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Table of Contents

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Social Inclusion (ISSN: 2183–2803)
2023, Volume 11, Issue 3, Pages 1–4
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Editorial

A Technological Smartness All Over the Place: Small-Scale Thing-Power Experiments With Wider Inclusive Ambitions

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Abstract
We live in a societal realm where robotics, artificial intelligence, and digitalization are strongly reshaping our futures. Technological progress has created multiple possibilities. However, the unequally divided impact of technological progress reminds us of the danger of an uncontrolled detonation of technological smartness in society. Some of its experienced and anticipated effects are most likely undesirable. In this thematic issue, we present a compilation of small-scale experiments that help us think through the multiple challenges of a fast-evolving techno-mediated society. It sits on the cross-road between resisting technology or insisting on it in order to create a more socially inclusive sustainable society. The technological "smartification" of our society reshapes our notion of what it means to be human in the complex assemblage with non-human and other-than-human agents we are currently involved in. But it is also a catalyst for intelligent acts of human creativity that will strongly shape our collective future.

Keywords
digitalization; inclusive design; relational ontology; smart technology

Issue
This editorial is part of the issue "Resisting a 'Smartness' That Is All Over the Place: Technology as a Marker of In/Ex/Seclusion" edited by Karin Hannes (KU Leuven) and Fred Truyen (KU Leuven).

1. Introduction

Superintelligence penetrated our societal systems so deeply that software-mediated environments are now driving the work floor, trade and commercial logistics, political strategies, war zones, households, social innovation, creative development, and many other areas in civil society (Bostrom, 2014; Hambling, 2018). Meanwhile, digital information flows endlessly between different parts of the world. These data are intangible but they shape every bit of our culture, what we see, hear, how we live, and how we interact with each other. They inform how things and people are arranged, assembled, or related. Computers and mobile phones have literally become an extension of our hands. They act as gatekeepers to significant others. Robots we are not, not yet, or not fully. However, the boundaries between (wo)mankind and machine are becoming increasingly blurred. And we, as humans, materialize differently as a result of the discursive-material socio-technical realities we are part of and the playful interactions with technology we engage in (Braidotti, 2013).

At the same time, we struggle to identify ourselves as people whose thoughts and actions now belong to the cloud. Some may fear an apocalypse scenario in which machines and artificial intelligence will take over and humanity is no longer in control. Others might argue that an advanced techno-mediated society undesirable installs exclusion mechanisms that pose a danger to both liberal democracy and social welfare levels of those in more vulnerable positions, as the negative impact of a fast digitalizing society is already unequally distributed in

workspaces, schools, and the life sphere. These new complexities and assemblages challenge our thinking and actions. Who is in? Who is out? When does technology become a marker of inclusivity or exclusivity? Can it be both at the same time? Who is rewriting the discourse on techno-mediated inclusive societies? A new generation of digital natives sits at the forefront of decision-making. We adopt and adapt technology in the absence of better alternatives to envision progress in society. In this particular climate of technological progress and ever-growing digitalization, small actions are undertaken to stimulate people to disconnect and return to the tangibility of their private and public spaces to re-evaluate the value of time spent with family members, friends, colleagues, and community members.

This movement creates possibilities to re-imagine what a playful fusion with technology might look like. It may also increase our awareness of the incessant intermingling of the digital and the physical and what that means for our perception of embodiment (Taylor, 2013). Perhaps it does matter that millions of youngsters are now disconnected from old-customed and analog strategies for the exchange of information. It makes us wonder whether we should become less dependent on grid power, particularly in turbulent times where critical infrastructure is under attack (Popuk, 2022), and where would a detailed cartography of the individual and social impact of becoming more machine or machine-dependent lead us. Our desires, expectations, and visions on whether to resist or insist on technological smartness all over the place might differ, just like our thoughts on whose point of view should be taken into account to define progress in society and what our future protected paradise might look like under disruptive planetary conditions (Hannes et al., 2022). Can we really build a more socially just, sustainable, affirmative, pleasure-prone relationship with the non-human, technological agents we have created? If so, how? Or on the other hand, should we start revaluing the symbiotic relationship we have with other-than-human organisms? The natural environment that so far has provided us with what we need but it is rapidly declining under human pressure. Can the power of nature and the active agency of technology be used to restore, promote, or introduce a new balance between people, the planet, and technology (Bennett, 2010)?

We invited the scholarly community to help us think through the multiple challenges a fast-evolving techno-mediated society brings. This thematic issue presents a compilation of scholarly encounters with "smart solutions" in response to real-life challenges and opportunities, such as accessibility to services, safe passage in the public and the digital sphere, obstacles to participation in society, and changing perceptions about how to inclusively co-act with creatures and elements beyond the homo sapiens (Haraway, 2016) to increase the welfare of our scholarly, planetary system, and, most profoundly, of those people living in challenging circumstances.

2. Overview of Contributions

Statistics show that more vulnerable target groups are often less engaged with smart technology and digital devices. Consequently, they suffer the most from the digital divide (Reisdorf & Rhinesmith, 2020). Wahl and Kiuppis (2023) look deeper into this issue, in particular in the context of intellectual disabilities, in their contribution "Increasing Participation of Persons With Intellectual Disabilities With Smart Socio-Technical Arrangements." They build an argument that addresses the need to start from a socio-relational understanding of disability and the effort to look for "smartness" in the situational arrangement rather than to people, devices, or applications. Their study illustrates how the establishment of smart socio-technological arrangements for persons with intellectual disability can contribute to "smart situations" in which an increase in activities and participation is more likely to occur. They discern, as part of such an arrangement, the technology used, the users, the activity to be supported, and environmental factors such as internet access, social environment, and socio-economic factors. The focus of these arrangements is to decrease these disabilities in different areas of life, as a means of social inclusion. For this, the authors stress the importance to shift the core attention from smart devices or applications to the arrangements that make the situation more inclusive. It involves the pursuit of more suitable access to electronic devices and applications to achieve a higher degree of participation in the "digital society" for this target audience. This approach helps to shift the focus away from technological questions to broader questions of what a person with an intellectual disability needs for a sustainable and successful use of technology.

A different approach to the challenge of including people whose voices are seldom heard is found in "The StoryMapper: Piloting a Traveling Placemaking Interface for Inclusion and Emplacement" by Vrebos et al. (2023). In this article, an interdisciplinary team of authors tries to assess the use of a place-making tool to facilitate inclusion in a situation where participation is aimed at different publics. The tool focuses on the visualization of complex emplaced ideas for cultural heritage, in which a bridge is made between past, present, and future, phrased as "placemaking in the middle." It puts agency front and center when researching and conceptualizing place and planning placemaking interventions. The article offers a reflection on the StoryMapper pilot for the larger placemaking project, from which the authors discuss the lessons learned and assess the encountered limitations. In particular, they make the reservation that StoryMapper only offers one modality to express emplacement ideas; this means participants feeling uncomfortable with "morphing"—the key process in the StoryMapper interaction—might feel hindered. In this sense, the authors plead for multimodality approaches for inclusion projects. It also entails

that success metrics should not be limited to who participates, but also to how they can engage. The authors further spotted a tension between the usability of the placemaking tool and the type and volume of data that researchers consider necessary for evaluating inclusion. For future research, the authors suggest an investigation of the impact of StoryMapper on participants and its ability to break through community barriers to engage the hard-to-reach publics through the concept of chains of engagement.

It is this community focus that is also featured in the article "Intersecting Positionalities and the Unexpected Uses of Digital Crime and Safety Tracking in Brooklyn" by Riddell (2023). The author describes an ethnographic work in Brooklyn, focusing on how (counter)surveillance apps—in this case, the Citizen app—impacts experiences of social inclusion and exclusion. Citizen is an AI-based live crime and safety tracking app that monitors police scanners. The idea is that citizens can add events and footage of incidences affecting "public safety." This way events are documented from different points of view—and more importantly by the affected communities. It is a typical use of "sousveillance" software. It functions as a social network in which people also express their feelings and emotions. Riddell's (2023) research aims to investigate the impact of these digital environments on how crime and safety are experienced in Brooklyn's neighborhoods, at the interplay of law enforcement, community empowerment, crime, and gentrification. Paradoxically, the tool both encourages community building and a sense of safety, as well as being in danger of promoting fearmongering and racial profiling, all coming down to how users interact with it. It is those individual localized aspects that the author aims to study.

In "The Digital Divide and Futurist Imaginings of Zelle-ous Resistors," Peluso (2023) does not necessarily promote inclusivity in the use of smart technology but tries to understand resistance to digital technology, in particular, financial tech—focusing on the case of the US multi-bank owned Zelle payment system. The author conceptualizes the Zelle system not as an expression of the digital divide, but as the ability to imagine a future where these very systems lead to more dependence and vulnerability than to the promotion of inclusion. The non-adopters highlighted in this study warn of the "cruel optimism" behind the "there is an app for every problem" idea, which is partly driven by previously encountered negative experiences. Peluso (2023) investigates the particular stance of users towards these supposedly helpful apps and how this influences the perspective of their future selves. Very different from the digital divide discourse—where the focus lies on the possible inability of users to embrace digital tools—the author brings to our attention other concerns at play: These reticent possible users are not just focused on having seamless services at their disposal, but rather want to consciously be in control of their journey, they want to have time on their side, know where they stand, and are not interested in living an externally imposed life. In sum, citizens are wary of possible future digital dependencies that would generate new exclusions.

The very idea of dependencies on technology and more-than-human agents in society is also explored in the bio-art study "Co-Creatively Producing Knowledge With Other-Than-Human Organisms in a (Bio)Technology-Controlled Artistic Environment," by Jacobs et al. (2023). The premise of this research is the need to rethink the relationship with the natural environment by transcending the anthropocentric point of view. The case study of choice focused on five projects from the Dutch Bio Art & Design Award and was approached with a mix of visual and context analysis as well as qualitative interviews. The research reveals that the true epistemic relevance of bio-art lies in the multispecies perspective, forcing the rethinking of the relation between nature and culture. This should lead to new, more ecocentric ways of knowing and acknowledging agency from other-than-human organisms. This becomes clear in the discussed cases where artists and organisms are engaged and entangled in a co-creative process, where both are dependent on one another and new technology. The study stresses the living "materiality" of works of art and the often playful role technology adopts in design processes. It is a stark reminder of the need to overcome the well-entrenched idea of "human exceptionalism." As argued by the authors, this epistemic insight has a profound impact on the concept of adequate research methodologies. It also challenges what it means to function as an academic.

The changes in our academic fabric as a consequence of digitalization are central to the study "Collaborative Writing as Bio-Digital Quilting: A Relational, Feminist Practice Towards 'Academia Otherwise'" by Vackova et al. (2023). Here, digitalization is introduced as a social experience. Their approach of quilted poetry is portrayed as a methodology that helps us attune, through collaborative writing, to the often unnoticed aspects of our bio-digital ways of working. The authors conceptualize this as a way of resisting "normative, exploitative practices in the neoliberal academia" and describe themselves as "group of academics with different journeys and localities, connected by a common interest in the effects of boundaries, the dynamics of power, and the desire to do things differently" (Vackova et al., 2023, p. 65). What makes the study interesting is its focus on the daily, almost ubiquitous, intertwining of the digital and physical dimensions of daily academic life. Becoming attentive to this reality by writing poetry is a way to attend to how our bodily presence is entangled with technologies and helps a growing consciousness of its impact. With a methodological focus on ethical approaches, the authors want to recalibrate their way of working in academia, with attention to the embedded precarity of relations. This should lead to a re-imagination of ethical work relations to redefine and transcend inclusion in a post-digital future.

3. Conclusion

Imagining the virtual mediated world outside normality has become different for many. But it cannot be taken as a given. As illustrated in this thematic issue, the technological "smartification" of our society reshapes the notion of what it means to be human. As much as inclusion is on the radar of scholars working in the field of social design and social innovation there is little evidence that suggests that the gap between the resourceful and the resourceless has been eliminated. Nevertheless, the small-scale scholarly experiments presented in this issue provide insight into what a techno-mediated society for all might become, should become, or would become if we pay enough attention to the very notion of inclusivity; an affirmative project that strongly shapes a collective future in which creativity flows in multiple directions and differences in the needs and learning curves of different groups of citizens are accounted for.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

Increasing Participation of Persons With Intellectual Disabilities With Smart Socio-Technical Arrangements

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Abstract
"Smart devices" and "smart applications" open up a wide range of opportunities for the individual. Today, the vast majority of the population in Europe uses electronic devices with a multitude of "smart applications" as an aid in everyday life. One part of society that could arguably benefit more from these types of technology is that part comprised of persons with disabilities. Statistics show that persons with disabilities, especially those with intellectual disabilities, own and use fewer electronic devices than other parts of the population. Several authors have addressed this issue, referring to it as the "digital divide." In this argumentative article, we advocate a social-relational understanding of disability and conceptualise "smartness" as an attribute for situations (and neither for devices and applications nor for people). Through what we call "smart socio-technical arrangements," persons with intellectual disabilities potentially gain a higher level of activity and more independence. It appears that an individualised technology environment can contribute to the enablement and increase of participation of each person. The article links up with an applied research project analysing the establishment of socio-technical arrangements not only for, but also with persons with intellectual disabilities. Our main question here is how to adequately conceptualise the "smartness" of situations for persons with intellectual disabilities. We argue that the use of devices as components of socio-technical arrangements can optimally lead to smart situations in which persons with intellectual disabilities are more active and less restricted in their activities and participation. "Smartness" then is a synonym for functioning and an antonym of disability.

Keywords
intellectual disabilities; participation; smart applications; smart devices; smart situations; smart socio-technical arrangements; smartness; technology use

Issue
This article is part of the issue "Resisting a 'Smartness' That Is All Over the Place: Technology as a Marker of In/Ex/Seclusion" edited by Karin Hannes (KU Leuven) and Fred Truyen (KU Leuven).

1. Introduction

"Smart devices" (Silverio-Fernández et al., 2018, p. 8) such as smartphones, tablets, or digital voice assistants, as well as "smart applications" (Kornyshova et al., 2022, p. 2), are constantly evolving and supposedly becoming increasingly "smarter." The purpose behind these devices and the huge number of corresponding applications is to enhance the user's life as much as possible and to outsource time-consuming routine or annoying tasks. The majority of people choose to use a variety of "smart devices and applications" to facilitate their daily life, e.g., for becoming oriented in a city (Ahad et al., 2020), getting assistance at home (e.g., for saving energy see Kadam et al., 2015; for security issues see Batalla et al., 2017; for indoor planting see Lee & Park, 2020), or for health tracking (Distefano et al., 2017). Voice assistants such as the SIRI by Apple, Microsoft's personal productivity assistant Cortana or Amazon's cloud-based voice service Alexa are by now developed as "entities" rather than just tools.

They support the user as "artificial companions" (Hepp, 2020) that take on a variety of assignments, thereby in principle making everyday life considerably easier.

One part of the population that could benefit immensely from "smart devices" are persons with disabilities. Paradoxically, however, those persons, especially those with intellectual disabilities (ID), tend to own and use fewer electronic devices than most other parts of the population (Boot et al., 2018; Chadwick et al., 2022). Several authors have dealt with this issue, referring to it as the "digital divide" (Sachdeva et al., 2015; see also Dobransky & Hargittai, 2016; Scanlan, 2022). In order to address this as a global social problem, a background paper for the 2016 World Development report *Digital Dividends* provides us with a useful overview of how technology can help enhance the participation of people with disabilities (Raja, 2016). However, on a personal scale, the underlying causes for the digital divide do not seem to be individual (e.g., preference for analogue interaction or lack of motivation to use technology) but rather socio-economic (Chadwick et al., 2013). After conducting 11 focus groups of 50 people with ID, Heitplatz (2020) reports (for the case of Germany) that the participants expressed their wish to enhance their digital skills but that frequently they do not feel supported by their caregivers (see also Heitplatz et al., 2019, 2022). According to one study by Johansson et al. (2020), the largest groups of people who do not have access to technology and do not feel included in the "digital society" (in Sweden) are students who attend special education schools for students with ID, as well as people living in institutional settings. Having little opportunity to participate online can be associated with efforts to reduce online risks (Livingstone et al., 2015). While "smart technology" offers many potential benefits for persons with ID, there are also serious potential risks in relation to personal data or privacy issues that need to be addressed (Chadwick et al., 2017; Seale & Chadwick, 2017). Several studies in cyberpsychology consider the fact that certain persons with ID are especially at risk of falling victim to cyberbullying or phishing attacks. Seale and Chadwick (2017) present evidence that many persons with ID and/or the people in their environment are aware of these risks and have found strategies to deal with them. Some scholars, e.g., Seale and Chadwick (2017, p. 7), claim that a weighing of interests between risk and normalcy can potentially account for the fact that engaging in risky behaviour might lead to positive outcomes in terms of "development of knowledge, skills, independence and resilience."

In line with a systemic view on social inclusion regarding the digital divide, this article focuses on the use of technology by persons with ID as an opportunity to increase participation. We start from the premise that "smart devices" and "smart applications" become part of a socio-technical arrangement connecting users with their immediate environment in particular situations (e.g., in the city, at home, in health care), and thereby help increase their activity and enable greater participation.

The article links up with an applied research project analysing the establishment of socio-technical arrangements not only for, but with persons with ID (see Section 3). Our main question here is how to adequately conceptualise the "smartness" of situations persons with ID are immersed in. Our understanding of disability in general, as well as of ID in particular, is rooted in social-relational models (Callus, 2021; Reindal, 2008), drawing on biological, psychological as well as social aspects as explanatory factors. With its bio-psycho-social model, developed in the International Classification of Functioning, Disability and Health (ICF; arguably the most well-known social-relational model of disability) the World Health Organization (WHO) provides us with a tool to understand and describe the interaction between the different components of health in the "process of functioning and disability" (WHO, 2001, p. 18). Accordingly, rather than understanding disabilities as attributes of persons, the "units of classification are situations, not people" (WHO, 2001, p. 11). In the ICF, the components "body functions and structures" and "activities and participation" interact with each other as well as with the components associated with contextual barriers and resources such as "environmental factors" and "personal factors" that influence the complex interrelation between functioning and disability. A change in one component can, and likely will, have an impact on all the other components and the individual's functioning. We use the term "person with intellectual disabilities" in the plural, as it is our understanding that a person can face varying disabling conditions in different areas of life. Thus, the concept of disability refers to contingent scenarios and, in line with the bio-psycho-social model, to be understood as a complex interaction between different "components of health" (WHO, 2001) in various situations. Following a social-relational understanding of disability, the term "intellectual" is not to be understood as an attribute of persons either, but rather as a social aspect as well. This means, in line with the ICF model, that if certain adjustments are made (e.g., concerning communication use of plain language) the functioning of people may be increased, and consequently, the level of disability may be lowered.

2. Smart Socio-Technical Arrangements

To describe the complex interaction between technical and social components and to adequately conceptualise the "smartness" of situations in which persons with ID are immersed in, we borrow the notion of "socio-technical arrangements" (Callon, 2004; see also, e.g., Lösch et al., 2019). A socio-technical arrangement in our analytical focus encompasses the technology used (in terms of devices, applications, and functions), the users (with or without ID), the activity to be supported (e.g., shopping, listening to music, online communication),

and the environmental factors (e.g., internet access, social environment, socio-economic factors) as shown in Figure 1. A particular socio-technical arrangement is composed of these components:

As described above, we do not consider disabilities as attributes of persons, but rather, as per social-relational models, as "a construct between the individual and the environment" (Heitplatz et al., 2019, p. 112). Nor do we consider "smartness" as a characteristic that is attributed to either persons or electronic devices and applications as entities of analysis. Rather, "smartness" is from our perspective, like functioning, understood as a social-relational construct that can be used as a positive umbrella term for complex situations in which the socio-technical arrangement between the user, a device with its corresponding applications and functions, and the environment lead to a higher level of "functioning" (Nierling et al., 2021). Lower levels of functioning, and thus of "smartness," correlate with a higher degree of disability, understood as a "negative umbrella term for impairments, activity limitations and participation restrictions" (Sykes et al., 2021, p. 2). Accordingly, devices that are well adapted to the needs of the user contribute to "smart" situations, rather than being smart or making the user smart. Relating to the concept of socio-technical arrangements, we attribute the category of "smartness" to situations in which all parts of the socio-technical arrangement function together in a way that facilitates a situation. The person immersed in a smart socio-technical arrangement experiences an increase in activity and, consequently, in that person's participation.

Hence, in order to make a situation smart, and thereby contribute to a higher level of "functioning," by increasing both activity and participation, one has to look at all the different components of the socio-technical arrangement and make sure each component is set up in a way that it can interplay to facilitate the situation. A "smart device" with a "smart application" only contributes to a smart situation if it can be deployed accordingly. For example, downloading an application on a smartphone is not per se contributing to making the situations that its user will be in any smarter. Vice versa, the individual person's ability will not change simply on account of the technical advancement that the application eventually provides. A calendar function on a mobile phone that recalls its user's appointments only *seems* to be smart when reminding the person sufficiently in advance so that there is time to prepare before an appointment. However, not only do such kinds of matches between purposes and means require a particular electronic setting, carried out by a (third) person with good technical knowledge, but also when thinking of persons with ID as users of the phone, further considerations arise, e.g., individual understanding of time and individual orientation to time.

The smart socio-technical arrangement approach shares certain features with other models that conceptualise the use of (assistive) technology in connection with human activity. While, for example, the human activity assistive technology (HAAT) model (Cook & Hussey, 1995), as well as various accounts in the field of activity theory (see, e.g., Kaptelinin & Nardi, 2006), or the "learning by expanding" approach (Engeström, 2015), focus primarily on how humans use technology, we are mainly interested in understanding (and improving) the process of *participation*, in our case of persons with ID, in different areas of society. Through what we call smart socio-technical arrangements, persons with ID potentially gain not only a higher level of activity

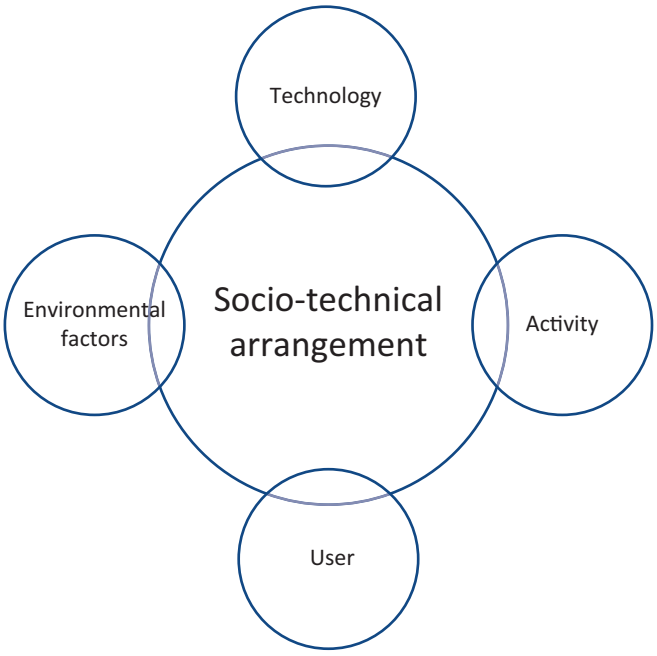

Figure 1. Components of a socio-technical arrangement.

but more independence since an individualised technology environment can contribute to the enablement of each person.

3. Experiences From a Research Project

For the last few years, we have been part of a research project in which the socio-technical arrangement approach was applied in case studies of persons with ID. The aim of this applied research project was to identify potential disabling situations and then to establish an appropriate socio-technical arrangement in conjunction with the researchers, the persons with ID, and their support staff. During that process, we observed many recurring factors influencing the decisions for persons with ID regarding socio-technical arrangements, but also many individual factors. In the following paragraphs, we discuss these observations in light of both the existing body of literature and the conceptualisation of the "smartness" of situations (provided in Section 2). In Section 4, we illustrate an individual smart socio-technical arrangement developed during the research project.

"Social and interpersonal well-being" is dependent, arguably during the Covid-19 pandemic in particular, on "interpersonal relationships and social inclusion with friends, family and others through digital inclusion" (Chadwick et al., 2022, p. 246). According to Cobigo et al. (2012), social inclusion is considered a process in which persons have opportunities to interact with others, participate in activities, and have a sense of belonging. All these liberties were restricted during the pandemic, as people in many countries were forced, albeit temporarily, to live in states of seclusion and solitude. According to Reisdorf and Rhinesmith (2020), "this need for social isolation has led to renewed discussions about the now starkly visible digital inequalities and inequities…that have existed all along" (Reisdorf & Rhinesmith, 2020, p. 133). Accordingly, and in order to eliminate the risks of (further) digital divide, social inclusion measures do not only need to focus on the improvement of digital skills of people with ID but moreover to tackle the barriers preventing caregivers "from supporting their clients in achieving digital literacy" (Reisdorf & Rhinesmith, 2020, p. 134).

Figuring out which devices and applications are suitable for a person is not always easy. As we set out above, it is interconnected with all the components in the socio-technical arrangement. Ideally, when thinking about the use of technology, one should first consider the situation and then determine which "situational solutions" (compare See et al., 2022, p. 3) can be found and established together with the person. To figure out how to make the situation "smart," the different components of the socio-technical arrangements have to be addressed. In the following paragraphs, we introduce the components of a socio-technical arrangement in relation to persons with ID.

3.1. Activity

One first step in adjusting a smart socio-technical arrangement is to identify activities the socio-technical arrangement could encompass. Increasing the activity levels of persons with ID in domains with low levels of activity can, according to the understanding of the bio-psycho-social model of the ICF, help increase participation. Thus, the approach of looking for domains with low levels of activity can assist with identifying disabling situations. Involving persons with ID in the decision-making process is crucial as they most likely know best which situations disable them and which are the ones in which they would like to see change (see, e.g., Wigham et al., 2008). However, for people living in an institutionalised setting, this can be a difficult task as they sometimes cannot imagine life scripts or activities outside of their accustomed settings (see, e.g., Trescher, 2017). They might need assistance with this task. It could be that even personnel in these institutions might not be able to imagine activities that are situated outside the existing routine. This is on account of their being involved in existing practices; changing them would mean changing the institutionalised practices. The ICF and its different activities and participation domains might be able to assist with identification of blind spots and with the dismantling of disabling institutionalised practices. Changing these practices is a desirable and, concerning participation possibilities, an indispensable goal. However, on account of limited resources and underlying political circumstances, there are only limited possibilities (see Trescher, 2017, pp. 47–51).

3.2. Technology

In addition to mainstream technology, there is an additional sector of assistive technologies. Assistive technologies are designed specifically for people with disabilities to use (Boot et al., 2018) and are mostly designed for one specific impairment-compensating function, e.g., special communication devices (Crowe et al., 2022) or assistive technology for cognition (Sohlberg, 2011). They are often very expensive as they are generally developed solely for a small group of anticipated consumers. Critics, especially from the disability studies community, complain that the development and use of special devices increase discrimination, as the stigma of needing a special device is individually attributed and connected to the assumption that disability results from a physical limitation for which there is a technical solution (Mills, 2015; Mitchell & Snyder, 1997, p. 8).

In 2002, Ott (2002, p. 21) criticised the term "assistive technology" in an essay titled "The Modern Histories of Prosthetics," and posed the questions as to how and when a device can be labelled as "assistive":

> Since all useful technology is assistive, it is peculiar that we stipulate that some devices are assistive

> while others need no qualification….The designation creates a technological ghetto at the margins of consumer and political culture.

At the same time, mainstream technology is criticised for not considering the needs of persons with disabilities (Mills, 2015). According to the "social construction of technology," the design and development of a technological artifact is shaped by the concepts of the social group designing it (Bijker & Pinch, 1987). However, people with disabilities are rarely included in the development process of mainstream technology. Mainstream technology, in comparison to "assistive technology," is often much cheaper and easier to purchase (see, e.g., Smith et al., 2022). Directive (EU) 2019/882 of the European Parliament (2019) intends to guarantee accessibility to all products and services in the EU as of 2025. Therefore, manufacturers are forced to consider the needs of persons with disabilities. Commonly, this is realised in the form of an "inclusive" or "universal design" (Clarkson et al., 2003; Pullin, 2009). Pullin (2009) challenges the idea of the universal design as it has to accommodate a multitude of features for different needs which makes a device complex and very likely rather complicated to use. We argue that this could especially be a challenge for persons with ID who might be looking for a simple design without many different functionalities to choose from. For instance, during our research project, we supported several persons with ID who had different accessibility features (e.g., screen readers or captions) on their devices, but were neither aware of these features, nor, after learning about them, knew how to use them. In addition, devices with a lot of complex software need to be updated regularly in order to keep functioning properly. Updating a device is a task that also tends to be complex. When it comes to design, according to Pullin (2009, p. 69), there is a "trade-off between simplicity and universality." This means that either the design of a technological device is very simple, with only a few functions that are easy to understand. In this case, the device will very likely not be accessible for everybody. If the design of a device is universal, one has many different accessibility options with the result that it's not simple anymore. A good example of a simple design given by Pullin is the iPod from Apple. It had only a few buttons and its only function was to play music. However, with its slim buttons and small icons, it surely was not accessible to everyone. With the emergence of smartphones which included a music player in their range of functions, more accessibility options to navigate the music player became available. However, the navigation of the device became more complicated too. So, the smartphone, commonly considered a "smarter" device, might, due to its complex functions, not contribute to the smartest solution for persons with ID. It seems that there is no easy way to resolve the conundrum surrounding universality and simplicity. Pullin (2009, p. 93) proposes:

> [A] *resonant design* for a design intended to address the needs of some people with a particular disability and other people without that disability but perhaps finding themselves in particular circumstances. So this is neither design just for able-bodied people nor design for the whole population; nor even does it assume that everyone with a particular disability will have the same needs. It is something between these extremes, not as a compromise, but as a fundamental aspiration.

For example, screen readers can be helpful for people with visual impairments as well as for people who are unable to read. However, screen readers can be helpful for people who do not want to look at the screen all day and prefer to let the device read a text for them. Good examples are speech assistants such as Amazon's Alexa or Apple's SIRI that are used by many people with sight impairments while also being widely used by the general population.

The idea of *resonant design* is in line with our smart socio-technical arrangements approach. With reference to Ott (2002), we assume that all technology is assistive and that placing the focus on particular impairments is illogical as using technology always compensates for functional limitations (no matter who is the user). Placing the socio-technical arrangement at the centre of attention could help to undo certain preconceived ideas or hasty (although well-meant) conclusions we might have about certain technology that is to be used when having a certain impairment. Maybe the device or application that first comes to mind is not the best, or if so, will need to be adjusted when considering the situation in which it is to be used.

3.3. Users

Assistive technology devices often focus in their design on certain impairments and do not consider other factors like age or culture (Pullin, 2009). Users are not only very heterogeneous in their abilities but also differ in taste and priorities (see, e.g., Mavrou et al., 2017). That is why the socio-technical arrangement has to consider the abilities and preferences of every user individually, including the embeddedness of socio-technical arrangements in various situations. Ravneberg (2012, p. 259) points out (and considers this as "practical implications" of her study on "prerequisites for a qualitative good life for people who are users of signalling devices") that crucial to the acceptance of the technology is "the aesthetical side of design, identity and user satisfaction." This also needs to be considered in order to avoid abandonment of the device (see also Kaleshtari et al., 2016). One reason for the "digital divide," as presented by Sachdeva et al. (2015), is the financial factor. As persons with disabilities are often impacted by unemployment or are dependent on social welfare, resulting in a lack of money, they often have fewer means to purchase (expensive)

devices or applications (Lussier-Desrochers et al., 2017). This might have an impact on both the choice of a particular device or application and, consequently, the socio-technical arrangement. Deciding on which kind of device or application is the right one for the user is not an easy task, especially for people who have had little previous experience with technology and perhaps have little knowledge about the potential of a given technology. As stated by Chadwick et al. (2013), as well as Ramsten et al. (2020), to be able to choose the use of something, one has to know about its existence and possibilities. According to the ICF, "an activity must be available to enable participation" (Ramsten et al., 2020, p. 15). Not knowing about the possibilities of technology means not having access to its full potential. Rarely is there sufficient support, training, and education regarding technology and its opportunities for persons with ID (Khanlou et al., 2021). They often depend on environmental factors such as support staff or family members who might not be sufficiently trained themselves (Chadwick et al., 2013).

3.4. Environmental Factors

Access to devices, the internet, and digital literacy depend largely on environmental factors, especially for people with disabilities who live in designated residential facilities and who often lack (reliable) access to the internet (Alfredsson Ågren, 2020; Heitplatz & Sube, 2020) and suitable devices (Chadwick et al., 2013). Moreover, there are still institutions that do not offer internet access to their clients, e.g., on account of legal reasons such as data protection (Heitplatz & Sube, 2020). Support staff and carers often play the crucial role as gatekeepers to internet access, devices, applications and education (Chadwick et al., 2013; Ramsten et al., 2019). Their decision-making can be impacted by their own knowledge and beliefs about technology as well as by demands from parents and the requirements of the service providers (Heitplatz et al., 2019; Ramsten et al., 2019). Therefore, ensuring that staff members have or obtain competences in digital literacy is necessary to help them make proper and informed decisions, especially together with their clients (Heitplatz, 2020). Furthermore, persons with ID seldom have access to education programs on digital literacy themselves, and that lack of information and qualification often places them in positions of dependency (Khanlou et al., 2021). As mentioned above, if people have had little experience with technology, they depend on the support and expertise of those helping them to choose and purchase the devices and applications that seem right to those helpers. Several studies document the wish and need of persons with ID to have access to technology and corresponding education and training themselves (Chadwick et al., 2013; Heitplatz, 2020; Heitplatz et al., 2022). Next to often non-existent training for persons with ID, support staff frequently have limited time resources available to accompany the acquisition of required technological skills (Heitplatz, 2020). In some cases, setting up an arrangement might mean increased or altered support needs as the person with ID is more active. Moreover, technologies might reproduce already existing dependencies or could be used by the environment to do so (Mankoff et al., 2010). Nevertheless, it can in some cases also help to reduce the support requirements of persons with ID as their autonomy increases. This, in turn, can result in the support staff having more time available for other activities (see Section 4 for an example). Ramsten et al. (2019) indicate that the openness of an institution and its support for the staff regarding technology use play an important part in fostering technology use by persons with ID. Heitplatz (2020) emphasises how important a positive statement about technology use from an institution is and how important it is to include the employees in this step.

4. Illustration of a Smart Socio-Technical Arrangement

In this section, we illustrate an exemplary setup of a smart socio-technical arrangement that was experienced in the above-mentioned research project. One user who we accompanied and who lived alone was always dependent on his support worker to call him when he had an appointment. As he had no concept of time, he was dependent on her to call him in sufficient time in advance, so that he knew when to get ready and to leave the house. The user stated that he was stressed by constantly having to answer the phone. His wish was to be able to manage this situation independently. He is unable to read and write. Now he uses the calendar and the alarm clock on his phone with speech output and ring tones to remind him. He sets it up once a week together with his support worker for all his upcoming appointments. Hence, his support worker does not constantly need to call him to tell him to get ready. At the same time, his activity level in carrying out his daily routine increased as he gained more independence on a daily basis and could handle things himself. He also gained more time to do other things, as previously he had tended to get himself ready and appear at appointments too early as he was concerned about being late. Figure 2 illustrates his individual circumstances regarding the different components that led to the establishment of this particular arrangement.

5. Conclusion

We have illustrated how the establishment of smart socio-technological arrangements for persons with ID can contribute to smart situations in which an increase in activity leads to an increase in participation which in turn is likely to lead to an increase in functioning. This is a dynamic process that is associated with a potential decrease in disabilities in different areas of life which in turn is the foundation for social inclusion. The emphasis

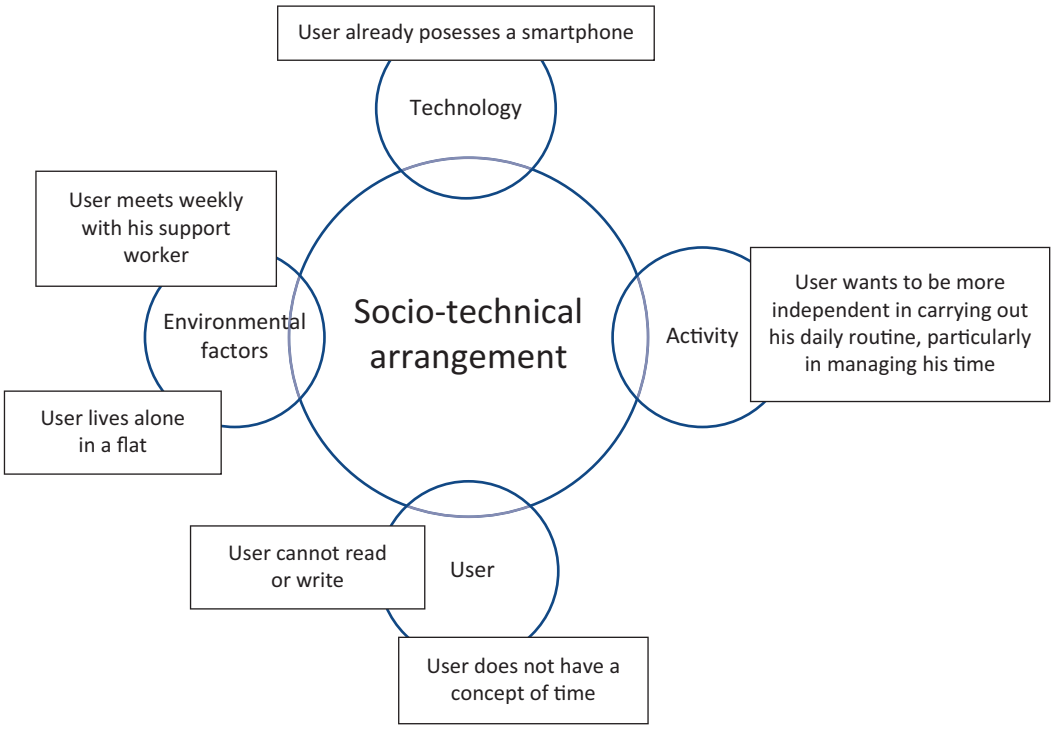

Figure 2. Illustration of individual components to be considered in a user's smart socio-technical arrangement.

of the social-relational approach we have taken here lies in shifting the attention from the "smartness" of a device, application, or a person, to the "smartness" of socio-technical arrangements and situations. We started with the basic premise that persons with ID tend to face many obstacles when it comes to the use of technological devices. We outlined that as consumers, users, and recipients of social services, their needs and preferences—with the provision of assistive technology devices—are either generalised and projected onto all persons with ID (as if we are thinking about "one size fits all" solutions for an entire group) or they are commonly overlooked and excluded from the discourse on technology use. We stated that figuring out which devices and applications are suitable for a person is not always easy, and we described as an ideal that, when thinking about the use of technology, one should first consider the situation and then determine which "situational solutions" (compare See et al., 2022, p. 3) can be found and established together with the person with ID. We argue that the smart situation approach can help overcome the "digital divide." It can be one component contributing to the improvement of a person's access to suitable electronic devices and applications, as well as achieving a higher degree of participation in the "digital society." This approach helps to shift the focus away from technological questions to broader questions of what a person with ID needs for a sustainable and successful use of technology. Smart socio-technical arrangements can be seen as opportunities for the increase in both their activity level and participation, and in the end, help to contribute to social inclusion.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

The StoryMapper: Piloting a Traveling Placemaking Interface for Inclusion and Emplacement

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Abstract
As a response to traditional (top-down) urban planning processes, placemaking engages local citizens in the process of shaping the form, social activity, and meaning of places around them. However, placemaking practices similarly face political challenges regarding inclusion and emplacement. These challenges relate to who participates, facilitation through linguistic discourse, and place engagement itself. Attempting to address these challenges, this article (based on a pilot study) reports on the design and deployment of the StoryMapper, a traveling placemaking interface that uses a participant-driven "chain of engagement" recruiting process to invite participants to create emplaced "morphings" (i.e., visually produced stories superimposed on public space) to spark dialogue on a digitally facilitated living map. This pilot study took place within a larger placemaking project that engages citizens to share their ideas regarding the reconversion of a community church. Plugging the Storymapper into this larger project, we discuss preliminary findings relating to the role of placemaking facilitators in citizen-driven recruitment and the role of multimodality in placemaking processes. This pilot study suggests that inclusion should not only be evaluated based on who participates and who does not, but also on how the tool itself, in its capacity to engage participants to visualize complex emplaced ideas, may facilitate inclusion of different publics.

Keywords
citizen participation; cultural heritage; design; emplacement; inclusion; mapping; pilot study; placemaking

Issue
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1. Introduction

Conceptually, placemaking attends to the ongoing social practices involved in making and remaking physical places, compared to the more physical focus of traditional spatial planning (Akbar & Edelenbos, 2021). This current notion asserts that a place is not only shaped by the built and natural environment but also emerges through ongoing social practices and meanings ascribed to them on a daily basis (Cresswell, 2005). This means that placemaking is not solely a physical action but arises through the social activity that involves citizens (Akbar & Edelenbos, 2021). As such, placemaking can promote collective decision-making about the future appearance, organization, and use of the socio-spatial environment. Thinking with Lefebvre's spatial triad, which recognized the intricate relationship between cultural practices, imaginations, and representations in place (Lefebvre, 1974), we acknowledge the potential of creating meaning through stories in placemaking.

Placemaking as a social practice is implemented through a variety of interventions. In a literature review of theoretical trends in placemaking, Strydom et al. (2018) categorized placemaking as a physical, social, or economic construct and identified a trend of placemaking used as a tool for empowerment. This political

dimension of placemaking relates to the transformation of place to redistribute power. Such power redistribution benefits ordinary citizens, fosters a sense of belonging, and increases participants' impact on transformation processes (Stage & Ingerslev, 2015, p. 121). While in its initial conception it held the potential to challenge the dominance of top-down planning by taking into account everyday encounters (Courage et al., 2020), recent critique claims that placemaking became a buzzword to address all urban challenges or aspire a certain metropolitan lifestyle (Platt, 2021). Like other participatory processes (Cooke & Kothari, 2001), placemaking is a complex practice that introduces various challenges related to inclusion and emplacement.

First, placemaking practices have been criticized for being insufficiently inclusive, as citizens may be excluded by choice or structural inequalities (Platt, 2021). As such, placemaking struggles to achieve diverse attendance. Research practices are faced with similar challenges, as there is a tendency to work with those people that voluntarily attend participation events, who are then taken to represent "the community" as a homogenous group (Cornwall, 2008). Furthermore, participatory researchers rarely report on bias and drop-out rates in the samples they describe or on dynamics of exclusion, self-exclusion, or peripheral participation (Cornwall & Gaventa, 2000). However, placemaking facilitators, be it practitioners or researchers, inherently impact the recruitment process and potentially reinforce existing power dynamics (Biedermann & Vande Moere, 2021). While popular definitions typically refer to inclusion as who does and does not participate, more substantive definitions refer to the recognition and valuing of differences among citizens by providing the necessary support to ensure that everyone can participate (United Nations General Assembly, 2007). Some scholars argue against binary distinctions between top-down and bottom-up facilitation and propose a more collaborative and ethical approach based on Massey's (2005) conceptualization of place as relation, a site of multiplicity and dynamic, from a positionality at the middle. This reinterprets placemaking as an always-becoming process that is never started or finished (Platt, 2021).

Second, the notion of placemaking as always-becoming directly links to emplacement, as it does not start from a tabula rasa but reshapes existing configurations in real-world environments. The spatial turn refers to the growing academic interest in the role of place, as well as the acknowledgment of the agency of place (Coemans et al., 2020). In participatory research, this is illustrated by the growing recognition of the significance of spatiality in reaching empowerment aims (Kindon et al., 2007). However, Jon (2020) points out that planning's predominant focus on discursive practices in decision-making has overlooked spatial and sensory aspects of the built environment and the environmental impact on how we think and form opinions. More recently, the dominance of linguistic discourse has been challenged by a growing body of research proposing alternative methods that integrate material and spatial aspects to directly engage with place, such as walking methodologies (Springgay & Truman, 2018), participatory mapping (Powell, 2016), or tangible placemaking interfaces that are shared among citizens (Crivellaro et al., 2016).

Participatory mapping is a powerful process to facilitate the mapping of local knowledge and experience of a particular place by recognizing, integrating, and communicating citizen needs. It engages citizens to map their relation to place by visually representing physical and socio-cultural features of significance and has an empowering purpose. Powell (2016) argues that innovative and multimodal mapping methods help uncover what often remains unseen, not to triangulate or reach a consensus, but as a supplement. Interactive placemaking interfaces, such as mobile applications, place-based public interfaces, or social probes promise to provide swift and opportunistic engagement opportunities through diverse modalities in locations of immediate relevance. As such, they allow citizens to decide for themselves whether and how they would like to engage in placemaking at times and locations of their convenience. This study builds on the potential of participatory multimodal mapping via an interactive placemaking interface to create new opportunities for meaningful engagement with place, addressing the challenges concerning inclusion and emplacement as outlined above.

2. Objectives and Research Questions

Broadly speaking, the StoryMapper project aims to answer the research question: What potential opportunities and challenges for inclusion and emplacement are introduced by placemaking interfaces?

Using the StoryMapper as a traveling placemaking tool to facilitate participant-driven recruitment processes, we set out to explore an inclusive and emplaced mapping process. The StoryMapper builds on two core concepts: (a) a self-steering "chain of engagement" that aims to disrupt conventional recruitment processes by inviting participants to select their successor by passing a tangible frame without a central placemaking facilitator, and (b) "morphing," which we define as the creation of visual stories superimposed on the environment in response to a locally relevant question. This article reports on the conceptualization and initial deployment of the StoryMapper.

We set off with a pilot study to test the qualities of the StoryMapper in a real-life setting, given the fact that we developed an innovative research tool both concerning morphing as a form of data collection and the chain of engagement as a sampling approach. As Hannes et al. (2023) have noted, pilot studies or experiments enable researchers to experiment with new ideas before entering more complex case studies while at the same time establishing terms of engagement of

newly developed methodological tools and approaches. In qualitative research, the emergent nature of how relationships unfold often determines the success or failure of participatory engagement. The different phases of qualitative inquiry processes are entangled and cannot be seen as separate (Kim, 2011; van Teijlingen & Hundley, 2002). Therefore, in this article, we use the data collected to identify patterns that can direct further research needed to evaluate the StoryMapper. In line with van Teijlingen and Hundley's (2002) argument on researchers' ethical responsibility to share methodological and practical insights gained from pilot studies, we intend to share our reflections to create learning opportunities for related interactive placemaking interfaces and mapping deployments. The research question posed for this particular pilot was: Which design features of the StoryMapper were identified during the pilot deployment as potentially relevant for inclusive and emplaced engagement?

This pilot reports on a real-life cultural heritage placemaking project within a village neighborhood—the re-conversion of a community church for social, cultural, and community-based purposes. The re-conversion of cultural heritage requires special attention to these placemaking challenges, as the physical form, the daily use, and the social meaning might significantly be remade in the process. This calls for an always-becoming approach to placemaking that includes a diverse audience, as well as special attention to the dynamic and relational emplaced aspects of the past, present, and future. We conclude with reflections on the characteristics of the StoryMapper, the application of the participant-driven recruitment approach through the chain of engagement, and the emplaced participation potential of morphing to extract insights from the process to guide future research.

3. Methodology

3.1. Conceptualizing the StoryMapper

3.1.1. The Chain of Engagement: A Self-Steering Recruitment Process

The chain of engagement builds on snowballing, a method used in qualitative research to recruit participants by inviting them to suggest other suitable participants (Charlie Parker et al., 2019). The chain of engagement additionally shifts the agency to recruit from facilitators to participants, who create a continuously growing chain by self-selecting and engaging the next participant to reach into existing social networks otherwise hard to reach. By passing a tangible frame from person to person, the approach intends to additionally spark dialogue between participants to engage those who may not typically participate in placemaking activities. As such, the frame serves as an entrance point to produce and submit data in response to placemaking concerns.

3.1.2. Morphing

Inspired by photovoice and theoretically backed by the new materialism call for sensory-spatial awareness (Jon, 2020), we define morphing as the in-situ production of place-based data superimposed on the environment. Participants produce stories or visions in the form of visuals on a transparent canvas to augment the environment (Figure 1). This augmentation may transform the surroundings by (re-)placing or (re-)moving elements and is photographed against the environment. The idea behind morphing is to visualize the multiplicity of place-based meanings found in a community.

Figure 1. Morphing as a way to communicate an idea for the use of the church façade.

3.2. Situating the StoryMapper

Interactive interfaces facilitate placemaking in relevant public spaces by offering engagement modalities such as multiple-choice polls via tangible (Coenen et al., 2019; Vlachokyriakos et al., 2014) or touch-based (Valkanova et al., 2013) interaction and open-ended feedback creation such as photo (Memarovic, Fatah Gen Schieck, et al., 2015), video (Fritsch & Brynskov, 2009), and textual submissions via situated public interfaces (Fischer et al., 2013) or personal computing devices (Jorge et al., 2013). As such, placemaking interfaces promote inclusion by enabling citizens to self-decide whether and how they would like to participate, independent of availability and preferences. For instance, it is known that public displays can motivate "borderline" engaged citizens to provide planners with short-texted idea proposals (Schroeter, 2012). Physically situated social networking

services enabled students to communicate their opinions to their local youth affairs department through playful engagement (Hosio et al., 2012), and low-tech posters proved to be efficient tools to support grassroots organizations to engage in data collection and public discussions (Vlachokyriakos et al., 2014). While design recommendations, such as closely aligning the displayed content with the location and people (Schroeter et al., 2012), are continuously enhancing the value for citizens to engage in placemaking, and therefore increasing the probability to involve more diverse subsets of citizens, placemaking interfaces have been equally criticised for their tendency to exclude certain publics. This exclusion comes not only because of the digital divide that prevents ubiquitous computing interventions from reaching the full breadth of social diversity (Le Dantec & Edwards, 2008) but also because such interface deployment sometimes still fails to upend the hierarchical dependencies between facilitators and participants (Biedermann & Vande Moere, 2021). It has therefore been argued to further democratize placemaking interface practices (Puussaar et al., 2022), such as by allowing citizens to co-determine the collected content (Callum Parker et al., 2020; Liu et al., 2019).

Holding a long tradition of engaging citizens in mapping activities to disrupt unequal power dynamics (Cochrane & Corbett, 2020), participatory mapping is increasingly used not only to understand and represent the link between people and place but to build on the affective potential of mapping for placemaking purposes (Kahila-Tani et al., 2019). However, a number of power-related challenges have been identified, such as issues of trust, clarity of the goal, impact, and leadership (Brown & Kyttä, 2018). At the same time, the substantial growth in digitization has affected participatory mapping in multiple ways. Firstly, the proliferation of mapping technologies and location-capturing devices has resulted in a range of technological tools. Second, it has opened opportunities to democratize participatory mapping to a certain extent (Crampton, 2010). Kahila-Tani et al. (2019) argue that while digital mapping can broaden recruitment by engaging other participants, it also introduces new forms of exclusion due to the disparity in access, skills, and motivation to the digital sphere. Digital mapping approaches have the potential to be more dynamic and democratic compared to paper-based approaches: Real-time interactive mapping can be done at different times and places and can onboard dynamic aspects of space. Finally, research that pushes against the epistemological limits of digital technologies has triggered the introduction of qualitative and multimodal approaches for data production, creating rich, nuanced understandings (Jung et al., 2020).

3.3. Manifestation of the StoryMapper

The StoryMapper consists of a hand-held "tangible frame," a custom "online form" to provide feedback, and an off-the-shelf online "living map," as illustrated in Figure 2.

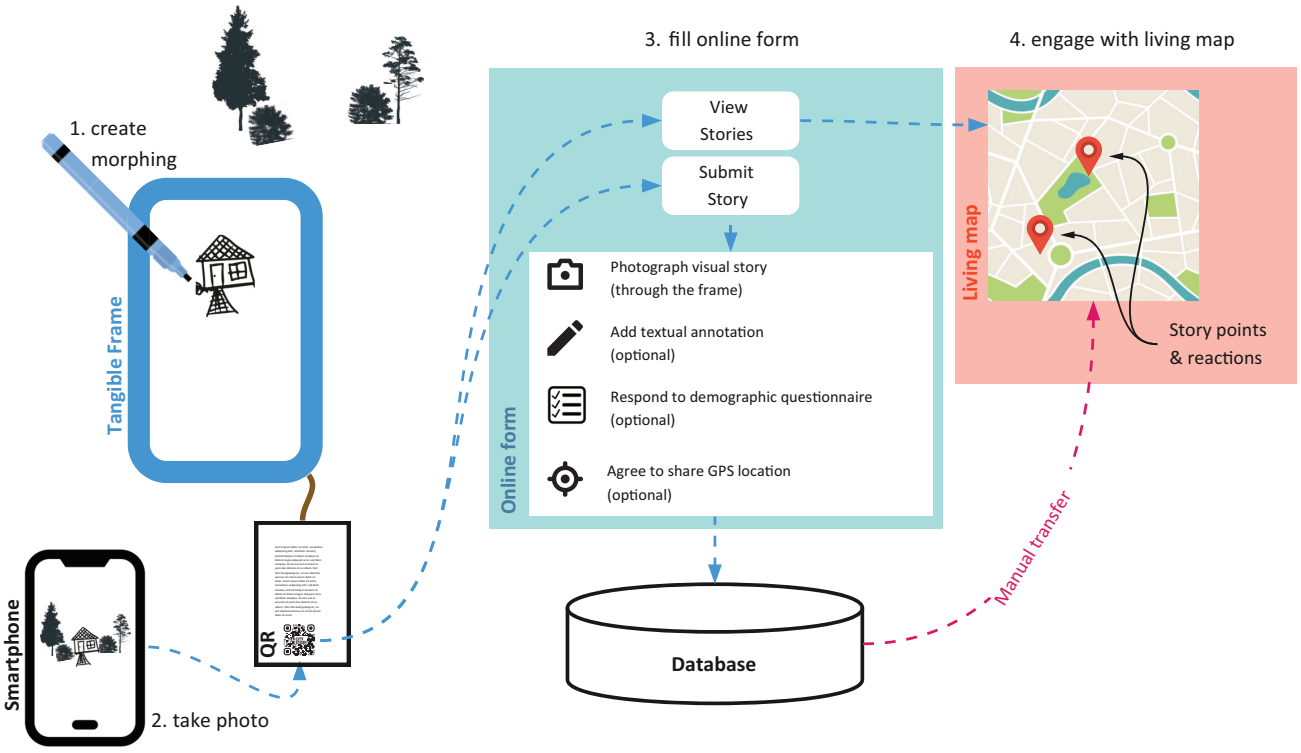

Figure 2. Experimental setup of the StoryMapper: Participants who receive a frame can access the StoryMapper online form via QR code, allowing them to either create or interact with existing contributions.

A plexiglass sheet, enclosed in the 3D-printed tangible frame forms the canvas to create morphings. A printed set of instructions attached to the frame (Supplementary File 1) posed a place-based inquiry and guides any participant in using the provided tools (i.e., markers and wipes or a set of Lego bricks) to create a morphing in response. The visual layout of the instructions used the vector elements produced for the municipality's participatory process. To submit their contribution, participants were invited to scan the QR code in the instructions, leading them to the StoryMapper online form. Finally, participants were asked to pass the frame to another person they selected to contribute to the emerging chain of engagement. This final step was not further specified and was left open to the discretionary decision of the current participant to lower the barriers to participation.

The online form serves as the digital backbone of the StoryMapper. After a detailed introduction to the placemaking context and inquiry, it provides a link to visit and engage with existing contributions on the living map and step-by-step instructions (Supplementary File 2) to contribute a new morphing. Following the latter, the online form invites participants to superimpose their morphing over the place they intend to change, photograph their composition, add a textual description, and respond to a series of demographic questions. Upon informed consent, the morphing is automatically stored together with all submitted data and the current geo-location in a free online database (Google Firebase).

To publicly render the contributions, the research team manually copied the incoming contributions to create interactive pins on a living map (Padlet) in near real-time. This format was chosen because of its open-access features that do not require the creation of a user account, as well as its interactive features, including viewing, response, and polling options. Additionally, the map allowed participants to create contributions by uploading photos and text beyond the intended StoryMapper workflow. The link to the online form and living map was further communicated via flyers and the official social media campaign of the municipality.

3.4. Piloting the StoryMapper

3.4.1. Context

The StoryMapper pilot study was conducted within a participatory trajectory initiated by the municipality of Herent, Belgium, aimed at the reconversion of the Sint Laurentius church in Veltem-Beisem. The church—no longer used for worship since December 2018—was earmarked for community repurposing. In collaboration with the diocese, the local church committee, and Parcum, the Flemish expertise center for religious heritage, the municipality started the formal process of deconsecrating the church and handing it over to the municipality for community use.

Given the cultural sensitivity and meaning of the building, the consortium sensed the necessity to engage citizens in this transformation. As part of this process, the municipality set up an engagement trajectory including an eight-week community inquiry phase with a survey and two community meetings, and a one-day community festival that marked the end of the participatory trajectory. We ran our pilot in two phases, parallel to the inquiry phase and the community festival. This case was chosen due to its placemaking challenge and the neighborhood's sensitivity to the transformation of a community church. The church and its surroundings materialize a symbolic and spatial meaning after centuries of cultural and social practices. It illustrates the need for a sensitive process with attention to the inclusion of community linked to and beyond the church building and sense of place.

3.4.2. Data Collection and Analysis

During the first inquiry phase, three frames circulated in the community for three weeks, starting with citizens with direct connection to the place: the former church caretaker, a shopowner on the church square, a school parent, and, after the initial chains broke, a neighbor and café visitor. The inquiry used was: What use do you see for the Sint Laurentius church in our community? After observing a certain resistance to drawing among some of the participants, we introduced Lego bricks as an additional morphing medium in the second inquiry phase. During the one-day festival, three more frames were handed out by the primary authors to visitors of the event. The inquiry used was: Can you share a story or memory about your village? For each of the two phases, a separate living map was prepared.

The data collection consisted primarily of submissions made through the StoryMapper, including participant-generated morphings, and/or textual descriptions, voluntarily provided demographic data (gender, age, and neighborhood connection), quantitative interaction logs through the online form (time, date, and location of the created contributions), and engagement with the living map, such as additional posts, comments, and reactions. To reconstruct the chains of engagement, unique IDs attached to each of the frames allowed us to track and recreate their journeys based on photo submissions. In addition, the first authors documented qualitative findings, such as field observations and informal interactions with initial participants in a shared research diary.

The visual and textual contributions from the living maps were coded and analyzed using NVIVO. The two first authors independently coded contributions following an iterative bottom-up approach. In the first cycle, each coder reviewed every photo and textual contribution and assigned a series of codes to each of them. The emerging code books were subsequently compared and discussed. In the second cycle, all codes were further refined and combined into categories.

To categorize our results we followed the analytical framework developed by Rose (2016). Her work established four sites of interpretation for images, which we adopted as sensitizing concepts into our analytical framework: Within the site of production, we look at how a contribution was made, where, by whom, and when. Within the site of image, we were interested in spatial aspects, particularly how the morphing was embedded in the environment. In the site of circulation, we analyzed the chain of engagement, including how often and in which intervals the frame has been passed. For the site of audiencing, where contributions were made publicly available and the dialogue could continue, we analyzed the interactions on the living map, focusing on how participants responded to others' contributions.

3.4.3. Positionality and Ethics

As some of the authors live or have relatives in the neighborhood, we positioned ourselves as insiders within the community. To gain a better understanding of the StoryMapper in placemaking processes, we collaborated with both community and municipality as allies rather than external researchers. Becoming part of the context and social processes we study, we acknowledge the reciprocity of benefits gained from this research project. Participants could share their ideas and stories through a different, playful modality. The outcomes were presented during the community workshops which lead us to become involved in the broader participatory process. One of the authors facilitated multiple round table discussions during the two workshops and became involved in the temporary neighborhood management board of the building. Where possible, we aligned this allyship with what Dierckx et al. (2020) conceptualize as a "third sphere" that builds on principles of equal intelligence, shared control, and multiplicity of ideas. This, ultimately, was challenging on the level of ethics. The data on the living map is openly accessible to a wider public. While self-mediated as a platform, we took a mediating role to keep an eye on potentially inappropriate content. Moreover, to ensure anonymity, contributions were disconnected from any personal information of the participants.

4. Results

4.1. Sample

In this pilot, a total of 17 participants received a frame and successfully contributed at least one morphing to the living map. Table 1 details how the StoryMapper reached a relatively diverse subset of residents with an overrepresentation of women and the age groups 20–39 and 40–59.

4.2. Site of Production

In total, both living maps gathered 28 contributions, including 22 morphings and six additional contributions: Four images and two text-only contributions were directly uploaded to the living map. Four of the morphings were added as examples by the authors to illustrate the idea of morphing. While we consider these exemplary morphings as part of the data collection because they generated further dialogue on the living maps, the authors are not considered part of the sample in Table 1. The remaining 18 morphings were created by the participants, including one sent in via email, emphasizing that the online form did not work on the participant's phone. Eighteen morphings were created using markers, three using Lego, and one combined both methods.

Twelve out of 22 morphing submissions did not include geo-coordinates. Morphings and observations, however, showed that six photos were made in the church (e.g., morphing 2.2), three against the façade of the church (e.g., morphing 4.3), three in the park or town square (e.g., morphing 2.4), four in or around the wooden churches that were part of the municipal project (e.g., morphing 3.1), and seven at unknown locations

Table 1. Demographic overview of participants reached by the StoryMapper.

		Phase 1	Phase 2
Gender	F	5	4
	M	4	2
	Unknown or other	2	—
Age	0–19	1	—
	20–39	4	2
	40–59	3	2
	60–79	1	1
	>80	—	—
	Unknown	2	1
Connection to place	Living	10	4
	Working	—	—
	Unknown	1	2

(e.g., morphing 1.4). This suggests that our approach to traveling placemaking interfaces motivated people to use the StoryMapper on-site and engage with place.

Observations were made at the initiation phase that some participants felt uncomfortable drawing and preferred to share their ideas orally, or felt unsure about being able to explain the process to other participants in the chain of engagement. Moreover, the authors recovered three abandoned frames in public spaces that contained morphings not submitted through the online form.

4.3. Site of Image

Our data collection reveals diverse forms of engagement with the environment through morphing. Twelve morphings interacted in some way with the environment, including the four exemplary ones. Of these twelve, four morphings used the environment as a passive background without embedding it (e.g., morphing 3.1). The other eight actively augmented the environment, for example, drawing a slackline attached to existing trees. Two morphings showed the same sketch of a skate ramp uploaded twice with different backgrounds (morphings 3.2 and 3.3). Ten morphings were photographed against a neutral background, for instance, a table (morphing 2.5). This data could illustrate how the task of creating morphings was sometimes unclear or irrelevant to participants.

In addition, four contributions showcased multiple 2D angles into one frame, like 2.6, which combines a frontal view of a glass with a plan view of a plate. This hints at practical difficulties in capturing the morphing in front of the environment or potential challenges in using drawing to express ideas using the same 3D perspective as the background (e.g., morphing 3.1). Interestingly, two participants aligned the frame with the environment by tracing elements, such as trees (e.g., morphing 2.4) to overcome this challenge. Other strategies (n = 12) used to clarify ideas included the integration of text in the morphings (morphings 1.3, 1.4, 2.1, 2.3, 2.5, 2.6, 2.7, 3.1, 3.4, 5.1, 5.3, 6.1), the use of different colors (n = 4; morphings 1.1, 1.3, 2.6, 2.7, 5.2), or the inclusion of people as stick figures or Lego figurines (n = 15; morphings 1.1, 1.2, 1.3, 2.3, 2.5, 2.7, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 5.1, 5.3, 6.1).

We identified six categories among the ideas with a strong focus on youth and social activities, as detailed in Table 2.

4.4. Site of Circulation

Figures 4 and 5 re-construct the six initiated chains of engagement with a total of 22 morphings. Each dot represents one link in the chain (i.e., a morphing contributed using the StoryMapper), including the age and gender of its author, the date and time of submission, and a unique identifier that links to the corresponding morphing in Figure 3.

Of the 22 morphings, four were created by the researchers, eight were invited by the researchers to initiate (six) or reinitiate (two) a chain, and ten were invited by previous participants as intended. Twice, participants requested help from the researchers in producing or uploading a morphing (i.e., researcher-aided submission). In total, 11 morphings were submitted within 20 minutes or less, suggesting that they were likely created by participants as part of a collaborative activity or the same participant (morphing 3.2 and 3.3). The remaining morphings showed longer intervals between each other, which indicates a perceived lack of priority in the recruitment of follow-up participants. In addition to the contributed morphings, six contributions were directly added to the living map without the use of the StoryMapper (see Figure 6).

4.5. Site of Audiencing

To anonymize locations (some participants morphed at their homes), the locations for the pins on the living map were located in public spaces around the church. A total of 28 reactions in the form of likes were given to various posts. Moreover, there were two comments on posts, one on the main pin on the church, and one as a direct reaction to a morphing, with an additional idea.

5. Discussion and Conclusion

This study examined the design and pilot deployment of the StoryMapper as a traveling placemaking interface to foster inclusion and emplacement. The deployment

Table 2. Overview of the identified categories of living map contributions.

Category	Includes	Total	Numerical identifier (see Figure 3)
Social/cultural	group activities, meeting places, relations, and social care	7	1.3, 2.1, 2.2, 2.6, 4.1, 5.2, 5.3
Sports	outdoor and indoor sports	7	1.1, 1.2, 2.3, 2.4, 3.2, 3.3, A7.4
Children/youth	daycare, youth facilities, and child-related memories	5	3.4, 4.2, 5.1, 6.1, A7.3
Multifunctional		3	1.4, 2.5, 2.7
Learning	knowledge and skill-based learning facilities	2	3.1, A7.2
Religion	worship and ceremony	2	4.3, A7.1

Figure 3. Overview of the visual contributions on both living maps. Each number corresponds to an independent chain of engagement and "additional living map contributions" represent direct contributions to the living map without the use of the tangible frame and online form.

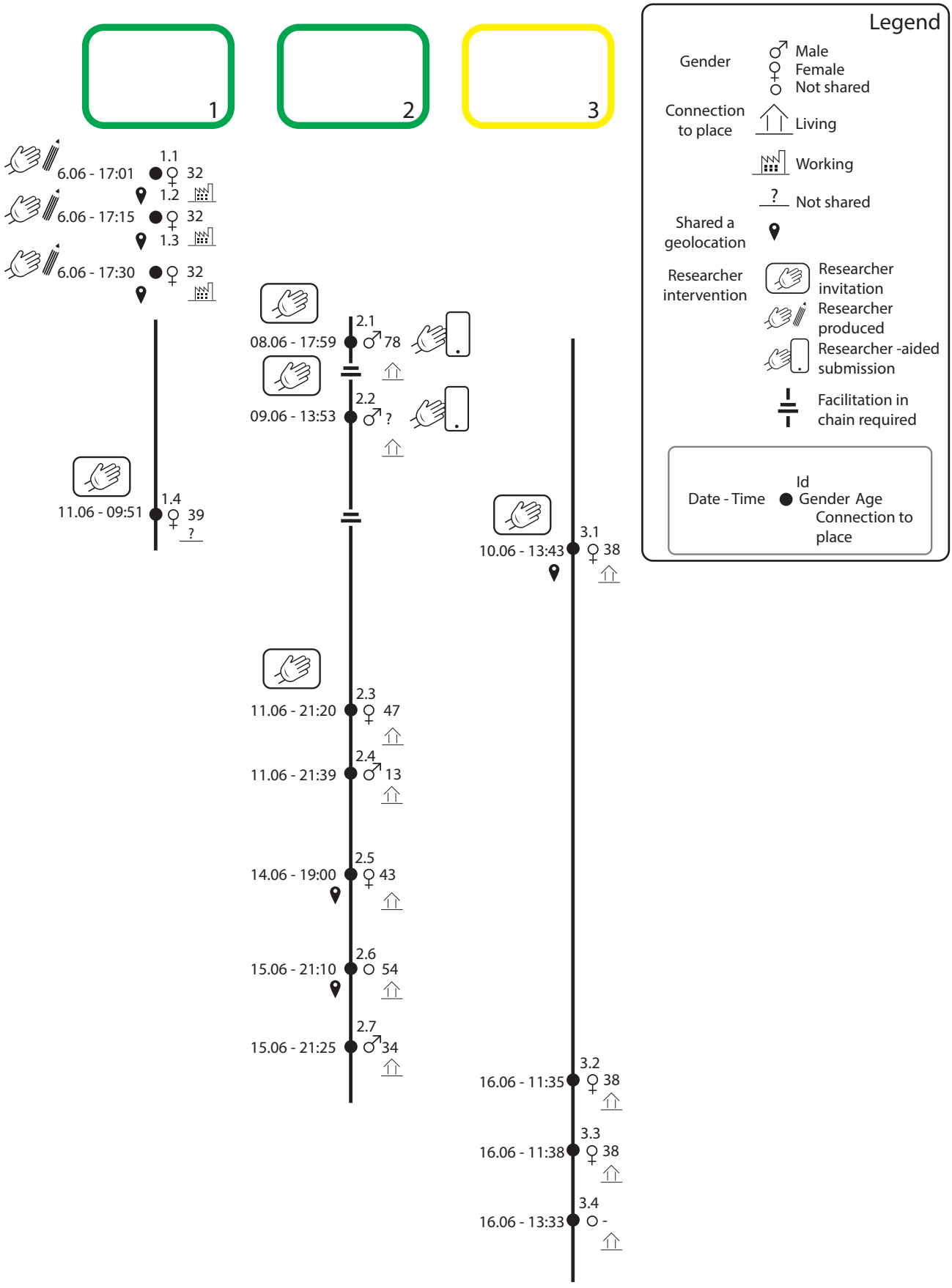

Figure 4. Visual reconstruction of the three chains of engagement during Phase 1.

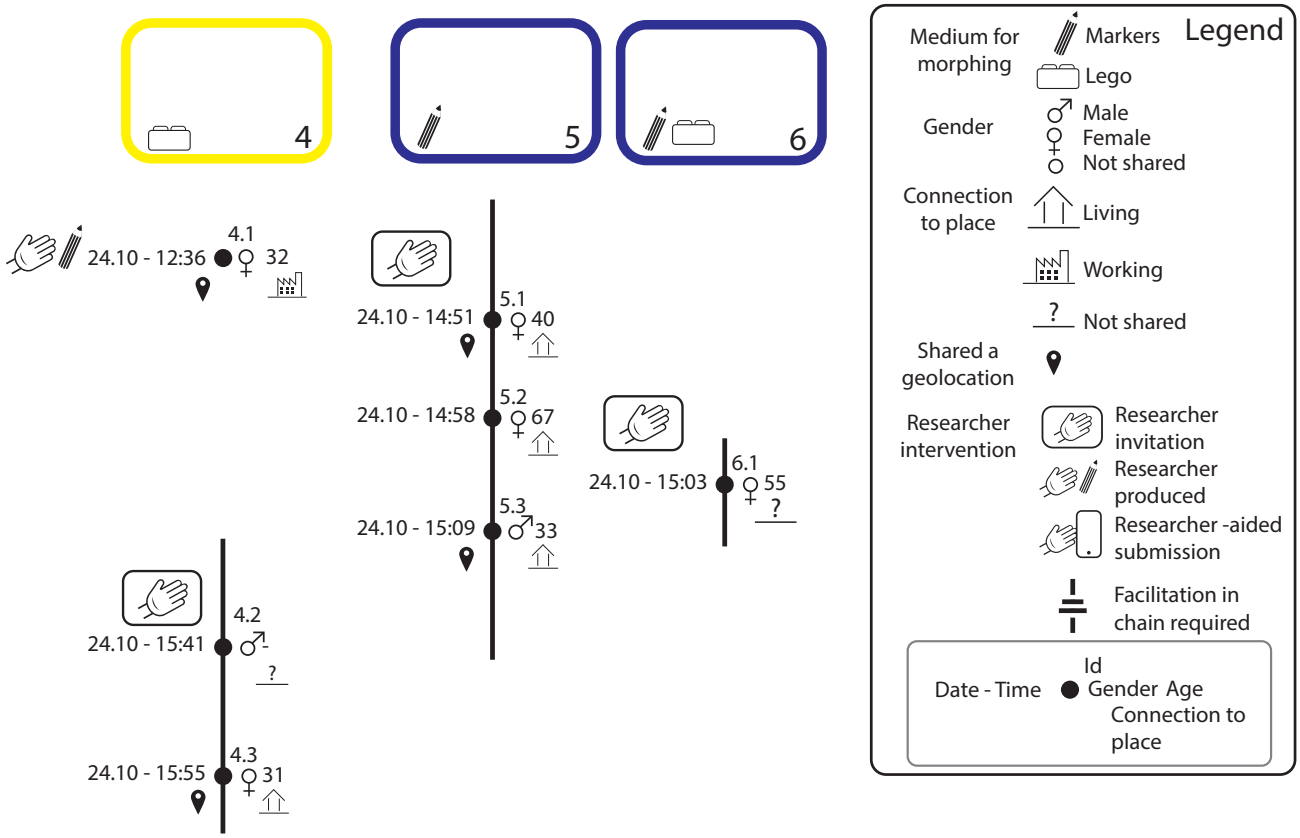

Figure 5. Visual reconstruction of the three chains of engagement during Phase 2.

was facilitated via a chain of engagement recruitment approach where participants select the next participant by passing the physical StoryMapper frame. In addition, the StoryMapper aimed to promote direct engagement with the environment through "morphing," the augmentation of the environment through the frame. Both concepts were tested as part of an ongoing placemaking project related to the repurposing of a community church, with the purpose to identify design features that should be considered in the deployment of the StoryMapper as an interactive placemaking interface to promote inclusive and emplaced engagement. Our preliminary results illustrate how the invitation of the StoryMapper into an attentive engagement with the physical neighborhood environment, achieved mixed results. Simultaneously, it steered engagement with other community members through the maps. The design features that this pilot taught us about concern (a) the role of facilitation within participant-driven recruitment, (b) the role of simplicity within the deployment of interactive placemaking interfaces, (c) the potential of multimodality as a marker of inclusion, (d) the

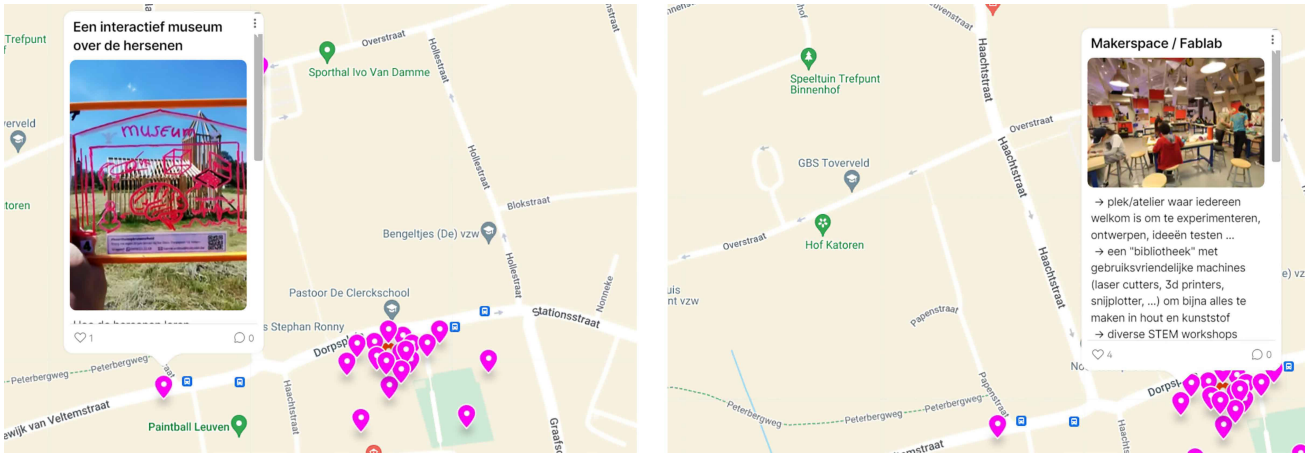

Figure 6. Example of a morphing contributed through the StoryMapper (left) next to an additional contribution (right) on the living map which generated engagement from other users through four "likes."

accessibility of different modalities, and (e) the challenge of evaluating inclusion. We also note that while our approach to morphing created an opportunity to share placemaking stories through direct engagement with the environment, it requires clearer instructions. In the following paragraphs, we discuss how the chain of engagement unfolded and how the morphings and living maps affected interaction with physical and digital places.

5.1. Chains of Engagement

The chain of engagement process required more facilitation than initially anticipated, as the chains broke off whenever a participant did not pass the frame. Potential obstacles included a reluctance to draw, the complexity of combining new concepts such as morphing and the chain of engagement, and preferences for more established interaction modalities, such as speech or text. Finally, to some participants, the technical challenges of the StoryMapper were too hard to overcome, as illustrated by the e-mail contribution and the recovered frames with unsubmitted morphings. This suggests that the online form was insufficiently intuitive, incompatible with some phones, or that the motivation to complete a contribution was too low. Follow-up research could therefore focus on determining the factors that influence the breaking of chains. This resonates with Platt's (2021) argument that inclusion is a complex ideal and that fully removing the facilitator in the deployments of placemaking tools is not always feasible.

While our participant sample was relatively diverse in terms of age and gender, the chain of engagement approach might have introduced a certain bias, as people tend to engage with like-minded individuals. For instance, the longest chain (Figure 4, frame 2), touched upon interrelated categories, such as sport, multifunctionality, and social/cultural matters. This potentially indicates that they circulated among people with similar interests while people with other (unrelated) concerns were potentially excluded. However, it is worth noting that the agency of selecting follow-up participants changes every time the frame changes owners, which potentially increases the likelihood of a more balanced recruitment process overall. This is further illustrated by how the same chain reached citizens from a variety of age groups.

5.2. Morphing and Living Maps

The pilot results allude that our morphing methodology shifted place engagement from a tabula rasa approach to active engagement with the physical environment to a limited extent. Participants chose their own "framing" of the environment or other background, yet the results suggest that this was rather a circumstantial than a conscious decision. The use of neutral backgrounds could indicate that the idea of morphing was insufficiently clear or challenging to carry out due to, e.g., light reflections on the plexiglass. Given the initial concerns regarding sketching, we tested Lego as an alternative in the second phase, while being aware of the potential restraints posed on participants. An interesting pattern we noticed with the Lego morphings is that participants created more coherent scenes that were slightly more disconnected from the background (e.g., morphings 4.2 and 4.3). Potentially linked to the challenge of finding the right perspective, this requires further evaluation in upcoming research.

The morphing invited participants to contextualize their ideas within their surroundings, with the aim to integrate the agency of place. In this regard, place itself served as an elicitation, opening up place registries of material and non-material meanings. By plugging the StoryMapper into a larger placemaking process, the morphing provided a visual supplement to the linguistic methods deployed by the municipality because the morphing process triggered different ways of seeing and thinking (Arnheim, 1969). Morphings can offer an entry point for individuals to select a communication approach that aligns with their communication preferences and sensibilities. A range of options for this morphing process may move towards a more inclusive placemaking practice.

The act of morphing presents participants with the opportunity to envision and shape the future of a particular place. Moreover, the morphings can offer an embodied experience of different "situated knowledges" (Hamilton & Kelemen, 2015), with the potential to challenge existing power structures by visualizing what (or who) is not there. This potential is in line with the idea that every image embodies a way of seeing (Berger et al., 1973) and the potential of participant-produced visuals to offer insights into the perception of place (Pauwels, 2015).

Participants started using the living map as a way to add additional ideas without the frame. As such, the dialogue continued beyond the StoryMapper as the map was appropriated by citizens. This indicates that citizens found their way to the living map quicker than they could lay hands on a frame, therefore creating an additional participatory space of engagement, asynchronous and open. Additionally, the living map flattens traditional power dynamics of co-located events that benefit the "louder voices," insofar as each contribution receives an equal place on the map without hierarchical order. However, although we did not encounter such a case, participants might overshadow the mapping process by contributing multiple similar ideas to enhance their impact.

5.3. Implications and Lessons Learned

If we accept the agency of place in research (Coemans et al., 2020) and Massey's (2005) conceptualization of place—as marked by the potential of multiplicity, relations, and change—research methods, as well as

placemaking approaches, should adapt to this agency and characteristics accordingly. The morphings are related to emplaced cultural heritage elements from the past as well as the future, linked through the present physical environment. This stance requires understanding that every placemaking intervention is part of a larger ongoing process of place without a clear end or beginning, or what Platt (2021) frames as placemaking in the middle.

The pilot findings regarding the challenges in emplacement via morphing highlight a need for simplicity in the design of interactive placemaking interfaces. Although the StoryMapper became a facilitating entity through the chain of engagement, it did not always succeed in guiding participants through the creation of emplaced contributions. However, similar to the uncertainty of feedback in the praxis of cultural probes (Gaver et al., 2004), we would like to acknowledge the insightful potential of contributions that emerge through the ambiguity of following a method, even when it is conceptualized in a different way. Some participants overcame the difficulty of conveying an idea through the intended morphing method by—incidental or conscious—(mis-)appropriation of the interface, for instance by drawing an idea using a frontal view against a neutral background (e.g., morphing 5.1). Such brief technology-driven engagements without human facilitation, therefore, require engagement flows based on simple instructions (e.g., through an explanatory video) that leave open space for interpretation and different forms of engagement. We further argue that placemaking interfaces should be adapted to the community in question, such as the use of recognizable visual elements. Further, each interruption in the chain reduced the chance for other residents to contribute an idea. This suggests that our chain-of-engagement approach to placemaking interfaces suffered from a perceived lack of urgency, similar to how stationary public interfaces are affected by interaction blindness (Memarovic, Clinch et al., 2015). We recognize a need for affordances that continuously promote engagement, such as by enticing curiosity through objects (Houben & Weichel, 2013).

Facilitators interested in implementing a chain of engagement for placemaking could take measures to increase chances for a balanced engagement. First, placemaking facilitators should ensure diverse starting points, based on an in-depth understanding of the social structure of a place, acknowledging relevant (and/or underrepresented) citizens or groups, by selecting representative individuals to initiate the process. In this pilot, we selected initial participants during the first phase based on in-depth knowledge of the community and the participatory process itself, with attention to a potential interest in the new function of the church. In addition, new chains could be iteratively introduced by benchmarking against incoming demographic data and specifically recruiting underrepresented publics for balanced engagement.

Although the StoryMapper extended the larger placemaking project by providing an additional interaction modality to citizens, the placemaking interface itself provided only one or two modalities to express emplaced ideas, potentially hindering those uncomfortable with morphing. In combination with the chain of engagement, this might hinder their ideas from receiving public attention on the living maps. On the other hand, the living maps formed a digital space for engagement that provided additional modalities, such as viewing, liking, or providing textual or visual responses, that potentially attracted a more inclusive citizen cohort. This implies that it remains challenging to operationalize placemaking through morphing—or any other single-modality method—alone. For placemaking facilitators, we suggest providing citizens with the agency to participate on their own terms, so that multimodality becomes a marker for inclusion. Finally, this suggests that inclusion should not only be evaluated based on who participates but also on how participants can engage in the process.

5.4. Limitations and Future Work

The findings of this pilot have to be situated in relation to an important study limitation: the tension between the usability of the placemaking tool and the data we as researchers consider necessary for evaluating inclusion. This tension is even more explicit within innovative technology-based methods. The shared ethical concern regarding privacy issues in relation to the small sample size could have been overcome by engaging more participants in the project over a longer period. Moreover, the introduction of two unfamiliar elements (the chain of engagement and the morphing) could be a challenge that would require a more focused approach on each separately to develop a richer understanding of each element. Using a more familiar tool to test the chain of engagement approach could provide insights into how the chain unfolds without technological barriers. Alternatively, exploring various approaches to utilize the visual-spatial opportunities of morphing could offer valuable insights into the communication and interaction styles of different users with their surroundings.

The purpose of this pilot study was to explore insights and understanding of how the StoryMapper works rather than producing empirical generalizations. Future research could therefore investigate the impact of the StoryMapper on participants and its ability to break through community barriers and reach publics hard to reach compared to traditional recruitment approaches. This could be done by querying previous participation in placemaking activities or additional efforts in terms of data acquisition, including ethnicity, mother tongue, disability, educational level, and economic status. Additional qualitative data can help to understand drivers of recruitment to draw inferences regarding inclusion. The relative numbers of hard-to-reach members of a community engaged through a chain of engagement would further

become comparable to those of related studies. Finally, further research can also evaluate the impact of the morphings on participants and placemaking projects in comparison to other placemaking practices.

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Conflict of Interests

The authors declare no conflict of interest.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Article

Intersecting Positionalities and the Unexpected Uses of Digital Crime and Safety Tracking in Brooklyn

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Abstract
Citizen is a live crime and safety tracking app in New York City that uses AI to monitor police scanners for incidences that are relevant to "public safety," whilst also utilizing user-recorded footage, as users near a crime, fire, or accident are encouraged to "go live" and film unfolding events. Users comment additional information and post expressive emojis as incidences unravel. In sharing information across a digital network, Citizen functions as both a form of social media and a peer-to-peer surveillance app. Through this lens, my ethnographic research investigates the impact of the digitization of crime and safety as an everyday experience in increasingly gentrified neighbourhoods in Brooklyn. The question of whether technology is a marker of simultaneous inclusivity and exclusivity speaks to the dialectical nature of digital technology, as producing concurrent "good" and "bad" effects. This article explores the ways that Citizen exemplifies these tensions: The app makes users feel safer but also more anxious; Citizen is a place for community information sharing to both productive and pejorative effects, it is used to both surveil one's neighbourhood, instilling fear and mistrust, and to sousveil law enforcement and circumnavigate the NYPD at protests, producing accountability and a sense of safety. Through ethnographic examples, this article further navigates the cultural and local specificities of use, the complex positionalities that are mediated by the app and the consequences this has for those who experience social inclusion and exclusion.

Keywords
community and inclusivity; lateral surveillance; protests and resistance; racial injustice; sousveillance

Issue
This article is part of the issue "Resisting a 'Smartness' That Is All Over the Place: Technology as a Marker of In/Ex/Seclusion" edited by Karin Hannes (KU Leuven) and Fred Truyen (KU Leuven).

1. Introduction

This article opens with an autoethnographic vignette of a walkthrough of the Citizen app, a self-described personal safety network in which the public safety system is opened and AI is used to monitor police scanners for 911 calls that are relevant to "public safety":

> *Citizen Notification Alert!* A warning sign flashes across my phone screen. I swipe to unlock and log into Citizen app, the homepage a dark and foreboding grid map of New York City, awash with dozens of yellow and red dots. I click on the notification: "Two men shot, Bedford Stuyvesant, Brooklyn." A grainy video of red flashing lights from the emergency vehicles at the scene glares back at me. Prayer and angry face emojis ping out of the comments section and float up my screen. A 9.36 PM update informs me that the person was shot approximately three times. A subsequent update at 9.42 AM declares that officers are canvassing for a man wearing a ski mask that fled southbound on Wycoff. I open the comments section:
>
> @SammyG7000: NYC going to shit. Almost back to the 80s and early 90s
>
> @Purpleboi: wtf that's right by me
>
> @Brooklynuser783929854: first guns in schools now this [face palm emoji]

I zoom back out to the dark mode map scanning for alerts and see a yellow dot a few miles away. "Car fire on Brooklyn Queens Expressway, Exit 28." A video,

uploaded by Citizen user @thor444, shows what was a car, now a blazing ball of flames with thick black smoke billowing out across the highway. Dozens of other videos of varying quality appear, uploaded by other Citizen users at different times and vantage points; some shot from above, from buildings across the highway, others from under the neighbouring Manhattan Bridge. Others show officers diverting traffic, while a video with a green verified tick, documents the firefighters firing streams of water at the smoking vehicle. All the while shocked face emojis scatter across the screen. I open the comments section:

> @Tinytina50: as if traffic on the BQE is not bad enough…
>
> @nozy778: Nothin' coming out of there
>
> @bkbbyy0: Car-b-que

Citizen also utilizes user-recorded footage, as users near a crime, fire, or accident are encouraged to "go live" and film the unfolding events. When a user is close to an ongoing incident, Citizen will ask: "Is this still happening?" It will offer the option of "yes" or "no," awaiting a response in real-time. In addition, users can also self-report incidences if they see something they deem to be of concern in their area. Other users are notified of this information via alerts (see Figure 1), warnings of potentially dangerous situations happening around their physical location, as Citizen also functions as a map of the city, utilizing geolocation awareness technology (Figure 2). The dark mode map conjures imagery of Gotham and vigilantes, while the app's minimalist eye icon emphasizes that we are watching. As situations unfold, more information floods in, from user comments, further video clips, and uploaded police scanner voice recordings. Emojis expressing shock, anger, and hope bubble across the screen as incidents unravel. Citizen also has magic moments, reporting on local news such as the return of a missing cat or notification of a parade. It is in this sharing of information across a digital network that Citizen functions as both a form of social media and a peer-to-peer surveillance app.

1.1. History of Citizen App

Citizen is currently in 60 different US cities and boasts 10 million active users as of 2021, 2 million of which are reportedly in New York City. Its founder and CEO Andrew Frame made millions moonlighting for fledgling Facebook and was previously arrested by the FBI for hacking NASA as a teenager (Bertoni, 2019). According to Crunchbase, Citizen has amassed $133 million in funding from multiple venture capitalist investors, including

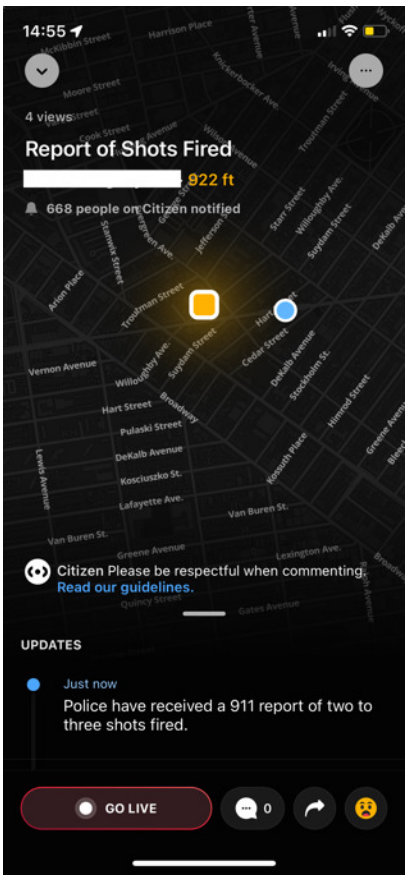

Figure 1. Citizen incident.

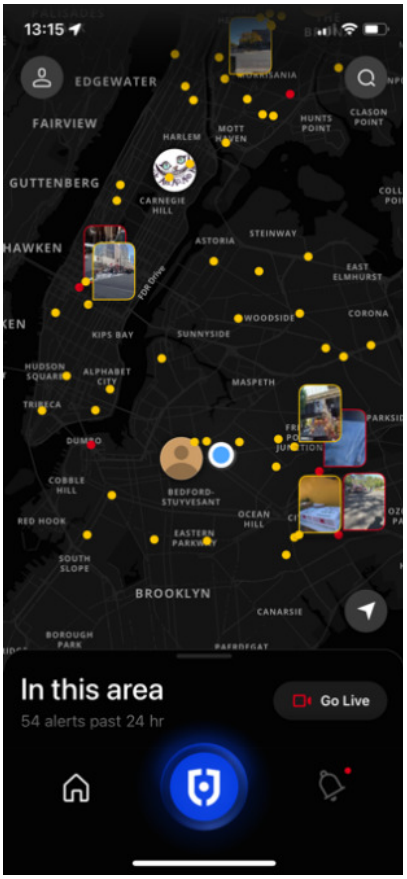

Figure 2. Citizen map.

PayPal founder Peter Thiel. Citizen does not advertise and claims that it does not sell user data. However, Citizen has been mired in controversy from its inception, attracting an abundance of media attention across the political spectrum, raising potential dangers, highlighting scandals, and reporting on the app's escalation of privatized security. Citizen was not always named as such. When the app first launched in 2016 it was called Vigilante and was swiftly removed from the Apple store for violating its guidelines on user-generated content apps that risk physical harm. Just a few months later the app rebranded and relaunched as Citizen, although the majority of its features remained the same. Vigilante's #CrimeNoMore was replaced by Citizen's #ProtectTheWorld, as the app purported to move away from crime fighting and to a mission of safety empowerment. The term "Citizen" stirs up nationalistic mythology of the patriotic hero, the law-abiding citizen, proud and dutybound. "Citizen" is both a personal call to action and an inclusion in something bigger, a community of like-minded concerned citizens.

However, it wasn't long before concerns were being raised by the media, reporting that users felt paranoid and fearful, highlighting worries about voyeurism and misinformation, while also acknowledging the potential for accountability and transparency in community and law enforcement relationships (Herrman, 2019). Other articles cited concerns about racial profiling and exacerbating stereotypes of neighbourhoods with high crime, in which whole communities are stigmatized after being placed under greater scrutiny (Murrell, 2020). This is especially perturbing with the affordance of the self-reported crime feature. Experts warn this could have damaging consequences as decisions about who does and doesn't look suspicious often reveal racial biases (Lin & Baker, 2020). In further concerning developments, Citizen was reported to be testing a privatized on-demand security force in LA and Chicago in which a security response team would physically arrive on scene at reported incidents (Cox, 2021a, 2022). These plans were later abandoned. May 2021 was a scandal-filled month for Citizen, as just four days after the LA report, Cox (2021b) further reported that Citizen accidentally exposed user's Covid-19 data, including names, symptoms and self-test results, and another two days later, a hacked data scrape of Citizen was posted to the dark web (Cox, 2021c). Just one day later, Cox again reported that Citizen placed a $30,000 bounty on the head of a wrongly accused homeless man for starting a Californian wildfire. Citizen released his picture resulting in a wrongful detention by local officers. The notification was instructed to be sent out by Andrew Frame himself. Leaked Slack messages from this time show Frame saying: "This guy is the devil. Get him…We hate this guy. GET HIM" (Cox & Koebler, 2021). In an attempt to monetize, in August 2022, Citizen launched Protect, a $19.99/month subscription service that purports to provide you with a 24/7 digital agent, who can monitor your audio and video, message you in real-time, send emergency responders your location, and alert family and friends to your situation: "Today, instantaneous locatability has become the principal capacity of the 'secure' subject" (DeNicola, 2012, p. 91). However, no one I spoke to has bought into this. Digital community surveillance is not new, existing in the form of email chains and listservs (Lowe et al., 2016) before the dawn of apps and social media. Today, Citizen exists against a backdrop of competing personalized and privatized digital security apparatus, from Amazon's digital doorbell Ring, to Nextdoor, a neighbourhood app, where users can buy used furniture and share recipes whilst also warning other users of "suspect behaviour.''

The dialectical nature of digital technology and its production of ambivalent attitudes are well accepted within the field of technology studies (MacRury, 2013; McQuire, 2016; Miller & Horst, 2012). In embracing the ambivalent and often contradictory nature of the digital technology we study, we are best placed to emphasize how it is socially embedded and culturally constructed, revealing the complexities, uncertainties, and nuance that abound human–technology relationships and interactions (Graham, 1998; Rambe & Liezel, 2015). However, that does not necessitate falling into reductive binary framings which abound in surveillance studies. Thus, moving beyond dualistic paradigms of care and control, panopticon and synopticon, this article will grapple with the tensions and ambiguities produced and mediated by the app that don't neatly fit into these categories, rather they overflow into unexpected and culturally specific uses of Citizen, such as resistance, sousveillance and as a community resource. Through ethnographic examples, this article explores how Citizen, as a security practice and a peer-to-peer surveillance app, instils a sense of fear and mistrust about one's neighbourhood, which could result in damaging consequences such as racial profiling. However, this article will also reveal the productive powers of Citizen when used in creative ways, such as to circumnavigate the police at protests and to empower communities with knowledge about neighbourhoods. I am arguing that Citizen has the capacity to create fear and yet consolidate community, to both surveil and sousveil, and to simultaneously recreate and resist existing power structures. These contradictions are often exposed in relation to the complex intersecting positionalities of users, including race, gender, ethnicity, and sexuality, complicating who benefits from the app and how. Furthermore, anthropological research is uniquely placed to address these complexities and reveal such nuances, due to the nature of long-term immersive fieldwork.

2. Surveillance, Synopticon, Sousveillance

It has been well-documented how Foucault used the panopticon, a technology and architecture by which prisoners do not know if they are being watched, to demonstrate the disciplinary power of institutions (Foucault, 1995). In 1997, Mathiesen argued that Foucault's use of

Bentham's panopticon was insufficient as it had omitted to discuss and pre-empt the rise of the synopticon, an inversion of the panopticon, in which the many watch the few, a practice well observed in mass media. The TV show *Big Brother* was a good example of the synopticon, where contestants willingly agreed to be constantly filmed for the entertainment of others. There has been much scholarly engagement and response to Mathiesen's concept of the synopticon. Lyon (2005) argued that 9/11 exemplified the synopticon, as the world gazed through TV screens at the catastrophe. McCahill (2012) argued that the panopticon–synopticon fusion of mass media reproduces power imbalances in regard to crime reporting, focusing disproportionately on street crime and under-emphasizing white-collar crime. He also acknowledged that the synopticon may have democratizing potential and mentioned the rise of citizen journalism, but then went on to say that is not the case in the context of the media, crime, and criminal justice system that reinforces power imbalances.

However, Mathiesen had not anticipated the "new modalities of visibility engendered by new media" (Bucher, 2012, p. 1164). This is Doyle's (2011) critique of Mathiesen, that the role and form of media have shifted with the rise of alternative media that are critical of security, surveillance, and crime discourse. For example, media outlets like *Vice* and *Wired* often report on the failings and injustices of digital surveillance. Additionally, Doyle argues that Mathiesen, while focusing on the synopticon as a means to control, has excluded the potential for resistance, referencing the proliferation of CopWatch videos and what has now come to be called sousveillance (Mann, 2013), an inversion of the traditional, authoritative gaze of surveillance, in which the public watch those in positions of power. The horrific murder of George Floyd in 2020 at the hands of the police was filmed and posted online by 17-year-old Darnella Frazier, in probably the most well-known instance of sousveillance. This does represent a form of synopticon in the narrowest sense, as the masses watch the few, however, it is not as a mechanism for oppression or control but rather as a means of resistance and accountability. Additionally, Doyle finds fault with Mathiesen for not considering the role of culture and intersecting positionalities, like gender, race, ethnicity, class, and sexuality. Media draws from and is reshaped by these broader frames of meaning as "these relationships are complex and recursive" (Doyle, 2011, p. 294). Thus, while it may be tempting to categorize Citizen as a synopticon, in that many watch the few, I believe it is an inadequate metaphor through which to view the app, as it omits the possibility of resistance and sousveillance, while also failing to account for the shift to personalised media and the impact of viewer/user positionalities.

Additionally, there has been significant research within anthropology and other disciplines on the dialectical relationship between care and surveillance (Frois, 2014; Zurawski, 2004), specifically within the digital realm (Madianou, 2016; Miller et al., 2021). While this is an important lens through which to look at digital surveillance, this article moves beyond that binary to look at the unexpected uses of Citizen, in all their contradictions and complexities. I am arguing we discard these restricting paradigms and look at the local tensions and nuances that have arisen with Citizen use in Brooklyn, resisting rigid categorization. Furthermore, as this article will demonstrate, these tensions are often animated by intersecting positionalities.

3. Methodology and Fieldsite

This article is based on eight months of ethnographic fieldwork in New York City from March to November 2022. I was predominately located in Bushwick and Bedford-Stuyvesant (Bed-Stuy), increasingly gentrified neighbourhoods in Brooklyn that border one another, working mainly with artists and activists who had generally lived in the neighbourhoods for a number of years. I undertook participant observation while volunteering at a multi-purpose community space in Bushwick and worked closely with the Black queer owner, Zine, who is a prominent community leader in the neighbourhood and was described to me as "the heart of Bushwick." They have run multiple local political campaigns, including for mayor and congress, worked in community outreach, food and clothes drives, and they are also an artist themselves. I also undertook participant observation at parties, on the subway, at DIY art events, pop-ups, drag shows, at the beach, and in the park, amongst other places. I interviewed over 70 people, often multiple times, both in person, at coffee shops, interlocutors' homes, on long walks, and over Zoom when necessary. I further conducted a five-hour focus group with 10 of my primary interlocutors. My choice in the use of the term "interlocutor," an anthropologically progressive and accepted term for the people I have been working with in the field, is an attempt to address historic power imbalances in the discipline, of researcher and researched, as "interlocutor" infers a dialogue, a two-way relationship of exchange, as opposed to extraction of information. For example, "informant" connotates a provider of information, while "participant" and "respondent" has a tendency to replicate the colonial power dynamic. "Interlocutor" allows for a relationship that isn't purely one-sided but is rather reciprocal; a cultural exchange that "corresponds to the dialogic nature of fieldwork" (TriCollege Libraries Research Guide, 2022). To recruit my interlocutors, I often utilized a snowballing methodology (Low, 2008). This technique lent itself well to conducting research in Brooklyn, as I generally found people to be open and accommodating, inviting me to events and suggesting other people I should talk to. All of my interlocutors have been pseudonymized and all images are either my screenshots or have been shared with permission.

Often my research involved "deep hanging out" (Geetz, 1998), which resulted in excellent rapport and trust between myself and my interlocutors. This is also

important for "holistic contextualisation" (D. Miller et al., 2021, p. 21) as I spent a lot of my research not talking about Citizen and security but rather about my interlocutor's lives, relationships, and histories. As an anthropologist, I needed to conduct long-term fieldwork where I was immersed within a community to best explore culturally specific ways in which digital technology, in particular the Citizen app, was embodied and embedded in people's everyday lives. Furthermore, I have also been conducting online ethnography, both on the Citizen app and more generally across the polymedia environment, reciprocally engaging with my interlocutor's social media. My interlocutors comprised a diverse demographic in regard to gender, sexuality, ethnicity, race, and socio-economic background. I was mainly working with Millennials and Gen Z, as this is where I had access and who I most came into contact with through my work with the community leaders. However, at times I did also speak with people from older generations. Some of my interlocutors were born and bred New Yorkers, others were from upstate, different states, and different countries. Most people I spoke with were critical and sceptical of the NYPD and the current carceral system. Often my interlocutors were my peers and I believe this both strengthens and limits my research. As noted by Donnelly (2018, p. 381) in her research with gentrifiers in Bed-Stuy, she had much in common with her participants, and she cited this as a strength of the study, believing her participants were more candid and open with her and less defensive than they may have otherwise been with a different interviewer. That being said, I also acknowledge that this approach limits the scope of my research. However, as is essential and ethical for anthropological fieldwork, I went where I was granted access and respected community leaders and gatekeepers when they declined to be involved in the research project.

There is a strong emphasis on community and the importance of community in Bushwick and Bed-Stuy. This term is used loosely and crosses purposely by my interlocutors, intersecting between different localities and social relations. Community referred to the surrounding blocks of one's home, the entire neighbourhood, the nightlife community, the arts and activism scene, and the queer scene, to name a few. "Community" also meant reaching out on Instagram for mutual aid, to supplement funds when income was low in order to pay rent, buy pet food, or move out of an unsafe living situation. Communities are rarely homogenous and are often in flux. These intersecting and colliding "scenes" that my interlocutors occupy are not delineated and are often referred to interchangeably. Thus, I am using "community" in the same way my interlocutors do, as amorphous and inclusive.

3.1. Context: Security in the US

The philosopher Brian Massumi discussed the terror alert system in the US introduced after 9/11, arguing that this system was designed to create fear that stimulates direct activation that is lived through the body. As activation reoccurs, fear becomes self-relating, eventually becoming the ground of existence and a way of life (Massumi, 2005). Within the anthropology of security and surveillance, there has been ample research on this normalization of fear and the ways in which security is placed as an everyday concern, embedded in people's lives (Fassin, 2014; Fawaz & Bou Akar, 2012; Frois, 2014; Low, 2008). Masco (2014) argues that, post 9/11, the amplification of terror and fear was utilized as a justification for increasing security apparatus. With this "phantasmagoria of fear" (Maguire, 2014) promoted by the state and media, danger became standardized as a continuous campaign to normalize imminent threats, resulting in a national state of perpetual anxiety and mistrust. This in turn tailored an atmosphere of fear which was used to legitimise technological surveillance practices to protect citizens from both real and imagined threats (Frois, 2014, p. 50). Fear became normative as it was established as a fact of social reality and security was thus positioned as something we constantly engage in. This in turn works to reaffirm any sense of disorder and one's need for protection, as security begets insecurity.

This is something anthropologist Setha Low found in her research on gated communities in the US (Low, 2008, 2019). As emotions of fear were subsumed into the conception of home, insecurity became an everyday concern, which actually worked to heighten feelings of anxiety rather than making them feel safer. She further argues that these emotions are exacerbated by the media and both the local and global discourses on insecurity and crime. Similarly, in Portugal, Frois (2014, p. 46) discusses this "power of security discourse" where CCTV was installed despite expenditure, low crime rates, and local police insistence on its ineffectiveness, but rather due to pre-existing political ideology in which security had been naturalized. While there are certainly differences in the case of New York City, it has been reported that the perception of crime rates is misaligned with actual crime statistics (Akinnibi & Wahid, 2022). This is most probably a result of high reporting on crime in the city and the regular press conferences by Mayor Eric Adams, emphasizing the crime levels in the city (Fitzsimmons, 2022). Apps like Citizen further compound the situation, as they work to confirm that crime is indeed all around. The success of the privatized security industry in the US is also a result of individualism and neoliberalism, as the responsibility of security has been shifted onto the individual, as the state has diminished (Low, 2008). Individual citizens and communities have taken on the role of defending themselves and their homes, and technology corporations have responded in kind. As Goldstein (2013, p. 13) argues, the "security state is the logical counterpoint to neoliberalism's privatization of civil society."

Another consideration that is important to mention in the context of the US is the deeply entwined history

between surveillance and racism, charting back to chattel slavery. For example, Browne (2015) draws attention to the Lantern Laws, under which Black slaves were required to carry lanterns at night as technologies of surveillance in colonial New York that sought to keep racialised bodies illuminated and marked as dangerous. Violent visibility produces the racialized body (Browne, 2015, p. 68) and positions them as an issue of security. Today, technologies of surveillance have been criticised for reproducing racial bias (Nkonde, 2020) and this is something Maguire (2014) also highlights in his analysis of counter-terrorism at European airports, where agents employ pseudo-scientific methods of screening for "suspicious behaviour." He argues that these security decisions are influenced by moralized and racialized knowledge and that what is suspicious is culturally specific. Citizen app is effectively placing that judgement with its users, who are untrained and have feelings of unsafety, as I will discuss later in the article.

4. Citizen App in Bushwick and Bed-Stuy

Ethnographic research is aptly positioned to grapple with the chaos and contradictions of the everyday experiences of using digital technology and my fieldwork has uncovered such intricacies and inconsistencies. Citizen is used for a variety of reasons and by a wide-ranging demographic. Some have described using Citizen for comedic value and trolling, others have stated how Citizen helped them track Covid cases during lockdowns, and others have described their experience of using Citizen with neutrality and indifference. User's opinions and feelings about Citizen oscillate over time and through the different ways that they use the app, describing it as "very informative," "useless," "racist," "a double-edged sword," and "a lifesaver." Some people think Citizen is trustworthy because you can self-report incidences, others think it is untrustworthy for this very reason. Citizen has unexpected uses. For example, I was sitting in the local park in Bushwick with Z. She has lived in Bushwick in the same railroad apartment for the past ten years and regularly runs monthly community salon events, showcasing local artists from her apartment. While in the park, we heard loud sirens, and Z said: "I bet that's on Citizen." It was: Engines rushing to a nearby fire. Z followed up: "I literally got renters insurance which covers fire because of seeing all the fires on Citizen." Other unintended uses were more complicated.

4.1. Protests and Resistance

In the summer of 2020, as the Black Lives Matter protests surged in the weeks after George Floyd's murder, Citizen downloads skyrocketed, surpassing *Twitter*, *CNN*, *Fox News*, and every other "news" app on the Apple charts. While most of my interlocutors already used Citizen prior to the protests, they often noted a change in how they and their friends used the app during this time. Eva is a queer Latinx furniture designer who lives in Bushwick, a place she describes as having a "thick culture." Her mother is Mexican and her father is white, who grew up in Buffalo, upstate New York, a place Eva describes as very white and extremely racist. She grew up in Texas and experienced a lot of racism as a brown kid and frequently witnessed her mother being racially profiled by law enforcement. She also grew up on military bases and had to unlearn the glorification of the US military once she got older and moved away. Eva was very active during the BLM protests and this raised difficult conversations with her family in regards to her disavowal of law enforcement. Her father found it very sobering to realise his daughter was no longer on his side. During the protests Eva was going every day, marching for months. She described her legs getting tan and buff, wanting to be outside as much as possible during Covid and do something that felt powerful. During this time, she was chased by police, hit with batons, and hid out after curfews. Eva used Citizen often during the protests and found it really helpful in seeing what direction they were going in and how to catch up. It was also useful to figure out where police would be, avoid cop traps, and anticipate kettling tactics, in which police form large cordons to contain protesters in limited spaces, often as a means to arrest protesters. Citizen was often used in conjunction with other apps like Waze, a navigation map, before messaging friends over Telegram to communicate their location and that of police.

However, during this time Eva saw activity explode across Citizen, with constant shootings and stabbings, which she found very overwhelming. She heard friends saying that often these reports were false or unfounded and there was a conspiracy going around that the police would make up incidences on Citizen. These incidences were being reported in areas like Bushwick and not in more affluent neighbourhoods of Brooklyn like Williamsburg. Eva saw this as misleading and making it look like certain neighbourhoods were more dangerous or had higher crime rates during the time of the protests. There would also be information about police activity that turned out to be unfounded, in her eyes intentionally generating unnecessary fear. Eva was worried this could create a divide between people and she was angry, so she started going to the location of reported incidences to see for herself what was happening and every time the area was empty, with no people or noise. After these experiences, Eva would only rely on the comments section to verify whether something was true or not, especially in the case of comments from people who stated they were there or they lived upstairs of a reported incident. In early 2021 Eva deleted Citizen. These inconsistencies were part of the reason but also the anxiety the app created, both for herself and her girlfriend, as notifications of supposed violence would jarringly interrupt their day. She is now annoyed talking to people who still have the app because she believes Citizen was created to scare people and is used to stigmatize specific

areas. This is a shift from how the app was originally introduced to Eva, as an informative, important piece of technology in regards to safety.

There is much to unpack here. Firstly, I am interested in how Citizen was utilized for protest mobilization and as a means of resistance, an arguably unintended use of the app. The perpetual opportunism of smartphones (Miller et al., 2021) opens up unexpected uses and the practice of using Citizen to engage in solidarity and march in protest against police violence is an example of this. Eva details how Citizen was used as a way to monitor police presence at protests in order to avoid them, protecting herself and her community. Not only is this a form of resistance, I believe this is also a form of sousveillance, taken at its broadest definition, as Eva used Citizen to track the police. This is powerful in the climate of the summer of 2020 and the sousveillant witnessing of George Floyd's murder. Walsh (2010) also writes about the inversion of an event that would be traditionally surveilled, like a protest, which is then, in fact, sousveilled, in the case of US–Mexico border crossings, where civilian-led sousveillance teams watch for border patrol and vigilante organizations in order to provide care for migrants in the form of water and high-resolution maps. "While they may enhance and extend state control over bounded territories and populations, watching, monitoring, and rendering visible are not inherently exclusionary or repressive acts" (Walsh, 2010, p. 113), but rather can function to undermine authority. Thus, an event that is normally surveilled can be transformed and harassed into one that is sousveilled, while using the very same technology.

In regards to the conspiracy surrounding the police creating fake incidences on Citizen, Eva said she could see that being true but had no evidence to support it, which I also couldn't find. However, there are concerning connections between Citizen and the NYPD. While Citizen claims to have no formal ties with any municipalities, the company's relationship with local law enforcement is murky. For example, the ex-police commissioner of the NYPD, Bill Bratton, now serves as an executive on the board of Citizen. During his time as police commissioner, Bratton championed the use of emerging technology in policing, including COMPSTAT in the 90s, which mapped "emerging crime patterns" using "high-tech 'pin-mapping'" so that police could "quickly identify trouble spots," and PREDPOL in 2007, another predictive policing software, which has subsequently been banned in other cities for "perpetuating police bias by sending patrols back to areas where they've already made arrests" (Miller, 2020). Additionally, in cases of shooting reports, often Citizen posts that ShotSpotter technology has detected gunshots while emphasizing how that technology can also pick up fireworks or cars backfiring. ShotSpotter is an audio surveillance technology that is utilized by the NYPD, in which hundreds of small sensors have been deployed on rooftops and lamp posts, across areas of Brooklyn that are deemed high in gun violence. The fact that Citizen also uses this raises questions about the extent to which they share information and technology with the NYPD. Thus, while Eva's claims of police conspiracy are unfounded, there are definitely troubling connections between the app and local law enforcement.

4.2. Fear, Racism, and Gentrification

While Citizen was used as a form of resistance to great effect, its usefulness was entangled with other emotions. It is revealing that Eva mentions anxiety and the stigmatization of neighbourhoods like Bushwick as reasons for deleting Citizen. And while Eva saw for herself that some Citizen notifications were unfounded (see Figure 3), other people I spoke to had not, describing how the

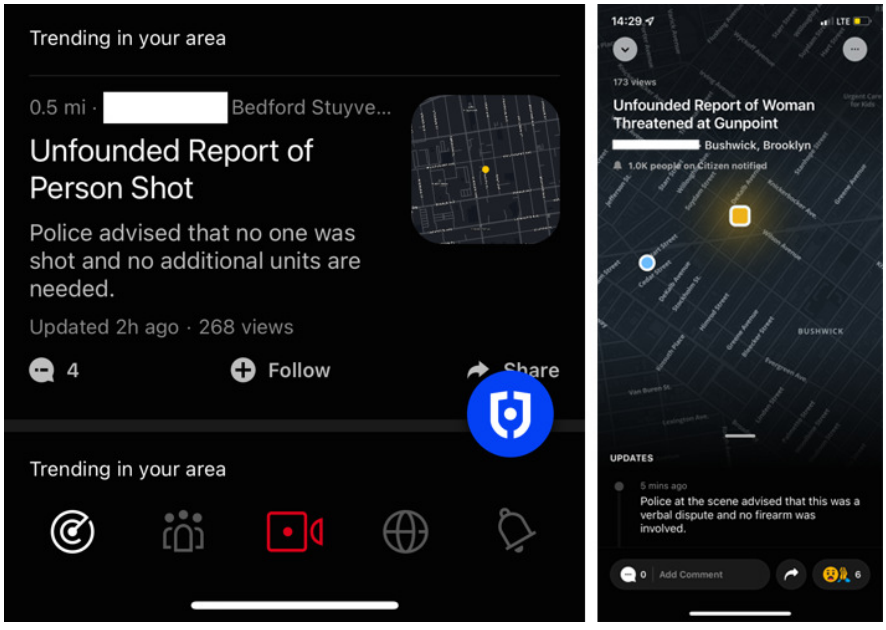

Figure 3. Examples of unfounded notifications.

app made their neighbourhoods feel insecure, mistrustful, and crime-riddled, making them in turn feel paranoid and unsafe. This is significant as, generally, my interlocutors don't spend a lot of time in their apartments. Living space is limited so they like to be out and about, at community events or parties. Thus, when your neighbourhood feels insecure this is impactful, as, extending Low's conception of home to include one's neighbourhood, "the reactive emotions of home have real-world consequences: They restrict participation and limit aspects of social interaction" (Low, 2008, p. 62).

Often due to media reporting, the perception of crime is disproportionate to actual crime rates and Citizen adds to this impression, in a way that is invasive, via notifications, and ever-present, as your phone is always with you as you move around the city. These notifications function as a continual reminder of your potential insecurity, jarringly interrupting one's day where ever you happen to be, be it at work, on the subway or at home in your bedroom, blurring the boundaries between public and private. Due to geolocation awareness, crime, or at least the perception of crime, becomes ever-present (see Figure 4).

Apps with maps are powerful, making users feel small yet significant, creating reference points of relation with the self always at the centre. Citizen creates an overwhelming map of your area that gives the impression that your neighbourhood is constantly under siege and therefore a space to be mistrustful of. As mentioned earlier, there have been concerns about Citizen and the dangers of racial profiling, and these concerns are particularly pertinent in this context. These worries are shared by Zine, the community leader mentioned earlier. They described Citizen as "straight up racist," saying it reminded them of the crime alerts on their college campus and that they started to dress in colourful clothing so as to not be identified as the generic Black man frequently described on the alerts. Other interlocutors have mentioned the prevalence of racist comments on the app, often accusatory statements directed at people of colour. Citizen asks its users to make time-sensitive moral judgements about who does and doesn't belong, and there is the danger that these judgements are animated by users' fears of a racialised other. This is because people of colour are more often placed into the category of "suspicious" and "criminal" in their own neighbourhoods, as racializing surveillance has the "power to define what is in or out of place" (Browne, 2015, p. 16). This can happen at an accelerated rate in gentrifying neighbourhoods like Bushwick and Bed-Stuy as "policing becomes offloaded to communities whose newest members have varying degrees of familiarity with existing neighborhood composition" (Bloch, 2022, p. 269). Additionally, gentrified areas are over-policed which results in exclusion and displacement, as more people of colour are incarcerated, which in turn further destabilizes communities (Kellogg, 2015). Thus, in streamlining a continuous feed of supposed crime into users' hands and homes, Citizen creates the impression of unsafety in one's neighbourhood, a feeling that can be particularly potent and consequential in the hands of gentrifiers who are new to the community. Furthermore, Zine also raised a similar point to McCahill regarding the lack of white-collar crime being reported on the app, which is particularly pertinent in New York City, the financial capital of the world. Rather, by focusing on violent crime, Citizen perpetuates negative racial stereotypes and reinforces ideas about Black criminality.

Figure 4. Screenshot of Z's messages about Citizen notifications.

These stories and views from Eva and Zine work to highlight the tensions and nuances that arise with Citizen use in these neighbourhoods. While Eva used Citizen as a form of resistance, to sousveil the police and protest safely, she also felt anxiety using the app and saw how certain neighbourhoods were being made to look more crime filled, be it intentionally or not, creating more fear and mistrust noted by other interlocutors. Whereas Zine points to concerns about racism and the perpetuation of negative stereotypes on Citizen, a danger that is heightened in gentrifying neighbourhoods, in particular when residents report feeling unsafe and insecure.

4.3. Community Potential

Zemmy is a 30-year-old performance artist who has lived in Bushwick for the last 10 years. They are white, gay, and use they/them pronouns. Zemmy describes their politics as nihilistic and produces and performs satirical queer DIY comedy across the neighbourhood. They have taken me to many drag shows, noise shows, and alternative comedy nights throughout Brooklyn. They generally feel safe in New York, citing their male presenting body as a possible reason for this sense of security, although they do say they wish they could leave the house dressed more femininely and not be a walking target. For Zemmy, Bushwick is the only place they really feel at home as it is where all their friends are and there is a real sense of community, stating: "New Yorkers are the best community builders, I couldn't live anywhere else." Zemmy has strong views on the failings of local government, as the city isn't doing anything to help low-income people like themselves, widening the socio-economic divide. They think the NYPD are useless and critique the fact that they still do a bad job when their budget is so large: "There are cops everywhere but what are they actually doing? The guy who shot up the subway had to hand himself in!" They further criticise the NYPD for not looking after people but focusing on, for example, turnstile jumpers on the subway because they can ticket them and make money out of it.

Zemmy sees Citizen as a community-focused space that has the power to make citizens safer. Citizen is one of their most used apps and they praise how it puts the power back into the hands of the people. Zemmy uses Citizen when they see police outside, be their apartment or out at a bar, to see what exactly is going on. They view this information, posted by other users, to be really important, in particular in the case of video footage of incidents as verification. Zemmy referenced the homophobic arson attack on the queer nightclub Pashed which happened in early 2022. They appreciated that Citizen provided detailed real-time information from multiple sources that they wouldn't have found elsewhere, as local news wouldn't have been covering it and if they were, it would be biased. Local news also wouldn't provide updates from neighbours on the level of smoke or police activity, which was posted in the comments section. While Zemmy finds this information about their community's safety essential, they also acknowledged the voyeuristic nature of watching these videos and the presence of biased comments.

Zemmy embraces Citizen app and highlights its role as a community resource. Similarly, to Eva's account, Zemmy uses Citizen as a form of resistance and also as sousveillance, as they keep an eye on police activity and whereabouts through the app. Additionally, Zemmy's account demonstrates the changing role of the media that Doyle mentioned, as Citizen functions as an alternative to the increasingly politicized and polarized news. In putting information dissemination in the hands of the people, Citizen provides a space for local knowledge creation, essential in a time of pervasive mistrust of the media. Furthermore, in the case of Pashed, Citizen is seen as disseminating hyper-local community news that would be otherwise underreported and is deemed trustworthy because it is circulated by that very community. This is essential in the context of the US today and the increasing violence towards the queer community in the form of shootings at nightclubs and ongoing drag bans. Therefore, through ethnographic research, these culturally specific uses of Citizen, as keeping the queer community informed and as a platform for activism, have been revealed.

Zemmy's account shows the community potential of Citizen app, while further reiterating its role in resistance and sousveillance. However, in the case of both Zemmy and Eva, verification in the form of comments or videos from other users is essential in trusting the information provided on Citizen. Furthermore, while Zemmy does reflect on the possible adverse consequences of Citizen, they do so briefly and with more general language like "biased" as opposed to explicitly saying "racist." Conversely, Zine reflected on their previous experience of being racially profiled and applied this to their concerns about Citizen, while also reflecting on how these experiences led to them changing their appearance and how they present themselves to the world. Zemmy uses Citizen as an extension of their community, whereas Zine, as a young Black community leader, is concerned that the very usage of Citizen could result in racism and harm against their community. The balance between inclusion and exclusion of "community" is delicate and oscillating in this context. Moreover, the ethnographic accounts of Eva and Zemmy exemplify the disparate localised and unexpected uses of Citizen, the concurrent opportunities for community erosion and consolidation, and the ways in which these outcomes reify along complex lines of intersecting positionalities, including race, ethnicity, gender, and sexuality.

5. Conclusion

In moving beyond the restrictive binaries of care and surveillance, and panopticon and synopticon, this article has explored the often contradictory uses of and feelings

towards the Citizen app in Brooklyn. These paradoxes are common within participatory surveillance, as it has been found to both strengthen a community's sense of belonging and instil a sense of fear (Purenne, 2016). By looking at the unintended and innovative uses of technology, it is possible to challenge assumptions about surveillance as purely pejorative, through the productive social value of sousveillance, while also highlighting how these uses are localised and culturally specific. For example, Citizen as a means of resistance, for protest mobilization, and to sousveil the police, has been harnessed by diverse activist communities in Brooklyn who are expressly mistrustful of the NYPD to enact social and racial justice more safely. The dangers of fear-mongering, racial profiling, and gentrification as a result of Citizen are real and pressing, however, these are not the sole understandings and applications of the app, as it also functions as a place for localized information sharing and community building. The way Citizen is viewed and used is greatly dependent on the positionalities of its users, which often intersect, and analysing the app should prioritise these individual, localised, and unexpected uses. Thus, this article has addressed the tensions and intricacies that arise with the Citizen app, as a tool for coexisting social inclusion and exclusion, dependent upon who is using it and how.

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Conflict of Interests

The author declares no conflict of interests.

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Alice Riddell is a PhD candidate at the Centre for Digital Anthropology at University College London. Her research examines the digitization of safety as an experience in Brooklyn through the Citizen app, a crime and safety tracking app, and social media, like Instagram and TikTok. She is further interested in the material culture of self-defence in the form of safety gadgets, such as alarms and tasers. She is currently a teaching assistant in the Department for Culture, Communication and Media at UCL.

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Article

The Digital Divide and Futurist Imaginings of Zelle-ous Resistors

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Abstract
The "digital divide" is widely acknowledged as exacerbating inequality by leaving some people on one side or the other of a knowledge divide without access to appropriate tools for the future and all the opportunities that digital technology promises. Attempts to understand this gap tend to focus on issues of trust, levels of financial education, and digital skills, mainly seeking to understand why some individuals and groups—who are mostly assumed to have minimal financial know-how and digital skills—do not trust either online financial institutions or exclusively app-based finance. Considering the large investment in fintech solutions driven by these industries, and the practical features designed in part to make the user's life easier and user experience more intuitive and reassuring, it is worth noting that such queries are inclined to conclude that these untapped users cannot imagine a digital future due to their own lack of digital skills and lack of exposure to tech. This article suggests that, for a portion of this population, many of whom are digital natives, this is not the case. instead, they can invest in understanding and adapting to technology and do so. Yet they are uncomfortable with the "instantaneousness" of some transactions because this doesn't allow them enough time to address a problem or have recourse for anything unforeseeable. Furthermore, their interest in fintech's inclusive platforms is foreshadowed by their vivid futurist understandings and imaginations. Indeed, they envision precisely the kind of digital significance that is often assumed that they do not. However, this article argues that the key difference is that many envision the future as a digital dystopia and are resisting what Lauren Berlant refers to as "cruel optimism." These types of imaginings motivate many to resist the vulnerabilities that they believe can make them overly dependent on technology in ways that they believe can potentially place them at risk. This article focuses on the US multi-bank-owned Zelle payment system and its online and app-based banking features as a case study to illustrate these points. It further argues that the inclusivity that online digital banking platforms aspiringly offer is often viewed by potential users not as a portal toward equality but rather as "a leap of faith" toward digital dependency and future vulnerability.

Keywords
cash; cruel optimism; data privacy; digital divide; dystopia; financial inclusivity; fintech; future imaginaries; glitches; hacking; P2P payments; scams; trust; Zelle

Issue
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1. Introduction: The Digital Divide and Technology Know-How

We propose the following research question: Why do economically precarious individuals who have digital know-how choose not to use fintech that is designed to make their lives easier and more financially inclusive?

The digital divide is widely understood to be a widening chasm between individuals and groups who have access to digital technology, high-speed communications, and media, and those who do not. The awareness of such a divide has steadily emerged since a 1995 National Telecommunications and Information Administration landmark publication that focused on telephone and computer access in the US (Brown et al., 1995; van Dijk, 2006). The transmission of new information technologies in the 1990s onward is widely credited with bolstering the overall economy and achieving ongoing economic growth, yet it is also widely acknowledged to have intensified the wealth gap for low-income

and ethnic or racial minorities (Broady & Hester, 2021; Friedline et al., 2020; Klein, 2021; Velasquez, 2020). The digital divide is also attributed to further widening the distinction between "skilled" and allegedly "unskilled" labour that contributes toward income inequality globally (García-Escribano, 2020; Gittler, 1993; Wahiba & Mahmoudi, 2023). Currently, the digital divide punctuates not only ideas about ownership and access to technology but—more importantly—also refers to the related digital know-how and savviness that reflects a mastery of technology.

Emerging technology is projected to continue at an accelerated pace, with the growth rate speculated to be at 104 percent for 2018 through 2023 (Sava, 2022). With certainty, the global Covid-19 pandemic sped up the adoption of online technologies—remote working, meetings, teaching, banking, and health care—and negatively impacted those without adequate access to the internet. While some of this adoption was due to pandemic fears (Abdul-Rahim et al., 2022), it also reflected a shift in attitudes (Krivkovich et al., 2020) and offered practical solutions for many lifestyle and workplace challenges. At the same time, the move toward online activities created an "emergency crisis" for households that struggled with issues of access and maintaining sufficient internet speeds (Lai & Widmar, 2021). This resulted in inequitable access to several crucial areas of public service such as education (Chandra et al., 2020) and health care (Gallegos-Rejas et al., 2023; Singh et al., 2020), thus disadvantaging many.

In line with accelerated mobile technologies, fintech adoption and usage—measured by increased online financial transactions—has also markedly risen and is likewise challenged by the widening digital divide. Here, the digital divide is centred around those who require or prefer cash or other traditional transactions (checks and money orders) over those who manage their money electronically. The divide implies that those who are not operating their finances electronically (via mobile or online methods, most notably via financial apps) are losing out on speed, convenience, and opportunities linked to beneficial, ready, at-hand access and expediency. Hence, being strictly on the "cash side" of the digital divide raises concerns about financial exclusion, particularly in studies that assert that having access to appropriate financial services is beneficial for all, including individuals and households below the poverty line (Demirgüç-Kunt & Singer, 2017). In this light, the adoption of fintech is touted by the World Bank and the IMF as an important step toward financial inclusivity that will simultaneously accelerate economic and job growth while working toward cost-effectively shrinking the global digital divide (Tok & Heng, 2022; World Bank, 2021). Fintech offers the promise of assisting everyday people to affordably facilitate savings, payments, loans, credit, and insurance if they wish to.

In the interest of bridging the digital divide and its ensuing financial inequalities, many researchers, organizations, institutions, and governments have sought to comprehend the adoption of or reluctance toward fintech use (Abdul-Rahim et al., 2022; Chan et al., 2022; Klein, 2021; Mnuchin & Phillips, 2018). Efforts toward understanding individual and group hesitancy or dismissal toward automated mobile finance technologies have tended to heavily focus on issues of trust and mistrust toward online or mobile financial transactions (Aboobucker & Bao, 2018; Müller & Kerényi, 2019; Nel & Boshoff, 2021) and toward financial institutions themselves (Aldás-Manzano et al., 2009; Benamati et al., 2010; FDIC, 2022; Servon, 2017). The question of trust is elusive because trust is relational, intersubjective, temporal, and conditional. The only way forward for trust to transpire is for it to be ongoingly fostered and nurtured. For this to occur there must be shared frames of reference, shared meanings of vocabulary or narratives, and shared understandings of what the barriers to trust might be within rather than outside a framework (Peluso, 2011).

Efforts to comprehend variables that contribute toward the digital divide, specifically regarding fintech, have also assumed that disparate levels of financial knowledge and education correspond with opposing sides of the rift (Senyo & Osabutey, 2020). The underlying assumptions are that an unwillingness to take advantage of the benefits of fintech is, for a majority, likely due to ignorance and lack of skills. This is a complex set of assumptions, particularly when one considers what precisely is meant by financial and digital skills for the individuals and groups in question. Several studies have shown, for instance, that those who live in poverty and are relatively outside financial systems know a significant amount about managing finances, particularly regarding how they manage limited resources across multiple needs and wishes (FAIR Money, 2015; Morduch & Schneider, 2017). However, such financial know-how is disregarded because it "does not resemble the financial system recognized by most financial experts and by affluent Americans" (FAIR Money, 2015, p. 7). Furthermore, financial knowledge is relevant to wage income as well as work and life conditions and circumstances, and should not be understood as a generic panacea for economic uncertainty.

2. Objectives

The goal of this study is to understand why some individuals do not make use of a free, convenient, and efficient fintech service. To further examine social inclusion and the digital divide, I interviewed non-adopters of Zelle who currently use online and app-based banking that feature Zelle. Zelle is the most widely used peer-to-peer (P2P) fintech instant payment system in the US and is widely available via a large network of financial organizations. It is owned by Early Warning LLC, which, in turn, is owned by seven large US banks, and the system is used by over 1,700 traditional banks and credit

unions (Early Warning, 2023; Laverdure & Csutak, 2020; Zelle, 2022a). Zelle is built into each user bank's website and app design, allowing customers to initiate a free instant payment to another person or entity—using the intended recipient's phone number or email registered to their bank accounts—and only permits credit transfers (Krebs & Holbrook, 2019). It is because Zelle transactions and customer experience take place within the "security of their own bank's app" that the general population is comfortable using it (Sparks, 2017, p. 29, 2018). More than 5 billion transactions have taken place across the Zelle payments platform since it launched in 2017, with more than 99.9 percent occurring without any fraud, and moves it more money than Venmo or Cash App, thus providing safety (Mason, 2022; Zelle, 2022a, 2022b). Despite its ease of access and the ability to use it within one's own bank environment, many prefer not to use it despite being able to benefit from its convenience and simplicity.

3. Methods

The present study is based on a series of in-depth semi-structured interviews with 12 non-adopters of the US Zelle payment system—as a bank app or online banking feature—who live in large urban cities in the northeast US and all access a banking app that includes the Zelle feature. They are between the ages of 32 and 62 (seven women, five men). Eight of them identify as ethnic minorities, all have completed secondary school education, and two hold associate degrees. All participants have either average or above-average smart-technology digital abilities and know-how, and they all own laptops and smartphones, which they use regularly. While actual skills could not be measured directly, participant's confidence about their skills was accessible based on their statements of reported use of specific smart technologies (Helsper et al., 2020).

Participants were interviewed minimally three times with online or phone interviews lasting one hour. The recruitment criteria was that individuals should be around or below the poverty threshold and that they did not use Zelle yet had access to it via their own online banking or bank app. I began with two non-adopter acquaintances, and since a typical snowball effect did not occur, additional participants were sought via my existing network of contacts. Poverty threshold levels are measured following the US Census Bureau (2022). The research approach adheres to the American Anthropological Association ethical guidelines, prior informed consent (Alexiades & Peluso, 2002), and mixed methods appropriate for such studies (Peluso, 2017a, 2017b). We did not consult Zelle for this article, nor do we have any personal or working relationship with the company.

The most overt methodological concern in a project such as this one is the question of sample selection, generalizability, limited variability, and lack of statistical power. However, the methodology provides intensive data collection, increased engagement with participants, and a contextual understanding of a very specific set of research questions. The subsequent richness of data allows for nuanced understandings and analyses of a complex topic. To mitigate the limitations of a small sample, the data is triangulated with online discussion groups, blogs, and published research. This study does not intend to suggest that individuals should use Zelle or that this sample represents the full population of non-adopters. It does, however, offer a particular understanding of a portion of this population who are digitally capable yet choose not to adopt Zelle when it is available to them, and when they have the skills and know-how to access it.

4. Study Findings: Zealots and Zelle-nots

The findings conclude that decisions related to (non)use, although amidst varying degrees of mis/information, tend to be underpinned by dystopian views of a digital future that can potentially control, exploit, and exclude them. Despite not using Zelle, all participants reported circumstances and contexts in which they suffered from either not receiving or not sending instant payments. In initial interviews, their principal reasons for rejecting Zelle encompass a wide range of concerns, many of which certainly centre around issues of trust, safety, and security. Their most salient reason for disapproving of this service concerns its instantaneousness—the very feature that makes Zelle convenient for others. They prefer the delays that occur with other payment methods because it gives them time to correct a mistake and take corrective measures. They consider errors to be part of the human condition.

All participants hold varying degrees of information and misinformation concerning Zelle, which I have organized around four main themes: fraud and scams; hacking; glitches; and privacy. The instantaneous aspect of Zelle lends itself to fraudsters who elicit authorized payments from credulous and vulnerable victims. Such misguided transfers cannot be cancelled or reversed (Geldenhuys, 2022; Krebs & Holbrook, 2019). Alongside a good understanding of what constitutes scams, participants assume that using Zelle means that money can be withdrawn by fraudsters without their awareness and/or that one's banking app could be hacked. Participants had either heard about fraud from someone else or read headlines stating this via online news or social media. Indeed, such headings are common, but they often offer incomplete information and do not explain that one would need to directly authorize a payment to a fraudster for fraud to transpire. Zelle (2022b) has responded to misleading reports by stating that fraud and scams represent less than 0.1 percent of all transactions. The Bank Policy Institute, a nonpartisan public policy, research, and advocacy group representing leading US banks has further stated that Zelle is the safest way to move P2P money (Payne, 2022).

Together with participants, we reviewed the relevant operating rules of NACHA (formerly the National Automated Clearinghouse Association), the electronic payments association. NACHA governs the ACH (Automated Clearing House) electronic payment system network responsible for safe and fast direct deposits and direct payments across all US bank and credit union accounts (Board of Governors of the Federal Reserve System, 2015; NACHA, 2022; see also Krebs & Holbrook, 2019, p. 6). Pointing participants toward rules that state that the bank that initiates an ACH debit, an electronic transaction that requires a debit from an originating bank, and a credit to a receiving bank, requires that those transactions be authorized. This did not quell concerns but was noted. The idea of not having any recourse for funds that they themselves authorized was difficult to fully accept. While they agree that giving a scammer a check or cash that they themselves had unwittingly agreed to had similar consequences to an erroneous Zelle payment, they still have expectations that the bank must act on their behalf to recover the funds. The following comments emerged from participants:

> I just don't like that the bank won't advocate for me! With a check, they will put a stop-payment on it.

> It is just not a feature worth its while even though it would be great to receive money so quickly.

> Everyone is annoyed with me for not using it—It creates problems for me but I am just not comfortable.

When we explained that Zelle is not a credit card that will champion customer protection for undelivered goods, this was noted by participants but did not alter their positions.

Together with participants, we discussed the potential safety of their funds by examining samples of Zelle in-bank app prompts informing users that funds should only be sent to a trusted person or entity (Stolba, 2020). We also reviewed (a) Zelle's warnings of potential scammers, (b) prompts that suggest that it might be preferable to pay an unknown entity using a credit card (Zelle, 2023a), (c) a step that advises users to ensure that the recipient uses Zelle, (d) prompts seeking that the sender double-checks a transaction before authorizing it (Mason, 2022), (e) an in-app message that ensures they have the accurate email or phone number that the recipient has their bank account registered to, and (f) a step that matches recipient details. More recently, most banks also send immediate notifications of any Zelle transfers. All participants were very clear that they would never fall for scams and were knowledgeable about what types of scams were popular.

Fear of hackers was another shared theme among those resisting the use of Zelle. Participants concerns were focused on Zelle or their phone being hacked, not always explicitly referring to their bank accounts. We discussed how apps, websites, and branches offer protection and advice against fraud (American Bankers Association, 2023). We explained that if their bank-based Zelle service—only available through their banking app—was hacked that it meant that their bank account was hacked because it is a bank in-app feature. It was pointed out to participants how Zelle directed users to deal with fraud directly with their banks (Zelle, 2023b). This was something that participants understood but did not fully accept. However, they were concerned that their bank app could be hacked, whereby the hacker could then input their own Zelle details and initiate a payment to themselves. They were unconcerned that hackers, in such cases, could also access other features such as bank wire or check-writing authorizations. While this is possible, these are not authorized payments and would count as fraud, which banks should cover.

The most common hacking scam is when account holders unwittingly hand over their security information via phone, or other means, to callers who claim to be from their bank's fraud team. We reviewed the M&T Bank website, which warns of criminals who send text messages pretending to be from the user's bank alerting them of a suspicious transfer and then asking them to confirm activity via a link or by phone (M&T Bank, 2023). Users will then be asked to confirm their identity by revealing their username and password. With that information in hand, the scammer can transfer money out of the account. Participants unilaterally felt that they would never be susceptible to that kind of hacking. One explained:

> That is silly stuff, handing over your details, following links from a text—even if it is from your bank—and so forth. What worries me is the sophisticated hackers, the ones who gather all of your data and then "boom" and "bang," they are in all your accounts with Zelle being a fast way for the money to go out the door!

Glitches were often referred to as a concern. Most participants had a prior experience that entailed them being in the middle of a financial transaction either in person or remotely where suddenly a hardware, software, or electrical glitch occurred, either on their own side or that of the organization with whom they were interacting. While such occurrences are infrequent, they state that these created problems for them. In our discussions, it was difficult to see why Zelle would be a particular problem distinct from other online transactions.

Overall, voiced concerns about data privacy are significant among all participants. While they do not mind having bank apps as a matter of convenience, some felt that accessing many of the app features puts them at risk of privacy loss. Several voiced concerns about how their data can be shared in ways that identify them across platforms. One stated:

> I don't like the interconnectedness of data. I trust that the bank has my data and that it stays there. If I start

> using app features, I do not know if my details, such as my email or phone number, are also being shared. This bothers me! This identification can link me with other activities across the web.

Another participant said: "I don't care that this is inside my bank app—for me it is still a third party."

Participants had not previously considered that Zelle transactions share less information between senders and receivers because they do not provide bank account information, which is otherwise visible on paper checks (Mason, 2022). Yet, for them, it was not important to compare Zelle payments to checks, it was more about avoiding new ways that might compromise their identity, data, and privacy. Nonetheless, after reviewing security prompts together, participants felt more assurance about Zelle's data privacy. While participants find security signs reassuring, and indeed studies show that "security signs" reassure users regarding data-loss risks (El Haddad et al., 2018, p. 29), participants are uncomfortable with the added surveillance that they feel they did not opt in for.

Cybersecurity was a topic that participants conversed about with enthusiasm. Some 80 percent of them use VPNs (virtual private networks) across their electronic devices as a first port of call to ensure an encrypted connection to the internet. All use their smartphones and a variety of apps such as GoogleMaps, UberEats, Facebook, Instagram, and WhatsApp throughout the day, but avoid online shopping and do not store their credit cards in their smartphone wallets. They have passwords for their multiple devices, authentication verifications in place, and proactively update their operating systems and apps. Their knowledge of cyber security for the protection of their electronic devices signals an acute awareness of digital hygiene and safety.

As all participants had subscribed to varying degrees of misinformation concerning Zelle, we speculated that once this misinformation would be clarified they might become positively inclined toward adopting it, yet this was only the case with two participants (though others may have begun utilizing Zelle after this study). Nonetheless, the process of listening to participants' concerns and returning to them with reliable information resulted in a process of elimination of their major stated concerns. This, in turn, inevitably led to passionate conversations about futurist dystopian scenarios that they believed would leave them unprotected and vulnerable. These outlooks underlie their central uncertainties and suspicions.

5. Future Imaginaries and Dystopian Inspirations

Imaginaries are fluid ways to express and discuss one's beliefs, meanings, and experiences in relation to daily and broader influences such as culture and the economy (Strauss, 2006). Imaginaries begin in the mind before they are manifested as actions (Peluso, 2015; Peluso & Alexiades, 2005), taking hold over time and being shaped by one's surroundings and possibilities. They can also be collectively held and transform lives, particularly when shaped by conditions of economic precarity and marginality (Peluso, 2023). Imagining is a high-level mental capacity (Smith, 2023) linked to empathetic connections with a wide variety of unfamiliar others (Mezzenzana & Peluso, 2023a, 2023b) and a critical aspect of foresight thinking (Hauptman & Steinmüller, 2018).

Fintech imaginaries have been explored to understand the economy (Nelms et al., 2018), as a way to advance design (Elsden et al., 2017), and (c) in efforts to better design meaningful and efficient services (Kværnø-Jones, 2022). Indeed, participants are future-oriented in their decisions about digital finances. Among participants, there is hesitancy toward accepting that the adoption of a fully fintech life is positive. They are suspicious of being lured toward something that can backfire and become an obstacle to their digital independence. Berlant's (2011) notion of "cruel optimism" is useful for understanding how an attachment to promises of improvement is an optimistic act that can turn cruel if such promises are not sustainable or delivered. While participants acknowledge the efficiencies of fintech, they also worry about surveillance and becoming ensnared in a digitally dependent spiral. Several participants stated that we inhabit "the age of the Orwellian Big Brother" and that the current monitoring of one's every move is not benign. Instead, such surveillance is like many seemingly nonthreatening endeavours, including those that tout themselves as being inclusive and aimed at alleviating the lives of those who struggle economically. They expressed that the intended convenience of services such as Zelle is a strategy to "hook us in" and that it will eventually "trap us," resulting in one's independence being stifled. In this sense, their opposition to Zelle is a matter of where one draws a line in the sand over what is already experienced as a series of unwanted concessions.

The three main future imaginary themes that arose from our conversations, both underlying and surpassing participants' resistance toward using Zelle, are: a future cashless society; critical infrastructure vulnerabilities; and potential bank runs. Participants observed that cash has become less popular, with some stores not accepting it, not having change available, and preferring electronic transactions over cash ones. While participants understood this as a form of societal progress, they also viewed it as coercive and, in some ways, dehumanizing. As one participant explained: "If everything goes through banks then central banks and nation-states have all of your information and you become a number, a thing. When you are a thing you become meaningless and lose control over your own life." On an online blog covering this theme, someone stated:

> They spy on us now [in] every way possible. Collecting your data [in] big business like the face recognition

> in supermarkets self-service now. This is the trap set. Once all choice is eliminated by putting retailers out of business, the online companies can charge whatever they like, all choice will be eliminated. Don't be fooled by short-term bargains.

This aligned with another participant's thoughts: "Computers today track our telephone calls, credit-card spending, plane flights, educational and employment records, medical histories, and more. Someone with free access to this information could piece it [together]." More specifically, in referring to digital conveniences such as Zelle, one person said: "Cash is still a legal currency—all of these methods are forcing us not to use it!" It was clear that such matters had been deeply thought through, and they emphasized that their views were observational rather than conspiratorial. Indeed, one person remarked:

> This isn't a conspiracy. All there is is a paradigm shift from the way we did things, to the way we're going to be doing things in the future. RIP cheques [sic], postal orders, pre-decimal currency, imperial weights, etc., etc. I am just trying to keep my options open.

Another underlying broad concern that affects participant views on digital dependency was about vulnerabilities in local, regional, and national critical infrastructure. Their worries about power grid vulnerabilities as something that could directly affect their future vulnerabilities are not entirely improbable (Brooks, 2023; Smith, 2021). One informed participant explained:

> There is no doubt that the energy grid is going to either come apart from its own doing or be hacked. When that happens it will eventually be restored and money in the bank is FDIC insured, but during such a time we will not be able to use credit cards or access cash. This gives "cash is king" a whole new level of meaning. I know that it sounds far-fetched but when such things happen, they are a surprise precisely because we are not expecting it! So, the push on to a full[y] digital economy will put many people at risk—and I can assure you that the people at risk will be people like me who are already on the lower rungs of the economic ladder.

Another person explained: "I was visiting family [on a Caribbean Island] and there was a power outage that lasted a few days. Suddenly I was unable to do anything, and if it weren't for the $80 cash that I had on me, I would have been in serious trouble. It was an important lesson. Can you imagine if that happens in the US? It is only a matter of time. Who expected 9/11?"

The possibility of future bank runs was another theme that shaped participants' trepidation about becoming fully digital. Their foresight is based on their concerns about national and global economic crises such as war, global stock-market crashes, and pandemics. Despite the US banking system having thus far protected the public from bank runs, participants believe that they cannot be ruled out as a possibility and that an overreliance on a digital economy can make people exceedingly vulnerable. Many scholars have flagged the vulnerabilities of current financial systems and the possibility that bank runs cannot be ruled out, particularly during financial crises (Brown et al., 2017; Calderón Gómez, 2023; Li & Ma, 2022). One participant remarked:

> During lockdown [due to Covid-19] I heard a lot of rumours about ATM scares and possible bank runs, and although I did not act upon these, it did get me thinking that I should try to ensure that I still hold on to cash and more simple traditional banking methods. I don't use my iPhone wallet and I try to keep and use cash over cards.

Regarding P2P payments, another participant remarked: "If you send someone money but they can't get it out of the bank while cash is scarce, then it's as if you haven't paid them—no one can dispute that a cash payment is more valuable. The idea that a digital economy could create a liquidity crisis was forecast widely among participants. While this premonition did not paralyze anyone, it did create an overall sense of caution and hesitancy toward taking a full dive into a digital lifestyle, and it served as a justification for setting boundaries.

Dystopian visions are not strictly the other side of utopia but are rather embedded within them (Shah, 2021). Participants view a future of high-tech convenience as a positive expansion of modernity, yet because they do not perceive technology to be safe for everyone, particularly themselves, the panorama emerges as a dystopian landscape that they believe they must navigate with trepidation. Despite several adverse comments toward technology, participants also celebrated technology; they are interested and knowledgeable. What they desire are guarantees of protection against the possible mishaps of fraud and scams, hacking, glitches, and privacy.

6. Conclusions

This article has examined how future imaginaries frame and underlie digital decision-making and sensemaking by focusing on non-adopters of Zelle fintech services, which are designed to increase social inclusion through feeless time-saving conveniences and easy-to-use features. While participants envision digital futures similar to tech-believer folks, the key difference is that they view such futures as falling short of their promises and thus akin to serving as "cruel optimism." Their dystopian narratives—linked to their personal experiences and economic predicaments—view that future as more dismal than bright. To protect themselves, participants forge boundaries based on their own current and potential vulnerabilities as they strive toward moving away from

digital and economic dependencies. Their sense of reality is rooted in an understanding that their access to resources and how they are treated when seeking such resources are dissimilar from those who do not share their everyday concerns about survival. They are also anxious about their own future work and income prospects, and their outlooks inform their caution.

Aware of their own income marginality and social exclusion, they prefer to "self-exclude" from a fully "online existence." One of the participants, referring to the Solar Winds software company hack that occurred in 2020 and which affected thousands of organizations through a supply-chain breach, explained that it happened due to "the combination of human sloppiness and advanced cyber technology." That type of hack is deemed as likely to reoccur due to digital expansion and transformations (Dillon et al., 2021). The participant both idealizes the hack and is also repulsed by it, wavering between utopian and dystopian descriptions that reflect a "complex interplay between the actual, and the possible, dream and reality, spaces and temporalities, and competing versions of the ideal or the monstrous" (Bagchi, 2012, p. 5). Yet, throughout their commentary, they communicated that they did not want to be part of a fully digital environment. As with other participants, setting digital boundaries offers an increased sense of control over what is otherwise viewed as a dystopian landscape perceived to lead toward an inevitable loss of control and greater digital dependency. They frequently referred to the coercive elements of digital technology. One participant said: "I don't like being forced into it. I want other options, and those options are closing in and that's not fair!" Others expressed deep concerns for the elderly, rightly stating that they are being shut out of systems including automated phone systems that routinely require people to punch in their details.

Imagination and imaginaries cannot simply be placed in the category of fantasy. They reflect elevated mental capacity (Smith, 2023) and need to be taken seriously (Sneath et al., 2009) as they inform motivation and decisions (Peluso, 2023; Peluso & Alexiades, 2005) and are also linked to empathy and understanding others in a world that can be radically different from one's own (Mezzenzana & Peluso, 2023a, 2023b). Imaginaries inform and shape daily actions and outlooks, and are a valued aspect of foresight thinking. It is usually only when things go wrong or when worldviews collide that imaginaries stand out and are deemed as unrealistic. Indeed, as long as "business as usual" takes place, then decisions or stances are often not called into question unless something goes wrong, especially if equated to financial loss (Peluso, 2020).

This study highlights how participant tech savviness (average to excellent) is not a predictable deterrent to fintech adoption, and how participant knowledge of the digital world is quite advanced, perhaps even more so than many who trustingly adopt fintech. For instance, their dystopian inspirations and desire for privacy fuel their knowledge about and use of cyber protection measures. Indeed, the findings of this research align with those of the National Telecommunications and Information Administration study several decades back, which showed, despite expectations, that many disadvantaged groups have turned out to be the most enthusiastic users of online services (Brown et al., 1995).

This article argues that the inclusivity that fintech platforms offer, even with straightforward services like Zelle, is viewed by some potential users as an affront to how they wish to position themselves in the future. As mentioned, this viewpoint does not reflect a deficit in technological abilities or an understanding of tech know-how. It does, however, reflect a desire to "have time on my side," "know where I stand," and "not have a fully online life forced down my throat." Rather than as a means for social inclusion, participants view some fintech services as crossing their own self-imposed boundaries and thus would require "a leap of faith" toward what they believe will eventually lead to full digital dependency, which they see as leading toward further exclusion. Indeed, many initiatives meant to be inclusive can inadvertently turn out to be "a driving element in new practices of social exclusion" (Ravnbøl, 2023, p. 44).

The relationship between trust and risk is inextricable. Here, perceived risk becomes as important if not more important than actual risk. Speed can be a convenience in some circumstances and not in others. In their envisioned futures, participants want "no room for error" and "time to fix any errors when they happen" as part of their independence. This does not mean that they are tech-haters or tech-backwards. Participants' sense-making is a social process based on life experiences and deep understandings of their own vulnerabilities; indeed, interpersonal and institutional trust rely on such processes being validated (Fuglsang & Jagd, 2015). They want social inclusion and the conveniences of tech, but they do not want to be fully integrated into what they perceive to be the "thingification" of personhood. This article suggests that a shared imagining of a convenient technological future is what should be built upon, a future that acknowledges existing and potential vulnerabilities and uncertainties rather than one that downplays them. Sometimes raising and addressing fears is the best path forward for social inclusion.

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Article

Co-Creatively Producing Knowledge With Other-Than-Human Organisms in a (Bio)Technology-Controlled Artistic Environment

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Abstract
Along with the increasing awareness about the destructive force of humankind on nature, existential questions about how to create a more sustainable relationship with the natural world have emerged. To acquire a more eco-friendly attitude, we need to go beyond the well-established knowledge cultures that highlight a nature versus culture dichotomy. This study focuses on bio art as an epistemic vehicle to re-imagine our understanding of and connection to the natural world. Drawing on the theoretical stance of philosophical posthumanism, we discuss how artistic co-creation processes involving humans and other-than-humans hold the potential to introduce a shift in our worldview from anthropocentric to ecocentric. We further question what this shift might imply for how we approach the complex relationship between humans and other-than-humans in our own research. We conducted a within-case and cross-case analysis of five bio art projects that previously won the Bio Art & Design Award (2018–2020). To analyze the data, we used a combined approach of visual and context analysis and material semiotics. Qualitative interviews were used as a data collection technique to investigate the lived experiences of both artists and scientists involved in the projects. Our findings suggest that bio art's epistemic significance can primarily be found in its multispecies perspective: By following the wills and ways of bio-organisms, bio art makes the invisible connection between nature and culture visible. Bio art can provoke our thinking about how to include and approach other-than-human agency in the context of socially engaged research practices.

Keywords
bio art; ecocentrism; epistemology; other-than-human agency; posthumanism

Issue
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1. Introduction

Since the mid-20th century, the arts have shown an increasing interest in nature and ecology. Artists have taken the natural environment as their playground for artistic ideation and creation. Ecological art, or eco art, gained momentum during the 1960s and refers to artistic practices that center the natural environment, ecology, and sustainable development (Ardenne, 2019; Woynarski, 2020). Eco art can take many forms, from paintings and photography to installations and public interventions, and focuses on sustainable practices. Socially engaged artists, for instance, started creating community-based art interventions to preserve or restore ecology. Joseph Beuys' interventions in which he, together with local communities, cleaned the Elbe River in Hamburg (1962) or planted seven thousand trees in Kassel in *7000 Oaks: City Forestation Instead of City Administration* (1982) are keen examples of ecological works of art in which the social and natural environment collide (Woynarski, 2020). Besides eco art, the emergence of the art movement land art (also known as earth art or environmental art) in the 1960s also raised awareness about nature and ecology. Land artists started

using elements and landscapes to create works of art (Ballard & Linden, 2019; Ryan, 2007). Robert Smithson and Richard Long, both land art pioneers, extended the boundaries of the art world by elevating natural materials to the field of the arts (Ballard & Linden, 2019).

Two decades after artists began incorporating nature as a medium in their artistic endeavors, the boundaries of the natural world became resketched through the emergence of biotechnology. Biotechnological progress provided a new perspective on nature because living matter became manipulable and moldable, for example through techniques of genetic engineering, cloning, tissue regeneration, interspecies communication, cross-pollination, and such (Kac, 2007a, 2007b). Artists responded to the biotechnological evolution and took the acceleration in life science and technology as their main source of inspiration (Andrews, 2007; Kac, 2007b; Melkozernov & Sorensen, 2021; Stracey, 2009; Zylinska, 2014). These so-called bio artists engage with "biomedia," living matter such as mammals, plants, tissue, algae, bacteria, viruses, DNA, and so on. As such, bio art fits into the art-nature tendency. Similar to land artists, bio artists create artworks with natural elements. However, in the latter one, the natural elements live, are kept alive, or their liveliness is changed (Kac, 2007a).

The origin of the term "bio art" is ambiguous as it comprises various, hardly distinguishable sub-categories including, but not limited to, transgenic art, art that involves "wet" biology, semi-living art, art together with machine learning and computer modelling, life-modulated art, and so on (Anker, 2014; Catts & Zurr, 2007; Kac, 2007b; Stracey, 2009). Bio art also closely relates to "sci-art," referring to the introduction of scientific processes in the arts (Anker, 2021). Another connected field is bio design. The fields of bio art and bio design are narrowly interwoven, making it nearly impossible to categorize the two practices. Bio designers, for instance, take experimental and conceptual pathways instead of only focusing on function. At the same time, many bio artists have stepped away from their *l'art pour l'art* approach to take part in knowledge production and reflections on science and create functional outputs (Mateus-Berr, 2014; Myers, 2018). There is no consensus about what bio art exactly entails, besides including other-than-human organisms in artistic practices.

The current trend to focus on nature and ecology is inseparable from the increasing social awareness about the looming climate crisis (Reiss, 2019). As humankind's destructive force on the planet has become apparent, and technological innovation has even enabled us to interfere with natural processes, major existential questions about our position towards nature and other-than-human living matter have arisen. To move beyond an anthropocentric viewpoint to approach nature, new ways to understand the relationship between the human and the other-than-human are urgently required. As a liminal space between the arts and the sciences, Anker (2021) has argued that bio art and its hybrid practices can redesign contemporary knowledge cultures. Bio art provides insights into our kinship with other-than-human organisms, which might guide us towards a more sustainable and eco-friendly relationship with nature (Radomska, 2016; Van den Hengel, 2012). In this article, we focus on bio art as a potential epistemic vehicle that emphasizes ecocentrism in research-oriented explorations of reality.

2. Objectives and Research Question

This study describes the potential of bio art as a multispecies and ecocentric inquiry to study reality. We approach bio art as an epistemic avenue that goes beyond well-established knowledge cultures that render nature manipulable. We aim to acknowledge the agency of other-than-human actors. New ways to understand nature invite us to reflect on how we, as humans, ought to study other-than-human bio-organisms. Therefore, we examine bio art from a posthuman, multispecies perspective as part of the overall goal to develop a relational ontology that works together with nature in developing responses to major social challenges.

We assume that new epistemic approaches for understanding nature as a partner can be found in the methods and approaches bio artists employ when engaging with other-than-human bio-organisms. For this reason, we study how artistic co-creation processes involving humans and other-than-humans alike hold the potential to introduce a shift in our worldview from anthropocentric to ecocentric. Furthermore, we question what this shift might imply for how we approach the complex relationship between humans and other-than-humans in our research.

3. Theoretical Framing

This study draws on philosophical posthumanism to analyze and conceptualize the data. Posthuman theory seeks to dismantle the conventional distinction between humans, other-than-human living beings, and non-human materials. While other-than-human entities refer to all living matter and organic entities beyond the human body, non-human entities refer to non-living things such as technology (Braidotti, 2013; Haraway, 2016; Latour, 2014). Posthumanism draws on the theoretical and philosophical stance of new materialism which acknowledges the self-organizing capacity of living (i.e., other-than-human) and non-living (i.e., non-human) matter that fluctuates, is dynamic, and meaningful (Braidotti, 2022).

In this article, we specifically focus on humans' relationship with and connection to other-than-human organisms. Posthuman theorists highlight the agency of other-than-humans, meaning that they possess the capacity to co-influence and co-shape reality. Humankind engages in a reciprocal relationship of interdependence with other-than-human organisms.

Based on these insights, posthumanism seeks to move beyond anthropocentrism, emphasizes interconnectivity between all matter, and argues for "relational ethics of mutual dependence and care" (Braidotti, 2022). Nature and culture are not two opposites but shape and are shaped by each other (Latour, 2017). Agency is not necessarily linked to intentionality, which can be ascribed to humankind. Rather, all organisms alter the world we are living in, think of bacteria living in our body and trees producing oxygen. Posthumanism acknowledges this intimate entanglement between nature and culture and advocates for a relational approach (Ferrando & Braidotti, 2020).

To obtain a more sustainable and eco-friendly attitude towards nature, the feminist and cultural theorist Donna Haraway argues for *storying otherwise*: the need for other kinds of stories, for other perspectives to narrate about nature, and for *multispecies storytelling* (Terranova, 2016). She argues that storytelling about the natural and animal world shape the way we perceive nature and other-than-human organisms: "It matters what ideas we use to think other ideas with….It matters what thoughts think thoughts" (Haraway, 2008, p. 12). Haraway's (2008) writing *When Species Meet* is a compelling example of multispecies philosophy in which the entanglement of the human with other living organisms is discussed. She states that "we have never been human" because our bodies mainly consist of and relate to a range of natural organisms such as fungi and bacteria. She essentially argues that "we are a knot of species co-shaping one another" (Haraway, 2008, p. 42). Humankind engages in processes of *thinking-with, making-with*, and *becoming-with* our other-than-human colleagues. In other words, the human engages in collective ways of doing, meaning that both the human and the other-than-human work together to create reality (Haraway, 2016). We use Haraway's call for storying otherwise as a guiding principle throughout this study as we consider bio art to be a relevant pathway for multispecies storytelling.

Posthumanism has been adopted in various studies as a framework to examine bio art, highlighting bio art's potential to re-imagine humankind's relationship to nature and other-than-human living matter (Radomska, 2016; Van den Hengel, 2012). Many bio artists are inspired by posthuman writings themselves and employ posthuman concepts when engaging living matter in their artistic endeavors (e.g., Baum & Leahy, Michael Sedbon, among others). While learning how other-than-human agency manifests itself, we challenged ourselves to try and avoid anthropomorphizing other-than-human agency (Hornborg, 2021). With our situatedness of being human, the risk of anthropomorphizing bio-organisms remains. What we can do, however, is highlighting and acknowledging other-than-human agency and enshrining rights for nature (e.g., the nine rights of the Magpie river in Canada).

We acknowledge bio art's ambiguous position towards living matter and experimentation which has been critiqued by Wolfe (2010, 2020) among others. Rather than highlighting potential instrumental and problematic associations to other-than-humans, Braidotti (2013) argues for affirmative relationships: broadening the understanding of the self by embracing radical relationality with other-than-human organisms. In line with Braidotti's (2013) reasoning regarding affirmative ethics, we aim to highlight that the experimental nature of bio art precisely sparks imaginative processes that can guide toward renewed understandings of nature and culture.

4. Methodology

To study bio art's epistemic value, we used a case study approach. We have conducted in-depth and holistic examinations of specific cases of bio art. Each art project represented a separate unit of inquiry and consisted of a consortium of human and other-than-human actors working together. The art projects were examined by employing various methods for data collection and data analysis in a well-defined setting (Dasgupta et al., 2020).

4.1. Setting

The study was conducted in the context of the Dutch Bio Art & Design Award (BAD Award), an international competition that encourages young artists and designers to experiment with living matter and to "push the boundaries of technological and artistic possibilities" (Lagerweij, 2016). The competition wants to urge discussions concerning life sciences by combining cutting-edge research with creative practices. The award further aims to stimulate interdisciplinary collaboration at the intersection of technology/science and art/design, and it intends to explore cultural and ethical dimensions of science through artistic practices (Bio Art & Design Award, 2023). Artists and scientists apply to participate in the BAD Award. After a match-making event in which artists and scientists connect and form duos, they collaboratively write a project proposal. An international, independent jury awards the three most promising and original proposals a grant of 25.000 euros to realize their proposed project within six months. During the collaboration, scientists receive the opportunity to join the ideation and creation process of artistic projects, and artists are welcomed into renowned Dutch science and research centers in life sciences and biotechnology to collaborate with experts. The final outputs of the collaboration are displayed to the public during an exhibition at MU Hybrid Art House in Eindhoven (Van Donselaar, 2016).

4.2. Sample

We analyzed five projects that have won the BAD Award between 2018 and 2020. Table 1 demonstrates an overview of the selected bio art projects. To select

Table 1. Overview of selected bio art projects.

Project Title	Year	Artist(s)	Scientist(s)	Other-than-human organisms
Microbiocene: Ancient Ooze to Future Myths (Figure 1)	2018	Baum & Leahy	Stefan Schouten, Julie Lattaud, Laura Schreuder, Gabriella Weiss	Marine algae: Emiliania Huxleyi
CMD: Experiments in Bio-Algorithmic-Politics (Figure 2)	2019	Michael Sedbon	Raoul Frese	Algae: Cyanobacteria
Funkee: Fungal Supercoating (Figure 3)	2019	Emma Van der Leest	Paul Verwije, Sybren De Hoog, Aneta Schaap-Oziemlak	Fungi stemming from a human patient
Fur_Tilize (Figure 4)	2020	Dasha Tsapenko	Han Wösten	Mycelium: Schizophyllum Commune
Becoming a Sentinel Species (Figure 5)	2020	Sissel Marie Tonn	Heather Leslie, Juan Garcia Vallejo	Artist's blood

projects for analysis, we took into account the role other-than-human living organisms played in the artworks, as well as the artworks' foregrounding of the connection between humans and other-than-humans, nature, and culture. The five bio art projects were the units of analysis in this study, essentially representing places where human (i.e., artists and scientists) and other-than-human bio-organisms come together, co-create, and engage in a collaborative process of making-with one another.

4.3. Analysis

We used a within-case and cross-case analysis of the five selected cases as our overall research design. In the within-case analysis, we intended to understand each case in its own terms by describing the case as a whole entity. We identified various dimensions and examined them to generate an overall explanation of the selected cases. Subsequently, a cross-case analysis was carried

Figure 1. *Microbiocene: Ancient Ooze to Future Myths*. Source: Baum & Leahy (2018).

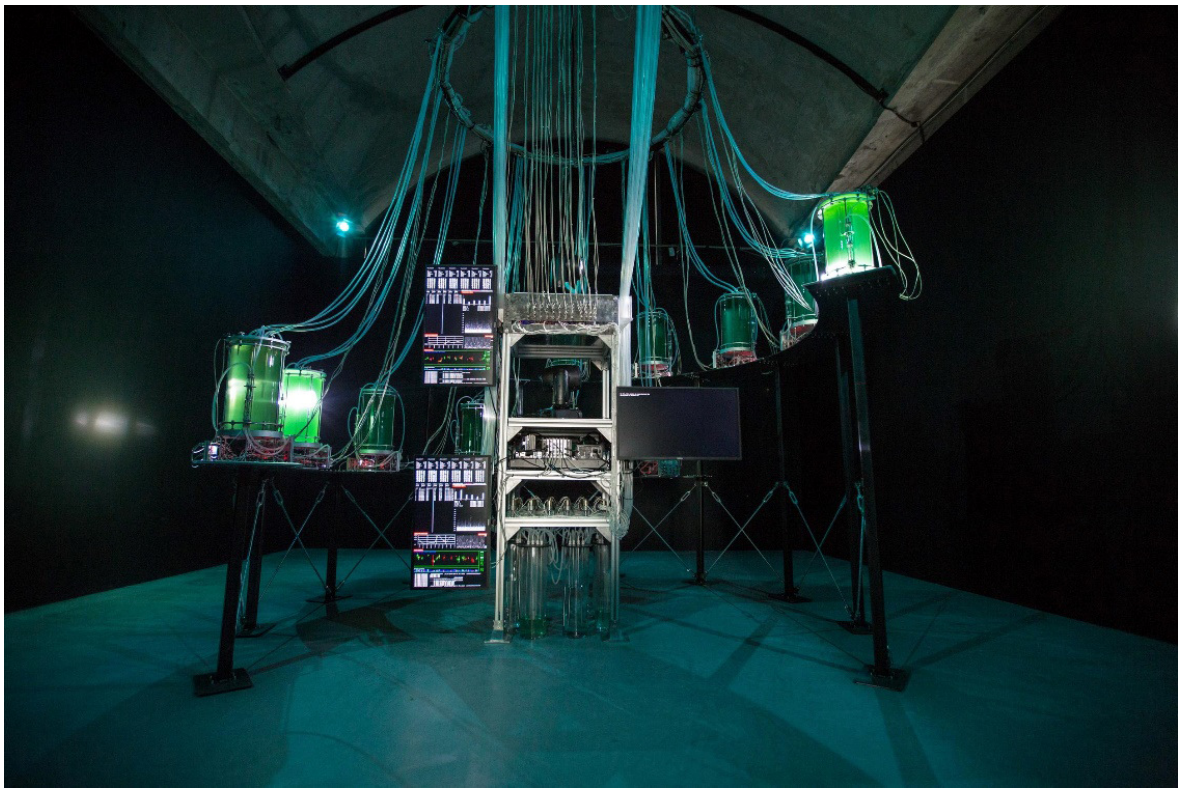

Figure 2. *CMD: Experiments in Bio-Algorithmic-Politics.* Source: Sedbon (2019).

Figure 3. *Funkee: Fungal Supercoating*. Source: Van der Leest (2019).

Figure 4. *Fur_Tilize*. Source: Tsapenko (2020).

Figure 5. *Becoming a Sentinel Species*. Source: Tonn (2020).

out to identify processes and ideas across different cases (Huberman & Miles, 1994). In the cross-case analysis, a comparative approach was adopted, aiming to pinpoint more systemic patterns in bio art. As such, we learned from different cases and provided overarching insights into bio art as an emerging artistic genre (Huberman & Miles, 1994; Khan & Van Wynsberghe, 2008).

We aimed to analyze the art projects from a multispecies perspective in which both human and other-than-human actors were acknowledged to be creators of the projects. In doing so, we combined a visual and context analysis with semiotic materialism to approach the data. The visual and context analysis focused on visual imagery and video content of the selected art projects and consisted of three dimensions of appraisal: the formal characteristics of inquiry, the positional stance, and posthuman concepts and practices. First, we examined the formal characteristics of inquiry of the works of art by focusing on what scientific and artistic methods were employed and how humans employ them with other-than-human organisms. Second, we examined the positional stance of the projects. Bio art tends to address certain ethical, political, and cultural challenges in their creation (Stern, 2011; Vaage, 2016). Accordingly, we highlighted the projects' critical stance and their alternative reasoning. Third, we considered how the projects relate to posthuman concepts and practices such as other-than-human agencies and multispecies entanglement. Understanding these aspects was an essential part of decoding the meaning of the bio-based artwork.

We synthesized this stream of data through material semiotics. Semiotics focuses on how meaning is created, communicated, and decoded. In material semiotics, non-human (i.e., material), and other-than-human (i.e., living matter) actors can be involved in the process of meaning-making: The meaning of the bio art projects comes into being through the intimate entanglement between artist, scientist, bio-organism, and non-living materials (Bettany & Kerrane, 2011; Law, 2009). Material semiotics emphasizes that "no single social structure or form of patterning exists because these material and social webs and weaves come in different forms and styles" (Law, 2019, p. 1). Using material semiotics helped us to "story otherwise" and to generate a less anthropocentric perspective that allowed us to treat the other-than-human bio-organisms, the artists, and the scientists as co-creators (Law, 2019).

We complemented this hybrid analytical approach with insights generated from qualitative semi-structured interviews carried out with the artists and scientists involved in the creation of the projects. A total of twelve interviews were conducted, five with artists (including one artist duo) and seven with scientists. We focused on how the artists and scientists experienced the co-creation process and how they dealt with the notion of shared agency with other-than-human organisms. The interviews were transcribed, coded, and subjected to a thematic analysis. In the thematic analysis, a range of categories was identified and related to the three dimensions used in the cross-case analysis.

5. Findings

In this findings section, we make a distinction between descriptive and analytical layers of interpreting the projects. We first describe the formal characteristics and the artistic process of inquiry of the artworks. We then dive into the analytical layer by discussing the projects' positional stances and their connections to posthumanism. Table 2 shows an overview of the five selected bio art cases.

5.1. Formal Characteristics and Artistic Inquiry

The concepts and processes explored in bio art can be presented or displayed for audiences in a multiplicity of forms. While some projects result in an installation set-up, others present bio-based design or even audio-visual films. To describe different artistic approaches, we have built upon Wang et al.'s (2017) categorization of art and research forms to explain the different artistic pathways the selected bio art projects have taken, including new media, visual art (sculptures, digital storytelling), literary art, and sound art. Whereas most cases engage organisms such as algae or fungi, some use human bodily materials including blood, DNA, cells, and tissue. The scientific fields of study identified in Table 2 relate to the fields of expertise of the collaborating scientists.

5.2. Positional Stance of Bio Art

While the analyzed bio art projects all take other artistic and scientific pathways, engage different materials, and hold dissimilar goals, each project follows a storyline that counteracts anthropocentric worldviews. The projects oppose humankind's destructive force on the planet and/or rebel against human attempts to gain mastery over nature. They resist hegemonic, humancentric ways of perceiving reality and aspire to acknowledge the significance and power of other-than-human organisms and the environment at large.

The artist Sissel Marie Tonn and the artist duo Baum & Leahy especially oppose human exceptionalism. Both projects counteracted dominant narratives about humankind's place on this planet through storytelling. In *Microbiocene: Ancient Ooze to Future Myths* (Figure 1), Baum & Leahy constructed a more-than-human narrative about the Microbiocene, a speculative geological epoch in which microorganisms take center stage. The narrative is based on micro-organic biomarkers that store scientific data. In the project, the microorganisms are appreciated as a storage space for the history of the Earth. The artists created a new narrative in which the microorganisms became the main storytellers, aspiring to re-tell and re-imagine planetary history from the point of view of the other-than-human (Baum & Leahy, 2020).

Table 2. Overview of the five cases.

		Microbiocene: Ancient Ooze to Future Myths (2018)	*CMD: Experiments in Bio-Algorithmic-Politics* (2019)	*Funkee: Fungal Supercoating* (2019)	*Fur_Tilize* (2020)	*Becoming a Sentinel Species* (2020)
Descriptive: Formal characteristics and inquiry	Visual presentation	Installation of a future archaeological site in which a microbial monument/sculpture is found with symbolic writings on it ("mycroglyphs"), telling the story of Earth's history from a microbial perspective.	Installation of a series of tubes containing two sets of algae that share one light source connected to a genetic algorithm that is testing various financial systems of collaboration and competition between the algae.	Design of a biological coating to protect biomaterials, presented through a commercial and educational set-up explaining bio-based research process.	Design of five fur-like, living garments out of mycelium and hemp, each representing a different level of symbiosis between the mycelium and the hemp.	Science fiction film about two scientists who inject microplastics into their own blood, resulting in a series of hallucinations and delusions about their watery origins in the primordial sea.
	Material characteristics	Microscopic marine algae: Emiliania Huxleyi Sculpture out of sea sediments	Algae: Cyanobacteria Hardware: tubes for algae, light source, technological infrastructures Software: machine learning algorithm	Fungi, isolated from a human patient Conceptual branding: bottles, commercial	Hemp and mycelium	Microphages in human blood cells Microplastics Hardware and software to present the film
	Intention	Imagining and acknowledging microbes to be the main storytellers of the history of the Earth	Demonstrating the limits of human and technological mediation of nature	Illustrating possibilities of living matter in an approachable manner	Generating a renewed notion of care	Generating an emotional response and reflection on the microplastics flowing through our bodies
	Art form(s)	Literary art (fiction) and visual art (3D sculpture)	New media (AI)	Visual art (3D design and 2D branding)	Visual art (3D design)	Literary art (fiction), visual art (2D digital storytelling), and sound art (soundscapes)
	Scientific field of study	Palaeoclimatology	Biophysics	Mycology	Microbiology	Immunology and ecotoxicology

Table 2. (Cont.) Overview of the five cases.

		Microbiocene: Ancient Ooze to Future Myths (2018)	*CMD: Experiments in Bio-Algorithmic-Politics* (2019)	*Funkee: Fungal Supercoating* (2019)	*Fur_Tilize* (2020)	*Becoming a Sentinel Species* (2020)
Analytical: Positional Stance	Critical position	Countering humancentric storytelling about the history of the Earth	Opposing science and technology's attempt to organize the chaos of nature by rendering bio-organisms and nature manipulable	Opposing trends in the fashion industry, such as fast fashion, waste, plastic pollution, mass production, etc.	Opposing trends in the fashion industry and agriculture: mass production and waste	Denouncing hierarchies between humans and other-than-humans, and the unequal distribution of toxicity
	Alternative reasoning	We need to appreciate the agency of microorganisms that have set beneficial conditions for life to thrive on Earth throughout the past, present, and future.	The development of the material world (both hardware and software) should be aligned with the needs of other-than-human entities.	Chemical-free, eco-friendly alternatives for destructive products such as synthetic coating and animal leather should be created.	We must acknowledge and appreciate symbiosis between other-than-human and human actors.	We need to concede that humans are sentinel species too, as our bodies are contaminated as well.
Analytical: Posthuman concepts and practices	Other-than-human agency	The researched sea sediments represent a storage space of the story of the history of the Earth.	The algae determine the other material characteristics and the "speed" of the installation.	The risky, pathological fungus possesses valuable features and can be used to create functional objects.	The mycelium alters and guides the ideas and practices of the artist and scientists.	The macrophages in the blood fight the microplastics outside the artist's body.
	Multispecies entanglement	The project highlights communication across species and envisions ourselves as being part of a greater ecology.	The project demonstrates collaboration between human (i.e., artist), other-than-human (i.e., algae), and non-human (i.e., AI).	The project demonstrates a durable relationship between the human and other-than-human via ecologically friendly alternatives to readily available products.	The project demonstrates a fruitful symbiosis between other-than-human organisms and humans by re-imagining how we care for our clothing.	The project shows that the natural environment is having slow and invisible, yet harmful effects on our bodies, just like humankind has had on the natural environment.

Note: the within-case analysis is represented in the columns of the table and the cross-case analysis is represented in the rows.

This strategy of counteracting dominating human-centric pathways was also adopted by the artist Sissel Marie Tonn. In her science fiction film *Becoming a Sentinel Species* (Figure 5), the artist highlights issues regarding speciesism:

> The use of sentinel species [in research] indicates a hierarchy: There are always some bodies that are more exposed to, more vulnerable for, and more immersed in our contaminated world than others. Sentinel species are instrumentalized and we do not take into account that they have lives and places in the ecosystem as well. (S. M. Tonn, personal communication, March 30, 2022)

Sissel Marie Tonn approaches sentinel species differently by putting humankind in that exact place. Just like Tonn, the artist duo Baum & Leahy goes beyond one limiting epistemological system by storytelling through another lens. The bio art projects offer a new angle to comprehend the past and the present:

> *Microbiocene: Ancient Ooze to Future Myths* is about a multitude, about existing as many, and about how this creates an inherent earthly connection and responsibility to the planet's past, present, and futures. (Baum & Leahy, personal communication, May 19, 2022)

The underlying reasoning of the analyzed bio art projects is to shift towards a more sustainable and ecocentric approach. As one of the interviewed scientists noted, bio art can engender thinking about the urgency to find new ways of approaching the world, and the urgency of a more sustainable and responsible attitude towards the planet:

> Art and design do not need to lead to innovative findings. What it can do is stimulate reflexivity and show that we urgently need to start thinking of alternatives to our current material world….We can start thinking about new alternatives and possibilities. (Scientist, personal communication, April 6, 2022)

While Baum & Leahy and Sissel Marie Tonn use storytelling, Emma Van der Leest and Dasha Tsapenko demonstrate what a durable relationship between the human and other-than-human might look like through the creation of bio-based materials. Both Van der Leest's bio-leather and bio-based coating and Tsapenko's grown garments are a result of making-with other-than-human bio-organisms. In *Funkee: Fungal Supercoating* (Figure 3), Emma Van der Leest employed a fungus that was isolated from a human being. The artist demonstrates that certain types of fungi might be harmful to humankind but can nevertheless have valuable features, which can change humankind's perspective towards fungi. The project provides a new perspective on fungi: Instead of perceiving the fungi to be dangerous, meaningless, and needless, these attributes are being replaced by new qualities that demonstrate their relevance. In this case, the potentially risky, pathogenic fungus could contribute to sustainable change by making bio-based materials more durable (Van der Leest, 2019). These alternative ways of perceiving other-than-humans can complement scientific knowledge creation. As one of the interviewed scientists noticed:

> An artist or an artwork can show you another angle and, even as a scientist, make you can think or feel something different. They stimulate you, trigger your senses, and in this way, they indeed provide another type of knowledge that scientific reports cannot provide. (Scientist, personal communication, April 13, 2022)

Bio art does not only provide a different point of view to understand nature, but it also offers a new way of encountering nature and other-than-human bio-organisms.

5.3. Posthuman Concepts and Practices

The agency of other-than-human organisms is a common theme that runs through all of the analyzed artworks. As ecocentrism seemingly presents a shared reasoning in the analyzed project, it highlights bio art's aim to acknowledge other-than-human's capacity to shape and influence reality. Ecocentrism is also reflected in the creation process of the projects. The artists align their ideas and practices with the agency of the other-than-human bio-organisms. As one of the scientist notices, "bio artists do not just take a piece of marble and create a sculpture out of it. Instead, the material is guiding them and the way they process it" (scientist, interview, April 13, 2022). Indeed, the artists Dasha Tsapenko and Michael Sedbon both emphasize other-than-human agency in their projects. When growing the garments in *Fur_Tilize* (Figure 4), Tsapenko had clear goals and expectations for the project in mind, but the role of the living organism was much higher. She had to revise her questions and alter her attitude toward the other-than-human living beings:

> I was sure that in two months, we would actually achieve what we told ourselves. But then, when I started to work, I realized that it was far from what I imagined. The role of the living organisms is much higher. (D. Tsapenko, personal communication, March 29, 2022)

Tsapenko started to observe and value what the organisms offered: "According to the organism's behavior, the story should be told differently" (D. Tsapenko, interview, March 29, 2022). In doing so, the artist experienced a shift in her attitude towards the living beings; instead

of perceiving them as materials she was using to carry out her project, the living beings became collaborators. While artists have always been guided by the media they employ, the agency of materials in bio art is particularly evident because the materials happen to live. Even after a bio artist finishes working on the artwork, the living matter will continue to grow and therefore, will continue to shape the piece of art. For instance, Tsapenko's living dresses will look different two months after entering the museum.

While Tsapenko's work highlighted the agency of living organism during the creation process and thereafter, Sedbon ridiculed human mastery over nature in his project. Sedbon brought algae, hardware, and software together in *CMD: Experiments in Bio-Algorithmic-Politics* (Figure 2). As they all work at different speeds, they needed to find a way to communicate and align: While the genetic algorithm works extremely fast, the growth of the algae is dependent on the living organism itself. Although the controlled environment provides perfect growing conditions for the algae, the artist asserts that other-than-human living organisms are impossible to predict:

> There are always going to be some properties [of the organisms] that you cannot control. Of course, you can engineer biology to go a bit faster, you can grow them in the best conditions as you can. But ultimately, you cannot do magic. (M. Sedbon, personal communication, April 5, 2022)

By showing the complexity of living matter and acknowledging its ability to transform, shape, and influence, Tsapenko's and Sedbon's projects represent a knot of agents (i.e., human, non-human, and other-than-human) that engage in a co-creation process.

The acknowledgment and appreciation of the agency of other-than-human organisms in bio art projects also result in reflections on humankind's position in the larger environment. As we have seen before, bio art reacts against anthropocentric worldviews and means to provide a more ecocentric approach to understanding reality. This approach highlights the entanglement of all planetary inhabitants in a shared and active environment: Humankind is understood as just one species in a knot of other species. This multispecies entanglement is highlighted in Tsapenko's and Sedbon's projects but is also to be found in Sissel Marie Tonn's film *Becoming a Sentinel Species.* Tonn emphasized kinship between the human species and the natural surroundings by turning humankind into sentinel species. Tonn's project demonstrated not only that our behavior has had destructive effects on the environment, but also that these effects are bouncing back and starting to impact our bodies. In doing so, the artist illustrated the intimate interconnection between nature and culture: Humankind cannot be understood without considering the surrounding environment. Similar to Dasha Tsapenko's and Michael Sedbon's projects, Sissel Marie Tonn breaks down the hierarchy and brings the artist and the living matter, the human and the other-than-human on the same level. They all question human exceptionalism and generate insights into our relational ontology.

6. Discussion and Conclusion: New Epistemology Through Bio Art's Relational Ontology

The aim of this study was to explore bio art's potential to steer toward multispecies futures by generating new, ecocentric ways of knowing. The five bio art projects examined in this study provide compelling examples of new epistemic pathways to understand the other-than-human and nature at large. They acknowledge the agency of other-than-human organisms and highlight our entangled way of being. The cited examples demonstrate that artists are being guided by the living organisms and generate a co-creative outcome. The final art product is the result of a close collaboration between the human and the other-than-human: Other-than-human organisms determine the formal characteristics such as materials that are being used (e.g., to keep them alive), the artistic form, and the methodology of the artist, which all contribute to the artwork's eventual meaning. The organisms are dependent on the artist and vice versa. The organism and artist engage in a co-creative process of *becoming-with* and *making-with* one another. Bio artistic endeavors, therefore, represent physical testimonies of organisms' power to transform, create, and manipulate. They are physical testimonies of other-than-human agency.

As living matter is the protagonist in bio-based works of art, bio art breaks through well-established ways of knowing and provides other ways to understand the world we are living in. Bio art responds to Haraway's (2016) call for *storying otherwise:* by challenging human-centric ways of perceiving the world, by preparing new pathways to understand our place on the planet, and, essentially, by re-imagining our relationship with other critters and the natural environment at large. In other words, bio art projects narrate differently by breaking down the human versus other-than-human hierarchy and by intensifying a different type of relationship in our study and research work. Since the analyzed projects originate from close collaboration between the human and other-than-human, they resist human exceptionalism and highlight that the mind of the artist is impacted and even guided by the materials the artist utilizes.

When exploring reality, we can learn from these new ecocentric stories in which the human and other-than-human are intrinsically entangled. Haraway (2016) keenly questions what would happen "when human exceptionalism and bounded individualism, those old saws of Western philosophy and political economics, become unthinkable in the best sciences, whether natural or social" (p. 30). Located in between the arts, the natural sciences, and posthuman concepts, we believe that

bio art provides epistemic potential. Bio artists recognize the other-than-human organisms to be collaborators, which in turn renders interesting perspectives to recast methodological and socially engaged research practices. Including other-than-humans in research-oriented explorations of reality might guide us toward new ways of knowing that intrinsically comprise multispecies entanglement. This is particularly relevant because existing research methods are limited and do not allow us to take all critters on Earth into account (Probyn, 2015). To include other-than-human entities in our research, profound methodological innovation is required.

Finding multispecies methodological approaches to draw inspiration from is challenging. Yet, they are highly needed to respond to a range of questions: How do we translate other-than-humans' agency and include it in our research designs? Can we communicate with other-than-human entities and how do we find a common language? How can we make our research practices as inclusive as possible and go beyond the human? While the epistemological ideas are thoroughly discussed by posthuman scholars, and some of the far-reaching answers to these questions are currently featured in future study research projects (e.g., Hannes et al., 2022), more efforts are required to translate these ideas further into workable research approaches. At the same time, critical questions arise about engaging living matter for aesthetic purposes and about including other-than-humans in socially engaged research practices. New concerns and challenges occur, possibly encouraging critical reflections on contemporary research practices and stimulating the imagination of alternative pathways. The experimental studies "bringing [human and other-than-human actors] together ensure that we keep our eyes down and ears open" (Probyn, 2015). They provide us with options for new methodological approaches to be used in multispecies research.

Based on the examined bio artistic practices, we have taken our very first steps and tried to story otherwise by adopting a multispecies research approach in which humans and other-than-humans were considered to be equal creators of the examined artworks. We, as humans and as researchers, became more acquainted with the notion of collaborative research *with* other-than-humans. We consider our study of bio art as an invitation to move beyond the idea that the researching object is somehow divided from the researched subject and to approach a study process as a knot, an entanglement, a network in which we are only one actor. Drawing on these insights, we believe that there is much to learn from bio artists on how to engage with living matter. We intentionally have utilized the word "engage" here, and throughout the entire article, to limit and overcome a reductionist approach of "using," "studying," "employing," and "exploiting" living matter. We have learned to go beyond treating other-than-humans as passive entities and we have aimed to highlight them as active agents throughout the article. As Haraway (2016) highlights, "it matters what thoughts think thoughts…what descriptions describe descriptions" (p. 12).

As the life-sustaining boundaries of planet Earth are being crossed one after another and sustainable transformation is urgently required, bio art can pave new pathways for reconnecting with the natural world. These new ways of thinking essentially represent side alleys—speculative or not—that complement the rather human-centric knowledge cultures that depart from hierarchical binaries. Through the inclusion of other-than-human organisms, bio art can give a glimpse of what multispecies relationality looks like, which might engender a renewed sense of responsibility towards the natural world.

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Conflict of Interests

The authors declare no conflict of interest.

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Article

Collaborative Writing as Bio-Digital Quilting: A Relational, Feminist Practice Towards "Academia Otherwise"

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Abstract
In this article, we explore how quilted poetry as methodology, through the practice of collaborative writing, can help us to attune to and think with what is un/seen, un/heard, and un/spoken in our bio-digital ways of working, as a way of resisting normative, exploitative practices in the neoliberal academia. We are a group of academics with different journeys and localities, connected by a common interest in the effects of boundaries, the dynamics of power, and the desire to do things differently. Drawing on our daily mundane encounters with/in both virtual and physical spaces of academia, including Teams meetings, Outlook emails, Google documents, and Miro board collaborations, we write quilted poetry with fragments of precarious matter: silences, messages, rhythms, feelings, and materialities. We attend to the entanglement of our bodies and their enmeshment in technology and share how bringing relational, feminist theories and the bio-digital together has helped us to both materialise new patterns of relations and enact a more ethical approach to working in academia.

Keywords
academia otherwise; assemblage; bio-digital; diffraction; post-digital; precarious kin; quilted-poetry; relations; response-ability

Issue
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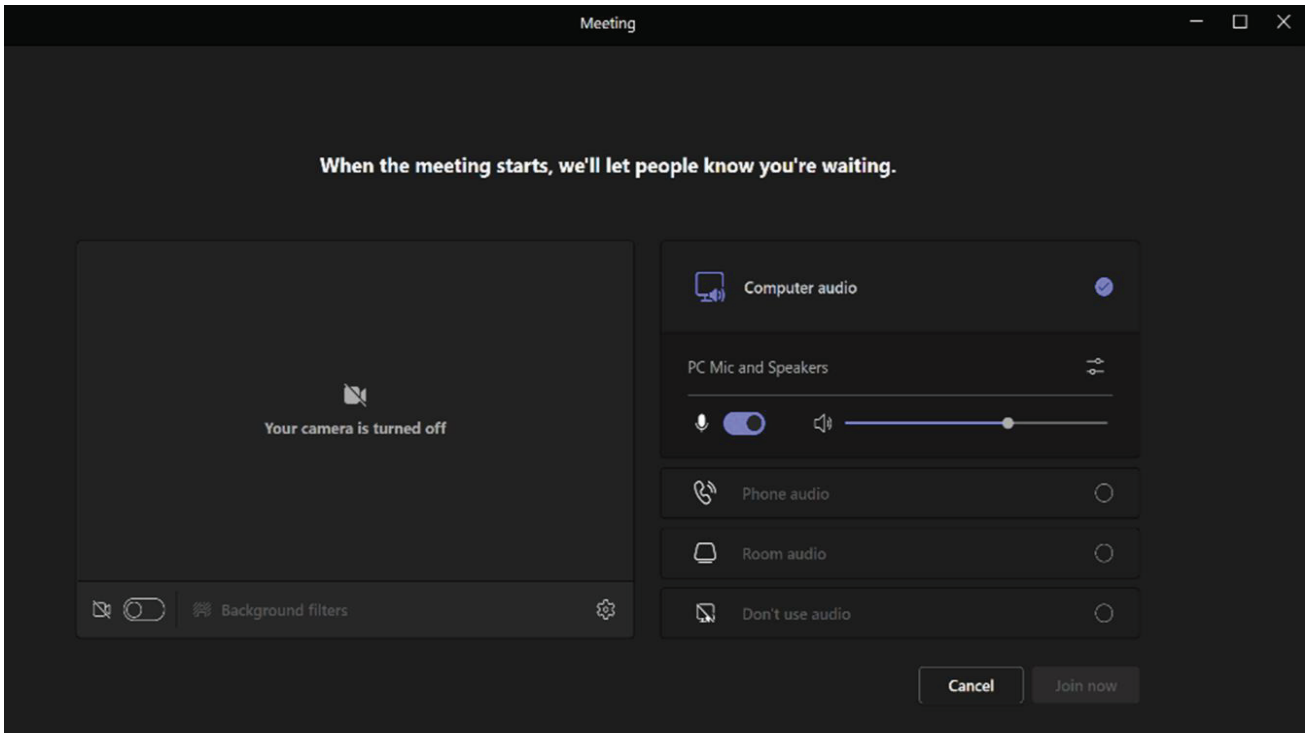
1. Assembling With Precarious Kin

Quilting involves an assembling of matter across a multitude of times, places, and bodies; producing layers to protect against "cold, pressure, or impact" and "strengthening textiles that had become fragile" (Gwinner, as cited in Strohmayer, 2021 p. 15). Often the materials involved in quilting are what Vicuña (2022) terms "precarious materials"—scraps, leftovers, modest and imperfect kin with uncertain futures. Similarly, our collaborative writing-as-quilting involves a collective gathering of matter across the physical and virtual, time, space, and place to strengthen working relations that have become fragile, and in the hope of creating layers to protect academic kinships against the pressures and impacts of academia. The precarity of the materials we work with is closely entangled with the precariousness of being women and mothers, working in academia, writing in "other than expected" ways, and living with/in/through precarity (Burton & Bowman, 2022). Attuning to our precarious bio-digital kin, we challenge the uncritical (re)production of academia "governed, regulated and lived by neoliberal principles" (Sotiropoulou & Cranston, 2022, p. 2) that privileges some at the expense of others. Through making the precarious explicit and visible, through acknowledging the ways in which our kinships with precarious "oddkin" matter, we collectively (re)make academic spaces. Moreover, by developing new

bio-digital patterns of relations, we contribute to "care-full" ways of working that withstand current neoliberal pressures (Sotiropoulou & Cranston, 2022). We share our collaborative process of quilted poetry writing, in which we assembled, stitched through, and responded to our precarious bio-digital kinship, as a contribution to experiments in developing more just futures rooted in more ethical and care-full ways of working in academia.

We explore and think with our own daily mundane, virtual, and physical entanglements with digital technologies, our email discussions in/with Outlook, online meetings in/with Teams (Figure 1), and virtual conference exchanges in/with Miro board through the method of quilted poetry, as a way of coming together, to (re)think and (re)imagine new ways of living, working, and becoming in academia. We pose the questions: What happens when meetings are conducted in Teams? What response-able relations are enacted as we are consigned to online waiting rooms accompanied only by the silent presence of bright screens? What other ways of working in academia are possible if we begin to pay attention to the silences in our virtual spaces, to the messages on our screens, and to the ways technology moves us as we move with/in/through it? To that end, we are guided by a central question: How can thinking, making, and becoming-with the digital in academic environments help us think productively and anew about ethical working relations in the post-digital, in which the bio-digital, rather than merely the digital, becomes a fertile ground for doing academia otherwise?



Teams: How do you want to join your Teams meeting?
L: Are we meeting today?
D: I am in the waiting room @ Teams
PC: [muted hum, silent screen]
Teams: You are offline
E: I have some unexpected obligations. Could you record your meeting?
Teams: When the meeting starts, we'll let people know you're waiting
P: [Am I not the organiser?]
Teams: Your camera is turned off
C: Sorry—just on an urgent call. Will let u all in asap
Teams: Recording. By attending this meeting, you consent to being included.

Figure 1. Meeting, living, becoming with/in/through Microsoft Teams, November 2022. Screen capture by Petra Vackova.

2. Attuning to the Digital in Academia

There is a need to write more about the changing relationship between academics and the digital technologies in their workplace (Decuypere & Simons, 2016). Some research emphasizes academics' "technophobia," and their resistance to using technologies more readily and creatively (Khalil, 2013). Some explore the emergence of new negative impacts of technology on academics, such as growing videoconferencing fatigue (Oducado et al., 2022). But to date, little attention has been given to the possibilities beyond neoliberal patterns of work that these difficult, daily encounters of academics and digital technologies in their work settings open up, and any new patterns of relations they generate. This is despite the rapidly increasing presence of digital technologies in the higher education environment. From computer technologies in their various forms, such as mobile phones (Ferreira, 2022), and communicational technologies, such as social media platforms (Williams & Greenhalgh, 2022), to data analytic systems (Nguyen et al., 2020), digital technologies are changing not only the way we work, communicate, and create knowledge, but also the way we relate to each other in academia.

The digitalization of higher education and the omnipresence of digital technologies is driven by the idea that digital technologies aid learning, teaching, and knowledge-exchange processes (Ifenthaler et al., 2022), and also generate inclusive and transformative spaces by lowering barriers to participation and supporting new modes of communication (Fulcher et al., 2020; Schwarz et al., 2020). Despite these recognised opportunities, some have nevertheless been wary of the role of technology in inclusive ways of working. Vicuña (2022) writes:

> The entanglement of our bodies—with both the material world of nature and the places that we live—is enmeshed in the hive-mind of technology that connects us with each other, while isolating us in new and uncertain ways.

Recent studies dispel the myth that digital technology itself can make higher education spaces more inclusive or fair (Couldry & Mejias, 2019; Smith et al., 2020; Thompson & Prinsloo, 2022). Digital technology in academia is not a neutral tool nor is it a universal good (du Toit & Verhoef, 2018; Prinsloo, 2020). Much like Sancho-Gil et al. (2020, p. 71), we are critical of the "inclusive and collective view of technology" because its effects may "end up having opposite results." Digital technologies can (re)produce normative forms of workplace power relations and exploitative, neoliberal practices when they are employed and engaged uncritically in academic work. Moreover, we are increasingly in a world where digital technology and virtual reality are not separate from a "natural" human and social life (Jandrić et al., 2018); the boundary between these once separate spheres is blurred, giving rise to new ways of being and becoming in academia in the post-digital (Cramer, 2015; Hodgson, 2019; Peters et al., 2022).

Our objective is therefore to complexify current discourse at the intersection of academic work relations and digital technology by experimenting with new patterns of relationality and moving beyond the discourse of inclusion. While we strongly support efforts to resist exclusionary practices and structures in academia, we posit that social inclusion as a concept and a practice is not only reductive but also problematic because it produces ideological patterns of difference and sustains a human-centred justice paradigm and therefore cannot successfully counter systemic injustices (Vackova, 2022). Thinking-with Sancho-Gil et al. (2020), we also challenge the simplistic notion of digital technology as a neutral object, a tool to be employed for the greater human good. Instead, we (re)frame digital technologies as precarious oddkin with whom we are intimately and inevitably intertwined in a "parliament of things" (Sancho-Gil et al., 2020, p. 71), where alternative practices are (re)examined, (re)imagined, and (re)enacted. Digital technology, while an important more-than-human kin, is merely one of the actors of our bio-digital becomings that both shapes and is being shaped towards new possibilities for more just futures in academia. There is an urgent need to think and act beyond the current narrow conceptualizations of both technology and justice when working against institutional injustices and towards new ways of working and thriving in academia. With this article, we hope to inspire academics in all fields to start attuning to what is un/heard, un/seen, and un/spoken in their daily bio-digital encounters in order to co-enact academic practices differently and co-create new ways of working in academia. We show how imagining and actively (re)making mundane institutional practices through entangling-with, layering, and stitching together precarious oddkin (Terranova, 2016) has helped us imagine "academia otherwise" and create "more livable stories" (Adsit-Morris, 2017, p. 43).

3. Thinking-With and Alongside Relational Theories and Concepts

Our doing of academia otherwise is characterised by the premise that existence comes to matter through relationships; *being* does not pre-exist relationships (Barad, 2007). Theorising, knowing, doing, and being are enactments in and of "specific material configurations" (Barad, 2007, p. 91), a material and iterative process that reconfigures and re-articulates the world (Bozalek, 2022). Rather than working with a critique of the binaries that constitute the bio-digital, the virtual and the physical, or the human and more-than-human, as separate, we think with/through the notion of assemblage (Deleuze & Guattari, 1988) and experiment with the various arrangements that constitute bio-digital

kinships. Inspired by the philosophies of Deleuze and Guattari (1988), who recognise matter and meaning as coexisting in complex "assemblages," we work with theory as concept to respond to how academic collaborations in the post-digital might materialise differently. Foregrounding heterogeneous relations through the concept of assemblage, we develop a productive practice of strengthening kin in resistance to divisive neoliberal effects of power in academia (Macgilchrist, 2021). In doing so, we show the rich complexities in contemporary human–technology assemblages that add depth to how we might enact and enliven our ways of working in academia. To think with bio-digital assemblages, such as those enacted with/in/through the Miro board (Figure 2), we propose, offers a way to scratch at the surface and explore new kinds of ethics.

Quilting-with and alongside relational, feminist, and post-digital theories we seek to be accountable to the material conditions we co-create as we experiment towards "new possibilities for living justly" (Barad, 2007, p. x). We contribute to experiments in doing academia otherwise (Beauchamps, 2021; Bozalek, 2022; Osgood et al., 2020; Romano, 2022), to support material, relational, and affective spaces in academia, and "reimagine the academy as a space of/for justice and flourishing" (Shefer & Bozalek, 2022, p. 26). By attending to our collaborative writing as a material and iterative process of quilting-with and alongside relational, feminist, post-digital theories, "we loosen the frame of our habitual academic practice in order to make space for unrecorded, small stories to bubble up, becoming undeniably present" (Beauchamps, 2021, p. 395).

4. Reframing Collaborative Writing as Bio-Digital Quilting

We conceive our collaborative writing as a quilting practice, as an act of kinship, of exploration, and of imagining, allowing us to "strengthen" each other, to "protect" and care for each other, but also to acknowledge and deliberately think-with the precarity of our materials and ourselves as we "become" in academia. Our quilted poetry is a space of political feminist resistance within academia that places the mundane, the othered, and the personal at the centre of academic writing, as a performativity of resistance against neo-liberal forces (Taylor & Gannon, 2018). Our collaborative writing is an act of care (de la Bellacasa, 2017). Taking care of each other with/in/through writing is an act of doing academia otherwise to us (Figure 3). Moreover, it challenges established orthodoxies about linearity in representing professional lives in favour of a rhizomatic, collaborative, artful, and playful act of doing-being together. In our writing, we collaborate not only with each other but with places, spaces, and mundane objects surrounding our daily academic life (Barad, 2007; Bennett, 2010; Coole & Frost, 2010; Taylor, 2013). Entangling and becoming-with the mundane, the matter, the surroundings, our collaborative writing becomes vibrant and agentic story-making. Such collaborative writing is a democratic ecology of events in which hierarchies are flattened, and in which what matters is the interconnection of parts, the knots, the entanglements of bodies, objects, stories, and voices, where the marginal is reworked and repositioned.

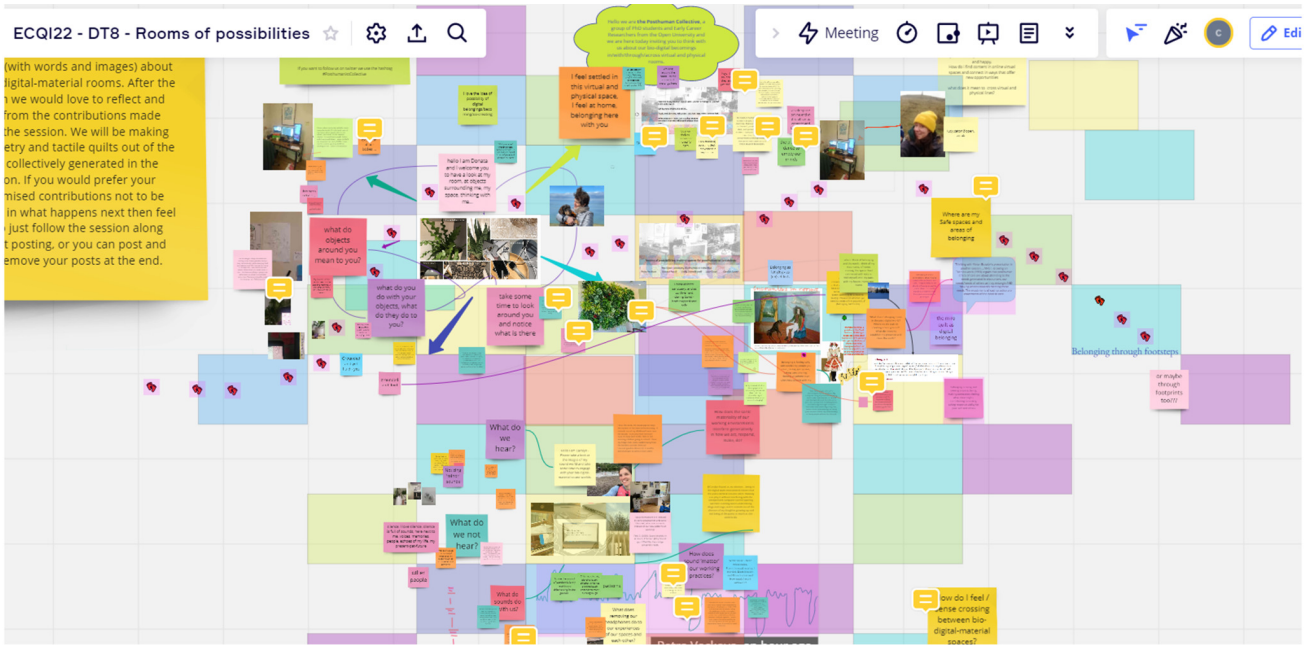


Figure 2. Assembling, experimenting, doing otherwise with/in/through Miro board, ECQI 2022, February 2022. Screen capture by Petra Vackova.

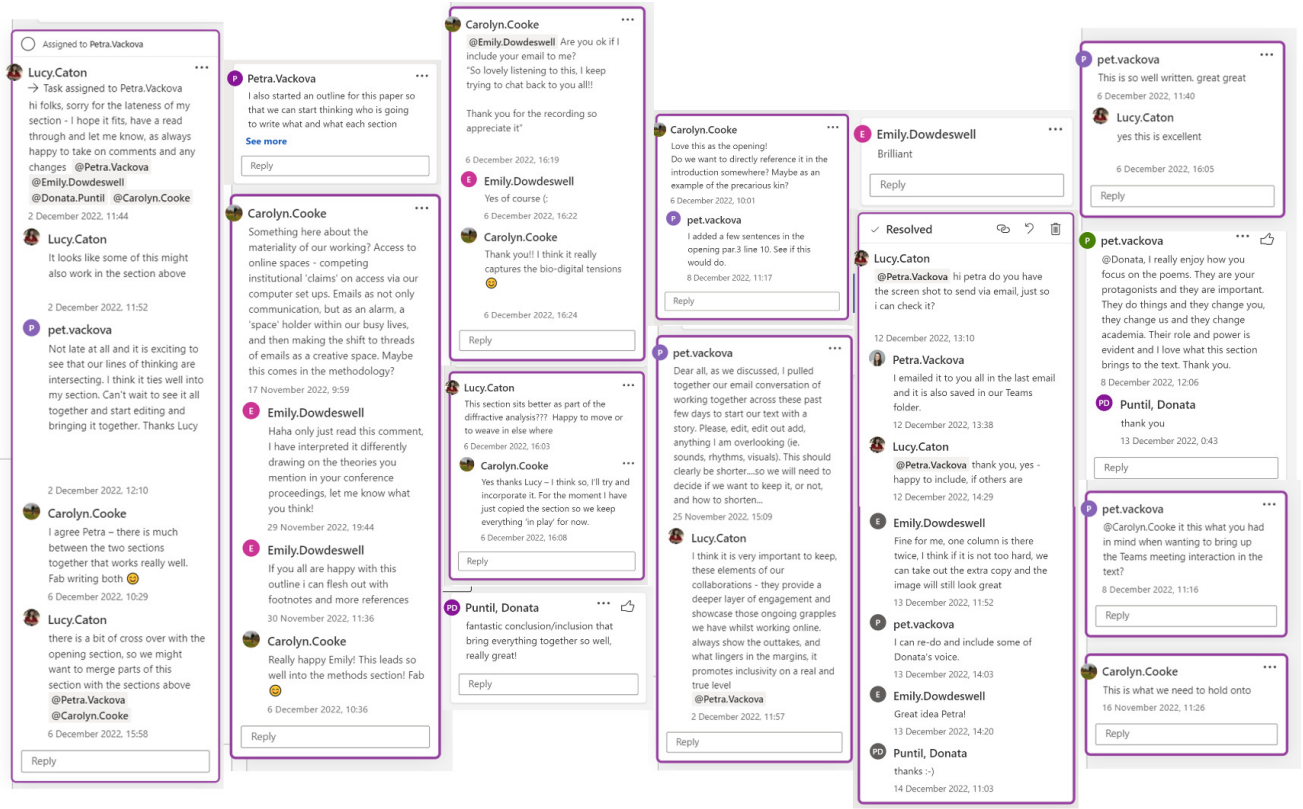


Figure 3. Writing, caring, quilting with/in/through Microsoft Teams. Screen capture by Petra Vackova.

Our collaborative writing through and with the presence of digital technologies, inspired by evocative autoethnography (Bochner & Ellis, 2016), creative-relation writing practices (Gale & Wyatt, 2021), and feminist storying practices (Taylor et al., 2020), is not to be understood as a fixed order of parts, but rather as an assemblage, a creative and relational movement, as a quilt of stories stitched together-apart, made and re-made, continuously, where the individual original patches are no longer recognisable. While quilting as method is well established within qualitative research (Clark, 2019; Flannery, 2001; Koelsch, 2012), (re)seeing and (re)enacting quilting as a relational, feminist, bio-digital, performative method acknowledges its position "at the intersection of material, embodied and textile rhetorics," whereby it becomes a practice that values the physical labour, the knowledge base of the creators and the relationality between human and more-than-human (Arellano, 2022, p. 17). With our collaborative writing as bio-digital quilting, we stitch together theory and practice. Doing and embracing the core values of care, labour, knowledge, and the materiality of our writing together, enacts academia otherwise. We conceive our bio-digital quilting as an artful collaborative practice (Kirkpatrick et al., 2021) in which the various bio-digital assemblages produce a generative space/place (Taylor & Gannon, 2018) where stories move, grow, change, and take a new life as they are stitched through, across and together. A collaborative writing-as-quilting is a practice of taking care, enacting academic writing differently, and a joyful, vital space/place for becoming that is imbued with creativity, co-creation, and co-response-ability of actions where traditional subjectivities and relationalities are destabilised.

5. Unfolding a Collective Practice

As noted by Knapp (as cited in Strohmayer, 2021), the English language is closely related to metaphors of sewing (e.g., piecing together, weaving ideas, stitching different sections together, threading an argument). This relationship between sewing, quilting, and language, creates a space for collaborative gatherings of writing/making/visualising in what we term "quilted poetry." Adopting what Lahman et al. (2019, p. 215) term a "poemish" approach to writing, which they define as a safe space for the creation of something resembling a poem for research purposes, we perform a process of making, embellishing, layering, patterning our bio-digital becomings in academia into poetic forms. Bai et al. (2010) note that poetry-making "provokes presencing," enabling transformations to happen while we pay attention to each other, as the assemblage of the poem "sinks into our being, and alters who we are" (Bai et al., 2010, p. 359). Collectively paying attention, making spaces for deliberately acknowledging and explicating our bio-digital "becoming" together through poetry-making, foregrounds differences that help us resist established relations in academia and consider ways of being and becoming that strive towards doing

academia otherwise. As we quilt our poems, we engage diffraction as an ethico-onto-epistemological practice of interference, or in other words, as a thoughtful and accountable knowledge practice that makes a difference (Barad, 2007; Haraway, 1997). In our collaborative poetry writing, diffraction is a process and a product through which we re(see), (re)hear, and (re)make tangible patterns of commonality and difference (Barad, 2007). By reading our poems with/through/between each other we pay attention to what the poems "do" in speaking to different patterns of relations and towards more ethical ways of working, being, and living in academia.

We start quilting by gathering and thinking with precarious matter (e.g., sounds, objects, metaphors, images) within our meetings, conversations, conference presentations, and our own writings. The precarity of this matter relates not to a substantive fragility, but to one of the multiple forms of precarity, enacted in the academy. We turn to the matter that surrounds us but is often un/heard, un/seen, and un/noticed while we are on video calls or writing emails, the sounds between, across, or excluded from our bio-digital ways of working, and to our embodied responses to the spaces we are engaging in. Each of us acting as a quilter sets in motion the creative process of writing by attuning to our daily bio-digital encounters with precarious oddkins and creating the first line of a quilted poem. The first line of a poem is then passed to another person, and then onto another until, over a week, each poem is materialised through our close entangled encounters (Table 1).

We share the emerging poems by email, thereby "holding a space" amongst all the other emails calling for our attention and time (Figure 4). These emails feel like daily presents, vitalising settled ways of working. As poems travel across various virtual and physical spaces, new layers, embellishments, and scraps are added, or threaded through the existing material. Once the journey is complete, the original quilter "binds" the emerging

Table 1. Mapping our quilting poetry-making.

	Poem 1	Poem 2	Poem 3	Poem 4	Poem 5
Initial line	*Emily*	*Donata*	*Lucy*	*Petra*	*Carolyn*
Thursday 17th	*To Donata*	*To Lucy*	*To Petra*	*To Carolyn*	*To Emily*
Friday 18th	*To Lucy*	*To Petra*	*To Carolyn*	*To Emily*	*To Donata*
Monday 21st	*To Petra*	*To Carolyn*	*To Emily*	*To Donata*	*To Lucy*
Tuesday 22nd	*To Emily*	*To Donata*	*To Lucy*	*To Petra*	*To Carolyn*
			(edit, embellish, extend)		
Friday 24th	*Share*	*Share*	*Share*	*Share*	*Share*

Outlook: bing

P: Did you manage to forward poem 1 and poem 2 last week? ….these two poems are stuck somewhere.

D: Yes I did.

Outlook: ? Help

L: Unfortunately, the poems (emails) have landed within the same week, my inbox has exploded. It has been a juggling act.

P: No worries. Thanks for the new sentence!

Outlook: Reminder [Dismiss all]: Cancelled: Cancelled: GESG, 15:00, Microsoft Teams Meeting, 3hrs

L: Poem 1 and 2 are back on track, I had sent around emails with just my contributions last week, without the rest of the previous emails. Eeeeekkk, I am so sorry!

Outlook: bing…bing…bing

C: We have poems!!! 😊

E: Well done everyone, we got there in the end.

Figure 4. Gathering, working, presencing with/in/through Outlook, November 2022.

quilt together, entangling it with the layers and materials that had been added, thinking with the additions and finishings to create the final quilted poem (Figure 5).

6. Diffracting Through-With Quilted Poetry and Following Loose Threads

Quilting with/in/through our daily, mundane bio-digital ways of becoming in academia and assembling, layering, and embellishing poems with patches of un/heard stories, ideas, sounds, un/felt rhythms, feelings, and un/seen images and materialities helps us to think through, think-with, un/do, and ask further questions about our individual and collective becomings with digital technology in academia. The process surfaces the synergies and tensions within our writing experiment, both reinforcing performative academic models (Sotiropoulou & Cranston, 2022), where efficiencies of time, money,

Figure 5. Bio-digital quilted poetry.

and resources are prioritised and amplifying the care-full, bio-digital, embodied experiences of co-creation, where the wider bio-digital assemblages of precarious kin become an encounter of new meaning and mattering. Quilted poems become a precarious meeting place that both illuminates and interrupts the dominant neoliberal practices in academia, helping us move beyond militant metaphors of strategies and targets (Phipps & Saunders, 2009). The tensions-filled realities of writing-as-quilting, our seated aching bodies, failing technologies, noisy backgrounds, family emergencies, or asynchronous work, lead to a generative deepening of bio-digital kinships and the co-creation of new threads of possibilities towards more ethical ways of working together.

Diffractively reading the poems, concepts, and materialities of our bio-digital quilt through and between each other, the following vignettes, written in response, explore what else the bio-digital quilt "does," what concepts towards new patterns of relationalities emerge in the encounters along its seams, folds, and threads. The following responses are not merely individualistic bounded thought exercises, but a practice of responding to and making with the assemblage of the diverse kin, materials, concepts, and affects that come together in the writing of quilted poems, in their diffractive re-reading and in the writing in-response.

Carolyn: The poems re-make what it means to collaborate. The etymology of collaboration is "working together," with a focus on producing something. This product view of collaboration is woven throughout academia; we collaborate to write courses, to bid for funding, to present at conferences. Our poems experiment with collaborating differently, re-making collaboration as more-than piecing different peoples' thinking together (which would be more akin to patchworking). Instead, collaborating as quilting is an "un/doing together" where we are constantly re/stitching through our bio-digital layers, between ourselves, our thinking, our acts, our lives, our materialities, our past-present-futures in academia. We make and re-make, we feel and re-feel, we stitch and re-stitch as a constantly dynamic process of coming to know and coming to be together.

Petra: The poems prompt us to (re)consider settled concepts and ideas such as the notion of belonging in the post-digital by unseaming, loosening, and (re)stitching the edges of the concept together. The notion of be-longing comes to matter and reorients understandings around ethical bio-digital encounters in academia. To "be-long" is to be and is to "long." It is both turning to oneself and turning to the other at the same time. Be-longing is a generative concept that challenges the harmony of the fixed realities of the self and opens to the entanglement of the self and the other for more just futures. Be-longing means being (un)settled, being both settled and being on the move, and taking the "other," the people-places-animal-things with you, as much as being taken with them. It is actively growing and wandering towards more just futures in academia in which the self is more than human, it is a more-than-human, emergent, nomadic community that allows for new ways of being and becoming (Braidotti, 2011). Thinking and becoming-with the notion of be-longing means attuning to being, the reiterative processes of worlding among kin in each moment, and to longing, the desiring the im/possible that drives experimentation (Deleuze & Guattari, 1983), towards new modes of working and becoming in academia.

Donata: The poems speak for-of-with us, are part of us, of our being together in space-time-matter. Co-creation is at the core of these poems, co-creation is at the centre of our collaborative inquiry, of our collaborative writing, and of our journey of being and becoming academics within and beyond a bio-digital environment. These poems speak of movements, of vibrations, of absences, and presences. They speak of knots, of connections, of lines of flight. They make and create new knots, new ways of being within academia. They are full of care, of taking care of each other, of emotions, of be-ing together, yet apart. They are togetherness. They make togetherness. They are process and product. They move, they are not static knowledge fixed in time. They change and fluctuate with us, with readers, with new encounters. They make new encounters possible. Writing them creates new lines of flight, new possibilities of exploring and producing academic knowledge differently. They are little pearls of beauty co-created across e-mail exchanges, inboxes, word documents, images, cut apart and stitched together. Creating something new, from the old, from dissonances, silences, rhythm, sounds, images, words, embodied experiences of togetherness. They make me happy, they keep me company, they keep me warm, wrapped within their stitched-together-words.

Lucy: The poems make tangible the kinship within our collective and bio-digital, more than human entanglements. What becomes stark, more than the words alone, is the shifting attention to relations at the cross section of the biological and the digital. What more can be accounted for, experienced, and unfolded, at this intersection? These questions lead to a growing sense of self-awareness, which means a renewed attentiveness to behaviours, fragments, and singularity, yet it also encourages recognition of my own entangled response-ability throughout, which incites an ethics of care (de la Bellacasa, 2017) towards "the others." Adjusting to an active rather than passive mode of accountability prompts a way to recognise the physicality of participating within the quilted digital poetry-making. Re-attuning to what I am *doing*, *sensing*, *hearing*, and *feeling*, becomes significant, within the wider assemblage that incites a more embodied and immersive enactment of response-ability. In other words, what matters and is made to matter in our bio-digital becomings, becomes clearer or, at best, easier to sense.

Emily: The poems unsettle linear scripts of living in academia and centre connections, creativity, and

processes of meaning-making to generate an analysis otherwise that blurs methodological boundaries:

> Any work…founded on carefully, collectively considered principles of justice, can only begin when the weapons are still and language is allowed to sing again. This makes a poetic project in such a context a political act with words; working to rebel phonemically; to change the air…to speak of the hidden, unjust things felt in the depths, bodying forth, despite itself, all kinds of emotion, shapes and patterns which are fundamentally disrespectful…of boundaries. (Phipps & Saunders, 2009, p. 359)

Our poems change the air of the academy by stitching through our fragmented scraps of precarity, community, and care to strengthen stories less told, layering and holding together what lies to hand. Pulling together frayed whispers, empty rooms, digital clouds, and auditory worlds that encompass both proximities and voids, into the crumpled warmth of community. Like the piercing of fabric in the act of stitching there is a violence to inclusion: pulling together rests on the assumption of an apart-ness. But the dispersed air that makes up spaces in between is caught up in the process of quilting and held in pockets of warmth. What previously kept us cold (technology, sounds, words, erasures, pushed aside-ness), now keeps us warm (connection, sounds, memories, presences, pulled together-ness), enacting "possibilities for intimacy, pedagogy, learning, creativity, adventure" (Bozalek et al., 2021, p. 844).

7. In/Concluding

Quilted poetry, a bio-digital, feminist, posthuman methodology developed here, is an experiment at thinking, working, and (re)doing academia otherwise. Through quilted poetry, new meaning is generated when language is used differently, when scholarly text meets everyday language, images, and sounds. The assembling of unlike things, through playful writing/quilting/entangling encounters, disrupts the settled flows and rhythms of academic writing practices. Quilted poetry is not a representational practice, it is an attempt at care-ful workplace collaboration and bio-digital kinship that decenters expertise, unsettles individualisation of thinking, and performative agendas of neoliberal academia. It is a safer (s)pace for new patterns of relation beyond inclusion to emerge through its interactiveness and responsiveness rooted in attentiveness to more than oneself. It challenges how we engage and inquire in academia in the post-digital. While developing our quilted poems, the familiar "bing" noise of emails demanding our productive attention becomes the sounding of relationality. Seeing each other's cursors flicker in shared documents as we work the same text, instead of being a distraction, becomes an act of be-longing. Making time and space in busy academic schedules for un/doings, software failings, and productive frictions, becomes a matter of ethical urgency. Quilted poetry-making is therefore imbued with possibilities to engage otherwise in the spaces of and beyond the university. Through quilted poetry, we come into contact with each other's physical and virtual communities, we share each other's homes and entangle with the precarious fragments of work/family/self/place/other, we (re)attune to our daily bio-digital kin, the various modalities of online documents, video calls, electronic mailboxes, and instant messaging.

Quilted poetry is a poemish opening of—and opening to—a particular process of becoming that produces new imaginaries and makes precarious kinships tangible through which new ways and stories of becoming and living in academia unfold. It is a diffractive experiment at re/assembling self/other/digital/academia away from precarity and towards new possibilities for more just futures. It is therefore not an endpoint that has an outcome or a conclusion. It is a "what if" and "what else" proposition that asks: What if academia becomes enacted otherwise? What will academia be, feel and look like once we start imagining ethical work relations beyond inclusion? What are the possibilities towards more ethical ways of working, inquiring, and becoming with/in the virtual and physical spaces we are so intimately entangled with? How else can re/making settled concepts reorient understandings around ethical encounters in academia in the post-digital? What other relations are possible when collaboration is enacted as a process of bio-digital un/doing together? What if we enter spaces where more-than-human kin speak for-of-with us? What if we not only listen to stories less told but weave our own scraps of precarious living into their fabric, what new possibilities for more ethical ways of working and inquiring can we make to matter then?

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