication may or may not be taking place, and that communication may or may be adapted to the video call.

Above, physical presence was highlighted, but another interviewee includes physical contact as well. Zoom is adapted in the everyday work of a member organisation working with young people, where it is used for daily morning meetings, as the work often required fast responses to crisis situations with service users. The daily meeting also has significance beyond the allocation of work tasks, as it also provides workers with a chance for mutual support. The interviewee highlights the feeling of togetherness that the meetings provide, which they see as beneficial to staff at a time when social contacts were limited by lockdown. However, they also highlight what Zoom does not provide: close in-person contact. This one of several examples where interviewees highlight what Zoom is lacking in comparison to in-person interactions, but here going beyond the limitations of the single-speaker video stream:

> "It was the only way, I mean the staff team really valued it. I think we all did because it was that first thing in the morning,"oh my God this happened last night, you know, on the news, how we can address this?" And it was very, very all together, it was just we felt like supported through that time.

We hated it because we are very face-to-face kind of organisation, you know, very hug-ey. And, and it was just yeah it was awful for us, because we all do things personally and stuff. So was it just where we were also supporting each other as women and mothers, you know for our staff with children was incredibly difficult and they were furloughed. And it felt like they didn't want to be furloughed at times because they needed that contact. But then also home educated children, so it was really difficult for them. And I think that morning meeting set everybody's day. So once we finished it, it was time to then go and crack on with the rest of the day, but I think one of the nice thing is, is that it was all - we were all together. And that was nice because staff were in and out, so some workers didn't see each other or whatever, so it was really good. [...] But we couldn't wait to get back to face-to-face."

Thus, participants highlight how Zoom does not allow them certain everyday interactions with others that they see as important, if informal, parts of their work. Put simply, they compare Zoom with in-person interactions, and find it lacking. They miss previously discussed social cues such as body language and established meeting routines such as a cup of tea or an informal conversation outside of the meeting agenda - aspects that were pointed out by early research on workplace video conferencing. Here I add to this the affective challenge that communicative asymmetry introduces, a hurdle to forming affective attachments with others. In sense, this is a rephrasing of the awareness and connection that early projects such as "portholes" aimed to establish through the lens of publics. As noted before, Stavrakakis defines the fantasmatic logic of affect as drive or desire towards "recapturing our lost/ impossible enjoyment (Stavrakakis, 2007, p. 196)." Here, it is the experience of enjoyment that is lost in the process, with a desire for closure in the future: "But we couldn't wait to get back to face-to-face."

Anderson (2006, p. 734) notes that while affect is as understood as something that cannot be fully grasped, it involves a drive towards a form closure in the future. I argued before that this a common ground between the notions of affective investments in DT and affective attachments in HCI. An example of this common ground is articulated by an interviewee from a larger local mental health charity. They understand of affective attachments as in-person connection in their work, which they were unable to transfer to Zoom. For them, the shift to service delivery through Zoom represented a major shift in the way they work. In practical terms, they observed digital exclusion and fatigue from their service users, while the organisation itself was not large enough to deal with an early pandemic influx of digital service users. They struggled to translate their service to a digital format, which they describe in affective terms, as they are "very keen on [...] the story and in-person connection" and their "heart lies in the in-person work." This, too, can be read through the notion of enjoyment, although what is "irretrievably lost through socialisation" (Laclau, 2005, p. 116) here is not only physical presence, but a way of working that depends on affective attachments. This an example of a common ground

for affect in HCI and DT publics in practice, in a fantasmatic logic that is specifically about (a lack of) affective attachments.

Third, participants highlight the value of a shared purpose in the work of the collaborative. As this shared purpose is not defined, it may act as an empty signifier representing a number of shared issues - a function it can only fulfil if an affective investment is made. As noted before, such an affective investment is characterised by drive towards an impossible closure. Now, we can place it within a discursive sequence, as participants not only discuss what Zoom is lacking in inter-personal affective attachments, but what it lacks in relation to a shared *thing*. This thing is a shared vision or purpose that the collaborative shares, as highlighted by an interviewee from a local church:

> "[...][W]e have similar interest in people, a similar remit, you know, in sup-
> porting one another to do that. [...] So we've had a working relationship and,
> you know, a good working relationship, I would say, and, you know, we're sort
> of, we have a similar vision, we are looking for the same things to happen."

A vision points towards the future. As such, it relates to fantasmatic logic of affect, in which the point of discursive closure is located in the future. What is missing here are specific aspirations attached to this place, its future, and what is threatening that future. As Gunder and Hillier (2016, p. 56) point out, in "achieving the good, healthy city, our symbolic system needs anchoring." If we can (partially) identify a fantasmatic logic of affect, what about the discursive elements that follow? Is there, for instance, anything articulated that stands in the way of discursive closure? Is there a chain of equivalential demands represented by an empty signifier? A full reading of shared issues from this perspective follows in a later theme. Here, the emphasis is on the articulation on Zoom, due to its use as the main shared collaborative mode during the pandemic.

One interviewee discusses a shared purpose from this angle, first in general terms, and then related to Zoom:

> "I think this sort of came up the other day and people saying like if you've
> got you know - I can't remember what group or what discussion I was in - but
> people were saying if you've got like a shared purpose, then that's it, that sort
> of drives that collaboration. And so I think if you've got like a particular kind
> of shared purpose which, it could be something specific to your organisation
> and another organisation, you both want to achieve this thing. But also, if
> you've just, if you've just got that shared purpose, if you want, like the best
> for the people who you're working with that's like, that's, I feel like that's
> the best foundation because then you won't get drawn into these like conflicts
> and these, you know, sort of territorialism and stuff like that. If you just
> genuinely want the best for the people you work with and enjoy seeing them
> grow and benefit then that's kind of, that's the best foundation. And luckily,
> most people want that, most people who are in the charity sector want that
> and that's, I guess why why people are drawn to this kind of role."

Here, they define the shared purpose as wanting the best for the local people they work with, which, in turn, helps prevent conflicts between member organisations. Relevant for a reading through affect, the interviewee highlights that there is drive towards that shared purpose, as "you both want to achieve this thing." This resonates with affect as the experience of enjoyment of the process, here of working towards that shared purpose. But is there affect related to identification? I have discussed (and will continue to in the following sections) examples of individual member organisations that operate in different fields, with different organisational structures. Thus, it is likely that understandings of what the *thing* is differ to a degree, due to the heterogeneity within the collaborative - especially when extending it a wider network that encompasses service users and their concerns. Thus, the function of that shared purpose is to *quilt* together that diverse group. Related to identification, there is a reference to territorialism, which, no matter the concrete definition, is defined by an antagonistic frontier, a distinction between *us* and *them*. In this instance, the Other remains undefined, while the collective identifies itself through a shared purpose. A further chain of shared demands or issues is not articulated here.[21] Thus, what remains is the force of the affective investment in the shared purpose, which in this case is more procedural, the active process of working together.

Zoom, however, is the limiting factor of that force, returning the argument to what was both articulated through the communicative asymmetries of Zoom in the previous section, and the related experience of a fantasmatic logic that is specifically about the impossibility of desired affective attachments:

> "I think what you what you miss out on that sort of - what you miss out on that helps kind of cement that shared purpose is the social interactions and one-to-one like on the start and finish of meetings. So the little bits like the little catch-ups before it begins when you just getting a cup of tea and then afterwards when you're catching somebody to get their contact details or whatever. So I think we, I think we missed those and going back to an in person meeting today, I definitely you know felt like that was that was there in a way that like you just don't get that on a Zoom call."

The interviewee makes the above statement in April 2022, just as in-person meetings are returning. Thus, making the comparison to recent experience is understandable. Once again, they highlight that mundane, informal interactions are missing from Zoom. Here, they connect to what that means for working together towards a shared purpose, which highlights the importance of affective investments into a collective project, to "cement that shared purpose." Thus, there is a stabilising effect implied here which is precisely the function of an affective investment in a discursive sequence. As Laclau (2005, p. 169) puts it, "the primary role of affect [is] cementing this articulation." In this instance, the force of potential affective attachments, and thus affective investments, was reduced to a degree.

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[21]In a following theme interviewees do articulate such antagonistic frontiers, but without reference to Zoom.

Indeed, Le Dantec (2016, p. 61), too, uses the same concrete metaphor, in that "affective interactions [...] set the stage for cultivating shared values that cement those attachments." This resonates with the challenges of articulating a shared purpose on Zoom as lacks the desired affective affordances. Thus, this reading also provides a further argument for the importance of affective attachments in the formation of publics, as interviewees articulate different forms of (in-person) attachments as the thing that they were missing during the pandemic, while using Zoom in their work.

Practical issues in work with service users

Apart from the affective lack, there were activities unsupported by Zoom, specific to a service user group. This led to organisations moving away from Zoom to other practices, which is the next theme discussed. This also relates to digital exclusion, which in itself is not an issue unique to Zoom, but compounds with issues that are. The collaborative and some member organisations provided devices such as smartphone and tablets to service users who needed them. The collaborative also purchased data packages for some service users and referred people to member organisations that did so as well. Specifically, the collaborative bought tablets for young people who participated in their in-person youth work sessions, as they were concerned to lose contact with them. They found that without these devices, young people would struggle to access education. They reflect this from as a form of digital exclusion:

> "And so, like the difficulty of people like not having like their own device or not having a device where they could access online learning, think that was like that sort of came up like regularly as a difficulty, so I guess like that's sort of like tech disconnect or tech poverty kind of thing, it's not just about being able to access kind of like video calling. I guess there's that sort of whole thing of being able to access learning as well."

At the same time, they also note that digital exclusion is not just about socio-economic markers, but a complex qualitative relationship with mobile computing:

> "[...][I]t's dangerous to think that kind of everybody living in deprivation is in this like digital underclass because I don't think that's the case, so I think a lot of people have a smartphone and have been able to access Zoom and have accessed Zoom. So, and I wouldn't say it's like oh"you can just say that you go below like this level of income and then you're in the digital underclass." It doesn't seem to work like that it seems to be like more bitty, like who struggles with it and it's maybe about kind of - it's about their it's about their access, so there's definitely issues there with like access to data, access to devices, but I think it's also about their relationship with technology as well. So it's a bit of a bit of a bit of a mishmash, to be honest."

They connect both access to mobile devices and access to mobile data to users' relationship with mobile computing. Member organisation shared several relevant examples of this, where issues of access compounded with issues of Zoom use in practice.

A multi-cultural creative arts organisation migrated different art sessions to Zoom. The interviewee notes that particularly their older service users often did not have the devices or the data needed to access Zoom. Thus, they provided these where necessary. Users also did not have previous experience with video calls. Finally, the sessions were multi-lingual. They had been able to navigate this in face-to-face sessions, but on Zoom this was an issue, despite providing translated materials. These issues compounded to a loss of confidence among participants:

> "Lots of the communities that we work with, you know, digital exclusions are a huge thing within those communities. So, again, I go back to the fact that, you know, we work with lots of communities and individuals who speak multiple languages within one room. That's great, you know, that presents its own challenges when you're doing that within face-to-face, we can work through it. I think what happened over the pandemic is that we tried doing it digitally and it just proved really difficult because if you got multiple languages, you can't have an interpreter for each language, because that, you know, you would just end up interpreting for the whole of the session that way. Also people felt, you know that confidence going, because when they were coming online as well, and they weren't able to communicate as well as they could have, you know, it was difficult. And then there was this other groups as well you know, with older people and people who basically couldn't afford devices, they didn't know how to use devices, you know. They couldn't have, you know, didn't have enough money for the data, you know what I mean. [...] There's a lot of people that you know, we were able to also provide iPads, you know, reconditioned iPads with as well."

To address these issues, the organisation then created WhatsApp groups for their projects, which enabled asynchronous communication during or after Zoom session, as well as informal interactions initiated by participants. This will be discussed in the following theme. A mental health organisation that transferred their services to Zoom also observed digital exclusion, with prior in-person service users not switching to Zoom. They also observed fatigue among service users on Zoom. As they found that their sessions did not work as well online, they reverted to in-person services:

> "[W]e had to shift loads of stuff to Zoom et cetera. And once we navigated that, but the uptake from the people we've been serving wasn't great. Lots of digital exclusion, et cetera, and also lots of people just got fatigued from doing digital sessions. Some of the content doesn't translate all that well to delivery online. Once we were able to revert back to in person stuff then we've kind of switched mainly back [...]."

The mental health organisation also notes the most people access their website on mobile phones, and that "people have limited data and we need to be very mindful of that." This data was required not only because people did not internet access at home. In some instances, they did have access, but were not able to use it due to privacy concerns. An organisation working with young people was concerned about losing contact to their service users. Realising that their users relied on public Wi-Fi for private conversations, they distributed data packages and mobile phones to their service users, before moving on to socially distanced in-person activities:

> "And then it was also about not everyone had access to data. What we realised at that point a lot of our young people actually have no data on their phones and go to McDonald's or hang around shopping areas, so they can use data. And so we dished out a lot of data packages, we got donated a lot of mobile phones, so we keep in touch with the young person themselves. So that was the main thing I think, lack of privacy. And so those conversations and some people just felt they weren't coping well. So and then they didn't want to come on to Zoom so being able to telephone them and having that visual of them each week helped us. And then we started doing, as things relaxed, we take them on a walk outside around the community. So that was our main thing with Zoom I think because it was slightly, I think, because we're very issue-based project, you know, some people joined in the craft sessions and stuff but. If we said anything you know where people were talking about - and the other thing was for Zoom as well, was: So I'm talking to you there could have been somebody in the background, listening to me saying how sad I was and you know, then look around and visually see me and things like that. I think that was our biggest thing."

Thus, video conferencing also led to privacy issues, as several organisations were able to *zoom* into peoples' homes and lifeworlds. This was acknowledged by the collaborative as well:

> "What was, really interesting, and this is slightly outside of the question, but what was really interesting was the fact that the youth workers particularly, were effectively inside young people's homes."

In practical terms, several organisations found that their service users did not have sufficient privacy at home as other people in that home were able to listen in on conversations. This led to issues with confidentiality for at times vulnerable service users.[22] This resonates with what Kirk et al. (2010, p. 143) called the "moral order of the home". Their work focused on a family setting, and the affordances of video calls for fostering

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[22]Interviewees did not share detailed examples regarding vulnerable users, nor were they asked to.

closeness in that setting. The moral order refers the differences of video call in the domestic setting compared to the more public setting in the workplace. A video call into the domestic setting may erode the boundaries of the home, and thus should be treated with sensitivity by designers. In the context of social work during the pandemic, this sensitivity is heightened further, as the service user (and likely the service provider) are required to be at home. Member organisations were confronted with intimate views into domestic settings that they otherwise would not have had, and unique challenges arising from this unintended "porthole", the video and sound on the edges, into the lifeworlds of their service users. Concerns that were usually discussed outside of the domestic space now had to be discussed within that space, eroding not only the privacy of the home, but the privacy required for the work with service users. This prompted the development of alternative material practices discussed in the following theme. For instance, one organisation working with young people switched to socially distanced in-person efforts such as care packages, discussed in the following theme. They also provided their service users with mobile phones and data packages, so that they could participate outside of their homes, as their service users initially wanted to use Zoom.

To summarise, transferring services to Zoom allowed easier access to services - for most, this was a positive. Showing the complexity of community-based work, the use of Zoom however also destabilised the moral order of the home, as that offered an unintentional porthole into the lifeworlds of service users. Digital exclusion became an issue despite access to data and devices, as Zoom was not suitable for services, leading to fatigue and confidence losses for users. These issues led to a transition to other digital and non-digital practices which are the focus of the following theme.

Regarding work within the collaborative and its member organisations, it is perhaps surprising to find that in the transfer of a fairly stable workplace network participants note the lack of something akin to portholes, in the sense intended by Dourish and Bly (1992, p. 541): participants miss the connections fostered by mundane, informal activities that happen at the periphery of more formal work meetings. This, I argue above, can be read through the notion of affective attachments, as articulated for publics in HCI. Despite the increased efficiency, participants felt that Zoom did not help stabilise the network of the collaborative:

> "Yeah I think it has increased efficiency in that way, but it's maybe like we need to remember that we need all those like social links and interactions to feel like we're really part of the network."

5.3.3 Material practices

In this section, I discuss practices that emerged as either alternatives or supplements to Zoom, which, as shown in the previous section, is *lacking* in certain aspects. This highlighted by the different participatory instruments in the alternative digital practices.

WhatsApp was used by some member organisations to deal issues arising from the affordances of Zoom. WhatsApp enabled asynchronous communication, different address system. Also asynchronous, podcasting and radio addressed the shared issue of social isolation. This common thread extends to the following non-digital practices as well, which can also be read as are material expressions of the shared issue of social isolation. To summarise findings, I discuss both digital and non-digital material practices in this theme. Some of these, such as the use of WhatsApp for creative projects or the delivery of care packages by an organisation working with young people respond to issues when using Zoom. The delivery of care packages was a way to address privacy concerns when zooming into the homes of vulnerable service users. WhatsApp was used to as an asynchronous supplement to groups run on Zoom by a multi-cultural arts organisation, allow participants to initiate more informal interactions and form connections. A singing group used WhatsApp instead of Zoom for mostly practical reasons, as participants preferred the address system of WhatsApp and the use of mobile phones instead of computers. In both instances, they highlight the social aspect of their sessions, particularly at a time when loneliness was an issue. Podcasts and community radio also responded to that issue, not only addressing it in content, but through the production process. Finally, care packages by a church were also aimed at this issue, while receiving funding from the collaborative. In the care packages of a carer organisation, collaboration is materialised, as the contents were designed together with other member organisations. Thus, objects make legible links between member organisation and make tangible specific or shared issues to service users.

As Le Dantec (2016, p. 35) notes, in the heterogenous and complex dynamics of a community context, issues provide a useful focal point for understanding the context and practices of a community. In this section, the material dimension of shared issues is discussed. In the following section, this is extended by a complementary discursive dimension. In the theoretical framework, I also noted the a priori ontological differentiation of the digital and the material (equated to the physical) in HCI, a narrow focus on making the digital material, by expressing it through tangible, physical materials and objects. Instead, Dourish (2017, pp. 34–38) suggests a focus on the already existing materiality of the digital, by drawing from ANT and its focus on the agency of material objects - an agency acquired through their interactions in a network of humans and non-humans. Here, he also highlights that digital objects can be the material objects of *Dingpolitik*, representing matters of concern. This theme picks up on this, by treating both digital and non-digital practices as material, and analysing through the prism of publics, by aiming to understand what concerns they represent in a network of humans and non-humans.

Digital practices - WhatsApp

I previously discussed the use of WhatsApp in mutual aid, as the main channel for coordinating requests. Contrary to some examples above, access to the necessary devices was not an issue here. The group (mentioned here due to its overlap with the collaborative) re-

ceived funding for devices. They used it to buy tablets for some coordinators, so that they could access the ageing social enterprise CRM and distribute tasks to volunteers. With the exception the CRM, mutual aid used phone-based modes of communication such as WhatsApp groups, and "[volunteers] were managing on their phones and they were managing on what equipment they had really." This use of a phone-based alternative to Zoom[23] is indicative of some of the issues addressed by a switch from Zoom to WhatsApp. In addition, WhatsApp enables asynchronous communication via text and multi-media content and provides a different address system. Here, WhatsApp will be discussed as the key shift in digital practices in addition to and instead of Zoom, in particular related to creative activities. In this section I discuss examples of digital (still material) practise that attempt to close the affectice gaps of Zoom through supplementary or alternative practices. For the multicultural arts organisation, multi-lingual service delivery on Zoom was the issue. This was overcome through using WhatsApp as an asynchronous supplement, that enabled multi-lingual, multi-media communication before, after and during sessions. For a singing group, the address system of Zoom was the issue, overcome with the increased ease-of-use of a mobile-first app. In both instances the social aspect of the session is highlighted, which is about being together while participating in creative activities. This has an affective quality but also points towards the shared issue of social isolation, more clearly pronounced in the following non-digital and digital practices.

As mentioned earlier, a multi-cultural arts organisation supplemented Zoom with WhatsApp, as they saw the impact of Zoom on the confidence of their multi-lingual group participants. While they did provide translated materials for service users so that they could participate on Zoom, they found the use of WhatsApp, in conjunction with Zoom, helpful. This shift from synchronous to asynchronous communication, allowed participants to initiate more informal interactions:

> "Yeah so we ran this project or so - we've got an arts, health and well-being project called [...] and we also run this project called [...] was about sort of hope, kindness, and home, it was on people's interpretation of that during that time. And we run various online sessions via Zoom, but what we tried doing, that said, because we tried sending translated material out some members of our community groups so that they could easily access the sessions. So those practical things about accessing the sessions, but there was also I guess more creative and structural things in terms of what we were doing before that. Then what happened is that we would create groups for WhatsApp groups for each of the groups that were participating in a certain project. So that might be up to 13 or 15. Say, for instance we've got a group of feel good women's group which is about that. And usually what they do, they meet in person to create art projects, chat, talk, you know, and sort of, you know,

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[23]Zoom of course does work on a smartphone, but appears to be more commonly associated with its desktop application.

about a social interaction, especially those groups that are most isolated, you
know what I mean. So that had just suddenly gone for them, so WhatsApp
groups enable them to talk to each other within, during that time, but also
to share creative work that was created during the session. But then what
happened is that we found that they will then start to share like, you know,
what they were cooking that day or whatever it was. So it became a kind of
a support network for themselves and we saw that happening across multiple
projects in different ways, so we were working with a young - so we've got
a music project with young people as well. And we did that with them and
again the same sort of thing happened there where they would record some
of their music or make some beats and they share it on the WhatsApp group.
But also then talk about what they've been up to that day [unintelligible],
but it was a way of them keeping connected at that time when basically no
one was allowed out really. I think it was really important especially during
the winter. It was, I think, that was for some, the only bit of connection that
they had outside of their own family or with wherever they were within that
space."

Thus, a significant shift in practices occurred for this organisation, from "connecting
participants, to artists [...] in live spaces", to attempting service delivery on Zoom, and
then establishing WhatsApp groups as an asynchronous supplement that helped with the
delivery of multi-lingual creative arts groups. This resonates with "portholes" (Dourish
and Bly, 1992), an early attempt to adapt video calls to fostering awareness and connec-
tions in the work place through video of everyday workplace activities. While this was
a passive system for awareness, WhatsApp could be described as an active system with
a light touch, as participants do have to actively photograph and share their activities
through WhatsApp. As participants chose to do so without prompts from the organisa-
tion, a connection has been formed. In addition, this format pre-empted questions on the
"moral order" of the home (Kirk, Sellen and Cao, 2010) to a degree, as participants had
more control over the boundaries of their domestic space, being able to frame and review
a photo or video before sharing it on WhatsApp with the group.

A local choir is another example of WhatsApp use for a creative project, where Zoom
was not suitable for the group of participants. This choir is a member organisation of the
collaborative. It received funding and a space for its activities through the collaborative.
In relation to the previous analysis on the affective lack in Zoom, it is worth noting that
the choir is about *being together*:

"Well, we had at one time a membership of about 20, which was great and like
I say it wasn't about technical singing, it wasn't about becoming a choir, it
was about doing. And that worked very well and people came and went a bit,
as happens to everybody. It began to evolve into as much a social occasion as
it is an opportunity to sing and share your story and conversation."

This peak membership of 20 declined during the pandemic, as sessions were transferred to first Zoom and then WhatsApp. Here, too, privacy was an issue - some could not participate in singing from home. For others, however, participating from home allowed them to be more flexible as they did not account for travel time - this, too, has been noted in the context of Zoom use. Initially, the organiser of the choir planned to use Zoom to continue sessions during the pandemic. They envisioned participants using computers, which allow more people visible on the screen at the same time. Some participants were, however "frightened of technology and they were frightened to get it wrong", despite support from the organiser. As the choir already had a WhatsApp group, they started using this for the sessions, once they realised that video calls were an option. The use of mobile devices resonates with issues of access, many choir participants did not have computers capable of running Zoom, but they did have a smartphone capable of running WhatsApp.[24] While the video stream of WhatsApp was sufficient, audio latency was an issue. Due to this latency, audio signal was transmitted with a slight delay - an unavoidable issue for the digital processing and transmission of sound (but a non-issue for, say, a radio). Thus, the organiser asked participants to mute their microphones as they sang along with them, which "robbed people of the social aspect, [but] it kept them in touch with the musical aspect." This, of course, would have been an issue on Zoom as well. WhatsApp was chosen due to access to hardware and ease of use - particularly of the address system:

> "Yes, I think that was part of it, and I think, because with the, with WhatsApp, I was just able to do a multi-way call and all they had to do was answer the call. It just seemed a lot easier yeah. You can call within calls if somebody drops out, you can just drop the list and bring them back in. Whereas if they drop out on Zoom it's up to them to return to the call."

This could again be considered from the perspective of the address system. A Zoom link is agreed for a specific time, and interaction with other participants is only possible in a time frame for which there is an active link. Without this link there is not address system to connect them; it is the only thing that can connect participants. WhatsApp[25], as either supplemental text chat or alternative video call platform, uses groups with fixed membership, and participants are identified by their phone numbers. This made both asynchronous participation in the groups of the creative arts organisation and synchronous participation in the choir easier for participants in comparison to the temporary access granted by a Zoom link.

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[24]At the time of writing WhatsApp is supported by Android phones running Android OS 4.1 released in 2012, and Apple phones running iOS 12 or newer, where the oldest supported device is the iPhone 5S released in 2013. Thus, the vast majority of smartphones currently in use is capable of running WhatsApp.

[25]As with Zoom, we can view WhatsApp here as the eponym for a smartphone application for text (and voice) chat and video calls.

Both the choir and the creative arts organisation highlight the social aspect of their use of Zoom and WhatsApp for group sessions, a potential way of coping with social isolation during the pandemic:

> "But also then talk about what they've been up to that day [unintelligible], but it was a way of them keeping connected at that time when basically no one was allowed out really really. I think it was really important especially during the winter. It was, I think, that was for some, the only bit of connection that they had outside of their own family or with wherever they were within that space."

Digital practices - Podcasting and Radio

Writing on everyday material practices, Marres (2012, p. 62) notes:

> "John Dewey favoured a conception of engagement in terms of practical invest-ment, arguing that the actual efforts people make provides a more adequate expression of their engagement with public affairs than 'what they say about it.'"

In this section, I will look at the efforts made by collaborative members to address, in practice, one of the shared issues highlighted by many: social isolation. The discursive context, "what they say", of this will be discussed in the next theme, particularly regarding the wider context in which issues are then materially enacted. Here the emphasis is on their practices related to this issue "the role of objects, technologies and settings in the organization of publics (Marres, 2012, p. 62)". I discuss here two examples of largely digital practices, radio, and podcasts, in the sense that a digital technology is one of the actors involved. I am looking at these two *things* not just the object of design(-after-design), but the network of human and non-human actors interacting with it. Contrary to the previous examples of Zoom and WhatsApp, we are dealing here with one-directional broadcasting. As noted in the methodological framework, this shifts the focus from the design *Thing* to the *public* articulation of matters of concern, and the representation of these concerns is one of the challenges of infrastructuring as design (Storni, 2015, p. 168). How, then, do collaborative members design for *making public* their concerns? As with mutual aid, infrastructuring is done by infrastructural allies, and the method here is *tracing* of actors and movements within infrastructures. In the next section, I move on to other (non-digital) material practices that deal with the same shared issue, as material expressions of the shared issue of social isolation.

An organisation working with carers produced a series of podcasts during the pan-demic. The aim here was to tackle the issue of social isolation among carers, in con-junction with Zoom groups produced together with other member organisations of the collaborative. Little work has been done in HCI on the production of podcasts, with a

recent exception the work of Rime et al. (2022, p. 16), who look at the workflows of podcast producers. They find that a typical workflow consists of pre-production, production, and post-production. For the carer organisation, the interviewee provided insights into the first two aspects, although it should be noted that the interview was not about technical aspects, but what they articulated with their podcasts. Regarding the technical aspects of production, the collaborative provided the carer organisation with funding for microphones required for the production of podcasts. This was sufficient to proceed with production. Technical tasks such as recording and editing were done by the interviewee, who has a creative background and was hired by the carer organisation for digital marketing. In pre-production, the content of the podcast is typically conceptualised.

In this instance, they conducted a survey for local carers, which also provided a starting point for the content of the podcast. They identify the need to make the support available to carers, in order to address mental health concerns:

> "As an organisation, we find that a lot of carers are struggling and reaching breaking point then because they don't have much support and know what's out there. So that often, I guess, them, for lack of a better phrase, rather educated on naive around what is out there for them and their caring role. And what support is out there from us and other professionals and even little things like not knowing that when you go to a hospital, you can actually apply and get the carers' pass."

In these podcasts, they worked with local carers to address their questions and concerns, including on social isolation. The practice of producing the podcast also contributed to addressing the issue of social isolation, by making it public with local carers:

> "And we got rather creative with how we approached it through that. [...] And so we were able to actually get a lot more carers involved through that and start a podcast, able to answer their questions there in the episodes of the podcast. And so that was quite nice to break down the social isolation and work with carers and you know, and carers be able to listen to it back and relate to it essentially, that was quite nice as well. Although that didn't as much, obviously listening to it didn't break down as much social isolation, it did bring a lot of comfort that there are other people in the same situation. So we were getting over that bit of that loneliness, combating that."

As such, the issue of social isolation is not only addressed through the content of the podcasts, but participation in their production (and the preceding survey). The practice of participation itself becomes part of that shared issue. Drawing from ANT, Andersen et al. discuss participation itself as a matter of concern. This is done to draw attention the processes involved that make participation happen (Andersen *et al.*, 2015, p. 259). They do this through two concepts. One, participation is *partially existent*

throughout a project, not just specific events (Andersen *et al.*, 2015, p. 258). In this instance, there is indirect participation throughout from survey participants, as it is their responses that (partially) shape the content of the podcasts. Two, such a participation is *overtaken* by other actors (Andersen *et al.*, 2015, p. 254), taking over the representation and materialisation of agency. In this instance, the podcasts enabled a degree of self-representation for carers, as part of a wider network of participation - although it has been overtaken for the purposes of this thesis, through several translations in interviews, workshops, transcriptions, and analysis. At the time of interview, the podcast is back in is back in pre-production:

> "We're wanting to bring it back, but currently we're developing what we want to do and bring that back, but we want to do it in person and do the recording there."

As with other discussed activities done remotely during the pandemic, they too articulate a desire to work in-person. Likely related to this, Rime et al. (2022, p. 15) note that podcast creators had to be "creative" for their recording setups during that time.

Another example of addressing social isolation through practice is the work of a community recording studio that is a member of the collaborative (and works with several member organisations). They see social isolation as one of the key issue during (and after) the pandemic. Thus, they view their own work as more than an affordable recording space for local musicians:

> "Post-COVID it's definitely loneliness and isolation. Music is very, like now is very much about providing a social space for people. And this isn't just about our organised activities, these are people that come in for years and years, that use the space to play music every week with their friends. And we have people that come in, and they're in now that are in their 70s. So they come in every week to rehearse and they still play. They play gigs around the [region], so we're, you know, we're kind of quite critical for those people who are desperate to get back in to have some space to meet and play music together."

During the pandemic, the recording studio itself was either closed or only open to limited activity, to comply with social distancing rules. Thus, they produced a radio show, working with the residents of a care home who before the pandemic were regulars at a weekly music cafe organised by the recording studio. Volunteers from a local independent cinema helped with the production and broadcasting of the radio show, as they also run a community radio station. A resident of the care home acted as DJ, and called others live on the air for music requests and chats. Later, recordings of the show were distributed on CD:

"Yes, yeah. So I was just kind of in the background, you know, I have pieces of paper up kind of saying, you know, like five minutes left or, you know, kind of doing a little bit of directing them and then that wonderful [name], who helped out. He seemed to just, he seemed to be able to decipher every song that they asked for, and then he kind of did a quick search and was then able to play it really quickly. We yeah, we managed to get them, you know, get them out, and then it turned into kind of where he'd even ring people up. Call them, you know, they'd be asking him about his family and his wife, he's a big part of [the recording studio], he kind of say comments about, and I can record it. You kind of, in the end you forgot it was on the radio, it was brilliant. It was really kind of down to earth kind of recording. The ones that kind of got involved in the group house loved it. They loved him calling them, and playing their music and listening to it in the other room. And the other thing that we did as soon as we actually put some CDs out, which people might see as being quite old-fashioned but bearing in mind that a lot, but yeah quite a lot of people coming didn't have access to technology, you know. We actually kind of, you know, burned some CDs and dropped them off at the nursing homes, with the music and music that they used to listening to. And the songs that people play here in the cafes. That was perhaps quite different to what people were doing technology-wise. We had to go back to the more old-fashioned ways of using CD players."

To analyse this project, it may be helpful to briefly reflect on the perspective of service users, as the interviewee highlights their importance for both production and consumption of the radio. Here, the recording studio works with older adults on the issue of social isolation. Technology is one of many dimensions to the exclusion of older adults (Walsh, Scharf and Keating, 2017, p. 90), but HCI work centres on this dimension. Vines et al. (2015, p. 3) conduct a discourse analysis on ageing in HCI and find that ageing is framed as a "problem" (which includes social isolation) in a "discourse of deficits" that can be addressed through technology. To counter this, they propose that older adults should not just be treated as research participants, but as contributors to the ageing research agenda in HCI (Vines *et al.*, 2015, p. 21). In the specific context of digital content, older adults are framed as consumers, not producers, with the key "problem" being access to content (Waycott *et al.*, 2013). Reuter et al. (2021, p. 257) examine the role of older adults at content creators for radio (and adjacent media) in detail. They propose that "by facilitating collaborative content creation activities, local communities can better support older adults' digital participation and facilitate inclusion across different life domains." To a degree, the local recording did just this. For them, the technologies used are not central, but part of a wider network to address social isolation among their service users, where they adapt their practice to ensure that service users can participate in the creation and consumption of content. As with the podcast, the practices of participation itself relate

to the issue of social isolation. Here, the concept of infrastructural allies is useful, as these were necessary actors closing gaps in the radio network - these allies contributed to recording and broadcasting, producing, and distributing the radio show, using technologies that residents already had access to. One, volunteers from the local independent cinema managed the recording and transmission infrastructure, providing the necessary facilities, devices, and skills. Two, a resident of the care home was integral to ensuring participation of other residents, acting as the DJ. There is slight (but necessary) inversion here, as this DJ called people to take their requests, and not the other way around. Three, the recording studio distributed copies of the radio show on CD to care homes. What matters is not the technological intervention, but the ad-hoc socio-technical infrastructuring by allies to make the radio show work.

This recording studio also organised movie nights for the residents, once social distancing rules allowed for small in-person gatherings in "social bubbles." This leads to the next element of material practices during pandemic: those where a digital communication technology is not a central actor.

Non-Digital practices

Organisations adapted their pre-pandemic practices to social distancing rules, while other organisations switched from digital practises early in the pandemic to non-digital material practices once social distancing rules allowed for this. While these practices are diverse, there is a common thread: they are material expressions of the shared issue of social isolation (as with podcasting and radio). This shows the relevance of a material understanding of publics, as *things* are act as stand-ins for the issue. This is not quite *Dingpolitik*, as these objects do not take centre stage. They do, however, represent a network of actors working addressing social isolation in their everyday practices.

To adapt their pre-pandemic practices to social distancing rules, a community centre that is part of the collaborative transferred all of their adult learning courses online. Some of those courses, however, relied of materials and the facilities at the centre to process them, including their pottery classes. Thus, they offered a pottery drive-thru:

> "And we offered here like a drop-in service for pottery. So people would drive through, and we would put clay play in the backs of their cars, and off they would go again. [...] So we had a pottery drive-thru. So we had like - it was a bit like McDonald's, but you could pick clay up! Or drop pots off to be fired, or."

Once rules allowed for socially-distanced outdoor interactions, the community centre installed benches that they named the "chatty bench":

> "Or, and, then, you know, as soon as they could they started meeting outdoors so they met in people's greens, you know, a member's garden, here in the

garden. So that you know we have we have some benches that were installed at [community centre] outside, and that was deliberately there for people just a come and chat, you know. And just the whole idea that if there was somebody sat on a bench somebody would go and talk to them, you know, you wouldn't just leave somebody sat by themselves, you know. The whole idea was that those benches were there for the people who wanted to communicate with other people and in whatever way, you know. So that was the sort of underwritten thing, and we were sort of advertise it as a chatty bench."Come and have a chat", you know, and we would keep an eye on that and make sure that everyone - we had a gazebo open the garden and so people would use that. But yeah that funding from the government allowed us to buy more benches and gazebo and, you know, things that we needed that would help us to continue."

This bench is, of course, very different from the Camden bench discussed in the theoretical framework. That bench is an as an example an anti-biographical design strategy, in which a hegemonic human agency is inscribed into an object, before other actors got to have their say. The notion of infrastructuring publics is seen as a democratic anti-thesis to this, as the design process is opened to be non-linear and ongoing: *design-after-design.* Here, it is the use of the object that is opened up. The chatty bench is not an intentional design object, but it does act as one, as the need for a socially-distanced outdoor meeting space to tackle loneliness is a design problem. The approach resonates with the notion of infrastructuring, as the chatty bench is open for people to use as they see fit. To abstract, it is about "sociomaterial processes intended to sustain and develop communities of participants (Wakkary, 2021, p. 114)."

In another instance of infrastructuring a process to tackle isolation, the local church set up a system for coordinating welfare calls by volunteers. This was an immediate response to the first lockdown, as they had identified the issue of social isolation before the pandemic. In the final service before the lockdown, they asked for contact peoples for people who would want a phone call. Then, a group of volunteers made weekly phone calls, with each volunteer handling around five people. Their approach is similar to mutual aid as well, as they implemented a small-scale classification infrastructure, in the form of a traffic light system:

"And we had a kind of a traffic light system where the people who were taking it on to do the ringing used to report back, and the, you know, they didn't tell us all the detail about people's lives you know, but they just sort of said, these people are green, they're fine, or these people are maybe amber, I have a concern, but I don't need to talk to you about it yet, or this is a red, and I maybe need to talk to you about this, you know, we need to ring them. So we just had that traffic light system going on and that worked really well."

A classification system is a "a set of boxes (metaphorical or literal) into which things can be put to then do some kind of work (Bowker and Star, 1999, p. 10)." Using this system, volunteers were able to flag potential issues with the people they were calling and put them in the colour-coded "box", at which point church staff could step in to assist, and arrange further help if needed. In some instances, it went beyond the initial goal of addressing social isolation. They provided help with shopping or prescription medication (similar to the mutual aid group), and advocated with local authorities, and referred to medical care or charities as needed.

In another effort that worked within social distancing rules, several organisations distributed care packages to their service users. These packages materialise different things. The local church delivered care packages around Christmas, which again relate to social isolation. An organisation working with carers provided creative packs and food boxes and did so in collaboration with other member organisations. An organisation working with young people provided care package focused on physical and mental wellbeing, but the packages were also a response to privacy issues when using Zoom.

Supported by a small grant from the collaborative, the church distributed care packages containing food, toys, homemade wool socks and other items, a collection of objects with a message related to social isolation:

> "[...] [L]ook, you're not on your own, we're here, and these people can support you."

While the church worked directly with the collaborative on their care package, the organisation working with carers created theirs together with another collaborative member organisation. A creative arts organisation provided content for care packages, a materialised example of collaboration between organisations:

> "Yes in a couple of ways we partner up for them. And we've partnered up to do things, then, especially during COVID. And partner with like [art organisation, and the rest of us the [collaborative] creative packs and all that project. We have been, we were involved with that, and then we also run them on the back of courses using the booklet, and so we do bits and bobs like that. We also worked alongside [food charity], to offer food boxes to carers and so. It's linking up with different organisations through the - there's a few more, but I can unfortunately I can't think off the top my head."

An organisation working with young people distributed care packages to their services users, the contents often centred around different aspects of mental health, such as relaxation or exercise. They delivered packages in person, and followed up with a phone call (this organisation also distributed mobile phones and data packages to its service users):

> "It was an excuse to go deliver something, an excuse to see the person. Yeah and that's how they became, those care packs became a little lifeline, a nice

treat, something positive to look forward to every week. Which helped with young people's mental health because they knew they were going to see one of us, well the same person really, every single week. So that helped them immensely."

As an organisation that struggled with the issue of privacy at home during Zoom calls, the care packages served another important function. It allowed the organisation to have private conversations with their service users, which allowed them to intervene and help with situations[26] that they otherwise would not have been aware of:

"[T]he staff really enjoyed it and said they got better outcomes, because they were seeing the whole family dynamic and the right people were able to step in and help them better. And because I had that one-to-one time with the workers, you know, socially distanced, and there was a lot more that came out and there was a lot more that we were able to deal with quite quickly or talk about with them. So they were in a better place to carry on with the rest of their week."

These care packages are, after the lifting of restrictions, still in use when the organisation visits a new service user after a referral.

5.3.4   *Signifiers of shared issues*

In the previous section, the material dimension of shared issues was discussed. In this section, this is extended by a complementary discursive dimension, as there is a gap unaddressed (and in some instances unaddressable) by the practices and objects that materialise efforts against the issue of loneliness and social isolation. This gap relates to the wider context of that issue, beyond the local scale. In theoretical terms, this section moves from the material public to the discursive public, extending the equivalential chain beyond what is represented (and representable) through localised objects and practice. I recall here from a previous section the Dewey quote used by Marres (2012, p. 62), claiming that what people do is a "more adequate expression of their engagement with public affairs than 'what they say about it.'" In this instance, that would be an incomplete expression, as *what they do* relates to *what they say*. To paraphrase Laclau (2005, p. 106), in *quilting* a discourse, empty signifiers become embedded in material practices. Thus in this section I move from *tracing* material practices, to *quilting* them into the larger discourses related to these practices.[27]

In this section, I discuss the related shared issues of austerity and duplication, expanding on the preceding themes. Austerity is seen as the root cause for the hardships

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[26]Details of these situations omitted here, and only non-specific examples were shared in the interview.

[27]As discussed in the methodological framework, this also where Laclau's theory intersects with classic PD that draws from Wittgenstein's language games, in that they were attentive to the language users use to describe the systems that they use.

that necessitate different forms of action against issues such as social isolation. Avoidance of duplication is an issue with two dimensions. One, on a practical level it relates to the value that collaborative member organisations see in working together on shared issues. Two, on a political level, it can be read a stance against a neoliberal public service delivery, in which organisations are set to compete against each other for limited funds. This extends on the shared issue of austerity, but also links to the affective gaps of Zoom, as this is an articulation of a shared purpose.

Before the discussion of these two issues, it is useful to define neoliberalism in this context. Here it is expressed through policies of austerity, implemented by successive UK governments in response to the 2008 financial crisis. In particular, these policies relate the devolution of local government as *localism.* A classic definition by Harvey (from Allmendinger and Haughton, 2013, p. 8) views neoliberalism as the advancement of human well-being through economic freedoms, ensured by an institutional framework by a state that intervenes as little as possible. In planning, the concept of *neoliberalisation* has been used to show shifts in planning policy first under New Labour and then the following Coalition government under the Localism Act 2011 (Lord and Tewdwr-Jones, 2014). The latter reform transferred some planning functions from regional authorities to local neighbourhoods, while deregulating the planning system so that it would not "hinder job-creation and growth" by, for instance, opposing new developments in the neighbourhood (Lord and Tewdwr-Jones, 2018, p. 235f.). This rhetoric of anti-planning and anti-welfare tropes continues in the proposed 2020 planning reform, where Fearn and Davoudi (Fearn and Davoudi, 2022, p. 348) highlight parallels in the use of the *state of exception* between emergency governance during the pandemic (as I discussed in the introduction) and authoritarian government interventions in planning. This continues the erosion of the post-political planning system (Allmendinger and Haughton, 2012),[28] where power is concentrated at the state level, and specific local levels, following the devolution from the regional to the local scale. The Conservative government that followed the Coalition government further increased spending cuts to local authorities (Lowndes and Gardner, 2016). Thus, neoliberal planning is a more authoritarian, state-driven regime (Fearn and Davoudi, 2022, p. 358) than the malleable ideology of neoliberalism would suggest.

The civic element of localism is reduced to a rhetoric device to justify neoliberal policy, "serving to fill an underlying void created by the privileging of market rationalities over social needs (Featherstone *et al.*, 2012, p. 178)." This void is not the only affective element here. As noted briefly regarding mutual aid, austerity causes large scale "infrastructural breakdown of modernist practices, social relation, and affective continuity (Berlant, 2016, p. 394)." Continuing from Foucault's definition of neoliberalism as the market as the formative principle for social relations Anderson identifies "state-phobias." These are

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[28]From a DT perspective, this is antagonistic governance, instead of agonistic pluralism (Fearn and Davoudi, 2022, p. 357). From an ANT perspective, this is an emphasis on matters of facts over matters of concern (Fearn and Davoudi, 2022, p. 350).

collective affects that stress the excesses of the welfare state, often stigmatising based on class and/or race (Anderson, 2016, p. 741f.), "[s]ticky atmospheres of irresponsibility [that] fail[...] to address the complexities of social and economic disadvantage (Hitchen and Raynor, 2020, p. 187)." The affective atmosphere of austerity has also been related to living with disability, in work that highlights the relationship of the affective and material in the everyday (Hitchen, 2016), as I also attempted to show with the material practices of social isolation in the previous section. The everyday material impacts (Raynor, 2017) of austerity are disproportionally felt by women. This follows a dual fantasmatic logic in which the precarity and uncertainty of present-day austerity clashes with both the post-war promise of progress and prosperity in the past and future hopes "orientated towards maintaining a position by avoiding decline (Raynor, 2021, p. 555f.)." For practitioners working in fields affected by public spending cuts (in the North East of England), there is an emotional toll as well, as providing care under these conditions is challenging for a multitude of reasons (Clayton, Donovan and Merchant, 2015). This resonates for example with the use of Zoom for mutual support among workers, as discussed regarding an organisation that works with young people. The above examples are at odds with the rhetoric of *austerity localism*, where local people are defined as a homogenous singularity, thus denying existing heterogeneity, inequality and conflict in localities. In particular, localism privileges those who can afford to get involved with local governance, while excluding those who cannot (Featherstone *et al.*, 2012, p. 178) - even those who can volunteer in neighbourhood planning processes find it is time-consuming and complex (Parker *et al.*, 2020, p. 650) This includes (or rather excludes) deprived neighbourhoods, such as the one the collaborative operates in. Still, austerity localism may also open spaces for emergent publics that contest it, potentially providing alternatives to the "neoliberal subjectification of the growth- based subject-citizen (Williams, Goodwin and Cloke, 2014, p. 2809)."

In a study of a community project in the North East of England, Webb et al. (2021, p. 221f.) draw attention to tension between the Localism rhetoric and public sector austerity, which includes the marketisation of the third sector. Localism was part of two competing Conservative party discourses, in which it, on the one hand, affords local authorities and communities the power to distribute funds and innovate (as for example the digital civics agenda attempts to do), while, on the other hand, also curtailing that power through austerity, in the form of significant cuts to local government budgets (Hastings *et al.*, 2015, p. 603). Local councils mitigate these cuts through strategies that reduce the costs, the council's role, and the need for services (Hastings *et al.*, 2015, p. 606). There is also an uneven geography of austerity where local authorities of areas with higher levels of deprivation are impacted more by significant local government grant cuts, while also not being able to take advance of new, alternative revenue streams introduced by the Coalition government (Lowndes and Gardner, 2016, p. 360; Gray and Barford, 2018). In the city that the collaborative works in grants have been cut by more than the national

average, while a shortfall of £77 million is expected across income streams for the 2019-24 period (Steer, Walker and Kerslake, 2021). Related to this, austerity has also driven the digitalisation of public services, albeit framed as necessary and beneficial to all. As with localism, these reforms disproportionally impact deprived communities (Crivellaro *et al.*, 2021, p. 89f.). Hastings (2021, p. 138) also draws attention to the parallels between the rhetoric of togetherness present in both post-2008 austerity and the 2020 pandemic. In both instances, the impacts are distributed unevenly. For instance, front-line public sector workers were directly impacted by the pandemic, while they previously absorbed (Hastings and Gannon, 2022) the impacts of austerity. Thus, Hastings calls for an assessment of the amplification of pandemic impacts due to austerity. This also relates to charities and community groups such as those represented by the collaborative, who are expected to produce swift responses to the crises, while their funding has been cut due to austerity in the years leading up to the pandemic (Hastings and Kerslake, 2021, p. 140). In the city the collaborative works, the local authority has implemented a collaborative approach, after recognising poverty in the city and their own limited resources to tackle this due to austerity. They attempt to manage this through decreasing the need for services and adopting a place-based approach where the council coordinates partnerships (Steer, Walker and Kerslake, 2021, p. 110f) with organisations such as the collaborative and its member organisations.

One related issue that has been amplified by the pandemic is social isolation, showing the links between the everyday material practices and discourses of austerity, but also the far-reaching impacts. As one participant notes:

> "You've got lots of people who worked through it, whose jobs got more difficult and more stressful, plus they may well have had like children at home as well and been trying to juggle isolation, like keeping the kids entertained and potentially in some kind of, you know, doing some kind of learning, plus potentially working like full time in a public facing job you know. I think, you know, they've maybe had it the hardest and because, and then, when you speak to people who've worked all the way through in like the NHS, for example, it's like, it's the hardest it's ever been for them. So yeah, I think, so I think that's been really difficult. I think the impact for people who - again I don't want to like speak for everyone and sort of generalise but kind of for what I've seen people who are reliant on benefits. Either sort of unemployment benefits or like health related longer term benefits. It's been the isolation that's been the challenge. So it's been like missing out on the the normal support and connection and social, like, opportunities to socialise that's been really, really difficult. And that, sort of, that goes for like British people and also a similar situation for asylum seekers as well, who have kind of been stuck in this sort of pandemic. [...] So it's been really a mixed bag, I guess everyone's situation has been magnified. So if you're like a working

parent with children in school, your situation is suddenly like bang, like you know you have to do, like everything like times 10. But then you know if you're somebody who's already a bit isolated and not working then that's magnified as well."

Austerity localism

Issues that are not articulated through material things and practice may still be relevant, just not necessarily represented through material practice - this is the rationale for articulating both material and discursive readings of publics in the theoretical framework. In this case, we are dealing with the shared issue of austerity, identified by participants as the root cause for deprivation in the neighbourhood. There is a gap unaddressed (and in some instances unaddressable) by the practices and objects that materialise efforts against the related issue of loneliness and social isolation. Thus this section complements the material dimension of shared issues with a discursive dimension that extending the equivalential chain beyond what is represented (and representable) through localised objects and practice.

This is where the discursive sequence[29] of DT provides a useful analytical framework, as now we are dealing with shared issues that are recognised but not addressed through material practices - neither by the collaborative or any responsible institutions. Thus, analysis in this section is conducted through the theoretical concepts of that sequence. Are there logics of equivalence and difference at play? Are antagonistic frontiers drawn? Is there an element that acts as an empty signifier, and is there an affective investment in it?

Before proceeding with a reading of how collaborative members understand austerity, it is important to highlight the impacts of austerity on people in the neighbourhood. As noted above, Hastings (2021, p. 137) calls for an assessment of the amplification of pandemic impacts due to austerity on front-line public sector workers. While a full assessment is beyond the scope here (as it is an issue that was identified during the open research process, and not an issue that was identified previously as the focus), the collaborative members provide perspectives from front-line workers doing jobs that previously were done by the public sector. Specifically, they provide perspectives on the amplification of pandemic impacts due to austerity on people in the neighbourhood. Interviewees highlight the disproportionate impacts of austerity on specific groups, while others highlight the amplification of existing issues through the pandemic.

A local community centre highlights the work they do with local food banks to deal with food poverty in the area,[30] but also how their arts classes may help people with mental health issues amplified by the pandemic. An interviewee from the collaborative also notes that the increased use of food banks as an example of how "existing economic

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[29]See figure 2.3 in the theoretical framework.

[30]Food poverty is one of the issues caused by austerity that the council attempts to attempts to address through a collaborative, place-based approach (Steer, Walker and Kerslake, 2021, p. 110).

hardship has been amplified by the pandemic." While the pandemic has amplified issues related to austerity, austerity itself remains the key concern for the future, as "it's going to get a lot worse:"[31]

> "I think, well there's a number of things, it has been the impact the pandemic and now and it gets called the cost of living crisis down to wholesale economic management with the economy over many years. I think this coming winter will be very hard indeed. [...] I think, we've got some fledging plans like running things like a soup kitchen out the basin in [local park] and so upon, simply because we do not foresee - We see a very, very grim winter coming up. With the cost of electricity and gas, and everything else as well. Even the supermarket shop seems to have gone up, seems about 25 per cent more expensive than it was a year ago. And the people we serve already living very marginal, precarious lives. And the conversation we've had with other organisations in city, Citizens' Advice and so on is that yeah, it's going to get a lot worse."

While this an example of the amplification of social isolation by the pandemic, another interviewee highlights the compounded amplification of issues caused by austerity during the pandemic. They highlight the lack of services available for minority communities, with "racial and health inequalities that already existed and they've been exasperated by COVID as well". For ageing people from that community this leads to social isolation:

> "I guess so again in terms of, so like in terms of total health and wellbeing right, there's some there's some amazing projects out there, you know what I mean, especially for older people within communities as well. Especially if you're white British, you know what I mean. So you've got lots of reminiscing projects you've got sort of projects that in sort of like tea dancing and things like that you know. But if you look at, there's an ageing population within the minority community as well. I'm not talking just about asylum-seeking communities and those seeking refuge and sanctuary. I'm talking about established communities that have been here since the 50s, you know what I mean. And so they've worked and they're sort of done that, and you know, families and things like that and they've been part of [neighbourhood]. Now that population is ageing now, it's about 70 plus, 80 as well. And there is very little culturally appropriate services out there for that community at all to access. And so what you're sort of finding now is that is a huge amount of isolation within that community. There's a huge amount of also, you know, mental health issues, physical health, you know, issues as well and I'm not talking - I'm talking about more about like again from the our perspective in terms of how people can engage in terms of creatively or culturally or -

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[31]This interview was conducted in Spring 2022.

you know, not going to the doctors and getting medication, you know what I mean, I'm not talking about that. I'm talking about holistic ways of how people can be supported in those communities and there is a lack of that because the services that are out there, are mainly not sort of appropriate or relevant to those communities. So what then happened is that you know again, I guess that those inequalities, then you know come to the fore as well, you know I mean. I guess as an organisation, we try doing our very best, but we're also a small charity so there's only so much we can do in terms of capacity, in terms of funding, in terms of projects."

Contained in this lengthy quote are several key points. Long-standing minority communities are not provided with appropriate services, in contrast to their peers. Thus, there is compounded inequality based on age, race, culture and language.[32] This leads to social isolation within these communities. There is a direct link to austerity here, as inadequate service provision is the cause for this isolation. In that context, the interviewee highlights that they do not have the capacity to deal with this, an example of underfunding in the charity sector under austerity. One of their concrete responses during the pandemic, the use of WhatsApp groups as an asynchronous supplement to Zoom use, discussed as material practice above.

The shared issue of austerity relates to the shared issue of social isolation as a mental health concern:

"I supposed the sort of headline one's are kind of deprivation, so like people who just don't have enough money struggling to make ends meet and it's only going to get worse. Maybe kind of, you know people who like find it hard, to like access services. So maybe like a bit disenfranchised sort of, not kind of not taking up opportunities. Lot of mental illness, difficulties with like depression and anxiety, which is like can be a real barrier for people to access things. Even if they know those things are going to help them feel better, kind of. You know the structural inequality that runs through like British society, as you know, it's really clear. […] Yeah and I think, you know, we had austerity and that, you know, kicked everybody, and then, you know, so many services were cut and things that like really helped in the community, like youth provision, you know, mental health support is like at a real, like, all time low, support for children with additional needs, just even to get like an assessment to get a diagnosis, it's like at an all time, like longest waiting lists. So, and then we had the pandemic and had this like epidemic of like isolation and, yeah obviously now we've got like the squeeze on cost of living. So, you

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[32]Looking at the experiences of older South Asian women in the UK during the first lockdown, Akhter et al. (2022, p. 1139) highlight specific challenges faced by them related to austerity and the pandemic, "how the public discourse of the"Asian family" as a homogenized social policy category has undermined the ability of ethnic minority citizens to make claims on the state for their care needs."

> know, it's just been kind of like, you know, the sort of like the region was
> already like hammered by sort of years of Tory and well not even necessarily
> Tory, just, you know, like western capitalism - just sort of you know."

First, the interviewee highlights the impacts of austerity on mental health as a barrier
to accessing public services. The root of these issues is deprivation. The interviewee then
highlights the deep cuts to publics service funding identified in the literature on *austerity
localism* (Hastings *et al.*, 2015, p. 606). While they note structural inequalities and their
function as amplifiers (Hastings and Kerslake, 2021, p. 130), austerity is identified as
something that "kicked everybody", as the scope of services cut is broad. In a sense
neoliberalism is recognised as the ideology driving Tory *state-phobia*, as "the region was
already like hammered by sort of years of Tory [rule]" driven by the broader ideology of
western capitalism. They note an "epidemic" of isolation during the pandemic - the shared
issue of social isolation, discussed in its material dimension in the previous theme. Here, it
is used to differentiate between the global issue of the pandemic and the local issue of the
epidemic. It serves as a metonymic bridge between issues, connecting the global impacts of
the COVID-19 pandemic and the global impacts of neoliberalism as "western capitalism"
with the local issue of social isolation. Thus, an agonistic frontier has been traced, with
global forces made responsible for the local impacts of austerity, compounded by the
pandemic. This is not quite an *outbreak narrative*, as this is not tracing the networks of
patient zero, yet epidemiological concepts still provide the metaphors for constructing a
community (see Wald, 2008, p. 48f). I note here that is may also be inversion of the
typical discursive sequence in DT, where a particularity claims to represent a totality. At
neighbourhood scale, the inversion is, however, necessary to constitute the small totality
of the neighbourhood against larger antagonistic forces. Finally, the two examples of
social isolation discussed here a different, and what exactly the issue of social isolation
constitutes changes based on the configuration of actors (as Marres argued for material
publics). Social isolation for minority communities is different from the social isolation
experienced by those who struggle to access services due to mental health issues. This
heterogeneity of the issue becomes representable through what interviewees can agree on,
the antagonistic frontier to an austerity amplified by a pandemic.

Another interviewee goes further by not just differentiating between a local subject
and a global hegemonic project, but drawing a somewhat overdetermined antagonistic
frontier (*from their soapbox*) between "people" and neoliberalism:

> "The main issue we're trying to address: people's lack of social capital, if you
> want to put it that way. And addressing deliberate and concerted under-
> resourcing of both health and social care services and resources and also com-
> mon spaces and social fabric which has been ripped away over decades and
> decades of kind of, you know market-driven neoliberal appropriation of the
> commons. Sorry I get of my soapbox [laughing]!"

A lack of social capital is relevant in reference to *austerity localism* as it is a barrier to participation, part of a "refusal to engage with power relations and inequalities" within the localism agenda (Featherstone *et al.*, 2012, p. 178). They, too, point out the impacts of far-reaching cuts to public services. Neoliberalism is defined through what has taken and what it is taking from people. Thus, it is phrased as a lack, a fantasmatic logic of affect, as they articulate what has been "ripped away", or in Laclau's terms "irretrievably lost" (Laclau, 2005, p. 116).

Concretely this interviewee from a mental health organisation draws attention to the complexity of problems that their service users face, thus highlighting the tangible effects of austerity on their work:

> "So [the system]'s been about casting organisations as providers and asking them to compete against each other. And one of the consequences of that as well is that pots of money may arrive for, I don't know, criminal justice or could be arriving for homelessness and could be arriving for mental health and they get defined in very narrow terms. But the people we serve, you know, could hit all of those target areas and it's working about across those funding divisions which exists between health and social care and criminal justice and public health, etc, because that's the most effective way, we believe, of dealing people's lives which are, you know, people are human. Human life is necessarily multi-factorial."

Several organisations see duplication as a shared issue, so that is discussed separately below. Here, the point that public services under austerity are seen as unsuited to providing for the complex, "multi-factorial" issues of service users. This is consistent with a study with Universal Credit claimants in North East England, which finds that Universal Credit is "undermining vulnerable claimants' mental health, increasing the risk of poverty, hardship, destitution and suicidality", as it unsuited to the complex lives of vulnerable people (Cheetham *et al.*, 2019).

Similarly, an interviewee from an organisation working with young people highlights the complexity of the issues they are dealing with, overwhelming the organisation with referrals as relevant social services have been cut:

> "So the main issues we're dealing with [are] mental health, emotional well being, poverty, child protection, eating disorders, self harm. [...] I will work very closely with lots of other partners, so, you know, sexual health, midwives, health visitors, social workers, all the local schools. And they're mainly where all the referrals come from. Children services, and they refer to us when - we're in a crisis at the moment, we want to get back into the early intervention work that we used to do. But it's just society, austerity, all the cuts, and cuts to services. And at one point we used to get them at a very early stage, you know, things are just starting to go wrong. And now we've got them longer

than that because there's so many - we get them at crisis so when it's not just
one problem, it's multiple problems. So that's the crux of that."

Thus, a complex set of issues, "multiple problems" is linked to one cause by the interviewee: austerity. We can now assert that it is the thing that interviewees identify as responsible for their shared and individual issues. Thus, we can place it firmly on the outside of antagonistic frontier. When calling for an assessment of the amplification of pandemic impacts due to austerity, Hastings (2021, p. 130) notes that this also extends to charities and community groups. She points out that front-line public service workers act as "shock absorbers" for the impacts of austerity (Hastings and Gannon, 2022). It appears that the above organisations does so as well, as they now receive more referrals from public sector bodies, making early stage interventions impossible, and thus compounding complex issues.

With organisations only being able to provide limited responses, there is concern about not being able to provide beyond immediate crisis support:

> "I think this is really difficult and it's gives me a real dilemma because, and
> I think the majority of people are probably in such a state of crisis, they just
> want the support to continue because they think where the place they're in
> they maybe can't see a way out of that at the moment. And I do worry
> that while I wouldn't withdraw the support because I know how much it's
> needed, I do have concerns that we're almost keeping people where they are
> and just maintaining them. You know we're not proactively doing anything
> that supports them to step out of this situation they're in. You know, and
> that you know that seems very simplistic, but that's a genuine worry I have
> but also an acknowledgement that, you know, people that we are supporting
> in that way are in absolute chaos most of the time and then what's brought
> them to where they are is so complicated it's difficult to unpick and to know
> where to start."

Once again, the complexity of peoples' lifeworlds' is highlighted, but framed in a tension familiar from mutual aid, as with the focus on the necessity of survival work, there is little room to work towards social change. In this instance, there is no ad-hoc reconfiguration of actors that allows a shift away from survival work. As also noted in the context of mutual aid, there is view of the local council as bureaucratic, unresponsive and top-down:

> "Historically [city] been very much a council town in terms of people have
> looked, you know - the council are the big boss in the town and people have
> looked to the council for help and solutions and local authority. There's
> this paternalism in there then there's political consequences in terms of how
> power gets concentrated but also, the way in which bits of council have been

de-funded. I'm not sure the populace as necessarily caught up with the fact
that the council can't provide what they expect it to provide."

In light of the literature discussed regarding *localism austerity*, it is relevant that the interviewee notes that the majority of people remain unaware of the redistribution of power and resources, which is perhaps surprising, given that the pandemic may have increased attention to public services, and made cuts to them more visible (Steer, Walker and Kerslake, 2021, p. 107). Another interviewer argues that the devolution of local government remains an ongoing power struggle:

"I think there is. I think some of this loops back to what I was saying earlier about [city] being culturally being led by the Council. I'm looking to the Council for solutions. I think some bits of the Council quite open to listening to [collaborative]. Other bits of the Council, are a bit more command and control and telling people, though this is the master plan, and this is what you should be doing. And that's a tension that isn't going to go away anytime particularly soon. And we see it, I see it, manifesting the bits of work on the health side of things, outside of the [collaborative] as well. This strange dynamic that goes on when the council, because of its historical baggage thinks it should be calling the shots and having the final say on things. And it's talking a lot about kind of devolving in power down [unintelligible], but I don't think it's really got a grasp of how it needs to change until that happens."

They note a "strange dynamic" within a council that, on the one hand, is pursuing collaboration and partnerships with organisations such as the collaborative and its members, while on the other hand, continuing a top-down management style. This may link either to the historical "paternalism" identified in the preceding quote, or the place-based approach adopted by the council, which places them in the role of "place leaders" (Steer, Walker and Kerslake, 2021, p. 108). Still, this is localism imposed by austerity, as such collaborations are implemented by the council due to their own lack of resources (Steer, Walker and Kerslake, 2021, p. 110f). Still, such localism may, despite its issues, enable input from emergent publics (Williams, Goodwin and Cloke, 2014, p. 2809) such as the collaborative.[33] It is also worth noting that local government is associated with top-down management despite disciplinary budgeting by central government (Lowndes and Gardner, 2016), perhaps suggesting that this is an instance where local government is associated with austerity, because they have to implement it (Steer, Walker and Kerslake, 2021, p. 110f).

Avoiding Duplication as a shared driver

How, then, does austerity shape the practices of the collaborative? The previous section sketched a chain of equivalence between issues set against austerity amplified by the

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[33]A more detailed analysis of the austerity localism is beyond the scope here, but Ferry et al. (2019) provide an analysis of the required organisational changes in Newcastle city council.

pandemic. These included a diverse range material practices on the shared issue of social isolation, which is part of a complex set of issues related to budget cuts in public services. The collaborative acts as a shock absorber to these cuts. To address a complex set of issues so despite limited funding, the avoidance of duplication matters. This shared issue is now discussed in a separate section as it partially stands alone. It can also be seen as another driver for action on shared issues, in addition to the affective force of a *shared purpose*, discussed previously in relation to Zoom. The chain can be extended by another element, as duplication can be set in opposition to austerity and neoliberalism, in that it values collaboration over competition. There is also a practical element to the avoidance of duplication that also relates to austerity, as there is minimal funding available to deal with an increase in service users dealing with complex issues. Collaboration is seen as a way to address that.

An interviewee from the collaborative provides an open definition of the purpose of the collaborative, in supporting people in the community through collaboration on issues, while avoiding duplication:

> "The initial intention for [collaborative] was to help people who live in the community have a better standard of living, you know, to try and address some of the challenges and I suppose, improve their wellbeing and improve their lives in general. And the way we aspired to do that was by getting all of the organisations to collaborate, which why we call it the collaborative because that was the intention. So avoid duplication. If there were any gaps, you know if if there was a gap in a particular age group or within a particular cultural identity to try and try fill those gaps so we together, we could provide a whole range of support that meant that people live better and felt better."

All interviewees shared examples of collaboration, although it should be noted that in some cases there were collaborations between individual member organisations that were independent of the collaborative, for example due to preceding its formation in late 2019. What the collaborative does is make legible the links between organisations, irrespective of their individual positions in the network:

> "[Creative arts organisation] has been here for 30 years, so they weren't new. Other organisations, yeah, I wasn't working, I didn't know very much about what was happening with [charity]. I didn't know very much about what was happening with [religious charity]. They were sort of in their own space, and you know and. [Mental health organisation] is fairly new to [city] I think they weren't around before [collaborative], so [mental health organisation] is post-[collaborative] development yeah so. And I had met with [name] from [mental health organisation] via someone else I knew, so I knew about them outside of the [collaborative], and I suppose. But it's still nice to have that bit of catch up time in that space on a monthly basis, to see what everybody's doing."

For others, such as organisations working with young people or carers, the collaborative allowed them to work with member organisations they had not worked with before, here materialised in the previously discussed care packages, and extending to the issue of food poverty:

> "Yes in a couple of ways we partner up for them. And we've partnered up to do things, then, especially during COVID. We have been, we were involved with that, and then we also run them on the back of courses using the booklet, and so we do bits and bobs like that. We also worked alongside [food charity], I think it was [food charity], to offer food boxes to carers and so. It's linking up with different organisations through the - there's a few more, but I can unfortunately I can't think off the top my head."

They, too, see value in being part of the network due to information that they receive through the collaborative, and the individual collaborations that they can form:

> "Firstly, being able to offer more opportunities locally, then for the folks in [city], and of course [neighbourhood]. So that would be one of the you know of key pillars there as to why we do it. And I'd also say it is really useful just generally so know what's going on for [neighbourhood] and then with other local organisations, so whether that is through the meetings and going along and raising, you know, highlighting what's going on, or it is just receiving the newsletter. It's really useful, just to be able to know what is on your doorstep, because sometimes it can be quite difficult to keep up with that if you're an individual, whereas bringing it all together as a collaborative is brilliant and, of course, we can then collaborate on them, and you know, make the most of it."

For both existing and new collaborations, information is shared through the monthly collaborative meetings and newsletters. This where avoiding duplication is relevant on a practical level:

> "And one of the things for me in the early days when I was here when we were thinking about how to take things forward was about people working collaboratively and not, you know, duplicating. You know we're not duplicating results, not having to duplicate energy, actually working with and supporting one another in what they're doing and so that's what we've tried to do."

An organisation highlights their collaborations, and then points out that the monthly newsletter helps avoiding duplication in this context:

> "Yeah [art organisation], we had worked with [art gallery] for a long time. [Christian charity], I think, we're better off there, [women's charity], as a

professional meeting with other female leaders and that's been quite helpful for me, and we do provide quite a bit of support for each other. Who else is there? [Mental health organisation], and you know, being able to use their facilities based in the park. And there was the youth groups, they were gonna come her at one point and run from here. That all changed due to the kind of referrals they got. So it's been quite a few partnerships and you get a newsletter so you know what's going on, before you didn't know. So the newsletter's great and it helps us, not duplicate, but, so, or if we say right that needs doing, then we can come together and do it together. So that's it."

The monthly meetings serve a similar purpose, although it is worth noting that they were perceived as passive when they were run on Zoom (as discussed previously):

"Well I attend their meeting when I can so they have a meeting once a month about developing projects that are relevant to [neighbourhood] and to the local area. And it's often a good way of networking with other organisations that are about, so there's bits of joint work that comes out of there."

Beyond the practical benefits, the collaborative fills a void left by *austerity localism*, stepping to coordinate and inform in way that was previously done by the council:

"But I think the [collaborative] is a great initiative, I think it brings together everything that's happening in one area in a way, probably, that the council used to do in the past. Yeah but because the youth service and the community learning service that that the council ran with individual community organisations is stopped having any sort of input into the community, I think the [collaborative] have taken that on. And I think they actually do a better job because they don't come with an agenda. You know, it's not about promoting council services and it's not about promoting one group over another, it's about about fairness and, you know, an enthusiasm and for everything that's happening in [neighbourhood] in order to encourage more. It would be great if they got more funding to be able to share around the place and to have more stuff. It is what it is, you know I suppose it's not to lack of trying, they're very hard working people."

The key issue of *austerity localism* affects the collaborative as well, as they too struggle access funding:

"I think what would help most would be an acknowledgement at a strategic level within, not just the council, across the statutory services, the NHS as well, that this relatively inexpensive, low level work with people in communities works. I think they understand that in principle, but the trick they've got to do is to fund that sector in a longer term and more sustainable way.

> You won't get results in three years doing this kind of thing. It's taken such a long time to get there, it'll take 10, 12, 15 years to show any effect, and I think strategically, the need to invest in this kind of work. Because that you know this, the reliance we're pushed into a reliance on grant funding, which is always going to be and fragile. And the most damaging thing is to have rolled up and run a project for two or three years, got people excited, got people engaged, and then have to say"I'm sorry well we've run out of money and off we go again." So you're back to where you started and that's really damaging."

They highlight here the competition for funding within short funding cycles. They call for a long-term investment in their work, as an acknowledgment from the (local) public sector for their collaborative approach. The disciplinary effects of austerity are on display here, as they highlight that this approach is relatively inexpensive. Thus, collaboration itself is constrained by austerity. As noted before, charities and community groups are expected to produce swift responses to the crises, while their funding has been cut due to austerity in the years leading up to the pandemic (Hastings and Kerslake, 2021, p. 140). This is where collaboration has a counter-hegemonic dimension, and thus slots more firmly into the equivalential chain against austerity:

> "It's to break down the - it's to collaborate in the face of a system which is certainly, [trying] to unpick it a bit now, which has been built for the last 30 years on competition. So it's been about casting organisations as providers and asking them to compete against each other. [...] Human life is necessarily multifactorial. Yeah it's that collaboration and it also it boosts one's own morale by realising there are other people who are like-minded."

There are practical (in this case both rational and affective) benefits of working together instead of competing. Here, on a more abstract level, the opposition to competition over limited resources can be read as an opposition to austerity/neoliberalism. Regarding the Localism Act, David Cameron argued that "public services should be open to a range of providers competing to offer better services (cited from Webb *et al.*, 2021, p. 222)." The collaborative inverts this, arguing that public services should be open to range of providers collaborating, which would offer better service due to the complex nature of the problems that service users face (as discussed in the previous section). For instance, a multicultural arts organisation sees collaboration as a way to help other collaborative members deliver culturally appropriate services, which, as discussed before, are currently not offered by the public sector, nor can they be offered by a small organisation alone:

> "I guess as an organisation, we try doing our very best, but we're also a small charity so there's only so much we can do in terms of capacity, in terms of funding, in terms of projects. And I think that's why I'm really interested in

working with the collaborative as well, to see how we can work collectively, to ensure that some of the services that we provide as a collective are appropriate to the communities we serve. That's kind of an anecdote, that's just one example, you know I could go on about other examples, about young people at school facing racism. Yeah so again, racism, prejudice, discrimination impacts massively on all communities, whether they're young or old as well, which then sort of has massive effects on your confidence, live chances, also doing well at school, getting a good job, all these sort of things. So yeah so racism and discrimination is kind of is our kind of a fundamental sort of thing about inequalities that exists within the sector, within communities as well you know. There is sort of that, you know, that thing about sort of you know, structural and institutional racism as well, which does, regardless of what people say, it does exist."

They highlight here different types of racism that affect their communities. Structural and institutional racism in particular relate to austerity, not only in the previously discussed affective "state-phobias" (Anderson, 2016, p. 741f.), the "[s]ticky atmospheres of irresponsibility [that] fail[..] to address the complexities of social and economic disadvantage (Hitchen and Raynor, 2020, p. 187)." To cite the United Nations (*Visit to the United Kingdom of Great Britain and Northern Ireland: Report of the Special Rapporteur on Contemporary Forms of Racism, Racial Discrimination, Xenophobia and Related Intolerance*, 2019, p. 9f), "[a]usterity [in the UK] has had especially pronounced intersectional consequences", in particular for ethnic minority women. They have also impacted small charities that work towards racial equality[34] - for example by collaborating towards culturally appropriate services.

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[34]In their comments on the "Report of the Special Rapporteur on contemporary forms of racism, racial discrimination, xenophobia and related intolerance", the UK government did not respond to this point (*Report of the Special Rapporteur on Contemporary Forms of Racism, Racial Discrimination, Xenophobia and Related Intolerance on his visit to the United Kingdom of Great Britain and Northern Ireland: Comments by the State*, 2019).

Part IV

Discussion and Conclusion

6 Discussion

I will structure this discussion chapter through my initial research questions, to articulate new understandings of (and contributions to) infrastructuring publics across the theoretical framework, the methodological framework and the case study. The goal of this discussion is to provide answers to my research questions, and in the process highlight or generate new understandings on infrastructuring publics at local scale, during infrastructural breakdown. While the specific conditions of pandemic-induced breakdown may or may not be repeated in the future, the point of research at moments of infrastructural breakdown is that "[t]he normally invisible quality of working infrastructure becomes visible when it breaks: the server is down, the bridge washes out, there is power blackout (Star, 1999, p. 382)", or a global pandemic. What new understandings become visible in this instance? To reiterate, I ask the following research questions: How does the collaborative infrastructure their responses to infrastructural breakdown? What shared issues can be identified through the prism of publics? Is infrastructuring publics a suitable frame for tracing and quilting shared issues?

I will also discuss the limitations of my knowledge claims. There are epistemological, methodological, and practical dimensions to these claims. How do they relate to the post-structuralist epistemologies of ANT and DT, the methods applied, and the practical limitations to these methods during the pandemic? First, the obvious limitation: the only responses covered here are the ones by interviewees and workshop participants, which covers about half of the collaborative membership organisations. In addition to this, the ones interviewed will likely have focused on the practices that they deemed relevant, when asked about the ways in which their work has changed during the pandemic. As citied earlier, Law (2004, p. 144) notes that there are three dimensions to this, in what is present (most obviously through material objects and discursive representations), in what is absent but described or otherwise visible, and in what is absent, yet still constitutive. Some of this will have remained hidden, excluded by participants. Yet, it is that final dimension still merits the most discussion, as this is where interpretation becomes necessary, to reconstruct that absent, yet constitutive Other. I attempt to do so across the themes discussed.

6.1 How does the collaborative infrastructure their responses to infrastructural breakdown?

In my first research question, I ask:

> *How does the collaborative infrastructure their responses to infrastructural breakdown?*

The case study themes discussed regarding this research question are mutual aid as a material public, the use of Zoom as response to communicative breakdown, and digital and non-digital material practices that are developed in response to issues with Zoom use. The material practices serve as transition to the next research question, as they are articulations of a shared issue, discussed in the following section through the prism of publics. These three themes resonate with different aspects of infrastructuring. Mutual aid as a material public highlights the role of infrastructural allies in keeping a classification infrastructure working, as they act as intermediaries between service users via the CRM, and volunteers via WhatsApp group. The shifts to the mutual aid infrastructure also show how the configuration of actors shapes the issue, as the focus of mutual aid shifts away from survival work once the ageing social enterprise CRM is appropriated for mutual aid coordination. The use of Zoom highlights system-specific limits for the appropriation of an infrastructure. As Zoom is fairly rigid system, with few affordances beyond talking heads, participants note an affective gap in interactions that they are not able to reproduce. Issues for service users points towards another infrastructuring effort, as alternative practices are introduced, in part as a response to Zoom, in part as response to the shared issue of social isolation. These digital and non-digital practices serve as transition to the next research question, as they are articulations of a shared issue, discussed in the following section through the prism of publics.

6.1.1 Mutual aid as a material public

I find that the shifting configuration of human and non-human actors shapes the understanding of the shared issue of mutual aid in the neighbourhood, as a material public moves from an ad-hoc, social media-based response to a classification infrastructure. I first read this through the discourses of mutual aid, to articulate the shifts to the issue, and then highlight how these shifts are related to an expanding configuration of actors around that issue. Some of these new actors are technological, including a classification infrastructure appropriated from the CRM of an ageing social enterprise, maintained and managed by infrastructural allies from the collaborative.

This is where I make a novel contribution to the understanding of mutual aid work during the COVID-19 pandemic, which is also relevant to other community responses to disaster. These responses also involve data practices, as Marres (2017, p. 154) noted regarding disasters such as wildfires in the US and the Fukushima nuclear accident. Regarding digital participation, Marres (2017, p. 164) also asks:

> "[H]ow can we – as a society, with its discourses, its established ways of talking, and institutional arrangements – move beyond the assumption that publics are essentially static, passive and containable in the settings in which they become observable?"

In this theme, I contribute to that question. I relate my material reading of mu-

tual aid to a broad range of literature on mutual aid during the COVID-19 pandemic, providing an account of the changes to mutual aid throughout the pandemic through the configuration of actors. In that specific context in the UK, the relationships of mutual aid groups with councils can be described supplementary, complementary and/or adversarial, with potential changes to that relationship throughout different phases of the pandemic (Rendall *et al.*, 2022, p. 14). The mutual aid group in the neighbourhood moved from a brief adversarial stage early in the pandemic to a complementary relationship with the local council. Here, these shifts are accounted for through the move to a classification infrastructure, which is a novel contribution in that the technologies appropriated by mutual aid (again, *design-after-design*) also relate to the issue itself. They are not neutral platforms, but constitutive of the issue together with other actors.

To reiterate, mutual aid is defined through two elements, survival work and counter-hegemonic social change. In the context of the COVID-19 pandemic, mutual aid became a popular term for different forms of neighbourly support, its precise definition thus somewhat eroded. In the first stage of *infrastructural breakdown*, the council was perceived as slow to react (perhaps related to a general perception of the council). The mutual aid group, in contrast, was constituted as a Facebook group before the first lockdown. At this stage, aid requests in the group are selected and fulfilled directly by volunteers. The issue that the human actors share is not unknown, but *the* unknown, as both the dangers of pandemic and the policy responses to it are unclear. The initial absence of a government response drives that first stage. In the second stage of *ad-hoc infrastructuring*, the complexity of the system increased, and infrastructural allies (among them collaborative members) step in to negotiate between requests made by service users on Facebook and WhatsApp groups with volunteers. At this point, short-term survival work (but not longer-term social change) is identified as the shared issue of mutual aid. In the third stage a fairly stable *socio-technical infrastructure* is established, as an agreement on cooperation with an ageing social enterprise and the local council is reached. The CRM of the ageing social enterprise is used to track mutual aid requests and their status. Infrastructural allies add these requests to the WhatsApp groups of volunteers, set up during the second stage. Non-emergency requests are asked to go through the ageing social enterprise, while emergency needs are now directed towards the council. This changes the shared issue: as survival work in the strictest sense is delegated to the council. This shifts the relationship of mutual aid to the council from adversarial to complementary, as responsibilities have been distributed among the concerned actors, by splitting between emergency and non-emergency support.

The knowledge claims in this section benefit from the Facebook group serving as an archive for all public-facing mutual aid work. In particular, it provides a precise timeline of events, as, of course, every post is dated. This was useful as interviewees did not provide precise dates. In addition, their claims could be verified through posts on Facebook, and further context could be provided. As Marres (2017, p. 159) puts it, "[d]igital platforms

facilitate participation, the analysis of participation, [...] social media are platforms for social research before they are platforms for social life." There is a temporal dimension to the empirical material, as the infrastructures of different pandemic responses are not set up for the long-term. In this case, however, the Facebook group provides an accidental archive of text for tracing the mutual aid infrastructure over time. This timeline matters here, as any action taken by the mutual aid group during the pandemic relates to the policy response to the pandemic at the time when that action is taken. Thus the knowledge claims here are backed by another source, providing a fairly high degree of confidence in the empirical material - although it is of course possible that some material on Facebook was deleted, and that that material may be hidden, yet constitutive. For instance, as the mutual aid Facebook group defines itself as "non-political", it is possible that material perceived as "political" may have been deleted. It would still be constitutive of this definition, as it may have prompted the "non-political" stance. Regarding the classification infrastructure of the CRM, it is clear that there are hidden, yet constitutive elements, as I here rely only on recollections of the interviewees from the collaborative (as the work of the collaborative was the focus of this case study). The function of the classification infrastructure in shaping the shared issue of mutual aid can, however, be established. The precise workings of that infrastructure cannot, despite attempts to interview through the heuristics. This extends to closed elements of that infrastructure, such as the WhatsApp groups used for coordinating volunteers. Still, the role of the infrastructural allies is well established, and through the infrastructural breakdowns of that particular system certain qualities of the infrastructure become visible. These include issues with scaling, usability and adaptability of the system, as these required the work of the infrastructural allies. The "boxes" of the classification system itself are also clear, as the ageing social enterprise used them to track and publish the scope of mutual aid during the pandemic. To a degree, what remains hidden, yet constitutive however, is the everyday use of that infrastructure, when it is working through infrastructural allies, and not breaking down. Inverting infrastructural breakdown would thus be a productive starting point for further work, continuing the *tracing* of actors and their associations, hidden and encrypted in WhatsApp groups of coordinators and volunteers. Post-pandemic, these are dormant networks, and to a point they already were at the late-pandemic moment when collaborative members were interviewed on this. Thus, there are also temporal limitations to this. Still, this is where I make an original contribution to the study of material publics, or more generally data practices during disaster - a contribution that may have been challenging to capture at a later date.

The case of mutual aid differs from the other themes in that the collaborative and some of its members contributed to a different group. This case is still discussed however, as there is sufficient overlap, as a community worker from the collaborative acted as a mutual aid coordinator, as did another collaborative member. Some of the volunteers carried on volunteering with the collaborative later. The case of mutual aid illustrates several of the

methods of infrastructuring well, in how collaborative members respond to infrastructural breakdown. The mutual aid group structures its response to infrastructural breakdown in three stages, separated by the configuration of human and non-human actors at a time, which shifts the understanding of the shared issue. Infrastructuring here is used for its analytical capabilities, as the design-after-design is done by the mutual aid group, in particular infrastructural allies that maintain the CRM classification infrastructure, and act as intermediaries between the CRM and the volunteers in WhatsApp groups. In addition, this case illustrates how a material public is constituted through the actors attached, as the meaning of mutual aid shifts over time.

I show the usefulness of the *information infrastructures* approach for the analysis of community networks, in the appropriation of existing systems to new purposes through design-after-design. This is infrastructuring by users of systems themselves. This contains also a cue towards a humble recommendation for design under such conditions of external infrastructural breakdown. Under such conditions, the urgency of the situation requires *ad-hoc infrastructuring*, as patchwork infrastructures are negotiated by infrastructural allies. In this instance, they coordinated requests between CRM and WhatsApp, and without them there would be no relation between these two non-human actors - and the human actors of service users and volunteers at either end of that network. With less urgency to the emergency, the designer may be tempted to focus on removing the infrastructural ally from that equation, perhaps by providing a direct interface from between service users and volunteers through a bespoke CRM, prompting a linear use-before-use design process. With urgency to the emergency, the recommendation is to join the ranks of infrastructural allies instead, providing another form of knowledge and ability that may be useful for required short-term adjustments to available infrastructure. This recommendation is not only based on the analysis of mutual aid, but my experience in working with the collaborative during the pandemic, where I worked with them to transfer in-person work to Zoom in the AI workshops, and then acted as an infrastructural ally on a smaller, less urgent project for the website of the collaborative. This is where the normative perspective of infrastructuring is relevant. In design-after-design, infrastructuring is about design *Things* in which controversies (matters of concern) can be articulated, and which can be appropriated in new ways. The CRM, for instance, was appropriated in an unexpected way, but in the process the spaces for articulation such as the Facebook group became less relevant.

6.1.2 What Zoom is lacking

Regarding the use of Zoom as a stand-in for face-to-face communication, I find that there is an affective lack in video calls for collaborative work, and a complex set of issues for different service users. Some of these issue are addressed by material practices, which I discuss further below. Here, I will proceed with a focus on affect.

Part of my findings resonate with early work on video calls, and as such they are

not original. There is however an original contribution in highlighting that the issues identified in past prototypes of video call systems are similar to the issues of present established products. Even if the technology has changed and become accessible to a much larger group of users, a video call is still defined by talking heads. I also contribute a novel reading of these issues through affect theory, thus linking issues with video calls to practical obstacles to the articulation of publics. This affective gap is noted in particular for work between member organisations within the collaborative, and for internal work within member organisations. For work with service users, other issues are more relevant, as video calls related to complex issues faced by different groups of service users.

Following Marres, I define Zoom as a methodological instrument for participation, an artefact suited to specific modes of engagement based on its affordances. I find that participants find it lacking for the modes of engagement that they desire. This is framed through an affective lack. Read through Law's terms on the mess of research, this affective lack is in the third dimension of things that are absent, yet constitutive. As I noted before, affect is defined as a residue or surplus, a force that cannot be fully explained through the theoretical perspective, for example what cannot be understood rationally (in computing) or discursively (in post-structuralism). Still, participants articulate the (in-person) interactions that are absent, so the interpretative leap is from the second to the third dimension of Law's terms, and I provide here an interpretation through the prism(s) of publics, through affective attachments and affective investments. This interpretation resonates with concepts from early, experimental work on video calls.

Participants articulate practical benefits to the use of Zoom, such as the removal of travel to meetings, and an increased efficiency resulting from that. Regarding Law's second dimension, things that are absent but articulated, many participants highlight the impossibility of replicating in-person interactions on Zoom. This has practical implications, which are addressed in the following material practices. Here, I interpret this through affect theory, moving to the third dimension, things that are absent yet constitutive: desired social interaction that are not possible on Zoom, and associated with in-person interactions. I argue that there are three elements to this lack. One, the importance of affective attachments is highlighted in the joy of working together. Two, affective investments in everyday work show that there is lack that goes beyond the impossibility of in-person interactions. Three, realising a shared purpose is challenging on Zoom as it is lacking in affective, everyday, informal interactions. Regarding these claims, I note two limitations. One, it would have been useful to have more textual evidence for these three elements to further back this interpretation. Two, the interpretation of affect from text is challenging due to the residual nature of affect, as this is the interpretation of absence, not presence. What is, however, well established in the interviews is the association of Zoom with a lack of desired in-person interactions, the lack of "portholes" into the informal elements of cooperative work. Thus I attempted to analyse this through the prism of publics, which note the importance of affects for collective action on shared

issues. This much could be established in the second element, where participant argue that Zoom cannot replace "real" interactions, which points towards Laclau's definition of affect as the drive towards an unattainable whole. Here the "real" is unattainable due the communicative asymmetry of Zoom. Furthermore, in third element of affect on Zoom, the importance of a shared purpose, a participant (coincidentally, no doubt) used the same concrete metaphor as Laclau and Le Dantec. Where Laclau argues that the force of affective investments *cements* a shared issue, the participant noted that Zoom forecloses this stabilising affect. The lack of informal interactions, affective attachments, makes it impossible to *cement* a shared purpose, which also resonates with Le Dantec's understanding of affect. Even in the discussed literature on video calls there is some precedent for the role of affect, it is just not named as such. "Portholes", for instance aimed to foster an informal awareness and connection in the workplace, which I read through the lens of publics as (a lack of) affective attachment.

When working with service users, the issues with Zoom were more practical, and as such less interpretation is required. In this section I am dealing with the second dimension of the mess of research, absent things that are described or otherwise visible. These findings are further backed in the next section which deals with material practices, and thus with what is present through material objects. I will discuss the findings there, to draw connections across themes and research questions. Regarding service users, there were two issues in access to Zoom and privacy issues when zooming into the homes of service users. The issue of access relates not only to digital exclusion based on socio-economic markers, but also a qualitative relationship with mobile computing. While the collaborative and its member organisations did provide data and devices to service users when needed, there were also issues specific to service user groups, such as the challenges to multi-lingual service delivery, or fatigue during mental health sessions on Zoom. For some service users, the issue was privacy, as sensitive issue were now discussed at home. Member organisations were confronted with intimate views into domestic settings, an unintended "porthole" at the edges. Before discussing the material responses to this, I would note that in focusing on the collaborative, only the perspective of service providers is covered. Due to the sensitive nature of some the issues, no further research with service users would have been possible within the ethical approval of my work. No sensitive data was shared by interviewees due to confidentiality, nor I did ask them to. Thus, the above issues are described at a fairly abstract level. What I have noted above is what is knowable through the prism of shared issues - research into the complexities of remote social or mental health work is beyond that scope, and would have required a focus specifically on this.

Beyond infrastructural breakdown, this would be a productive direction for further research, as it identifies a gap in the theory of publics in HCI. Le Dantec's work on affective attachments, for example, focuses on in-person social work, to which some technological elements are introduced to foster affective attachments. This could be inverted, looking

at the role of social elements in fostering affective attachment in remote work. These, as noted, may be required to *cement* a shared issue, and thus enable shared action on that issue. While some participants note that they were moving back to in-person work as soon as possible, remote working is likely to remain relevant (if scaled down) post-pandemic due to the practical benefits that were also noted by interviewees. Thus, if a shared issue can be a driver for collective action, understanding if and/or how this could be done remotely could a productive direction. With the emphasis on affect theory, I contributed a new interpretation for old issues, present in both the experimental stage of video calls 30 years ago, and during its widespread adaptation during the pandemic.

How then to overcome this affective gap? For further work, I point towards procedural affect, as articulated in the SenseLab of Massumi and Manning (see 2015, pp. 70–79), which explores the constitution of groups through a direct application of affect theory. SenseLab addresses the demand for 'deliverables' (such as design outputs) by putting the event and what occurs in it at the centre instead. A subject-group is a group constituted through a shared, affective event. This can be a way of creating new groups and collaborations around that shared experience. Work in small groups should begin with affective mechanisms that preclude any talk, while reporting to the larger group should focus on mechanisms though which participants reproduce their process instead of reporting their results. Discussions should take a step back from the deliverable to the process through which participants generate them - instead of talking about their work, for example, they should be asked to talk about "what made the work work - the tendencies, skills, obsessions, attractions, inclinations that drove it from within." For experimental further work, transferring the subject-group to a remote format may yield relevant results for the affective gap in video calls. This, however, is non-emergency work, and as such would have been unsuitable for the collaborative during the pandemic.

In this case, the closed system of Zoom afforded for only limited infrastructuring. While the collaborative used it for their meetings during the pandemic, many highlight the affective gap in Zoom (which may or may not be possible to overcome). This presents an obstacle to the articulation of shared issues, as through the prism of publics affective attachments and/or affective investments are important drivers for this. Still, some of the material practices below address issues with Zoom use, moving the communicative challenge from Zoom to another actor, such as WhatsApp. I noted anti-biographies as a definition for exclusionary design processes where the design is done before actors can participate. Zoom is not quite an anti-biographical design object, as it is on the surface an open platform, on which participants can articulate what they want through video, voice and text. There are limited affordances for how this is done, however, and thus interviewees note issues with forming affective connections through Zoom. Furthermore, participants also have to infrastructure alternative material practices where Zoom shifts the *moral order of the home*, in sensitive work with vulnerable service users.

6.1.3 Material practices

I find that material practices are developed by organisations in response to issues with Zoom and/or specific shared issues, in particular social isolation. I separate between digital and non-digital practices, while noting that the digital is just as material. Digital practices include the use of WhatsApp as both asynchronous supplement and synchronous alternative to Zoom. The digital practices of podcast and radio production point towards the shared issue of social isolation, as do several of the non-digital practices. These include a chatty bench at the local community centre, a traffic light system for volunteer phone calls at the local church (a classification infrastructure with three colour-coded boxes), and care packages by the church. Other care packages are material expressions of collaboration between organisations, and of the privacy issues related to zooming into the home.

Through this theme, I contribute analysis using PD concepts such as design-after-design. Through the use of interview heuristics, descriptions are elicited much in the same way as intended by early, Wittgensteinian PD. While, at that early stage the focus was on use-before-use, by working with a workforce on the systems that they would use in their workplace, the methodological focus in my case study is the same. Design artefacts are used to elicit descriptions from users on the systems they are testing, and the designer is attentive to the language used in these descriptions. In this instance, the artefacts used by interviewees in their work are used to elect descriptions of their work, thus shifting the focus to design-after-design (as much of the work is not observable through remote research methods). In noting the parallels between the "language games" in PD and DT, I contribute the analytical vocabulary for these descriptions, which, in the following, makes it possible link these material practices through shared issues, as identified through the prism(s) of publics.

There were both digital and non-digital responses to the closed infrastructure of Zoom, which can as be classed as design-after-design by collaborative member organisations, as they are about ongoing, continuous engagement with service users. A creative arts organisation set up WhatsApp groups for their arts groups, which users then proceeded to use to share everyday activities in addition to their art projects. The WhatsApp group becomes a design *Thing* (in this case, in the old Scandinavian meaning as assembly) as it connects users and is embedded into their lifeworlds, as they appropriate the group beyond its initial purpose as asynchronous supplement. A singing group quickly switched from Zoom to WhatsApp, as users preferred a mobile-first app over the more desktop-oriented alternative. In addition, the addressability of WhatsApp provided stability. Users did not have to remember a link to a Zoom call. Instead, video calls were coordinated within a WhatsApp group and the person who ran the choir was able to add people to the call. If video calls are still mostly about talking (or singing) heads, then different modes of addressability provide differentiation, making it necessary to consider to most appropriate socio-technical infrastructure for a user group. Care packages were used to

deal with the issue of privacy on Zoom. As an organisation working with young people found, delivering care packages enabled them to have private (and socially-distanced) conversations with their service users, and to intervene in situations that they may have otherwise missed. As the same worker was tasked with delivering the package to the same services users every week, they could ensure continuity in their care. In this case human participation was key to ensure stability to this *Thing*, an assortment of objects centred on different aspects of mental health. Other material practices also express concerns with mental health, in particular the shared issue of social isolation. The WhatsApp groups of both the creative arts organisation and the choir were specifically designed as social activities where the process matters, and any outputs are secondary (resonating with the subject-group discussed above as an example of affective togetherness). Similarly, podcasts and radio production were about that shared process, in addition to the final recordings. The connection to social isolation was articulated more clearly here, as it also is in the classification infrastructure set up by the local church and its Christmas care packages.

These practices are tangible in that they relate to different objects. As such, they are fairly visible in the mess of research. In addition, the use of heuristics to interview non-human actors invited rich descriptions of these practices in the context of *infrastructural breakdown* during the pandemic. The use of the objects is also directly linked to specific issues by participants, related to Zoom and/or social isolation. Thus, these knowledge claims here link to Law's second dimension in the mess of research, things that are absent, but visible. I discuss these further below, where I view these practices through the prism(s) of publics.

This is where the process of infrastructuring intersects most clearly with publics as shared issues, leading to the second research question: What shared issues can be identified through the prism of publics? Through these material practices, the collaborative members infrastructure a response to issues with Zoom and/or the shared issue of social isolation. A material perspective narrows the field of vision towards localised practices and objects that materialise efforts against the issue of loneliness and social isolation, while a discursive perspective widens that field of vision towards things at the root of these issues. In the following, I analyse the role of these localised practices and objects through the prism(s) of publics, based on the description of objects and practices in the work of interviewees, drawing here from the Wittgensteinian parallel between PD and DT. The digital and non-digital practices serve as transition to the next research question, as they are here discussed through the first two dimensions noted by Law, but also have a (at least partially) hidden, yet constitutive dimension in the links to the discourses of shared issues.

6.2   What shared issues can be identified through the prism of publics?

In my second research question, I ask:

What shared issues can be identified through the prism of publics?

The case study themes discussed regarding this research question are material practices as related to the shared issue of social isolation, and the shared issues of austerity localism and the avoidance of duplication. I carry on from the previous question on how the collaborative infrastructures their responses to infrastructural breakdown towards the wider meaning of localised practices and objects, and the shared issues articulated in relation to these things. When discussing the signifiers of shared issues, I noted that Dewey's focus on what publics do is incomplete without some consideration of what publics say about the things that they do. In this section, I move from *tracing* material practices, to *quilting* them into the larger discourses related to these practices, in particular focusing on the link between the scales of a shared issue, from localised, material expression, to contextualised reasoning behind it. To answer this second research question, I carry on with the shared issue of social isolation, elaborating on the meaning of the localised practices and objects related to this issue. Then, I proceed with my discursive reading of publics, which allows me to contextualise shared issues not only in localised practises and objects, but political decisions and discourses that shape shared issues and how the collaborative can address these issues. Moving from material publics to discursive publics, I can identify a move from social isolation to austerity localism, and the avoidance of duplication as way to address that. These are the shared issues linked through the prism of publics.

6.2.1 Material practices

I find that digital and non-digital material practices are developed in response to issues with Zoom and/or the shared issue of social isolation. In the previous section this is considered as an infrastructuring effort by collaborate members, but here it overlaps with the second question, as through the prism of publics this can be identified as a shared issue. A stated above, a material perspective narrows the field of vision towards localised practices and objects that materialise efforts against the issue of loneliness and social isolation, while a discursive perspective widens that field of vision towards things at the root of these issues.

As stated above, in this theme I link these material practices through shared issues, as identified through the prism(s) of publics. Further contributions are made in the following shared issues, as social isolation is not only addressed in localised, material practices, but connected to wider issues such public sector austerity, and the complex issues of service users that need to be addressed in collaboration, while avoiding duplication.

This theme has been summarised in detail above. Thus, I discuss here the material practices related to mental health concerns, in particular the shared issue of social isolation. This issue was addressed through practice in the WhatsApp groups of both the creative arts organisation and the choir, and the production of podcasts and radio. The connection to social isolation was articulated more clearly here. The podcast producer

from a carer organisation notes that making these podcasts was in itself a way of working on the issue of social isolation together with carers, and making public the support they offer to carers. The issue of social isolation is not only addressed through the content of the podcasts, but participation in the production. Similarly, a community recording studio recorded episodes with the residents of a care home, with one of the residents acting as the key infrastructural ally, in calling other residents to take their requests and chat with them. This resonates with several projects in HCI on content creation by older adults as way of fostering social inclusion. The classification infrastructure set up by the local church also focuses on this issue, as do its Christmas care packages.

In Law's terms on the mess of research, the first and second dimensions of things that are present, and things that are absent but described, are covered through shared issues expressed in material practices. Interviewees articulate these links themselves, in their reasoning for these practices. Thus, these knowledge claims are interpretative in their reading as infrastructuring and design-after-design. Some claims are backed by outputs, such as the produced podcasts or radio shows (even if these are about the process), but other outputs are temporary and/or not public, such as the classification infrastructure and care packages of the church. Again, the perspective covered is that of the collaborative, and not its service users, which would by definition yield a more complete public. As Law (2004, p. 143) notes, method "crafts arrangements and gatherings of things." In this particular gathering, the focus was on the collaborative, and not its service users, an imposed constraint set early in the work due to the uncertain constraints set by the pandemic. Under these conditions, I could assume that I would be able to work with the collaborative remotely, but that work with service users would be more challenging. Service users are thus partially excluded, although they remain present in the arrangement through the descriptions of collaborative members. Service users, too, are *materially implicated* in the shared issues, in some instances more than the collaborative. They are the ones affected by social isolation, which is important to point out when discussing through a theoretical frame. Here I note that to a degree this is an issue with the focus on the shared issue. An open, contingent framing such as publics means that barriers to actors will become evident in the process of identifying a shared issue and the actors implicated in the public around it. The focus was identifying a range of shared issues through working with the collaborative. This open focus was to a degree made necessary by the pandemic. As I discussed earlier, the pre-pandemic AR had to be adapted for remote methods at an early stage, during which specific issues could have been identified. If the focus would have been on a previously identified issue, the study design could have focused on identifying a fuller scope of implicated actors and how to reach them, in order to let them articulate how they are implicated in the shared issue, from their subject position. Instead, the focus was (by necessity) on publics as a prism for understanding issues in a complex and heterogenous context.

To summarise, the shared issue of social isolation can here be identified through the

prism of *material* publics, in localised practises of member organisations during the pandemic. In the following, this material issue is contextualised within the discourse of austerity localism. Through the prism of the *discursive* public, social isolation acts as empty signifier, or more precisely, a partially emptied signifier. Social isolation is experienced differently by different service users and addressed differently by member organisations. The scope of practices described under the shared issue of social isolation is diverse, and it thus can only be a *shared* issue if it is emptied of some concrete meaning. In the following, it slots into an equivalential chain that includes austerity localism (as the constitutive Other), and the avoidance of duplication. Both are shared issues that participants relate to social isolation - not just in material practice but contextualised within political discourses.

6.2.2 Austerity localism

I find that austerity, or *austerity localism* as it is defined in planning literature, is articulated as a shared issue. It is enacted in several of the material practices discussed above, which are contextualised by interviewees within austerity localism. Beyond localised practices and objects, social isolation is identified as an issue that was amplified by the pandemic. Here, this is linked to a broader set of pre-existing inequalities amplified by the pandemic, extending a chain of equivalence against austerity amplified by the pandemic - this is not only a shared issue, but also the antagonistic frontier against which other shared issues are defined.

I make a contribution to the theory of publics at local scale (and by extension digital civics), which is where they were situated by Le Dantec in HCI. While material publics and *Dingpolitik* are not by definition local, the practices analysed through this prism are. Thus, by moving from *tracing* material practices, to *quilting* them into the larger discourses related to these practices, I provide an analytical vocabulary to understand how specific infrastructuring efforts relate to issues beyond the local scale, and what the contextualised reasoning for them is.

With austerity localism I move in theoretical terms from the material public to the discursive public, extending the equivalential chain beyond what is represented in localised, materialised practice. Social isolation is the shared issue that links the material and discursive dimension in a chain of equivalence. For instance, inequalities caused by austerity and amplified by the pandemic are intersectional, in that inequality is based on age, race, culture and language. This leads to social isolation, and in this instance is addressed by a creative arts organisation through the use of WhatsApp groups. In general terms, austerity is linked to mental health issues, and is seen as a limiting factor to the work that collaborative members can do to respond to that. In particular, they may only be able to provide immediate crisis support to their service users, instead of preventative work, as they are overwhelmed (yet underfunded) with referrals, as relevant social services have been cut. Furthermore, the issues of service users are complex and "multi-

factorial." While austerity is highlighted in general, some also specify that the issue is the local impacts of it: *austerity localism.* This leads to a "strange dynamic" where local government is both pursuing partnerships with organisations such as the collaborative, while continuing a top-down management style. In planning literature, austerity localism is identified as policy by the central government, but for interviewees local government is the institution associated with it - perhaps because they have to implement it as the result of disciplinary budgeting by central governments.

As noted before, there is a temporal dimension to the empirical material, as some infrastructures leave more traces than others. Mutual aid, for instance, leaves behind a Facebook group that provides text for tracing this infrastructure. Other may leave inaccessible and encrypted text in a WhatsApp group (and accessing this text retrospectively would not be ethical). Some leave a material, public output, in podcasts, radio shows or chatty benches, while care packages are, of course, given away. Thus, I now attempt retrospectively to quilt the meaning of these infrastructures, and the shared issues represented in them. I also extent this to shared issues that are not represented (or not representable) in these material infrastructures. The latter point extends again to Law's third dimension of the mess of research, things that are absent, yet still constitutive. These knowledge claims require a degree of interpretation as there is an interpretative leap from what participants say to what is said in the discourses of these things. Thus, this is my attempt to best relate the views of participants to the wider discourse of austerity localism. This is a bigger interpretative leap than the one from what participants say to what they do to address these issues in their material practices. We can establish links between what they say and what they do, but the links between what *they* say and what *is* said and done at a political level is fuzzier, not only because in this case the absent, yet constitutive Other is that of the malleable and hard to grasp ideology of neoliberalism.

I identify austerity localism as a shared issue through a discursive prism of publics. As other shared issues are set against it, I define austerity localism amplified by the pandemic as the constitutive Other. It is the discursive element that links social isolation to the following shared issue of the avoidance of duplication, as both relate to austerity localism.

6.2.3 *Avoidance of duplication*

I find that austerity localism drives a key shared issue within the collaborative: the avoidance of duplication. This is the stated goal of the collaborative, but it also resonates with other themes articulated to this point, and slots into the equivalential chain against austerity localism.

I continue here the discursive reading of shared issues such as austerity localism. As stated there, I make a contribution to the theory of publics with an analytical vocabulary that *quilts* larger discourses to localised, material practices.

There are two dimensions to the avoidance of duplication. One, there is a practical dimension as collaborating allows for the delivery of more relevant services to different

service users, while better dealing with an increase in service users dealing with complex issues. As this complexity relates to cuts to both publics sector and third sector funding, the complexity extends the chain of equivalence from austerity to the related issue of (the avoidance of) duplication. Two, there is an antagonistic dimension, where collaboration is seen as a response to imposed competition for funding. Avoiding duplication to better support people is defined as one of the purposes of the collaborative. Although collaboration between individual member organisations precedes the formation of the collaborative, member organisations appreciate that the collaborative shares information and enables new links, making it possible to avoid duplication. These efforts relate to austerity, as the collaborative is seen to coordinate and inform in a way that was previously done by the council. However, the collaborative struggles to access funding as well, which also has long-term impacts as they can only access short term funding, while they argue that their relatively inexpensive, community-based work would show effects in the longer term. This is the antagonistic dimension, as a collaborative approach is set against a neoliberal notion of competition that ensures better services. For the collaborative, it is collaboration on that offers better services across the complex problems that their service users face, which has an intersectional dimension highlighted both by interviewees and the United Nations "special rapporteur on contemporary forms of racism, racial discrimination, xenophobia and related intolerance."

As noted, there are two aspects to the avoidance of duplication. One, it is a practical issue for the collaborative, and two, it is an antagonistic issue set against austerity. The knowledge claims of this theme relate to different dimensions of Law's mess of research. One, participants clearly articulate the practical aspect of the avoidance of duplication. Two, a participant sets neoliberal competition against collaboration. Thus, these practical aspects relate to Law's second dimension, things that are absent yet articulated. There is again a fuzzier link between what the collaborative says and does, and what is said and done at a political level. Thus, in particular the antagonistic frontier to austerity localism relates to Law's third dimensions the mess of research, things that are absent, yet still constitutive. While participants do articulate the link, there is a degree of interpretation in relating it to the wider political discourses.

I identify the avoidance of duplication as a shared issue through a discursive prism of publics, where it is part of an equivalential chain set against the antagonistic frontier of austerity localism, as it relates practically to collaborative work with limited budgets for service users facing complex problems, and antagonistically to a stance against competition for limited funding.

6.3 Is infrastructuring publics a suitable frame for tracing and quilting shared issues?

In this final question I evaluate my application of digital civics as *infrastructuring publics*. As such, I focus here on the relationship between the theoretical and methodological

framework and the case study, in order to contribute to the theory of publics and the methods of infrastructuring. In particular, I focus on the analysis of the infrastructuring by the collaborative itself in response to infrastructural breakdown, more the analysis of infrastructuring than generative infrastructuring. First, I summarise my findings across the themes, using the previously introduced discursive sequence, as this not only summaries the findings of the case study, but also points towards the necessary modifications to its application to publics at neighbourhood scale. Second, I summarise my findings regarding mutual aid as a fairly comprehensive example of the relationship between infrastructuring and material publics. In both instances the configuration of actors manipulates the shared issue. For mutual aid, the meaning of mutual aid changes when an ageing social enterprise and the local council get involved. In the discursive sequence, a similar effect is identified at smaller scale, as the shared issue of social isolation gathers different assemblies of actors and things around it, shifting what the issue of social isolation means in each instance.

In the theoretical framework figure 2.3 visualised the relationship between rejected demands, made equivalent in their rejection by a responsible institution, to which an antagonistic frontier is drawn. Through an affective investment, one demand becomes representative of the chain of equivalence, as an empty signifier. For comparison, I repeat it here in figure 6.1. How then does this apply to the case at hand? In discussing the previous research questions, I highlighted elements of this sequence, and linked them to material publics. In order to provide an overview for the discussion that follows, I now visualise this relationship in figure 6.2.
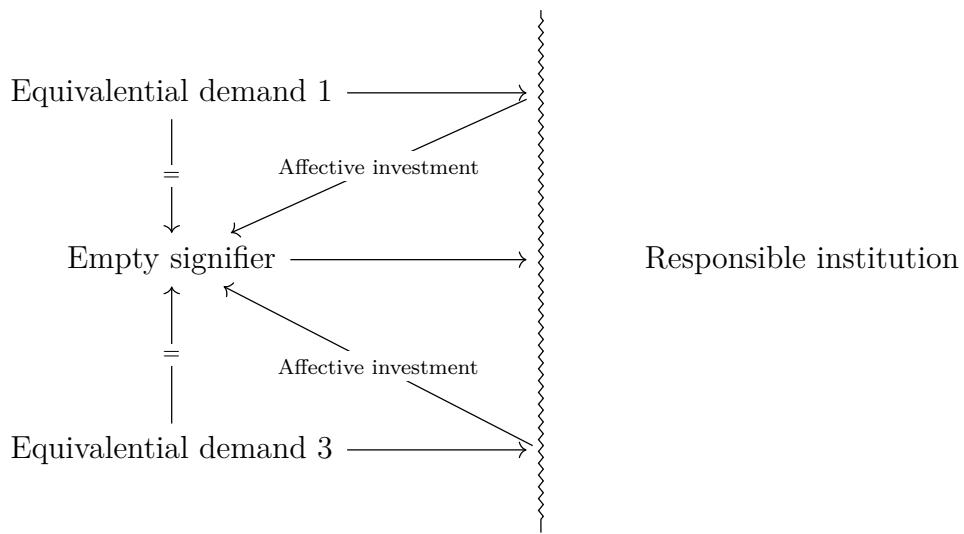

Figure 6.1: A sequence of popular demands represented by an empty signifier

In this sequence, there are three issues set against the antagonistic frontier of austerity localism amplified by the pandemic. These two elements are combined as many intervie-
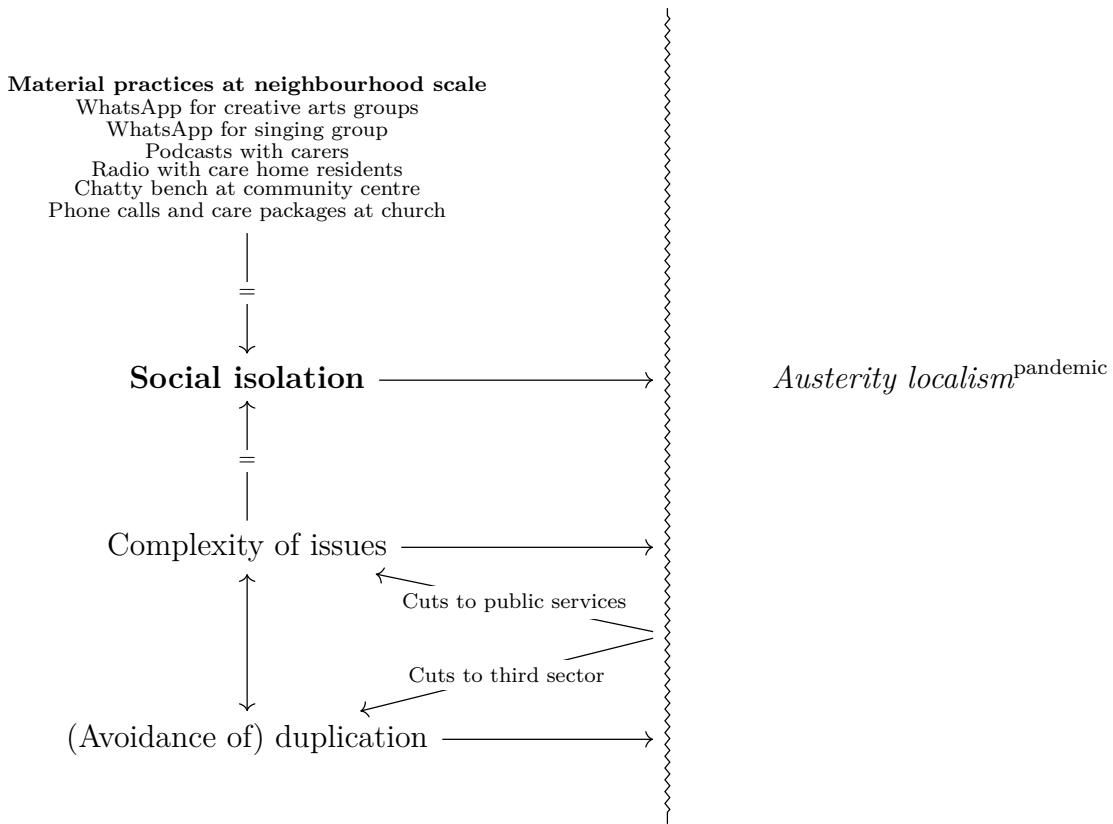
Figure 6.2: A discursive sequence linking localised material practices to the discourse against *austerity localism*

wees state that the pandemic amplifies pre-existing issues in the neighbourhood, many of which can be traced to austerity. An affective investment is not clearly identifiable here. Still, interviewees articulate a lack, as the avoidance of duplication relates to funding cuts to the third sector, while the increased complexity of issues faced by service users relates to cuts to public services. These two issues are linked to a degree, as the complexity of issues makes collaboration necessary. Social isolation is linked to complexity as well, as either part or result of a complex set of issues. Social isolation acts as a partially emptied signifier that represents the range of material and discursive shared issues. This is where I include localised, material practices, as they address social isolation in different ways, but without reference to the antagonistic frontier. The figure thus shows that the combination of material and discursive prisms of publics allows for the construction of links between issues across different scales. This is where I extended the theory of publics with DT, as that theory focuses its prism on the representation of issues (or demands, in Laclau's terms) through empty signifier, affective investment and antagonistic frontier. In this instance, this chain of equivalence contains several material instances of the issue of social isolation, and a number of other issues linked to it. This link is made possible through the antagonistic frontier to the neoliberal Other: austerity localism amplified by the pandemic. How, then, does this differ from Laclau's discursive sequence?

I define austerity localism as both a shared issue, and the constitutive Other of the an-

tagonistic frontier. As noted before, other issues are set against austerity amplified by the pandemic. Thus, there is here a slight shift to the discursive sequence of Laclau, initially necessitated by the shift from shared demands to shared issues, to align the theoretical vocabulary with other theories of publics. For Laclau, a shared demand is addressed to a responsible institution, to which an antagonistic frontier is drawn if they are unresponsive. For the collaborative, a "strange dynamic" and historical "paternalism" is observed regarding the council, while the "region was already like hammered by sort of years of Tory and well not even necessarily Tory, just, you know, like western capitalism." In this case, the responsible institutions of local council and central government are associated the shared issue of austerity localism, thus making that shared issue the constitute Other, against which other shared issues are defined. Crucially, this antagonistic frontier traverses scales, and even a small-scale neighbourhood project like the collaborative is set against the global impacts of neoliberalism and the pandemic. The antagonistic frontier does not require any adjustment for scale, contrary to following concepts of the discursive sequence.

The focus on shared issues instead of shared demands allows for the construction of a more inclusive equivalential chain. For example, a lack of funding is a shared issue, but not necessarily articulated as a demand for more funding. Still, as an issue it warrants inclusion in the equivalential chain against austerity localism. This may be an issue of scale, as Laclau's theory was formulated for far larger popular projects, which may necessitate a translation from issue to demand. As Žižek (2006, p. 558) puts it in his critique of Laclau's theory:

> "However, the term *demand* involves a whole theatrical scene in which a subject is addressing his demand to an Other presupposed to be able to meet it."

At this local scale, there is perhaps no need for performativity. Instead, the issue (not the demand) is identified, articulated and partially addressed through localised material practices. What is relevant here is that austerity localism is a constitutive Other in that it implicitly drives local action. Yet it goes beyond that scale, relating to political discourses. Thus, DT here enables the *quilting* of local practice to national discourses. Contrary to Laclau's discursive sequence, an affective investment is not clearly identifiable here, although a *lack* of funding is articulated. This may be where theory clashes with practice at this scale. Member organisations carry on with their work against the impacts of austerity, with less focus of work against austerity itself (much like the mutual aid group focused first on survival work and then non-emergency work, with less focus on social change).

At this local scale the shared issues relate and overlap, while in Laclau's discursive sequence shared demands only need to relate to each other in their rejection by the responsible institution. This, again, may be a question of scale. The more rejected demands there are, the less likely they are to overlap in anything else but their rejection.

As the collaborative feels that there is a shared purpose, and social isolation is identified by almost all interviewees, it is likely that in practice, collaborative work streamlines shared issues. At a larger scale, the representation of a heterogenous chain of rejected demands is the problem, which is where an affective investment in an empty signifier becomes relevant. Here, social isolation is at least a partially emptied signifier, capable of representing a diverse range of things, in particular when set against the antagonistic frontier. As noted above, however, the *force* of affective investments is missing here. Where for a larger movement the empty signifier "gives coherence to the chain (Laclau, 2005, p. 44)", at local scale it may be the everyday interactions of the collaborative.

Thus, some scaling of the discursive sequence is required here. Here the concepts of publics in HCI may be useful, as the commitments and dependencies between actors, artefacts and institutions matter, including affective attachments (Le Dantec, 2016, p. 62). This was legible in the theme on Zoom use, where interviewees noted a lack of affective attachments, a challenge to articulating a *shared purpose*. What was missing here, however, was a concept of scaling, present in both the works of Dewey and Tarde, the two early influences for publics in ANT and DT, respectively. Dewey's problem of the public is about scaling *up*, as the infrastructures of modernity make it challenging for publics to recognise themselves at a distance beyond the local scale. In the affective gap of Zoom, this is visible in the local, yet (socially) distanced scale of my case study. For Tarde, publics are about scaling *down*, in this case from the affective dynamics of the crowds, diffused through the distributed infrastructures of modernity to publics. Zoom, too, appears to diffuse affective dynamics.

It may be that at local scale, the signifier is not fully emptied because it is tied to concrete material practises against social isolation. I argue here that these material practices empty that signifier in a different way, as even at local scale these issues are heterogenous, and they may or may not have been expressed (at least partially) in material practices and objects. This is where I contribute a combined reading of discursive and material practices, to work across scales. As shown above, Laclau's discursive sequence applies when the political context of austerity is considered. At local scale, there is not quite the differentiation between heterogenous shared issues or demands that Laclau articulated. However, different forms of heterogeneity become visible through material publics. With a range of organisations working with a diverse group of service users, the same issue will have a configuration of different actors assembled around it. Social isolation, for example, is experienced differently by older adults from minority background, or older adults in care homes. The material responses by member organisations to this are different. In this case, these included WhatsApp groups, and community radio production. Read as through Latour's *Dingpolitik*, these material responses are objects around which a public assembles, and the collaborative provides an assembly point for these organisations working on the issue of social isolation. Read through Marres' material publics, this public branches out from there, through the different ways in which service users and

organisations are materially implicated in this issue, which changes what that issue is. Thus, I add here another problem to the many problems of publics: the *problem of difference* (Law, 2004, p. 158f). The same object of social isolation is enacted through practices that are different, which, in turn changes that instance of that thing, while still maintaining a relation to the general thing - they are design things, not objects, as they are part of "complicated entanglements (Latour, 2005a, p. 31)", set in relation to other actors in their everyday lifeworlds.

In short, we can recognise many material practices dealing with social isolation, but the instances of social isolation differ as they are enacted by different configurations of actors and things. The signifier of social isolation is thus partially empty because it represents several diverse configurations of actors and things. Of the two conditions for an empty signifier it fulfils one, as it is the name for the element that enables links between issues, but it is not so empty that it could represent other shared issues (see Laclau, 2005, p. 108). Even if the material practices of social isolation are heterogenous, we would still be able to draw a limit to what constitutes social isolation.

In the introduction I discussed the relationship of neighbourhoods, publics and the pandemic. It may be that relevant concept of scale is found in the definition of neighbourhoods during the pandemic as heterogenous, heterophilous networks that require specific infrastructures to be maintained - a definition that draws from a psychoanalytical understanding of the neighbour as *Nebenmensch*, constitutive of the subject, despite not being part of the discursive sequence of self/other or us/them. Such a neighbourhood is defined more by openness and ambivalence than identity or geography.

Here, the different material practices of the collaborative against different instances of social isolation can be seen as an example of such a heterogenous, heterophilous network, with different configurations of actors assembled through these material practices. These practices differ, but the shared issue is named social isolation and is recognisable as such across configurations of actors. This is the *Nebenmensch* in action, as there is openness and ambivalence in what can constitute a material practice against the shared issue of social isolation. At this scale, a lesser role is afforded to the constitutive process of signification - as I pointed out above, the signifier of social isolation is only partially emptied, and the force of affective investment is limited. In order to still articulate a shared issue, the discursive sequence must be adapted to neighbourhood scale, where it is not the empty signifier, but a heterogeneous set of material practices recognisable as the same shared issue despite their differences. Still, the discursive sequence remains relevant when antagonistic frontiers are drawn to austerity localism amplified by the pandemic. Notably, these frontiers are not drawn at neighbourhood scale, but against higher scales when austerity localism is linked to the city council, national governments and parties, or a global pandemic - in line with the concept of the *Nebenmensch*, where antagonistic elements of the discursive sequence are suspended at neighbourhood scale. In my thesis, I aimed to contribute a detailed reading of the infrastructuring of publics in particular

related to the analytical capabilities of this framing. This understanding of the discursive sequence at local scale is my contribution to that.

In the above, I discussed the *tracing* and *quilting* of shared issues, combining material and discursive publics. Through *tracing* material practices, it is possible to differentiate between different instances of thing with the same name, a signifier with different meanings. This is a novel understanding of a partially empty signifier at local scale. Through *quilting* these issues into discourses, it is possible to contextualise localised, material practices beyond the local scale. Thus, this modified discursive sequence is a suitable frame for tracing and quilting shared issues at local scale. What, then, of infrastructuring? In some case study themes, there was a greater emphasis on infrastructuring done by the collaborative, or collaborative members in mutual aid. These themes include material practices, the use of Zoom, and mutual aid as a material public. In short, a focus on infrastructuring is a frame for what does not work in the affective and practical issues with Zoom, and what is done when things do not work in the responses to practical issues with Zoom. These two aspects of infrastructuring tie in with the sequence discussed above, when the responses not only relate to Zoom, but to the shared issue of social isolation. Mutual aid stands apart from this sequence but articulates most clearly the relationship between infrastructuring and publics, as the efforts of infrastructuring a mutual aid system shift the discourse of the shared issue of mutual aid in the process, through the shifting configuration of actors.

To reiterate, I am interested in the infrastructuring as a form of design work done by users themselves, particularly at moments of infrastructural breakdown. There are two key methodological elements to infrastructuring, as defined for this project. One, the starting point is infrastructural breakdown, here the external breakdown of work practices due to the pandemic, and not the internal breakdown of a socio-technical infrastructure. This a focus on practice, before any intervention by researchers. In particular the focus on breakdown makes visible "[t]he normally invisible quality of working infrastructure (Star, 1999, p. 382)", and the role of actors who make an infrastructure work, the often mundane process and invisible mechanisms that enable connections between actors. Two, design-after-design, an attention to the ongoing, non-linear appropriation of designed objects by users in their lifeworlds. Due to the constraints of social distancing throughout my field work, I elicit descriptions of these objects (much like the prototype stage in early, Wittgensteinian PD) through a set of heuristics designed for interviewing non-human actors, through the interview responses of human actors, as this line of questions focuses on infrastructural breakdown and non-human actors.

Mutual aid was defined as material public that constructs a classification infrastructure maintained by infrastructural allies. Here, a shifts to the meaning of mutual aid are observable, at larger scale than for the discursive sequence. The configuration of actors shifts, as an ageing social enterprise and the local council get involved, and mutual aid shifts from survival work to non-emergency work, with emergency work delegated to the

council. The technologies appropriated by mutual aid are not neutral platforms, but constitutive of the issue with other actors. This case stands apart from the sequence, but contrary to the sequence, less *quilting* is necessary, as this theme is a fairly complete application of the infrastructuring of publics, in which I show how the alignment of a classification infrastructure by infrastructural allies at the same time shifts what the issue of mutual aid is about. First, mutual aid was coordinated via Facebook, WhatsApp and Google Forms, as survival work, necessary as the council was seen as slow to react to the infrastructural breakdowns of the first lockdown. This is an antagonistic relationship to the council. Design-after-design is visible in the third stage, where the CRM of an ageing social enterprise is adapted for non-emergency work through infrastructural allies. At this stage, the council takes over emergency response, suggesting a complimentary relationship. Of the concepts of the infrastructuring approach, the notions of infrastructural allies and classification infrastructures were particularly useful for categorising the work done by the mutual aid group. This is novel contribution to the study of mutual aid during the pandemic, and aligns to material publics, as I first *traced* the infrastructures of mutual aid, and then *quilted* the shifts to the understanding of mutual aid to the shifting configuration of actors in the classification infrastructure. However, this also moved the focus away from the everyday work of maintaining that infrastructure, when it is working through infrastructural allies and not breaking down.

Elsewhere, a focus on the infrastructures that work yielded relevant results for infrastructuring publics, even if these descriptions were elicited in the specific context of responses to the pandemic. First, the use of Zoom highlighted limits to infrastructuring by users, when the thing is not sufficiently adaptable to the expectations of and needs of users. Here, the analytical vocabulary of publics in HCI and DT was useful to articulate the challenges of forming affective attachments through Zoom, as it lacked the affordances for informal interactions - an issue already identified in early experimental work on video calls over 30 years prior. It should be noted here that the flexibility of this particular element of the analytical framework was not tested. What, for instance, if the issues with Zoom could not have been described through affect? Second, the practical issues of Zoom use with service users led to alternative material practices, elicited through the descriptions of the objects used in these practices. In particular the practices traced in relation to social isolation show what combining the analytical frameworks of ANT and DT contributes at local scale, as these practices express the shared issue of social isolation, through WhatsApp groups for arts and singing, podcasts, community radio, chatty benches, a phone-based small classification infrastructure, and care packages. As noted above, these objects are part of different efforts to address social isolation with different groups of people. This is my novel contribution to the theory of publics, as the attention to design-after-design, or perhaps *things-in-use* yielded a material reading of partially empty signifier, in the same naming for the representation of several diverse configurations of actors and things. As noted before, the combination of material and discursive

understandings of publics allows the traversing of scales from localised practices to related antagonistic discourses. While not all elements of the discursive sequence apply, this may be related to the size of the public. With this we arrive back at Dewey's problem of the public, as despite the distance introduced by the infrastructural breakdown of the pandemic, this is still a local public. Affective investment may be more relevant to a larger, distributed public, while rejected demands are likely to be less related to each other at a larger scale as well. Still, this shows the links between social isolation, the complexity of issues for service users, and the avoidance of duplication within the collaborative, as all relate to a degree, most pronounced in the antagonistic frontier to austerity localism, amplified by the pandemic. This, then, is my contribution to the theory of publics, and one that to a degree contradicts the provisional starting point of Le Dantec's argument (2016, p. 18) that publics provide a "stable theoretical frame around a dynamic context." Le Dantec refers to social work in a heterogenous community-scale context, similar to the work of the collaborative, where the pandemic provided further dynamism. Indeed, the focus on shared issues has a stabilising function, when referencing either stable material practices expressing issues, or the contextualisation of issues within larger discourses. In both instances, that stability is temporary, as material practices change once the specific requirements of the pandemic are removed for the configuration, while discourses in DT are always only temporarily stabilised. Still, for the purposes of my case study the focus on shared issues provided sufficient stability, in that it provided a focal point for an open approach. However, after tracing actors that frame is far less stable, as the same issue is the signifier for a multitude of assemblages of actors and things. As such, the focus on shared issues also destabilises by showing the complexity of the context in which the collaborative operates.

In the introduction, I reference Le Dantec's definition of digital civics as the infrastructuring of publics, pointing out that this definition differs from the relational digital civics research agenda of Olivier and Wright. While the agenda does not reference publics, the work it draws from does to an extent. I also highlight how empirical work in digital civics references the research agenda but does not systematically build on it. It is relevant to note here that much work in empirical digital civics is done at a local scale. Highlighting a few instances where publics are used to frame empirical digital civics, I return to Le Dantec's definition of digital civics as a starting point for systematically building on the theory of publics and the methods of infrastructuring, by drawing two theoretical traditions: ANT and DT. This is the gap where I make two contributions to the field of digital civics, in a systematic development of the underlying theoretical, methodological and analytical concepts, and their applications to the formation of publics through infrastructuring efforts necessitated by the infrastructural breakdown induced by austerity localism and amplified by the COVID-19 pandemic.

I summarise now the concrete contribution to digital civics, as articulated in this discussion and argue that this provides a bridge between the local focus of the undertheo-

rised relational research agenda and digital civics as the infrastructuring of publics. This contribution is summarised in figure 6.2 above, as it highlights how a discursive sequence for the articulation of shared issues is adapted to local scale. It accounts for the key role of material practices in the articulation of shared issues at local scale. This framing of publics in ANT helps address a gap in DT, as at local scale these concrete material practices mean that the signifier of social isolation can only be empty to the point where it can still act as a stand-in for a heterogenous set of practices, in this case against social isolation. In line with a psychoanalytical concept of the neighbourhood, antagonistic relations are less relevant at local scale. Yet across scales, the DT concept of the antagonistic frontier remains relevant. The shared issue of social isolation is related to the complexity of problems faced in the neighbourhood and the avoidance of duplication necessitated by that complexity. This equivalential chain of shared issues is set against the issue of austerity localism amplified by the pandemic. This, too, is a theoretical, methodological and analytical contribution to the digital civics agenda, which Olivier and Wright (2015, p. 62) contextualise within public sector austerity, concerned that there "is a risk that digital civics might be construed, on the one hand, as finding ways of making citizens *do it for themselves*, or on the other hand, as dismantling public service provision." For my case study, it is clear that when the collaborative does infrastructure their responses to local issues *for themselves*, they are aware of the overarching issue across scales and across the antagonistic frontier: austerity localism.

7 Conclusion

In this conclusion, I will briefly summarise the previous discussion by answering the research questions, discussing implications and contributions, summarising limitations and sketching possible directions for future work. I have done this in greater detail across the research questions in the discussion, so the aim here is to provide an overview and summary.

In this thesis, I set out to apply the theoretical concepts of publics and the methods of infrastructuring to the work of collaborative of community groups and organisations, in order to understand their response to the infrastructural breakdown of the COVID-19 pandemic. This is a thesis in digital civics, a research agenda at Newcastle University that emphasises the co-creation of relational public services, drawing from everyday politics, and (implicitly) the relational state. Both of those approaches relate to pragmatist publics. Le Dantec defines digital civics through infrastructuring publics. I set out to expand on this theoretical framing of publics, by drawing from the related approaches of Actor-Network Theory and Discourse Theory. I apply the analytical vocabulary of these theories to the methods of infrastructuring in Participatory Design, here understood as the design-after-design done by users themselves. I ask the following research questions: How does the collaborative infrastructure their responses to infrastructural breakdown? What shared issues can be identified through the prism of publics? Is infrastructuring publics a suitable frame for tracing and quilting shared issues?

In the theoretical framework, I first discuss the pragmatist origins of publics. In the Dewey-Lippmann debate, Lippmann argued that the increasing complexity of society makes democratic governance impossible. Dewey articulated the problem of the public, with publics unable to recognise themselves through the infrastructures of modernity. In ANT, Marres and Latour use this debate as a starting point. For Marres, material publics have a problem of relevance, where the configuration of actors around an issue is constitutive of the issue itself. Latour's *Dingpolitik* is an object-oriented understanding of the political, in which publics form around objects, generating different types of assemblies around them. In HCI, Le Dantec picks up on both the pragmatist and material understandings of publics and applies them at local scale in the context of social work. For Le Dantec, publics are defined as commitments and dependencies between actors, artefacts and institutions around shared issues. Actors form affective attachments that enable action on shared issues. In DT, I further theorise the role of affect through a discursive sequence used by Laclau to explain the performance of political movements. When a number of demands is rejected by a responsible institution, an antagonistic frontier can be drawn, and these demands are made equivalent in their rejection. Through an affective investment, one demand becomes representative of the chain of equivalence, as an empty signifier.

a Both theories have been used as normative frameworks for PD in Dingpolitik and agonistic pluralism, but as the focus is on the design(-after-design) done by the collaborative, I use them as an analytical framework. I first define infrastructuring in PD, noting the underlying parallels to the analytical approaches of ANT and PD, in the focus on matters of concern and Wittgenstein's language games. I argue that the tracing of ANT (of actors and movements within infrastructures) and the quilting of DT (around affective attachments and empty signifiers) can be added to the activities of infrastructuring. I introduce the concepts for analysing infrastructures, such as infrastructural breakdown, infrastructural inversion, and infrastructural allies, often applied in ethnographic tracing of actors. I introduce a model that sketches the path from designer-led, linear use-before-use to user-led, continuous design-after-design. Finally I review relevant PD work that utilised ANT and PD. I then introduce the three stages of my field work, all conducted remotely. The first stage consisted of an ad-hoc response to the pandemic, by transferring AI workshops planned with the collaborative to a remote format. The second stage consisted of the design and publication of a website for the collaborative, used as a playful trigger in workshops. The third stage consisted of an interview study following a heuristic approach for interviewing non-human actors through human actors, an approach that draws on ANT and related information infrastructures studies (thus focusing on infrastructural breakdown).

I analyse the case study through these three stages. In the AI workshops, the participants articulate several shared issues for the early stages of the pandemic. They note that inter-organisational communication and cooperation has increased between organisations, but that digital-only service delivery is not enough for many of their service users. They highlight a *discourse of necessity*, in which the economic necessities of the pandemic take precedence over the articulation of political alternatives. They articulate a desire to further develop their digital skills, as this has become more important during the pandemic. I incorporate this in the second stage, the website workshops, in which I work on potential media for the website with participants, as well as use persona-based methods to articulate who the collaborative views as their service users. In the use of the website, the collaborative struggled to maintain regular publications, but the contact form on the website enabled representatives from a religious group to get in touch and work with the collaborative, while another form was set up and successfully used for the distribution of small grants for community projects in the neighbourhood. In the interviews, I identify four themes, of which one, mutual aid as material public, stand apart. Regarding mutual aid, I find that the shifting configuration of human and non-human actors shapes the understanding of the shared issue of mutual aid in the neighbourhood, as a material public moves from an ad-hoc, social media-based response to a classification infrastructure. The other three themes are related, as I show through my novel application of both material and discursive analysis, as shown in figure 6.1 in the discussion. Regarding the use of Zoom as a stand-in for face-to-face communication, I find that there is an affective

lack in video calls for collaborative work, and a complex set of issues for different service users. I find that digital and non-digital practices are developed in response to issues with Zoom use. Some of these localised practices address social isolation, which is then contextualised within austerity localism. I find that this drives a key shared issue within the collaborative, (the avoidance of) duplication.

In my discussion, I answer the three research questions in detail, so here I summarise my findings. The collaborative infrastructures their response to infrastructural breakdown in three ways. One, they act as infrastructural allies in the local mutual aid group, taking an active role from the initial response to infrastructural breakdown to the later maintenance of the CRM infrastructure of the ageing social enterprise adapted for mutual aid. As infrastructural allies, they act as intermediaries between the CRM and the volunteers in WhatsApp groups. This case illustrates how a material public is constituted through the actors attached, as the meaning of mutual aid shifts over time. Two, the collaborative and its members use Zoom for communication during the pandemic but struggle with a closed system that has limited affordances for infrastructuring. In the interactions between and within collaborative member organisations, I identify an affective gap in the desired interactions that cannot be realised on Zoom. This presents an obstacle to the articulation of shared issues, as through the prism of publics affective attachments and/or affective investments are important drivers for this. When working with service users, there are several practical issues, for example privacy. Three, some of these practical issues lead to the development of alternative material practices, which is where the process of infrastructuring intersects most clearly with publics as shared issues. Through these material practices, the collaborative members infrastructure a response to issues with Zoom and/or the shared issue of social isolation. Three shared issues can be identified through the prism(s) of publics, in a chain of equivalence that includes social isolation, austerity localism (as the constitutive Other), and the avoidance of duplication. One, the shared issue of social isolation can here be identified through the prism of *material* publics, in localised practises of member organisations during the pandemic. I find here that the scope of practices related to social isolation is diverse, as it is part of several different configurations of actors and things. Thus, it acts as a partially emptied signifier, as the same name signifies different practices. Two, austerity localism amplified by the pandemic is the constitutive Other, as the other shared issues are set against it. Three, the avoidance of duplication relates practically to collaborative work with limited budgets for service users facing complex problems, and antagonistically to a stance against competition for limited funding.

To evaluate, I ask if infrastructuring publics is a suitable frame for tracing and quilting shared issues, in particular as an analytical frame for infrastructuring done by the collaborative itself in response to infrastructural breakdown. Here I make several new contributions to the theory of publics. First, the reading of mutual aid as material public that utilises classification infrastructures is a novel approach that builds on previous

work, in the relationship of mutual aid to local government as antagonistic, supplementary or complementary. Mutual aid is fairly complete application of the infrastructuring of material publics, showing the relation between the activities of infrastructuring (here adapting and maintaining a classification infrastructure) and the shifts to the shared issue based the shifting configuration of actors around it. Zoom, on the other hand, highlights the limits to infrastructuring when the thing is not sufficiently adaptable to the expectations and needs of users. My contribution here is only partially novel, as the analytical frames of early experimental video calls apply here. I do, however, articulate these frames through the prism of publics, highlighting the importance of affective attachments and investments where they are missing. In the discursive sequence, I make contributions the theory of publics by showing that the attention of ANT to objects enables the identification of a partially emptied signifier at a local scale. This is a similar effect to the shifts in the meaning of mutual aid, but at smaller scale. The issue of social isolation acts a partially emptied signifier that represents different instances of that issue. This is novel reading of an empty signifier, as it highlights the problem of difference, in that the same signifier is used to signify different things. Social isolation is different thing depending on the actors and objects assembled around it. This also relates to Le Dantec's argument (2016, p. 18) that publics provide a "stable theoretical frame around a dynamic context." I note here that that stability relates to research, as there is a focal point in shared issues. The context, however, is far less stable, as the same issue is the name for a multitude of assemblages of actors and things. Social isolation links to the complexity of the issues that different service users deal with, to which the collaborative responds with efforts to avoid duplication for better service provision. Duplication, complexity and social isolation are set against the antagonistic frontier of austerity localism amplified by the pandemic. I show here how the notion of shared issues has different functions in the discursive sequence. For instance, austerity localism is a shared issue, but it also represents the responsible institutions of local council and central government against which the other shared issues are set. These shared issues are *traced* and *quilted* in different ways, in material practices and discursive articulations. I expand here on Dewey's claim that what matters is what people do, as what they say about the things they do matters as well. Thus, I provide a more nuanced reading of the different functions that a shared issue can fulfil for a public, in particular when related issues are bundled and articulated together.

There are several limitations to my study, both practical and theoretical. I have highlighted issues specific to each theme in the discussion. As noted, I moved from an AR approach to a remote approach in which I utilised a website I built for the collaborative as a playful trigger. Instead of ethnographic work (as typical related to infrastructuring), I relied on interviews, although the interview heuristics I applied elicit similar things in that they are attentive to infrastructural breakdown and descriptions of objects and practices. Practical issues included reduced access to participants during the pandemic.

Without in-person contact to the collaborative, it was challenging to recruit participants, in particular for remote workshops. If more collaborative members would have agreed to an interview, it is likely that different issues or of different angles to issues would have emerged. There was also no access to service users during the pandemic, as the collaborative organisations themselves largely only had remote access. The focus on the objects and practices related to these issues provides an incomplete public, as some actors materially implicated in issues are missing. As the issues of service users would have likely been sensitive, this would have also required modification to the ethics of my project. As many interviewees noted, the pandemic amplified existing issues, and thus the theoretical and methodological approach had to be attentive to that, at perhaps a loss to a level of detail that would have been possible with a focus on a pre-identified issue. For example, if the (often sensitive) issues for service users related to Zoom use had been know in advance, the ethics and the design of the study could potentially have been modified for that, looking into the complexities of remote social or mental health work. The issue was not known in advance, however, because it was recent development due to the pandemic - this is why an open and flexible approach was chosen.

Still, the issues themselves are identifiable, as the focus on objects allowed participants to describe their work in detail through them. This leads to theoretical and methodological limitations, in particular where representative objects are absent. For example, the interpretation of affect related to Zoom is both a theoretical and methodological challenge, as the interpretation of affect is the interpretation of absence, not presence. Contrary to this, the material practices in response to this are tangible, and do provide rich descriptions of work on the shared issue of social isolation, to the point where I can highlight the heterogeneity contained in the different instances of this issue. There is a temporal limitation as well, as some infrastructures leave more traces than others. Some have material, public outputs in podcasts, radio shows or chatty benches. Other only leave encrypted and inaccessible text in WhatsApp groups. In contrast, mutual aid here shows the value of additional empirical material, as their Facebook group provided a rich archive to verify and supplement the recollections of interviewees. With the end of the pandemic (at the time of writing this conclusion), it is likely that later data collection would have yielded less rich descriptions of the collaborative's work on infrastructural breakdown.

Overall, it should be noted that the focus on shared issues is an intentionally open and flexible approach, as this was required due to the uncertainties of the pandemic. As shown in my themes, a broad range of topics is covered, and the literature I draw on to discuss these includes (among others) historical and current work on mutual aid, experimental early studies on video calls, work in ageing in HCI, and planning literature on austerity and localism. For future work, this presents several directions, depending on the disciplines above. Regarding mutual aid, a comparative study of other mutual aid efforts would be relevant, particular as the classification infrastructure is (at current knowledge) a fairly unique effort. How does the configuration of actors shape mutual

aid in other cases? I also noted in the discussion the role of the designer-researcher in design-after-design during emergency. If and when the next infrastructural breakdown happens, my recommendation was to join other infrastructural allies, to provide another form of knowledge and ability that may be useful for required short-term adjustments to available infrastructures (as I did in the early stages of the pandemic when transferring the work of the collaborative online). For future work regarding Zoom and other video call applications, I recommend in the discussion to focus on the role of affect, through experimental group work with subject-groups. These (in-person) groups focus specifically on affective attachments between participants, and not on content. Transferring this work online may allow the identification of affective affordances. As video calls remain relevant in workplaces after the pandemic, this may be a relevant direction for future work in HCI. Future work on other publics at local scale could focus on my contribution to digital civics, on the expanded discursive sequence, to better understand the relationship of the concepts of that sequence to scaling, in particular regarding the unique positioning of neighbourhoods as a place of openness and ambivalence, and less of internal antagonistic frontiers. At which point do the empty signifiers and affective attachments in Laclau's definition become more relevant? At what point do the links between issues become less pronounced? Finally, for publics at local scale, the most relevant question may be the partially emptied signifier, where the problem of difference showed how the same signifier encompasses a broad range of practices, depending on the relations between actors and things in a specific instance. This also relates to the design done by the collaborative in response to infrastructural breakdown, as an object becomes a design *Thing* in relation to other actors, as it is embedded in their everyday lifeworlds. As shown, many of the practices discussed are design(-after-design) in that sense. After all, the digital civics agenda is about relationality, which I (in the introduction) reformulated from a normative aim to the subject of inquiry, specifying that the social complexity of the everyday relates to the plurality of publics.

Part V

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