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Table of Contents

Acknowledgements	7
Guest Editorial	
Ageing with digital technologies: from theory to agency and practice <i>Magdalena Kania-Lundholm & Helen Manchester</i>	9
Articles	
Window work: Screen-based eldercare and professional precarity at the welfare frontier <i>Kristina Grünenberg, Line Hillersdal & Jonas Winther</i>	23
Infrastructuring ageing: Theorising non-human agency in ageing and technology studies <i>Marie Ertner</i>	51
Aging, embodiment and datafication: Dynamics of power in digital health and care technologies <i>Nicole K. Dalmer, Kirsten L. Ellison, Stephen Katz & Barbara L. Marshall</i>	77
The internet multiple – How internet practices are valued in later life <i>Vera Gallistl & Anna Wanka</i>	103
Transcending borders and stereotypes: Older parents' intergenerational contacts and social networking through digital platforms <i>Anoop C Chooleyil and Laxmi Putran</i>	127

Beyond the silver gamer: The compromises and strategies of older video game players <i>Gabrielle Lavenir</i>	155
Considering the role of material gerontology in reimagining technology design for ageing populations <i>Helen Manchester & Juliane Jarke</i>	181

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Ageing with digital technologies: From theory to agency and practice

By *MAGDALENA KANIA-LUNDHOLM*¹ & *HELEN MANCHESTER*²

The title of this special issue, “Ageing with digital technologies” points to two of the growing challenges facing the twenty-first century, namely the changing demographic structure of societies connected to ageing populations on the one hand and the technological development and digitalization of societies on the other hand. These challenges are continuously addressed by researchers and scholars across the globe in a variety of academic disciplines, including medicine, demography, biotechnology, neuroscience to name just a few. At the same time, questions of ageing and technology do not go unnoticed in other disciplines, including humanities and social sciences. The focus of this special issue is on the latter, namely exploring and better understanding the *social* and *material* factors, in terms of theory, agency, and practice, that play a role when older people are co-creators, users, and recipients of technological innovations.

The notion that older adults are one of the groups for whom digitalization of society is the most problematic has been widely discussed by ageing researchers (Russel, 2011, Quaana-Haase et al., 2018). Most research on older people and digital technology has previously been discussed in two ways: first, in the context of digital and social inequalities, digital divide, and social exclusion. This research has also informed the popular

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portrayal of Internet users in developed countries in rather stereotypical ways, namely young people as tech and internet savvy and older people as lagging behind and relying on help and support from others (Bennett, Maton & Kervin, 2008; Selwyn et al., 2003). Second, the focus has been on the role and impact of technology on older peoples' health and well-being (Schulz et al., 2015). One of the concerns has been that older people often remain excluded from key service infrastructures, which can negatively affect their mental health and well-being. Particularly in the latter case, the scholarly and public discourse has been heavily informed by the idea that different technologies, such as, for instance, social robots, online services, and assistive technologies, can possibly alleviate experiences of exclusion, loneliness, and marginalization. These studies are often informed by a celebratory, techno-deterministic approach to digital technologies and/or are characterized by an interventionist logic that positions the networked, digital technologies themselves as major solutions to the "problems" of aging (Peine & Neven, 2019). This research has previously informed various policies and policy interventions supporting the discourse of digitalization as an inevitably positive force and change in societies. For instance, in 2020, the European Council debated and produced a report entitled "Human Rights, Participation and Well-Being of Older Persons in the Era of Digitalisation" (EU, 2020). Also, the World Health Organisation's "Global Report on ageism" (2021) mentions the beneficial aspects of digital technologies in alleviating loneliness among older people during the COVID-19 lockdowns.

At the same time, in recent years, scholars have begun to critically address and assess the intertwining of ageing and technology and a new field of Socio-gerontology has been established (Peine et al., 2021a; Peine & Neven, 2021b). Here, the new theoretical perspectives and emerging methodological approaches provide both critiques of the dominant accounts of ageing and technology and inspiration for new policy solutions and technology design processes. The topics of research include questions of socio-materiality pertaining to care robots (Bischof, 2017; Ertner & Lassen, 2021), social media use (Beneito-Montagut & Begueria, 2021), and dementia care (Schwennesen, 2021) as well as empirical interventions, design research studies, and critical scholarship on the intersections between Ageing Studies and Science and Technology Studies (STS) (Bischof & Jarke, 2021; Manchester, 2021; Wanka & Gallistl, 2021).

In the spirit of Socio-gerontechnological studies, the task of this special issue is to continue the critical debate and expand the research on ageing and technology by shedding light on how the design and use of digital technologies are embedded in socio-material contexts and may be employed in many creative, sometimes unexpected ways. The approach of the research presented here emphasizes the agency of older people, both as users and co-designers of digital technologies and as participants in the complex processes and systems of technology development and use. This is to say that topics examined in the articles that are part of this special issue point to ageing and technology as a broad phenomenon embedded and located in specific material contexts, temporalities, and spaces. Instead of merely focusing on “testing hypotheses” and “applying theory,” we as guest editors were interested in research that would shed light on the “messiness of practice” emerging from, sometimes unexpected, encounters that involve questions of subjectivity, agency, digital (dis)engagement, and technology nonuse. We were interested in moving beyond binaries often invoked between, for instance, older people who have or don’t have skills or competencies to understand how this unfolds in real lives and situations.

Scholars in this special issue draw on a range of theoretical inspirations in their papers, including Science and Technology Studies (STS), Actor network theory, Feminist materialist approaches, and critical theories of ageing, and including those exploring datafication, power, and valuation studies. These theoretical understandings foreground particular epistemological and ontological thinking from social researchers, foregrounding relationality between human and nonhuman entities and therefore adopting methods that allow researchers to focus in on practices and how they unfold in complex relations. Many of the papers in this Special Issue adopt ethnographic and design methods and longitudinal design to describe and understand the relations between humans and nonhumans, between ageing and technologies, carers, wired connections, spaces and places, and older people.

Broadly, what connects our thinking across the special issue is the so-called sociomaterial turn that features in the work of the Socio-gerontechnology network (Höppner & Urban, 2019, Peine & Neven, 2019, Peine et al., 2021). The special issue sets out to shed light on the variety of ways in which technologies and ageing lives are not only mutually co-constituted

but also composed of human and nonhuman actors, public discourses, and power relations. By doing so, we hope to provide a closer look into more diverse, nuanced, and participatory techno-gerontological contexts and cultures.

In the following, we introduce the specific themes explored by the papers in this special issue.

Theme 1: Situating care and technologies: screens, robots, and infrastructures of ageing and technologies

Technologies and their effects have become increasingly implicated in our everyday lives and caring practices (Matthewmann, 2011) including in those of older people living in care facilities. Technologies are often seen as a solution to the problem of caring for people as we age. However, often mainstream technology designs for care settings have not lived up to the expectations of policy makers and designers when they are placed into real-life contexts (Vines et al., 2015; Peine & Neven, 2019). This is due, in part, to policy makers and designers not understanding the complex, unfolding relations between technologies, older people, carers, and the material places and spaces where they are situated.

In fact, scholars such as Mol, Moser, and Pols (2010) have suggested that care and technology have often been imagined as opposites. Care involving warmth and tenderness and often perceived as happening in the private sphere while technologies are cold and utilitarian, effective and efficient, and largely situated in the public sphere. They point out that this understanding creates false binaries that are not helpful in understanding how care practices increasingly unfold across assemblages of human and nonhuman relations (Callon and Law, 1995) in both public and private spheres. Technologies, such as health trackers, sensors, and assistive technologies, are increasingly entangled in everyday practices of care, situated in emergent relations, and therefore requiring constant repair, reconfiguration, and “practical tinkering” (Mol, Moser & Pols, 2010:13; Katz & Marshall, 2018).

Taking this approach to understanding the co-production of technologies and care practices means understanding the messy situatedness, the specificities, and the detail of relations (Code, 2015). This more nuanced understanding of caring practices suggests the importance of

acknowledging and making visible and tangible the affective, the ethical/political, and the maintenance work required for care when designing technologies (Puig de la Bellacasa, 2017). As Winance (2010, p.111) points out, caring alongside, among, and with technologies might then involve adaptation of practices that require exploration, testing, touching, adjusting, and paying attention to details in order to adapt them to find “a suitable arrangement (material, emotional, relational).”

In their article, entitled “Window Work: Screen-based care and Professional Precarity at the Welfare Frontier,” Kristina Grünenberg, Line Hillersdal, and Jonas Winther explore how policy imperatives and material situations led healthcare workers to switch to screenwork to deliver care during the COVID-19 pandemic. They draw on an ethnographic study in three Danish island locations to consider how care workers negotiated new roles, developed new competencies, and adapted their practices when caring through screens. Understanding screenwork as a material, embodied, and technological practice, they explore how screens frame vision in particular ways that delimit what care workers can see, do, and achieve. Drawing on the concept of a window as a metaphor, they discuss the “filtering” of the senses and the care workers’ and older people’s negotiations of proximity, feelings of closeness and connection and disconnection. They suggest that the introduction of screens, which is often seen as an “easy” solution to the “problem” of providing home care for older people, requires significant “invisible work” on the part of healthcare workers. In particular, the co-presence required for care workers to be able to attend to sensory experiences and bodies in space is not easily reproduced through “window work.”

In her article, entitled “Infrastructuring ageing; theorising non human agency in ageing and technology studies,” Sara-Marie Ertner proposes that the STS concept of infrastructuring can shed important light on the role of nonhuman agency and materiality in explorations of technology and ageing. She first describes the “reductionist” approaches and centering of the human in previous social studies of ageing and technologies and suggests a move toward a relational approach that focusses on how entities and realities unfold in practice. This view understands technologies, not as bounded objects, but rather as distributed in “complex chains of material relations [that] reconfigure bodies, societies and knowledge and discourse in ways often unnoticed” (Harvey et al., 2017, p. 5). Ertner

provides examples from her own work and that of Lipp (2019) and Langstrup (2013) to explain how the STS concept of infrastructuring can help us to foreground the idea of nonhuman agency in relations between care and technologies. For instance, understanding care robots not as bounded objects but rather as highly distributed across networks of entities, some of which might be visible but others invisible. Her paper demonstrates that researchers might look beyond the human actors and their roles in designing technologies for older adults or beyond a particular bounded site of investigation and rather foreground the distributed and complex workings of infrastructure in order to make sense of the messiness of technologies in practices of ageing and care.

Theme 2: Critical approaches to ageing and digital technologies: power and meaningful technology use

When it comes to ideas about the role of technology in society, the optimistic claims about technologies as solutions to keep ageing populations healthy and independent are among the most dominant ones. These are often informed by the “solutionist” logics of innovation, intervention, and effectiveness. They also encourage more desirable and cost-efficient forms of residence and care. At the same time, scholars have recently begun to offer critical and alternative perspectives with a particular focus on discourses on datafication and embodiment on the one hand and Internet use and aging on the other hand. Two articles in this special issue particularly challenge some dominant imperatives about the beneficial aspects of digital technologies as central to imagining ageing futures. By doing so, they offer a more nuanced perspective while emphasizing the complexity and embeddedness of power relations entrenched on both macro level of discourse and micro level of practice and use.

Nicole Dalmer, Kirsten L. Ellison, Stephen Katz, and Barbara L. Marshall, in their article, entitled “Ageing, embodiment and datafication: Dynamics of power in digital health and care technologies,” propose a framework for advancing critical research on ageing and digital technologies by shedding light on three dimensions of power, namely ageing bodies and numbers, ageing spaces and surveillance, and age care and gendered relations. By addressing these issues, they seek to emphasize the shift from more conventional gerontological ideas of healthy

and successful ageing to ageing futures and imaginaries informed by technologically enhanced and coordinated life courses. Methodologically, they draw on previously published studies within ageing and technology, policy documents, Age Tech advertisements, and corporate texts. They argue that to grasp the growing centrality of technology in current systems of care and risk management of older care recipients, we need to pay closer attention to the terrain of the neoliberal governance of health systems and austerity politics and how age-coded and gendered care labor relations reconfigure and endorse certain biases, including those of ageism.

A critical approach to aging and technologies, albeit explored from a different angle, is provided by Anna Wanka and Vera Gallistl who, in their article, entitled “The Internet Multiple: How Internet Practices are Valued in Later Life,” ask an important question about how Internet-related practices are valued. Using *valuography*-oriented methodology, they go beyond the binary distinction between Internet use and nonuse and argue for a sociological understanding of value that is both situated and enacted. They analyze different types of empirical materials, such as the funding bodies’ research mission statements, research proposals as well as interviews with older Internet users. They distinguish between two specific registers of values related to Internet use, namely autonomy and innovation. The results of their analysis point toward a performative, reflexive, and value-oriented understanding of Internet practices that open for further research and investigation of the “Internet multiple.”

Similarly, digital technology use perceived as a form of spectrum rather than “use/non-use” binary is explored by Anoop C Choolayil and Laxmi Putran, in their article, entitled “Transcending Borders and Stereotypes: Older Parents’ Intergenerational Contacts and Social Networking through Digital Platforms.” They focus on the question of what constitutes a meaningful digital interaction for older adults and how they make sense of their digital life. This article offers also a valuable, and at time overlooked, perspective from the Global South. Empirically, through interviews with older Internet users in Kerala, India, they explore the role of intergenerational contacts as motivational factors for embracing digital life among older adults. The results of their analysis confirm to some extent what previous research has shown, namely that older users often do engage in digital activities that are meaningful for them. Maintaining

contacts with their grandchildren who emigrated is often connected to perceived emotional support stemming from those contacts.

Theme 3: Older people as co-creators and creative agentic users of technologies

Scholarship in Age Studies and Design studies has begun to engage with how older adults themselves might have creative agency in their relations with technologies – both in use in their everyday lives (Bergschold et al., 2019; Wilson, 2018) and in processes of design (Vines et al., 2015; Baker et al., 2019). This has developed alongside an increased call, from organizations advocating for older adults and in policy frameworks, for the participation of older adults in the design and implementation of gerontechnologies (Lopez Gomez & Criado, 2021). These studies have begun to question dominant stereotypes of older people as lacking skills and interest in technology use and design or being frail and in need of care. While gerontechnologies have tended to be designed to support the health and care needs of older people, these studies have begun to explore creative and playful uses of technologies and resistance from older people themselves to those mainstream stereotypes suggested above.

Socio-gerontechnology scholarship takes up many of these questions while also adopting a critical understanding of how technologies are shaping and being shaped by socio-material constructs of age (Lassen, 2017; Peine & Neven, 2021; Wanka & Gallistl, 2018). Ethnographic methods have helped scholars to make visible older people's creative uses of technologies and their do-it-yourself arrangements to support depictions of older adults as "technogenarians" rather than "laggards" (Joyce & Loe, 2010; Lopez Gomez & Criado, 2021). In addition, Socio-gerontechnology scholars have developed and adopted participatory design approaches that involve older adults creatively in design and development processes rather than as "testers" of almost finished products and services.

Gabrielle Lavenir's article in this special issue, entitled "Beyond the Silver Gamer: The Compromises and Strategies of Older Video Game Players," draws on her ethnographic research with 15 women, aged 60–82 years who joined video game workshops in a French Cultural Centre. The article explores their situated experiences as they engaged playfully with the video games, exerting their agency as technogenarians (Loe, 2011). The argument

foregrounds the older adults' playfulness and creativity as they negotiate their identities as older game players. It contributes to our understanding not only of older adults' creative and skilful uses of technology but also of their agency and identities as they play out as people age. Lavenir develops a nuanced understanding of the complex way that participants' technobiographies contribute to their ambivalence toward video games and gaming and the development of alternative gender and age identities and collaborative approaches to gaming and play. Her article suggests how participants engaging in video gaming often need to resist and contest discourses that stigmatize the image of the "older woman," developing new discourses and identities to support their play in the process.

Helen Manchester and Juliane Jarke's article, entitled "Considering the role of material gerontology in reimagining technology design for ageing populations," takes up the theme of older people as creative and agentic as they engage as co-creators of technologies, alongside design teams. Their article draws on two co-design projects and utilizes feminist materialist approaches, including the work of Barad (2007) and Haraway (2016), to empirically explore, and critically analyse co-design as a sociomaterial process that produces specific subjectivities and materialities. They draw attention to the importance of critically understanding agency as co-produced dynamically between human and nonhuman actors during co-design processes.

They suggest the value of feminist materialist ideas in making visible taken-for-granted assumptions inscribed in contexts of gerontechnology design practices and offer advice for design teams co-creating technologies alongside older adults.

In summary, this special issue aims to continue the development of the interdisciplinary field of Socio-gerontology. It not only brings together social science and arts and humanities' approaches to researching the co-constitution of ageing and technology and their complex unfolding in everyday lives and spaces of care but also invites for future research and exploration in these rapidly developing fields.

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Window work: Screen-based eldercare and professional precarity at the welfare frontier

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Abstract

Digital technologies have become essential components in the organisation and delivery of elder care. With this article, we want to contribute to the study and discussion of the role and effects of monitors and telecare solutions in situated care practices. Drawing on ethnographic fieldwork among elderly citizens and healthcare workers in Denmark during the early phases of the corona crisis, we explore the introduction of screen-based technologies in eldercare and their implications. Our focus is particularly on what health professionals must do, to accomplish meaningful encounters through screens. In this context, we introduce the concept of “window work” to highlight how screens are active participants in care and how they frame and delimit what health practitioners can see, do and achieve in everyday care practices in significant and often unpredictable ways.

Keywords: care work, digital technologies, elder care, screens, senses.

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This article is the outcome of a truly collaborative process, from fieldwork to analysis and writing. The order of authors is therefore alphabetical.

Introduction

Digital technologies have become essential components in the organisation and delivery of eldercare. This transformation is not least propelled by worries about the socio-economic and health-related challenges associated with ageing populations. The argument driving this change is that welfare technology and digital solutions can lower healthcare expenses and simultaneously pave the way for a more citizen-centred, convenient and coherent healthcare system (Danish Government 2013; OECD/European Union 2020). Digitisation of health care is now taking place with unprecedented speed and urgency due to the current corona pandemic, which has forced nation-states worldwide to re-organise their healthcare systems overnight.

In Denmark, municipalities have effectively used the corona crisis as an opportunity to promote and boost the digitisation of the welfare system through speedy implementations of a range of new digital technologies (Local Government Denmark 2021). In a recently launched national digitisation strategy entitled "Health for you," the crisis is used to legitimise the push for digital welfare: "The efforts against coronavirus have shown us that it is possible to make a rapid transition to digital solutions" (Danish Regions 2020: 13). The strategy stresses that it is now a matter of "building on the good experiences" (Danish Regions 2020: 13), highlighting the swiftness with which health practitioners have begun to employ video consultations during coronavirus disease 2019 (COVID-19) to prevent the spread of the virus while simultaneously giving citizens access to necessary services at a distance (Danish Regions 2020: 13). The strategy's overarching goal is to ensure that telemedicine solutions, such as video consultations, digital rehabilitation programs, apps, wearables, virtual reality, artificial intelligence and sensor technology, become permanent components of the healthcare infrastructure (Danish Regions 2020: 13). The strategy, thus, echoes earlier political visions that have highlighted how telecare technologies can revolutionise the healthcare system by moving healthcare provision from institutional settings to the intimate spheres of people's everyday lives (Danish Patients 2010; Danish Regions 2010).

The corona crisis has stirred extensive anthropological interest in how societies manage urgent biological risk, the implications of different risk management strategies as well as how people, in particular, places

experience and live through the crisis and its situated societal implications (lock down, visiting restrictions and various protective measures (see, for instance, MAQ COVID-19 Responses; AAGE: “The Age of COVID-19”). A common thread running through these studies is the idea of the crisis as a social experiment that is at once extremely menacing while, at the same time, constitutes a unique opportunity to consider the social make-up of society and differing strategies of survival and adaptation. For instance, Sarah Lamb and colleagues challenge the prevailing narrative of the vulnerable older person, suggesting how many old Americans experience resilience, agency, social connections and pleasure during the crisis, creatively and employ digital technologies to maintain meaningful social lives in times of dramatic change (Lamb et al. 2020). A similar concern with the agency of the elderly during the pandemic can be found in Amy Clotworthy and Rudy G.J. Westendorp’s study of how people aged 65+ in Denmark performed situated evaluations of their negotiated situated risk, their responsibilities as citizens and everyday life in response to unclear political corona policies and the dominant narratives of the elderly being a particularly “at risk” population (Clotworthy & Westendorp 2020).

In this article, we draw on ethnographic fieldwork among elderly citizens and healthcare workers on one of the Denmark’s many islands during the early phases of the corona crisis to explore the introduction of screen-based technologies in eldercare and what health professionals do to accomplish meaningful encounters through screens. This article is based on 4 months participant observation in homes, in training centres, at cultural activities and in health care and political forums where digitalisation of elder care is discussed, as well as interviews with elderly citizens, healthcare professionals, municipal leaders and volunteers between June and September 2020.

By focusing on the introduction of screen-based solutions, we build on ethnographic studies of telemedicine (Langstrup et al. 2013; Oudshoorn 2008, 2009) and discussions about “the materiality of care” (Buse et al. 2018; Van Hout et al. 2015; Mol et al. 2010) and “care at a distance” (Pols 2012) that have explored the specific ways that telecare devices reshape the notions of closeness and distance as well as the provision and experience of health care (Langstrup 2014). Many of the studies mentioned above are

guided by theoretical resources from the field of Science and Technology Studies (STS), and an ethnographic commitment to exploring the co-productive capacities of technology and the various cultural, political, social and ethical implications associated with novel technology (Michael 2006; Suchman 2007). This article adds to the study of telecare through an ethnographic exploration of how healthcare workers – in a time of crisis and organisational shake-up – try to deliver good care with screen-based technology. In so doing, we highlight how a group of healthcare professionals attempt to perform their care work with and through screens, and how this work is both facilitated and curtailed by the functionalities, materiality and design features of particular screen technologies. With the notion of window work, we aim to stress how using screens to establish a virtual meeting point between citizens and healthcare professionals is no easy feat, but a material, embodied and technical practice that requires health workers to develop new skills and competencies. By bringing the idea of the “window” into discussions of telecare, our goal is to bring attention to how screens – much like windows – frame vision in particular ways and thereby alter social interactions and ways of relating and thus ultimately the unfolding of care. By changing the possibilities for care delivery, the screens pose a challenge to established and routinised embodied forms of care and, thus, raise important questions about what kinds of healthcare professionalism needs to be cultivated alongside the implementation of screens.

Theoretical Framework

A central argument within the field of STS is that technologies are not to be understood as bounded entities with inert capabilities but as inherently relational actors with emergent, situated and often unpredictable effects (see also Aanestad 2003; de Laet & Mol 2000; Prentice 2005; Suchman 2007). As such, they constitute fragile achievements in need of constant repair and work as well as the collaboration and coordination of multiple and sometimes unruly actors (Haraway 1991; Schwennesen 2019; Suchman 2007).

Inspired by STS, Jeanette Pols (2012), Nelly Oudshoorn (2008) and others have shown that the implementation and use of digital technologies in health care demand the development of new practices and new forms of organisation. Through detailed ethnographic studies of situated

technology use and adaptation, they show how making technologies work often involves a great deal of “invisible” work, for both patients (in this case, old people) and healthcare workers, whose care practices are re-configured in the process (Oudshoorn 2008; Pols 2012). Pols’ work on the use of various forms of telecare in the healthcare system in the Netherlands is particularly prominent. Concerned with the notion of “good care” (Pols 2012, see also Mol 2008), Pols challenges the dichotomies inherent in the discussion about “cold technology” and “warm hands”, in which digital care technologies are either considered entities with unlimited potentials or as co-creators of nightmare scenarios (Pols 2012). In her work, Pols argues that technology and care are not opposites, and that both views reduce the complexity that arises when technologies are implemented and become part of different everyday care practices. Whether technologies are “warm” or “cold” – “good” or “bad,” generate distance or closeness depends on the specific situation, and therefore, the effects of technologies must be studied empirically (Mol et al. 2010; Pols 2012; van Hout et al. 2015). As Pols and Willems argue: “To say that a technology is ‘good’, does not merely point to a characteristic of the technology... Rather this ‘good’ emerges when users and devices develop relationships” (Pols & Willems 2011: 494). These studies highlight that technologies are always socially and materially situated, and that the ways in which they appear and act in the world depend on ongoing relations, adaptations and tinkering. Furthermore, both “care as usual” and “care through technology” constitute material practices that shape ways of being present (van Hout et al. 2015: 1207).

In a Danish context, Langstrup et al. (2013) have studied how elderly patients in Denmark engage with telecare devices at home and nuanced the idea that telecare will have empowering effects and lead to more autonomous, self-caring and knowledgeable patients. Their point is that issues of space and agency must be re-thought along with the introduction of telecare (Langstrup et al. 2013). Likewise, Annette Kamp and Stinne Aaløkke Ballegaard (2019) have recently studied the introduction of “screen visits” in Danish nursing homes with particular attention to how healthcare professionals try to manage the ethical and professional dilemmas associated with providing good care through screens. One of their central arguments is that screen technologies mean that healthcare workers continuously must negotiate ideals of closeness and social

contact versus distance and ideals about “withdrawn care,” and that resolving such conflicts requires complex ethical work and gives rise to new forms of professionalism (Kamp & Ballegaard 2019).

With this article, we want to contribute to the study and discussion of the role and effects of monitors and telecare solutions in situated care practices. We are particularly interested in exploring how healthcare practitioners attempt to “tame” (Pols & Willems 2011) screens and how screen technologies tame healthcare professionals in the process. We draw on the concept of “invisible work” (Oudshoorn 2008) that underlines how technologies that are thought to optimise care work practices instead produce new tasks, re-distribute – and produce new responsibilities – work that is not always acknowledged. Whereas this is by no means the first time that screens in telemedicine are conceptualised as active participants in care encounters and in need of “domestication,” we want to point to how screens frame and delimit what health practitioners can see, do and achieve in significant and oftentimes unpredictable ways.

In this context, we draw inspiration from Judith Butler’s concept of “framing” (2016). Though developed in the context of media studies, we find her focus on the normativities inherent in the selection practices of broadcasting material useful. Butler points to the fact that *what we see* is limited or enabled by different frames, such as those provided by camera lenses and computer screens, which variously cut out specific “segments of reality” and, thus, become that through which we see and that through which we obtain and interpret information about particular situations. In this sense, a screen is “not a neutral technology of communication that simply exhibits reality, but a framing device that actively participates in a strategy of containment, selectively producing and enforcing what will count as reality” (Butler 2016: 6). Following Butler, in this article, we conceptualise the screens as active agents and “framing” devices in order to analyse what the screens enable and disable and how health professionals have to improvise and navigate in specific ways in relation to the screens.¹ During the course of our fieldwork, we started thinking about the screen as a form of window around which multiple types of framing

¹ This concept could also be used as an analytical lens onto the parts of our material that shows how old people navigate and strategize around the use of screen-based technologies. However, this is outside the scope of this article.

of everyday life and performative practices took place, both among the elderly, their families and the health professionals. Consequently, we started to think of the healthcare workers' practices with screens as "window work," that is, work directed at achieving social connectivity and meaningful encounters through an interface that frames and influences what can be said, registered and done on both sides of the screen. By suggesting the concept of "window work", we point to the screen in health care and particularly in the form of telemedicine as a form of framed and framing window that enables the state, here in the form of the healthcare system, to enter, look and prompt actions or project things into people's homes and lives from a "non descriptive elsewhere" (Pols 2012: 113). In contrast to the meaning of the screen as a displaying device and a type of shield, the concept of window carries the meaning of an opening between two otherwise separate spheres. Windows simultaneously act as a form of barriers or separations capable of hindering the movement of the body and filtering the senses (touch, sight, smell and sound). As such, windows constitute both an interface of social connection and disconnection. Also, understood as displaying devices, windows connote ideas of transparency and access; however, windows can be deceptive, providing only limited and selective access. In English, window furthermore carries the meaning of a time-space, in which certain conditions or opportunities exist. However, like all technology, a window is the result of a particular form of construction work, and windows enable a normatively circumscribed look into – and out from specific places and people.

Thinking of screens as windows raises important questions about the professed visions of achieving a more proximate, attentive and citizens-centred healthcare system through the use of screen technology: What can(not) be seen and done with and through screens? What are the screens a window into? What or who do screens reveal or expose? How do particular screens present, project and connect particular groups of citizens and health professionals? What are the windows of opportunity that screens provide? And what does it entail and mean to provide good care in a virtual space between people's homes and the healthcare system?

Taking up these questions, we add the existing study of domestication of technology (Pols 2011), in particular telecare technologies, with an analysis that hones in on how the hasty implementation of screens in eldercare during the initial phase of COVID-19 challenges established

and routinised and embodied ways of providing care, creating unknown terrain for otherwise experienced healthcare professionals. In this sense, we pursue Pols' notion of "unleashing" by exploring the awkward engagements that are shaped by technology. In our analysis, we show how "the window" works as a framing device for a specific, but often arbitrary selection of visual hints that point to the situation of the elderly citizen.

In what follows, we describe our ethnographic fieldwork on Ærø in Denmark, then we present three ethnographic cases that show how screens mediate new ways of seeing, new ways of talking, and new ways of moving. Finally, we propose the concept of "window work," which allows us to discuss the professional implications of screens across the three different empirical contexts.

Field Site and Field Work²

The ethnography on which this article draws comes from our collaborative fieldwork on the island of Ærø in the South Funen archipelago in Denmark. Home to around 6000 citizens, the Municipality of Ærø is one of the smallest municipalities in Denmark (Ærø Municipality 2020). Compared with other municipalities, the population consists of a significantly larger segment of elderly citizens, many of whom live with multiple illnesses that require specialised health services (Region of Southern Denmark 2013). These are only available on the mainland, which can be reached by a 90-minute ferry ride. Simultaneously, the municipality is experiencing challenges with the recruitment of healthcare professionals and specialised health experts. Demographic projections indicate that several other municipalities in Denmark will face similar challenges over the next 10–15 years (Statistics Denmark 2018).

To mitigate this potential care-deficit and deal with the increasing centralisation of the health sector in major cities on the mainland, Ærø Municipality considers investments in welfare technology as a way to provide quality elderly care for its citizens. Guided by this political

² Our fieldwork for this article was supported by the Velux Foundations, who chose to support 13 humanities and social sciences COVID-19-related data collection projects in the summer of 2020, with the overall aim to track the social transformations caused by the pandemic.

strategy, the municipality has become a “pioneer municipality” for developing and testing new digital welfare technology solutions, taking part in several digitisation projects. For example, the rural development project “The digital island – 2.0” on Ærø aims to improve internet coverage through significant investments in IT infrastructure and to increase the use of virtual consultations on the island Ærø (Ærø Municipality 2014). The municipality is also engaged in several significant and highly publicised digitisation projects, including a “video hospice” to ensure specialised palliative care for dying islanders and a “Health drone” to enable transportation of patient samples, medicine and medical equipment between the island and the mainland (Sundhedsdroner.dk).

The municipality’s prolonged focus on digital solutions has also meant that the municipality sees enhanced digitalisation as an obvious response to the corona pandemic and as a way to adjust healthcare services to the ensuing wave of restrictions and safety measures that had to be installed to contain the pandemic. Due to the corona crisis, for instance, the municipality has accelerated the implementation of a newly acquired video solution, which enables residents in care centres to communicate with their relatives via video. Furthermore, all rehabilitation activities and consultations between health specialists and citizens with chronic diseases have been replaced with virtual sessions and consultations.

Ærø is an interesting site for anthropological inquiry into eldercare and its digitisation because the island can be thought of as what Frida Hastrup and Marianne Lien term “a welfare frontier” (Hastrup & Lien 2020). The concept points to particular places or regions seen by state-authorities and others as marginal and “in need of pioneering development and resource transfer” (Hastrup & Lien 2020: vii). The “welfare frontier” also refers to places where diligent efforts are made to realise particular visions of the good life (Hastrup & Lien 2020: vii) and, thus, captures the duality of Ærø as a particular region of the Danish welfare state. Due to its remote location, Ærø is sometimes referred to as a part of “peripheral Denmark,” a condescending term used to describe areas in Denmark, located far away from larger cities and fraught with social problems and little economic activity. However, Ærø also constitutes a frontier in the sense of a place of innovation and experimentation. Branded as “Ærø, the digital island,” the municipality presents itself as a test site for various digital solutions, all aimed at realising a “proximate, digitised” healthcare

system. As the current Mayor of Ærø put it, “Ærø is an excellent laboratory for the development of coherent health services for the citizens” (Fyns Amts Avis 2017). For precisely this reason, we have completed several rounds of fieldwork on the island during the last few years to explore how digitisation and welfare technology investments transform the provision and organisation of eldercare.³

We conducted fieldwork for this project from May to November 2020 – a period during which the pandemic was “under control” with only isolated regional outbreaks. We planned the fieldwork in close collaboration with Ærø Municipality and included digitally mediated and later in situ interviews (n = 34) with elderly citizens, relatives, volunteers, health professionals and municipal leaders engaged in the health sector. Despite various corona-related restrictions curtailing our opportunity to conduct actual face-to-face fieldwork, we were able to conduct some participant observation. This included participant observation in connection with various care activities: rehabilitation activities in the municipality’s training centre, a few restricted cultural events at a nursing home, technology use in dementia care homes, digital home rehabilitation and virtual consultations. Our overarching aim with the fieldwork was to generate ethnographic data about the digitisation of what we term the “care network” that forms around elderly citizens, that is, the distributed constellation of municipal actors, civic associations, peers and close relatives.⁴ Conforming to the American Anthropological Association (AAA) ethical code of Conduct (2012), all participants were informed of the aims, scope and possible implications of the project, as well as their right to withdraw their participation and the material that they had contributed at any time during the project.

Interviews and observations were transcribed and discussed, and salient themes identified at collaborative analysis sessions, which is also

³ The project is carried out under the auspices of our research group Sensing Old Age (SOA) at the Department of Anthropology at the University of Copenhagen, in which we examine the embedded assumptions, imagined potentials and concrete practices related to the use of technologies that target an ageing population.

⁴ Thygesen also uses the term “care network” in her PhD from 2009, however her use of the term is broader as she uses it to point to the new network of actors that form across industry, tech developers and the health care sector in the context of smart home technologies in dementia care (Thygesen 2009).

where the notion of the “window” emerged as productive. The identified themes were then juxtaposed to relevant literature.

In this article, we draw on the part of our work that focuses on the health professionals, whose work has become even more dependent on digital technologies, particularly screen use, due to the corona crisis. Following their daily encounters and delivery of care with technology, we learned that the mediation of care through the screens modulated the care encounters and the delivery of care in specific ways. The use of screens further articulated and highlighted aspects of the health professionals’ skills and practices they would generally take for granted. In particular, we learned that delivering virtual care requires healthcare workers to make do with unreliable and sometimes unruly screens and gain a professional footing within new and more digitised care arrangements.

In the following, we present three ethnographic cases to highlight the concrete practices, in which screens as active participants lead to new forms of work and collaboration, and how they challenge the use of embodied knowledge, potentially undermine the elderly’s opportunities for participation, and bring with them specific norms and practices.

Becoming a Screen-Mediated Caring Body

The screen at work in the story of the occupational therapist, Lene, the storage technician Bo and 60-year-old Paul is the screen of a smartphone.⁵ The story shows Lene’s attempt to delegate her professional and embodied care practices – in fact, her particular way of “being a body” in the context of professional care to Bo and to the smartphone screen. Lene’s experiment with the smartphone screen illustrates how the use of the screen requires new forms of action and collaborations and how care technologies become entangled in socio-material, technical, embodied and sensuous practices. By looking at Lene’s use of the smartphone screen through the notion of window work, it becomes possible to tease out a tension between the screen, understood as facilitating a clear window into Paul’s home, and the screen as an active participant in the situation. The example furthermore shows how this use of a screen-based technology requires a substantial modification of Lene’s practices in order to work.

⁵ All names are pseudonyms.

Lene is an occupational therapist, and part of her job is to assess the needs of the elderly on Ærø for assistive devices and modifications of their home or bodily routines. This assessment is made in order to help the elderly carry on with their everyday life as seamlessly as possible despite the physical challenges or the disabilities that they might have: “Through my occupational therapy ‘lenses’ [briller] I am able to see whether I can somehow modify the home. Would it be possible to move objects around or avoid having to use the stairs? Is there anything that could be done differently? Normally I make an activity analysis to see where the problem occurs... Where do the challenges occur? I may not be able to bring an assistive device to solve the problem, but I might be able to change some habits or an activity.”

Because of COVID-19, Lene has recently been challenged in her usual ways of providing what she experiences as “good care.” In Lene’s case, these challenges have arisen, particularly due to the distancing measures tied to the pandemic. Lene explains that in the beginning, when she was still allowed to visit her elderly patients, the use of masks and surgical gloves and the requirements of one-meter physical distance made her aware that “touching” is an essential part of her work. This is so, although as an occupational therapist, she does not deal with training or other activities that require physical touch as such:

“I actually thought a lot about not being able to touch. Normally, when I say hello to people. I will place a hand on them. I use that a lot to signal, ‘I am here! This is peaceful, I come in peace’. I have such nice and warm hands! I feel that touching, by placing a hand on the other, is as important to them as it is to me.”

Later, when visits were suspended altogether, Lene could not “be there with” the elderly, let alone apply her warm hands. She found this situation problematic: “It’s always best to see the [borger]old person in their home. Otherwise, you will always overlook something. I need to see him move. You might be able to guess: ‘that could pose a problem’, but often this is not really the problem. Instead, it’s something completely different.”

To be able to continue her work, Lene decided to experiment with the use of a screen to compensate for her physical absence. She handed over a smartphone with a facetime App to her co-worker Bo, a storage technician, in charge of delivering, repairing and maintaining assistive devices. At this moment, during the pandemic, only he was allowed into

the homes of the elderly. Lene explains: "I thought, well, then he can be my eyes with that phone." Lene's idea was to direct Bo through the smartphone screen, understanding the screen as a form of window into the homes of the elderly, which enabled her to perform her care work, including the inspection of their homes at a corona-safe distance. She tested the idea, when she had to assess whether the new flat of Paul, a 60-year-old man living with Multiple Sclerosis, required modifications in order for him to be able to move about unhindered despite his shuffling feet and weak hands:

"Paul and I had already talked about what he needed done – where the challenges were. It was something about a doorstep, a door handle, and a keyhole. So Bo walked around and showed me the challenges through the phone... It looked sensible... As I already knew Paul, he just sat in the background waving and calling out: 'Hi Lene!'"

Bo did not know Paul, and he was not familiar with the "walk around the home" that Lene would have usually undertaken together with Paul, not only to *see his body move* through space but also to sense the particular material configuration of importance to Pauls' everyday life through *her own body*. Unable to be there with Paul, Lene attempted to extend and delegate her own bodily, sensory presence to Bo, and assess the situation through the smartphone screen that would allow Lene to see inside Paul's home.

After Lene had inspected the home through the screen and with the help of Bo, a carpenter was sent out to modify a few doorsteps and a door handle. The results, however, turned out to be far from ideal, and after a short while, the newly installed doorsteps had to be removed again. Lene, who was clearly dissatisfied with the results, explained:

"Normally I would have taken the trip around the house with the person in question. I would have seen where the challenges were. How does he get to his favourite chair? Where does his foot get stuck? I would have seen all this the first time, had I been there myself."

Lene's attempt to work through the screen highlights that both social, spatial and material arrangements normally inform her assessments of an older person's care needs and well-being. This type of assessment is not just visual but is based on years of embodied professional experience and knowledge accumulated through countless home visits and taking ageing

bodies for a walk through the material, intimate and social topography of home. With reference to Latour, she has become a particular form of sensing body that has learned to register and differentiate particular relational attachments, objects and movements in space (Latour 2004). This sensibility to what we might call a continuously emergent “ecology of care” enabled by physical co-presence is challenging to achieve through the screen, however. The screen only permits Lene to use her vision, rather than her whole sensory repertoire. Furthermore, Lene has no control over what the screen actually enables her to see, since the window, it constitutes rather than afford a transparent glimpse into Paul’s home, mediates and frames what she can see in a specific way and is tied by Bo’s movements. Lene has, in fact, delegated her authority and professional judgment to Bo, but Bo’s body has not yet “learned to be affected” by and become able to register the significant differences and challenges posed by Paul’s surroundings – an ability that lies at the core of Lene’s care expertise (cf. Latour 2004). Just as Lene is not in charge of Bo’s body, Lene is not in charge of the smartphone in his hand either. The potential of the smartphone screen, or its “capacity for action” in this case, is limited, not only by the screen itself but by the way it is related to and frames a particular configuration of actors (Aanestad 2003: 15). Introducing the screen, in this case, required a specific form of window work – new tasks, a new type of collaboration and a new way of being a caring body. For now, Lene must experiment with her care practices and “live with the erratic” (Mol et al. 2010: 10).

Taming an Unreliable Trickster

In the first account, we described how using a screen led to an unrehearsed arrangement and collaboration, and how the screen made it difficult to make use of and hand over embodied expertise. In the following account, about Lars’ screen-based consultation with a cardiac nurse, we highlight how screens can become unreliable facilitators that disrupt the dynamics of an important conversation about medical treatment. The story also shows how the screen, rather than acting as a mere facilitator of connection between places and people, in fact also becomes a barrier for the productive unfolding of this very connection.

Lars suffers from a heart condition and must have his medicine checked regularly by a specialised cardiac nurse from the hospital on the

mainland. Since the implementation of screen-based consultations, his usual consultations have been replaced with virtual ones every fortnight. Apart from Lars and the cardiac nurse, a home nurse is present in Lars' home to help handle "the practical stuff," as stated in the implementation protocol. The following ethnographic account illustrates the work involved in accomplishing a meaningful encounter, particularly how the untamed nature of the screen undermines Lars' participation in the decision-making process.

Figure 1. Lars, the home nurse, and the cardiac nurse during their video consultation

Photo: Author 2020



The home nurse, Kirsten, who is attending the consultation, is wearing plastic gloves, a surgical mask, and a see-through plastic apron, which crackles when she walks. 15 minutes have been set aside for Lars and the home nurse to “settle in” and “get into” the virtual consultation, which takes place in Lars’ living room. The room is arranged with a sofa covered with several rugs and embroidered pillows, a desk covered with tobacco, some tools, stacks of paper, and an old stationary computer screen. Shoes are scattered around the floor, and a wooden block has been put under the coffee table because it is seemingly too short. The wall is decorated with historical maps of Denmark in black and white. Along the wall are several small plastic bags from the pharmacy. This is Lars’ “Travel Pharmacy,” as he calls it, the place where he keeps most of his medicine. Lars thinks that he spends too much money on medication, particularly the new drug recently introduced by the cardiac nurse and that he has to take too much. Before the consultation begins, Lars installs himself in the usual spot, his “favourite chair,” and Kirsten sits down on the sofa opposite him. The screen is between them. Lars sees it, but the nurse cannot. She can only see Lars.

Kirsten guides Lars through the initial procedures on the tablet and helps him remember what he has to do next: “Remember that the screen goes black if we don’t place a finger on it,” she reminds Lars. A couple of minutes later, Birthe, the cardiac nurse, appears on the screen. After a brief “Hello Lars,” Birthe goes straight to the point, which is the need to increase Lars’ medication. Lars finds the drug expensive, and it becomes muddled, whether the meeting is about informing Lars that he has to take more of the costly pills if he wants to feel better or whether the cardiac nurse is consulting him on the matter. At this point, Lars asks the home nurse whether she can turn up the volume, to which Kirsten responds: “I am not sure I can... wait! I’ll just try to press this one... I think it’s on full volume... Did it help?” Lars hesitates, saying: “Yes, a little,” while he leans forward, holding a hand behind his ear. Birthe, the cardiac nurse, adds: “I also just want to know if you can see me properly?” Lars: “Yes, yes, it’s okay.”

Throughout the consultation, Birthe, the cardiac nurse, tries hard to speak in a loud and clear fashion, making the talk a bit staccato. The screen is small and reflects the light, making it difficult for Lars to see Birthe clearly. The sound is poor as well. However, Lars does not complain. He

is doing what he can to follow what Birthe is saying. He squints and stares intently at the screen, leans forward and at times tilts his head to the right, cups his hand discretely and puts it behind his right ear. From her seat on the sofa, Kirsten cannot see what is happening on the screen, but now and then, she interrupts, which sets off a discussion between her and Birthe on specific blood measure or new treatment trajectories. Consequently, it becomes unclear to whom Birthe is directing her questions, and both Kirsten and Lars either speak at the same time or hesitantly wait for the other to answer.

The consultation ends, Lars robs his eyes and comments that the small tablet screen is “too small” – pointing his finger to his large computer screen standing in the living room. Kirsten lights up, saying they should try to put it on for next time? Lars shakes his head, saying it is not possible, as it does not have a microphone. Kirsten sighs: “Ahh, okay. No, that won’t do.”

In her work on telecare, Pols (2012) reminds us that “taming” is an integral and initial part of integrating new technologies into established practices. Taming implies that actors try to fit the specific technology to their own routines and goals, and the process of tinkering and experimentation might eventually lead to a “domesticated technology” (Pols 2012). Although the screen evidently plays an important role in the conversations, it is not considered an active participant in the meeting, resulting in a particularly uncalibrated care arrangement. Kirsten attempts to “tame” the screen throughout the consultation by guiding Lars’ fingers and adjusting the volume. While they succeeded in meeting the goal of the consultation, the screen and the particular arrangements around it did not make the conversation easy. Untamed, the screen becomes a trickster that disfigures, distorts and dislocates the participants in the meeting in a way that interferes with the conversation and the crucial decision-making process about Lars’ medical treatment, which is on the agenda.

Ideally, the screen should function as a “window,” connecting the hospital on the mainland and Lars’ home on the island, saving Lars a long ferry trip and giving him the experience of proximate and patient-centred health care, in which Lars himself is actively involved in planning his treatment. However, the untamed nature of the telecare arrangement challenges the social organisation and dynamic of the conversation. In her work on webcams, Pols calls attention to the “magnifying” capacities of

webcams. As she puts it: "Webcams magnified something, not merely in a visual sense, the way a magnifying glass makes things visible by blowing up their size or bringing objects closer. Instead, what the webcams magnified were the existing characteristics of the social relationship between the webcam users" (Pols 2012: 112). As Pols puts it, the webcam "mercilessly exposes" whatever is not working. In this instance, the discussion about Lars' medication highlights the inherent asymmetrical relations between health professionals and patients despite the ideals of patient inclusion. During the screen consultation, it becomes even more difficult to adhere to this ideal because of the screen device's inferior sound quality, which makes it difficult for Lars to hear, follow and, thus, participate actively in the discussions about his medication. The screen seems to magnify the undomesticated nature of the webcam and the socio-technological arrangement needed for it to work. Furthermore, the screen distorts the participants' speech and appearance and leads to a particular social and physical dislocation of the meeting participants. In their work, Langstrup et al. (2013) describe the work of "emplacing" technologies in a patient's home, particularly the collaborative work entailed in "making a room in the room." As Langstrup et al. argue that the home is not only simply a geographical space but also an inherently social place, imbued with particular meanings, routines and a particular material and technical fabric. Establishing a virtual space in which the patient and the professional can "meet" and achieve some form of co-presence is an accomplishment (Langstrup et al. 2013: 54). In other words, it matters how and where the technologies are "emplaced" in people's homes, as this has crucial implications for how the screen might handle the characteristics of the social relationship between the webcam users (See also Oudshoorn 2012). In the above account, the screen is placed in between Lars and Kirsten, with Lars facing Birthe, the doctor on the screen. Kirsten, the home nurse, is physically located behind the screen - out of the picture - but audibly and actively taking part in the conversation. This positioning of the participants makes it difficult to figure out who is addressing who and who is supposed to answer, making the conversation stale. Unlike an actual face-to-face meeting, where meeting participants habitually attune their voices and bodily gestures to each other, virtual care encounters demand different ways of communicating. While Lars is clearly trying to signal that he is having a tough time hearing what the cardiac nurse is saying,

his gestures are not registered, which ultimately decreases his chance of playing an active part in adjusting his medical treatment.

The account highlights that implementing a telecare solution is not simply a matter of plug-and-play but an accomplishment that requires a situated arrangement of bodies, technologies and materials that are not necessarily aligned in advance. Although Kirsten, the home nurse, was present to “take care of the practical stuff,” finding the right arrangement is an on-going and potentially expensive and time-consuming process that is seemingly not considered an integral part of the virtual consultation and the act of care.

Projecting Bodies and Authority

The story of Martin and Olivia is about a digital rehabilitation program on a portable screen. Digital rehabilitation is a new service offered by healthcare assistants, such as Martin, who are already visiting the elderly citizens living at home. The idea behind the new technology is to move the physical training into the homes of the elderly in the form of a digital coach showing physical exercises. The screen, thus, provides a window into a rehabilitation gym. The story shows the effects of bringing in a new screen technology and how it challenges the professional authority of the healthcare assistant and projects new body images, and norms of fitness and the active body that compromises how Olivia, a woman of 93 years, relates to her body. In practice, mirroring the instructions and images provided by the screen reveals the implicit, not only health-related norms about fitness and strength but also professional norms from a “non descriptive elsewhere” (Pols 2012: 113) about what healthcare workers should be able to do.

The following field note describes Martin’s first time using the screen at Olivia’s house, a small country house in a small village along the main road:

We enter her living room, and Olivia sits on her sofa close to her dining table. On the table is everything she needs: Her pills, water, magazines and a small plastic bag with her midday snack rye-porridge and cream. She wants us to sit down and ask if we would care for a biscuit. Martin declines, saying he just finished his breakfast, and holds a hand to his stomach. Then, he puts his hand on Olivia’s shoulder and says, “Do you

remember why I'm here today? Last time, we agreed that it would be good for you to do some exercise." He lifts the tablet in his hand and opens it. Olivia's voice is low, but she smiles at Martin and says that she does not remember. Martin opens the program on the tablet and speaks loudly to himself while he ticks off boxes: "this is inadequate," "here, moderate barriers," "this she can't do" - he turns to Olivia "I'm just pushing some buttons." Martin continues and tells her to get up and follow him to the dining room, where they have to go through the program. She gets up with her rollator and rolls slowly into the other room. There is her bed, a new hospital bed. She is no longer able to walk up the stairs to her old bedroom. Last week she also got a toilet chair in there, which she starts talking about as we enter. She tells Martin that she really does not like the chair to be in the dining room. Martin says he is aware of it but tells her how she still needs it as walking on the stairs is not good for her at the moment because she might fall. Martin lights up the screen and begins to assess Olivia's physical state. The first exercise begins, and the tiny person on the screen is lying down and lifting her bottom. The exercise is called "pelvis lift," and Martin wants Olivia to do the same. And she gets onto the bed and lies down "lift your pelvis" Martin says. Olivia's hearing is bad, but she does not seem to understand what he means by "pelvis" and thus, does not understand what he is talking about. Martin lifts the screen to her head to show her what the little figure is doing. She then tries to lift herself, but her feet slide on the bedcover. Martin wants to help her and sits on her feet to provide resistance. Olivia's body contracts in pain, and Martin jumps off her feet and says: "that's fine," while he ticks off a few boxes on the screen. Mumbles, "she couldn't do that." Martin gets her back in a sitting position and continues with a few more exercises.

Professionally, Martin is trained as a health assistant, and digital rehabilitation is something new to his profession. Martin explained how he volunteered when his boss proposed digital rehabilitation as a specialisation that might be interesting for someone in his unit to lead. Usually, the elderly would be taken to do a training session with a physiotherapist in a training facility, or the physiotherapist would visit the elderly in their homes. The digital rehabilitation program was, however, introduced as a ready-made supplement to a physiotherapist. While observing Martin's instructions, it became clear that he was not used to performing the exercises normally undertaken by the physiotherapists. He would point to

the person on the screen to illustrate the exercises for Olivia to repeat, and when introducing the exercises, he would say the names used by the program, that contained words such as “pelvis,” which seemed unfamiliar to Oliva. The screen framed the care situation and acquired authority through the demands it made on Martins’ work-related tasks – demands that altered the normal roles and responsibilities inherent in his normal work practices (cf. Pols 2012). Martin had studied the program, but he did not have the bodily routine of instructing others by using his own body. His practices and the practices of the “little man on the screen” were supposed to mirror each other, but the apparent misalignment of bodies and professional repertoires led to feelings of insecurity, which made Martin jump ahead to new exercises, before finishing the previous ones and, thus, not assessing Olivia’s abilities properly according to the program. The screen prompts were directed at a different “care repertoire” than his own, and Martin needed to address and align this form of care with the technology and with his own care practices on the spot. His awkward attempts at mirroring the physiotherapeutic instructions performed on the screen then interfered with how he usually worked as a healthcare assistant, pushing him to embody and enact a form of expertise with which he was unfamiliar. At the same, these attempts made a specific professional boundary tangible (Mort et al. 2003; cf. Oudshoorn 2008). Furthermore, although Martin did his best to act as an extension of the screen, the screen feedback and the user body did not correspond and, instead, lead to tensions in the specific care encounter (cf. Schwennesen 2019). While trying to respond to the prompts on the screen to the best of his abilities, Martin then decided to skip a few of the assessment steps. This “lack of compliance” could be understood as his way of providing good care in a situation where his existing relationship with Oliva became distorted, creating both confusion and pain.

Window Work and Professional Precarity at the Welfare Frontier

With the concept of window work, we wanted to zoom in on the multiple engagements and procedures involved in enabling and accomplishing care and meaningful health encounters through screens and keeping an eye on how screens frame care encounters and filter embodied professional

practices. Furthermore, with “window work,” we have tried to fashion a concept that captures both the creative and precarious work entailed in working with screens, as well as the work that the screens *do* in their often absent-presence-like positions in the care encounter. Screens are often both present, yet peculiarly and conspicuously absent from explicit reflections about their role in the actual care encounters and on a managerial and organisational decision-making level. This absent-presence is also what instigates the multiple ad hoc practices that the healthcare professionals in the examples above have to undertake, in order to make the care encounter as smooth as possible. Screens potentially place health professionals in situations where they cannot make use of their bodily experiences and where the basis for care, presence, creativity and co-presence is altered.

It requires a particular form of “window work” to forge and maintain new social, material and technological connections in order to recalibrate care work and solve the core tasks in a situation where care is an outcome of collaboration through screens.

In Lene’s case, this new situation led her to reflect upon and invent new ways of organising her work. Using the technology to delegate her professional judgment, however, not only made her overlook essential details but also became aware of the way in which she would normally use her own body to assess the needs of the elderly. In Kirsten and Birthe’s joint endeavour to assist and consult Lars, the telecare arrangement’s untamed nature had a magnifying effect on the conversation’s social organisation and dynamics, exposing the incompatibilities, out-of-syncness, distortions and boundaries that emerged when caring through the screen. This exposure is central to what we see as defining window work. Similarly, in the example of Martin’s new tasks following the introduction of a screen-based rehabilitation program that was normally performed by other professionals, his professional authority was compromised by the misalignment between his professional approach and the approach prompted by the screen, resulting in Martin shortcutting the assessments to control what he saw as necessary for a good care encounter. A decision that made him appear unprofessional. Thus, the introduction of screens in eldercare set in motion local, previously untested collaborations and constellations of health professionals, citizens, technologies and ambitions, which meant that the health professionals ended up in situations where they had to invent new ways to ensure good care. In this way,

the screen-based technologies directly influenced and intervened in the self-understandings of the healthcare professionals.

In a time where digital technologies and particularly screens are touted as the obvious step towards a better use of resources and the delivery of proximate health care, taking note of how screens re-configure the care worker-citizen/patient-doctor relations, and the very process of care is of vital importance. Our stories highlight how screen technology leads to and requires new practices and competences and how health professionals, to a significant extent, become solely responsible for achieving meaningful care *with* and *through* screens. Notably, our stories point to a particular form of responsabilisation, in which frontline health workers are tasked with the work of realising the various political visions that the technologies carry. Anette Kamp and Stine Aaløkke Ballegaard (2019) argue that new technology in eldercare might lead to a new and attractive form of professionalism – an identity as a creative and development-oriented health pioneer. However, our work suggests that not everyone is interested in this kind of pioneering work or in spearheading digitisation processes, and that political investments in technology might compel some healthcare professionals to take on tasks and responsibilities that they are not able to lift in practice. Our work also shows that some healthcare professionals may be hesitant about using screens, not because they are against technology *per se*, but because new technology brings them into unfamiliar terrain and situations fraught with professional uncertainty. While most of the health professionals we met during our fieldwork were curious about the potentials of new technology, they were also reluctant towards hasty implementation processes, in which new technology is expected to work immediately – without continuous supplementary training, collective learning and organisational support. In particular, our stories of window work highlight the great deal of work entailed in translating their professional and experience-based care practices into new formats that delimit – and in radical ways – and modulate large parts of what they consider their core professional competence and experiences. In many ways, the experimental practices of health professionals call for a different understanding of screen-based and other technological solutions than those inherent in the political visions that these professionals *de facto* have to realise.

During our fieldwork, we often came across the story of conservative, unwilling and even lazy healthcare professionals, who did not want to engage with new technologies. Yet, already in the 90s, Madeleine Akrich discussed the problem of “technological monsters,” referring to technologies that are sophisticated, but unable to attract users (Akrich 1995: 179). Rather than an expression of conservatism or laziness, we argue that technologies sometimes become “monsters” and, thus, unattractive for healthcare professionals for interrelated reasons. First, because the complex and important sensory, bodily and experience-based care work performed by healthcare professionals that demands co-presence is not recognised. Second, because technologies are often speed implemented “as if” they were objective and inert ready-mades. Third, because the redistribution of responsibilities and the amount of extra work it takes are overlooked and, finally, because of the precarious and compromised professional positions that the healthcare workers often find themselves in, when they are asked to include technologies in their daily care practices.

The stories we have told above, however, show how technologies are by no means readily implementable, well-calibrated and functional tools that only require health professionals to develop a specific, delimited set of competencies and skills. Rather, screen technologies are active agents in need of “taming” that change how care work can be done in exciting, but also problematic ways. Digitisation is not only just a labour-intensive process but also an on-going learning process at multiple levels. When the implementation of the technology is not given the necessary collective care and attention, precarious situations arise at the frontier of the welfare state – instances where both the trust and care work of citizens and health practitioners are potentially undermined.

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Infrastructuring ageing: theorising non-human agency in ageing and technology studies

By *MARIE ERTNER*

Abstract

Scholars of ageing and technology are becoming increasingly interested in how technology and ageing can be seen as mutually constitutive, an interest that is beginning to form new research agendas, alliances and fields of their own. Different concepts have been used to theorise and analyse this relationship of mutual construction. This article explores a concept from Science and technology studies, which has not previously been put in direct relation to ageing, namely the concept of infrastructure. It proposes the notion of “infrastructuring ageing” as a theoretical-analytical approach for studying the mutual constitution of ageing and technology. This approach implies slightly new versions of, or attentions to, the non-human actor, agency and socio-technical transformation, and opens up to fresh ethnographic views on the social, material and techno-political transformations of ageing.

Keywords: ageing, gerontechnology, infrastructuring, non-human agency, STS.

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Introductory Vignette: Human and Non-Human Entanglements with Ageing

The Telenoid, more than One Object

Professor and roboticist, Hiroshi Ishiguro, is standing on a big stage. We are at the Global Future 2045 Congress.¹ Behind him, a huge slide show presents the title of his talk “The future life supported by robotic avatars.” On the stage next to him are two different robots: his geminoid twin, named after himself and designed to look exactly like him, and a telenoid robot, an odd-looking, white torso-creature mixing features that are at once clearly human like and clearly other than human, calling upon sci-fi images of aliens, ghosts and other out-of-this-world beings. The controversial geminoid is the main cause of his success and fame; however, the telenoid is the main reason for my interest in his work, because it has been promoted and developed as a robot for old age care which is my field of study. Ishiguro starts by stating that “this is our future. We will live with more humanoid robots. Our brains are designed for recognizing humans, not computers, not mobile phones. The human is the best interface for the human.” He goes on explaining how he has designed his robots that he and his team needed to have a hypothesis of the human. “Neurologists and cognitive psychologists do not have a perfect understanding of the human....” But when it comes to the telenoid, Ishiguro explains that after designing the geminoid, he found out that a more “neutral” design works better for a telecommunication robot: “this looks like a human, but we cannot tell the age or gender. Usually, we have an imagination about the speaker, we naturally project that imagination onto this neutral object.” In the end of the presentation, Ishiguro pulls out a miniature telenoid around the size of a mobile phone, small enough to fit in his hand. He walks from one end of the stage to the other flickering the mini-telenoid, lying stiff in his hand with its pale white torso and dark empty eyes. This is the future of the mobile phone, he proclaims proudly, waving the mini-telenoid in front of him as a trophy.

If I wanted to understand the telenoid “itself” based on this scene, I would be in trouble. Even though the presentation is about the telenoid,

¹ <https://www.youtube.com/watch?v=h34p5fzXjuQ>

there is not a lot of talk about the telenoid “itself,” rather we come to understand the telenoid through other entities such as Hiroshi Ishiguro the robot, human Ishiguro’s ideas about “the human,” human perception and cognition, and ideas and theories about mobile communication circulating through Ishiguro’s lab, but also ideas and visions about the future of care, and of a society populated by humans and human-like robots. In other videos, where the telenoid is presented, we come to know it in different ways; we learn about the materiality and tangible sense of the robot, its sensors, the delicate materials used as tissue, the soft sensation of its skin, the captivating gaze of its dark eyes and the feeling of its hug. We learn about its relation with a society in crisis, and the need for “help” as Ishiguro puts it, from robot workers to assist with the growing numbers of older adults. According to Ishiguro, we hear about the relation between these older adults and the robot, whom they assumedly love. We learn that the telenoid generates health and that it is healthy for older adults to communicate and interact with the robot. Understanding what the telenoid *is*, from this presentation, we need to understand it through its relations to a range of other entities and practices, material, social, sensory, affective and discursive. Read in this way, the robot appears here not as a single object but as relations, and as modes of relating, between all these various physical things and knowledge things. The telenoid then is to be seen as much more than a weird looking creature, it is also a relation between a roboticist and his ideas about humanity, the future and older adults. It emerges through relations between a number of different robots which are born from and birthing new ideas and knowledge, such as about communication, companionship, health, the future, and about humans and their needs. The point here is that we cannot really understand what this telenoid is or what it does, if we only attend empirically to its relation to users; how older users are imagined and inscribed into it, how they interact with it, if they accept it, adopt it or not. The telenoid is not the most prominent care technology, it is not widely distributed among senior citizens, but as it is travelling through innovation projects and care homes, assembling actors from different areas around it, and being presented in public talks and on international conferences, creating feelings of disgust and fascination in its audiences, “it” is nevertheless making subtle changes in people and practices around the world. In studying

relations between ageing and care, it becomes relevant to look not just at relations between older adults and technologies in use practices but also attend to a range of actors and practices that many of them are completely unrelated to ageing and care, but which become central, although often invisible, actors in ageing.

Introduction

In recent years, the academic interest in ageing and technology has been growing rapidly, and different approaches to theorise technology, and the relations between ageing and technology have characterised this field of study. Ageing studies has mainly addressed the topic from a focus on older users' experiences, adoption and acceptance, while more technically oriented fields, such as gerontechnology, have mainly focused on the technical aspects of the subject (Peine & Neven 2020). With technologies becoming an ever more important actor in ageing and old age care, analyses of how they are transforming and effecting practices, expectations and conceptions of ageing and caring in different ways are becoming more and more salient. Theoretical and methodological development of the approaches to study this phenomenon is needed. This is especially needed as it is a research agenda, which has been marked by a lack of analytical and theoretical richness and reflexivity (Peine & Neven 2020). Scholars of ageing and technology are becoming increasingly interested in how technology and ageing can be seen as mutually constitutive. This is an interest which is beginning to form new research agendas, alliances and fields of their own. The term socio-gerontechnology (Peine et al. 2021) has been coined as one way of labelling the assemblage of research and researchers interested in combining the topic of ageing and technology with sociological theories and concepts, emphasising the mutual constitution of ageing and technology (in the following I refer more broadly to "social studies of ageing and technology"). This article seeks to contribute to this growing field of research by considering how the science and technology studies' (STS) concept of infrastructure may enrich and expand understandings of socio-materiality and non-human agency. The concept of infrastructure has provided rich empirical analyses, theoretical reflexivity and vivid discussions within STS but have until now not been taken up actively within

social studies of ageing and technology. The author seeks to tease out central features of infrastructure studies in STS and uses this to point out to some of the theoretical and analytical potentials and the possible benefits for studies of ageing and technology of thinking with the notion of infrastructure.

This article starts by outlining different positions within the study of ageing and technology. I start out with approaches that have been labelled by STS and ageing scholars Peine and Neven as reductionist approaches to both technology and ageing. I then go on to explore a new research agenda combining ageing and technology studies with theoretical and analytical concepts from STS, emphasising relationality and the mutual constitution of ageing and technology. I then introduce the concept of infrastructure in STS, and review STS work on this topic in order to outline some central features of infrastructure studies. In the following part, the author discusses the analytical implications and possible potentials for social studies of ageing and technology of thinking with the concept of infrastructure and the socio-material processes of “infrastructuring ageing.” The article concludes by arguing that we need analytical frameworks that encompass a wider range of actors than singular technologies and users, in order to theorise and develop knowledge about the agency and effects of technology for older users. I suggest the notion of infrastructure as an analytical tool to open up the concepts of technology and agency even further, and thus, provide fresh ethnographic views on the topic.

Modes of Analysis in Studies of Technology and Ageing – From Reductionism to Relationality

Ageing and technology have become an increasingly important matter of concern for different research fields. Research on the topic has been characterised by a tendency of reductionism of different sorts. The interdisciplinary, but technically oriented field of gerontechnology (also called gerotechnology) can be seen as embedding an overtly “interventionist logic” (Peine & Neven 2019, 2020), aiming to promote technological innovations in products and services for older adults. With this focus on technology as pre-given solution, and technological innovation as the endpoint for research, this field of research embodies a kind of technological

reductionism similar to that of mainstream technology and innovation discourses, which reduces “the problems of ageing” to be solved by and understood in terms of technology and innovation (Ertner 2015).

Within studies of age and ageing, however, technology has received rather little attention, and mainly has been addressed through categories of “user adoption,” “user motivation” and “user perception” of technology (Peine & Neven 2020). Peine and Neven show how this research promotes another form of reductionism, which reduces relations between ageing, older adults’ lives and technology to matters of individual people’s perceptions and experiences of technology. Technology is thus reduced to merely a social phenomenon, which neglects the materiality of both technology and age.

In recent years, new types of research interested in seeking ways of connecting the social and technical dimensions of technology and ageing have begun to appear. Inspired by the field of STS, this new approach to age and technology studies can be characterised as having a more theoretically inspired approach to research, and to contribute to the field with new theoretical and empirical views on ageing and technology. Briefly summarised, STS are a broad and diverse approach to research in social, scientific and technical phenomena. It cannot be reduced to one theoretical worldview but is rather composed of many different theoretical and disciplinary fields and influences. A general denominator of STS research is an interest in social, technical, and organisational transformations, which are studied together. Social and material, or human and non-human, actions are seen as mutual processes that affect one another. This view is based on a relational and performative standpoint, which implies that empirical objects and subjects are characterised by contingency and indeterminism – nothing acts on its own, and nothing, human or non-human, is isolated from other things. If this is the matter, it has the consequence that nothing can be seen as fixed, stable or detached from other things, but must be analysed in practice, and in relation to other entities that take part in the acting. It is already apparent by now that STS does not limit itself to speak only of epistemology, or how the world, ageing and technology can be experienced and known by people. Much STS work engages with questions of ontological character. This is what Jensen and Gad have termed practical-ontology, which is the analytical interest in how entities and realities of the world (indeed how worlds) emerge

in practice (Gad et al. 2014). A theoretical approach to study science and technology relations, which has been very influential actor-network theory (ANT). A central premise for ANT is that analyses are carried out *symmetrically*, which means that the researcher must refrain from any presuppositions about who or what is acting in any given situation (Gad & Jensen 2009). This idea is based on the assumption that important insights are lost, if the researcher analyses the world based on pre-defined categories and distinctions, such as “technical” or “social.” Instead, the researcher must install a “deliberately naïve” attitude (Jensen 2004) towards what is being studied. From this position of not knowing the entities of the world or their relations in advance, it is ANT’s ambition to study the mutual construction of human and non-human actors, or the emergence of socio-technical actor-networks. From this non-humanist position neither the human perspective or human agency, nor the technical is prioritized over the other. This opens up to radically new types of analyses, and new forms of critical and reflective engagements with the world.

What does all this have to do with Studies of Ageing and Technology?

STS, and ANT in particular, has become a relevant inspiration for research in ageing and technology because it offers bridges to some of the huge gaps, which have so far been ingrained in studies of ageing and technology. It offers analytical tools and concepts to analytically bridge the phenomenon of technology and ageing, which have otherwise been kept relatively apart, and treated as isolated from each other. It thereby connects social research and technical research by stating that we have to understand the world as both socially and technically constituted, and this goes as well for both technology and ageing. Science and technology studies proposes a way to bring ontology back into the frame, and thus, to enable research that engages with questions of how these technologies are *concretely* and *materially* transforming the lives of older adults, and vice versa. Moreover, STS offers theoretical resources to a field, which has up until now largely been characterised by a lack of theory (Schulz et al. 2015; Sixsmith 2013, in Peine & Neven 2020). Science and technology studies has been taken up within social studies of ageing and technology in a variety of ways (see examples in Peine & Neven 2020; Peine et al.

2021; Wanka & Gallistl 2021). One stream of research has drawn inspiration from STS research on how users and technology are co-constituted and configured in design practice (see, for example, Jensen 2012; Oudshoorn & Pinch 2005; Oudshoorn et al. 2004). A central concern of analyses exploring the co-constitution of ageing and technology has to do with how negative and stereotypical images of ageing are produced and re-produced in design practices. Design practice has been a central locus of interest for such explorations, which have examined questions such as about how “images” and discourses of ageing are inscribed into technology by designers and engineers (Neven & Peine 2017; Oudshoorn et al. 2016). It has explored how older adults are generalised in design practice (Ertner 2016), and how certain myths and assumptions about ageing people are reproduced by designers of information and communication technology (ICT) (Durick et al. 2013). Similar studies have also looked at how images of older adults are constituted in relation to views on technology by companies, public sector organisations and research (Cozza et al. 2019; Lassen & Moreira 2020), and how older users negotiate views of ageing represented by technology in practices of use (Neven 2010). This body of research has developed a rich critique of technology, design and innovation practices of developing negative and stereotypical representations for older adults, which are inscribed into ICT. The responsibility for this tendency of stereotypical representation is often directed towards designers, engineers and other human actors in design, technical development and innovation practices. In line with this literature, some researchers have been concerned with the development of alternative, positive images of ageing and older technology users. Categories, such as “the innosumer” (Peine et al. 2014), older adults as “early adopters” (Peine et al. 2017) and “technogenarians” (Joyce & Loe 2010), have proliferated as attempts to circumvent the common negative stereotypes flourishing in the worlds of design and innovation. Yet, others have explored the existence or non-existence of an age-related digital divide (Gallistl et al. 2020; Neves et al. 2018; Jæger 2004). All of these studies have been, and still remain, extremely relevant and important in terms of pointing out the continuous tendencies of design, policy, and innovation of articulating and addressing older adults in stereotypical and problem-oriented terms (Neves 2021). However, despite the intention of recognising material agency, they tend to cling to ideas of single

humans, such as designers or innovators, as the main agencies in socio-technical practices, a point that will be discussed later.

Although some studies in the intersection between STS and studies of ageing and technology are placing more analytical emphasis on the agency of material, non-human actors by analysing how things like homes, prototypes, presentation materials, etc., act in non-compliant, surprising, multiple and indeterminate ways (López Gómez 2015; Peine et al. 2021; Pols & Willems 2011; Urban 2021), the majority of contributions in this domain remain concerned with how humans imagine, characterise, and represent ageing and older adults, and how these images are inspired by and circulated through technology. Therefore, how we might begin to take the agency of material actors even more seriously in the study of ageing and technology and what could be the analytical gains of doing that? In this article, I want to draw attention to the concept of infrastructure, which has gained great attention within STS, and bordering disciplines, but not yet within studies of ageing and technology. I want to do that because I find that amidst these fruitful engagements between STS and studies of ageing and technology, there is a yet unfulfilled potential for going deeper into the role and understanding of non-human agency. The following section outlines the concept of infrastructure, as it has been developed within STS, and discusses its analytical and reflective potential for diving into the “ontological mess” of ageing and technology.

Infrastructure in Science and Technology Studies

Studies of infrastructure within STS have taken many different forms and operated with different ideas of the concept. Because of these theoretical ambiguities, but also because of the empirical and analytical “unruliness” of infrastructures, it is a concept, which may appear to be quite complex, difficult to define and get into view, and even vague. In common understandings of the term, infrastructure is understood as basic physical and organisational structures needed for the operation of society, such as roads, railways and bridges, electrical grids and telecommunication. Within STS, the concept has overflowed such phenomena, and has been used to study complexly intertwined technical, organisational and social practices. The concept of infrastructure has, for example, been used in relation to information infrastructures and databases (Bowker & Star 1998, 2000; Star &

Bowker 2007), monitoring of development aid (Jensen & Winthereik 2013) and chronic care management (Langstrup 2013). Winthereik and Jensen have analysed the development of information infrastructures in development aid, and pointed to the recursive nature of such infrastructures and what they seek to support – partnership, accountability and transparency (Jensen & Winthereik 2013). Langstrup has brought the multiple, inconspicuous socio-material elements of chronic care management into view with the notion of “chronic care infrastructures” (Langstrup 2013). That infrastructures are often characterised by their invisibility and displacement seems to be an understanding shared by many of these studies. Bruno Latour’s iconic paper “Paris invisible city” exactly brings into view the invisible socio-technical networks of Paris, which are largely ignored by social scientists. In the words of Susan Leigh Star who pioneered the STS study on infrastructure, we cannot begin to understand the scale of the workings and effects of technical systems if we do not bring these hidden infrastructural arrangements into view:

Study a city and neglect its sewers and power supplies (as many have), and you miss essential aspects of distributional justice and planning power. Study an information system and neglect its standards, wires, and settings, and you miss equally essential aspects of aesthetics, justice, and change. Perhaps if we stopped thinking of computers as information highways and began to think of them more modestly as symbolic sewers, this realm would open up a bit. (Star 1999: 379)

Understanding the implications of technology on ageing involves more than studying interactions between humans and bounded technological systems. With Star, we may say that studying gerontechnology and neglecting things, such as chargers, passwords, wifi settings as well as hearing aids, glasses, living rooms or old fingers, will have us miss out on important aspects of the techno-politics of ageing. Infrastructures are not just technical structures, which social practices unfold on top of. Social and political conventions are folded into the very materiality of infrastructures. The main tenet of infrastructure studies is exactly to de-centre the focus on technology as objects, and to bring a range of heterogeneous actors or elements together in analysis (Blok et al. 2016). Indeed, as described by as Harvey et al., infrastructures are to be seen as “complex chains of material relations [that] reconfigure bodies,

societies and also knowledge and discourse in ways often unnoticed” (Harvey et al. 2017: 5). What distinguishes infrastructures from technologies is that they are “objects that create the grounds on which other objects operate, and when they do so they operate as systems” (Larkin 2013: 329). More than hinging on notions of connectivity, the concept of infrastructure also entails that something is being transported. Brian Larkin describes infrastructures as “matter that enable the movement of other matter” (Larkin 2013). As emphasised by him, this means that infrastructures can be seen as having a dual nature, in the sense that they are both objects, and the relation between objects – they are (sometimes) material forms that allow for exchange over space, as they facilitate the flow of goods, people or ideas (Larkin 2013). Studying something as infrastructure implies that it is not possible to separate the infrastructure and the entities that it transports. Analysing something as infrastructure implies first that it is not possible to separate material entities from domains of knowledge practice. Secondly, it implies an analytical position of not knowing in advance what “the technology” consists of, what it is, where it comes from and what are its effects.

This brief trajectory through some of the most influential studies on infrastructure in STS has hardly made the concept clearer or more delineated. However, this is actually a central point of studying infrastructure, because if we see them as complex, dynamic and emergent forms, it is also clear that we cannot specify what they are in advance:

Provisionally, and minimally, we might say that we are dealing with technologically mediated, dynamic forms that continuously produce and transform socio-technical relations. That is, infrastructures are extended material assemblages that generate effects and structure social relations... ” (Harvey et al. 2017: 8)

Defining infrastructure is something which, according to Harvey et al., can only be done provisionally. Any attempt to define the concept of infrastructure in unequivocal terms would be counter-productive, as the question of “what is infrastructure” is exactly what the researcher needs to address conceptually, empirically and experimentally (Harvey et al. 2017). The reluctance of giving any definitive definition of what infrastructure *is* means that there is no *one way* of studying infrastructure. Studying infrastructures and infrastructuring can be

seen as somewhat similar to an experiment, in the sense that it is up to the researcher to make relevant connections between the theoretical concept, the empirical field and the analysis. Indeed, infrastructures have been researched in different ways. Sometimes infrastructures are visible, empirical objects such as a cross-national pipeline (Barry 2013), sometimes they are information infrastructures (Star & Ruhleder 1996), and yet, other times the concept does not denote some “thing” in the empirical field, an object of analysis, but is put to use as a heuristic device for analysing other phenomena *infrastructurally*, as when Carey and Pedersen talk about infrastructures of certainty and doubt (Carey & Pedersen 2017).

As must be obvious by now, there is no one way of seeing or applying the concept of infrastructure, rather there are many. In the following section, I do not refer to one particular way of using and defining the concept. I engage the concept of infrastructure in a sense as a heuristic device for probing into, discussing and potentially opening up the research agenda on ageing and technology, and specifically the idea of non-human agency.

The notion of infrastructure has served as a rich analytical concept within STS, enabling the analyst to connect various sites, entities and practices in analysis. However, the concept has not yet travelled to the domain of social studies of ageing and technology. I point to three features of infrastructure studies, mainly within STS, which may have particular relevance for scholars interested in relations between ageing and technology. These have to do with the concept and nature of technology, on the empirical site, and on the notion of agency. These three features are not new to social studies of ageing and technology, nor is the STS inspired understandings of them. However, as shown in this study, the concept of infrastructure gives some advantages in the sense that it helps taking the idea of non-human agency even more seriously and instigate further “opening up” of our conceptions of technology.

In the following section, I review the relevant research using the concept of infrastructure focusing on each of these three features and discuss how the concept may propose new or somewhat different views and approaches to understanding and analysing relations between ageing and technology.

From Gerontechnologies to Infrastructures for and of Ageing *On the Concept of Technology: From Objects to Assemblages of Loosely Attached Entities*

The concept of technology has been at the centre of studies of ageing and technology to a degree in which it has become taken for granted as a concept and an empirical entity, and as the default starting point for empirical inquiry. Similarly, this has meant that technology has, to a large extent, come into view empirically as *an object*, a more or less bounded thing to be studied. Although new developments within the research field are increasingly taking up theoretical ideas about relationality, multiplicity and practice-based studies of technology, the notion of technology as object persist. One of the examples can be found in an article by Neven (2010), which studies interactions between care robots, older users and designers in a design project, and examines how images of older users shape the development of technology. The article looks at the different images of ageing produced by designers and users, respectively, and how the older users related to the robot's inbuilt script of ageing. Here, the robot becomes the materialisation of the designer's "image of ageing." The robot is thus a more or less stable discourse object, which acts as an extension of the designers' intentional inscription of the older user, and whose materiality matters mainly as a container for a discursive script invented by a human actor. Materiality does not act independently of humans but as material extensions of humans' projections of the world. Similarly, in so far as the robot acts, it behaves as a bounded object that represents ageing in a particular way. The author elsewhere emphasises that technologies are not to be seen as stable entities but that "multiple versions of a technology come into existence across different instances of their appropriation and use" (Peine & Neven 2020: 5), and that technology can be re-configured in use by users who may "adapt, circumvent, use selectively or decide not to use a technology at all" (Peine & Neven 2020: 6). This image of technological instability seems to resonate more with the social constructivist version of objects as plural. The tradition of social constructivism has rendered the world as consisting of plural entities, which have been constructed in particular ways in different times and places. The work of Annemarie Mol on "the body multiple" (Mol 2002) most clearly broke free of the plural idea of sameness and difference with her analyses of bodies that

were enacted as much more than one within the same hospital at the same time. That entities – both human and non-human – are always constituted through their relations to other entities, which means that they can be seen as multiple, as they are being “done” in relations, and as being relations. The post-plural attitude renders objects as much more dynamic, instable, and open to radical and active construction than the social constructivist image of the gradually changing, socially shaped objects.

In a PhD dissertation by Benjamin Lipp, the author explores the design and development of a care robot for older adults (Lipp 2019). In this work, a different version of technology and multiplicity is at stake. The author does not explicitly refer to the analytical concept of infrastructure, but the analysis has some of the same qualities that I want to point to with the concept. Rather than viewing design as a process of inscribing a fixed image of ageing into an equally fixed or bounded material form, Lipp looks at practices of what he calls “integrating robot(ic)s” (Lipp 2019: 131). This process, he argues, covers “establishment and maintenance of more or less stable interconnections between the robot system, users, and spatial surroundings” (Lipp 2019: 130). A different ontology than that of robots as bounded objects emerge, and he brings the robot into view as “a thousand pieces,” as his analysis does not separate a priori between the test apartment and the robot; “The ‘robot’ really denotes a *highly distributed system*, which spatially extends into the test apartment’s infrastructure, i.e., via cables and wireless network connections” (Lipp 2019: 133). Similarly, the work of roboticists appears to be much less as a formulaic procedure than as an experimental process of improvisation and tinkering. While there is no doubt that the inscription of pre-existing knowledge and categories is part of design processes, there is much more going on, and a vast range of entities, both social but also material, have to be made to fit. In this analysis, things such as carpets and cables become actors that take part in the emergence of the robot and its ability to function. We come to know the robot not as a “thing” as such but more as a highly distributed, fragmented network of entities. It is even to be seen as fragile (Ertner & Lassen 2021) as the connections between its many different parts are only sometimes held together and requires a lot of work not to break apart. Counting these otherwise invisible background things in as actors allows for the analysis to make different claims about the effects of robotics in care. The author poses the question of how our home environments will

need to change in order to accommodate robots. Viewing the robot as a distributed system with fluid boundaries that extends beyond its physical surface allows the author to bring into view other effects than those being played out at the user-robot interface. This also shows that “effects” are not necessarily inscribed into technology from the outset but are consequences of practical, material and experimental processes that happen through the interplay of many different, intended and unintended actors. The boundaries of technology blur and the robot melts into its environment, and the environment blends back into the robot.

Shifting the focus from technology to infrastructures of human and non-human objects and activities shifts the view from the all-powerful agency of humans such as designers and installs a more open attitude to discern empirically what entities become part of technology in any given situation. Perhaps, that is a central point to be aware of in the analysis of gerontechnologies; that oftentimes images of ageing do not have all that much influence on how technologies for older adults are designed and assembled. Viewing technology more as infrastructures than as objects begs for ontological questions, or “deliberately naïve” and ontological questions, as proposed by Jensen such as “what *is* this technology?,” “where does it exist, and where does it come from?”

Already it is clear that studying infrastructures involves attending to a range of diverse actors, and that we cannot from the outset know what the infrastructure *is* and what it consists *of*. Dealing with infrastructures and processes of infrastructuring underscores the sense in which we can never assume in advance, what actors are acting as parts of an infrastructure – this remains a question to be explored empirically. For the study of technology and ageing, this is an important insight, as there is potential for further opening of the more or less bounded entities such as “the technology” and specific humans such as older users, care personnel and designers. Analysing technologies as infrastructures involves attending to relations between loosely attached, heterogeneous entities, and the practices of mustering these diverse and distributed entities together to make them appear as one thing – or break down into “a thousand pieces.” When we do not take for granted or pretend to know in advance what a given technology consists of or what collaborates in making it work, this may open up to surprising new knowledge about technology and the way it intervenes in practice.

On the Empirical Site: Connecting Diverse and Dislocated Spheres

One of the central features of infrastructures is the way that they tie together otherwise dislocated spheres and domains of practice. Where the notion of technology almost automatically denotes a bounded, geographical place in which a particular technology resides, the attention to infrastructure brings forth an empirical site that is more difficult to locate in any singular place, as it cuts through various different sites and places. In her article on chronic care infrastructures and the home, Langstrup discerns the implicit “ideology of separate spheres” (Glazer 1990: 480–482, in Langstrup 2013) in healthcare research, more specifically in relation to chronic disease. This conceptual and analytical separation between different spheres, such as the clinic and the home, has had the consequence that little attention has been paid on how more mundane arrangements distribute activities between the clinic and the home in the management of chronic disease. Coining the term “chronic care infrastructure,” Langstrup proposes the view that the home and the clinic are always already connected in chronic disease management. Indeed, digital technologies are part of care infrastructures; however, understanding the effects of care, she shows, involves attending to a larger social and material network of inconspicuous elements. Langstrup’s empirical examples take us from a nurse in the clinic having a phone conversation with a haemophilia patient to the homes of patients with both asthma and haemophilia, where we learn how practices such as medication storage blends with the material and emotional qualities of the home – how, for example, the storage of medicine in the fridge serves to constantly keeping “disease in place in the home” as opposed to disease as something that is only mobilised upon visiting the clinic. Her analysis also illustrates the work that goes into making the links that allow the home to become a place of treatment. In this particular paper, the interest is in the effects of the chronic care infrastructure on the home, and the empirical attention is directed both at nurses’ work in the clinic and the individual homes of patients, connecting both these sites in analysis.

The tendency of separating between spheres, as Langstrup pinpoints, has also been the characteristic of studies of ageing and technology. As already mentioned, other scholars have pointed to the gaps within this body of research between a focus on either the technical dimension or the

lived experiences of older adults using technologies. This gap translates into a separation between different spheres such as between the home or healthcare institutions, design and engineering work, innovation projects, and policy. Such separations limit our understandings of the implications of technologies that rarely work on their own, but as part of wider infrastructures, and therefore, have multiple effects – many of them unfolding beyond the use of technology as such. One of the examples from my own work is the notion of active ageing. Active ageing has been vastly explored both within ageing studies and beyond, where it has been pinned down as different things and explored in different sites. Active ageing can be seen as a policy concept, a value inscribed into technology, or a form of care and self-care. In many older adults' everyday life's, active ageing has been incorporated into everyday routines, ways of managing their bodies, their time and their homes, the social and material arrangement of the home, purchase of technologies, and shapes thoughts and plans for the future. Active ageing often appears in whole new versions "in the wild" that are profoundly different from how it was imagined and described by policy makers or inscribed into technologies by designers. The effects of "active ageing" go beyond intentional applications and take part in forming new infrastructures of policy and care. Our understanding of active ageing is severely limited if the focus remains attached to a singular site, a singular policy document or the use of a particular technology, as active ageing is embedded into complex webs of practices, technologies and things, bodies, politics, care and everyday life.

Attending to the infrastructures of ageing allows research that connects different domains of practice and takes account of both technologies, policy concepts and everyday practices in the same move. The concept of infrastructure provides a lens through which we can see the socio-material arrangements that allow, for example, a policy concept or a technology to be distributed spatially. As such, the concept of infrastructure may occasion an increased attention to the often quite mundane arrangements that make the technology work as "gerontechnology" in particular ways, and which are often spread out in time and place in diverse sites. The concept of infrastructure may further open to see the "site," or place, as more than a container for interactions between humans and computers. The particular elements and entities in the environment collaborate in creating the effects of technology and are simultaneously created through

those interactions. Exploration of technology as embedded within its sites may open up new understandings of the effects, limits and possibilities of technology and how they are intervening in ageing.

Who Acts? – Non-Humanist Analysis

A central point of departure of the study of infrastructure is the notion from ANT of analysing reality from a “non-humanist disposition” (Gad & Jensen 2009). This emphasis on non-humanism can be understood in light of ANT’s most basic principle of symmetry, which means that the researcher must avoid any presumptions about who or what acts in a given situation. This is important to avoid reproducing common dichotomies between the material and the social, and the tendency of favouring human agency on accounts of social reality.

Jensen and Morita suggest us to think of infrastructure as experimental. With this notion, they seek to draw into view how processes of building infrastructures often involve a range of different and often invisible, unarticulated, and unanticipated actors, both human and non-humans, in particular. Processes of infrastructuring are experimental in the sense that we never really know in advance which actors take part in making infrastructures achieve the form and character they do. The effects produced by processes of developing infrastructures are often multiple, some foregrounded and rendered visible, others not. As an example of this experimental aspect of infrastructure, Jensen and Morita show how a particular sort of rice, grown in a local delta of Thailand, has become a central actor in high-stakes national politics due to its role in flood protection (Jensen & Morita 2015). In this view, infrastructures, such as environmental policy, are not made solely by politicians and influential human stakeholders but a diverse assemblage of humans and non-humans. In the case of rice farming and policy-making in Thailand, viewing infrastructure as an ontological experiment involves seeing how “rice, dikes, farming practices, canals, highways and much else are simultaneously infrastructure” (Jensen & Morita 2015: 83). The effects of such infrastructure went beyond “protecting environments,” they argue, as it brought about the whole new versions of landscape, novel forms of politics and much more. Non-humans, such as rice, are rarely represented in stories about how large infrastructures are made. This

goes to underscore the sense in which we can never assume in advance, what actors are part of an infrastructure, and what effects it produces. For the study of technology and ageing, this is an important insight, as a majority of such studies tend to focus on pre-set ideas of who is acting and with what effects for whom. As such, the concept of infrastructure may allow us to take materiality even more seriously in the study of ageing and technology. In relation to the design of new gerontechnologies, this could involve not taking the designer(s) as the *de facto* agent but, for example, bring into view the agency of design methods, materials and taken-for-granted qualities of the social and physical environment that design happens in (Ertner 2015). It could also mean to open up to more interest in the way that things like spaces (homes, hospitals, public areas, etc.), concepts of care, citizenship or hygiene intervene in the effects of technology.

Most importantly, the notion of infrastructure reminds us that we can never know in advance, what kinds of actors take part or what entities come out of these “infrastructural experiments” in the domain of ageing.

Madeleine Akrich’s vocabulary of technology as a script has gained wide recognition and uptake in STS inspired studies of ageing and technology (Akrich 1992). This view has it that the design of technical objects is a process, where the designers’ imaginations about the user and their practices are *inscribed* into technical form. Technologies for older adults are thus much more than technical objects, they contain the designer’s knowledge (or lack thereof) of the user, social values and norms. Interaction with technology implies a process of *de-scribing* the “script” of technology (Akrich 1992). This view places agency in the minds of the designers, and to some degree, the users who have the freedom to accept, reject or negotiate the designer’s script. Agency is thus very much a privilege shared by a few human agents, and mediated by and negotiated through technology. Some immediate implications of this is that agency becomes an attribute that is associated with the designer per se. The technology remains as a relatively passive object, with a more or less fixed, and pre-determined ontology.

The notion of infrastructure involves a re-thinking of the politics of technology. If it is assumed that technological development is shaped by multiple agents, both human and non-human, with competing interests and capacities, and in practices that are distributed in time and

space, we can no longer centre political critique on the flawed, stereotypical or stigmatising beliefs of single actors, such as designers or engineers. In fact, studying technological practices from a non-humanist position means that no single actor, no person, organisation, innovation project or document hold the power to enforce linear development (Harvey et al. 2017). With this in mind, a techno-politics of infrastructure is one that emphasises the unanticipated, distributed, experimental and complicated workings and effects of infrastructures in the wild. This distributed nature of power relations in ageing and technology makes it highly relevant to explore a wide range of actors, agencies and political effects relating to technological innovation in ageing, as new social and technical infrastructures keep emerging at a rapid pace.

Concluding thoughts on Infrastructures, Ageing and Technology

The recent academic interest in the co-constitution of ageing and technology has been mobilised through different theoretical conceptions such as ageing as scripted, images of ageing and gerontechnology. This study has explored the concept of infrastructure as it has been developed within STS. Attending to infrastructures, rather than single, bounded technological objects implies different analytical moves. While the infrastructuring of ageing can certainly be studied in a variety of ways, and in different theoretical and analytical frameworks, this article has sought to tease out some initial features of such an approach. The following four features can be seen as theoretical analytical implications or orientations of studying ageing-technology relations as infrastructure:

Unsettling “Who Acts” and Opening up the “Stage of Actors”

It implies not knowing in advance, who acts in a given socio-technical arrangement, and what such an arrangement consists of. Rather than focusing only on relations between “a” technology and older users, studying infrastructures opens up to a larger, and more varied scene of human and non-human, anticipated and “invisible” actors.

Technologies as Loosely Attached Socio-Material Arrangements

While it may imply shifting our focus from single technologies to larger heterogeneous infrastructures, it may also involve viewing technology as consisting of various more or less durable components and relations, and thus being exactly studied more as an infrastructure of loosely attached entities, than as an entity in itself. The concept of infrastructure reminds us that we cannot take for granted what a given technology “is.” Studying the social and technical infrastructures of ageing requires that we pose ontological questions, such as “what is this technology?” “what entities take part in making it work and in what ways?”

Implications beyond the Older User-Technology Interface

It implies not knowing in advance what is getting re-configured. This means that the ageing-technology nexus is opened up, what can become configured through the assemblage of new social and material infrastructures can be much more than images of older adults and concepts of ageing, it can be care, health, bodies, homes, families and much more. While it is, indeed, relevant to study interactions between technologies and older adults, there are many other relations and interactions that are necessary to trace in order to understand the many ways in which technologies are transforming ageing and older adults’ lives.

Agency and Technopolitics beyond the Script

Studying how conditions for ageing are being shaped through the immense focus on creating new social and technical infrastructures, such as policies, care facilities, assistive technologies and much else, implies a view on agency that does not favour the conceptual models of designers and other humans as default agential in technological and infrastructural practices. We may not know in advance who or what comes to act and in what ways, but those are exactly the core questions of exploring infrastructures.

This study suggests that attention to heterogeneous processes of infrastructuring may open up the empirical-analytical approach to study the mutual constitution of ageing and technology by taking non-human

agency even more seriously. This changes the type of research questions we pose, our empirical focus, and the kind of arguments and critique we can make in ways that are yet to be explored. Focusing on infrastructuring practices may allow studies that connect the entangled social and material practices and scales of policy, care, design, technology implementation and use, and everyday life, and opens to explore how such interconnected practices shape conditions for living and ageing.

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Aging, embodiment, and datafication: Dynamics of power in digital health and care technologies

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Abstract

As a growing body of work has documented, digital technologies are central to the imagining of aging futures. In this study, we offer a critical, theoretical framework for exploring the dynamics of power related to the technological tracking, measuring, and managing of aging bodies at the heart of these imaginaries. Drawing on critical gerontology, feminist technoscience, sociology of the body, and socio-gerontechnology, we identify three dimensions of power relations where the designs, operations, scripts, and materialities of technological innovation implicate asymmetrical relationships of control and intervention: (1) aging bodies and the power of numbers, (2) aging spaces and the power of surveillance, and (3) age care economies and gendered power relations. While technological care for older individuals has been promoted as a cost-effective way to

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enhance independence, security, and health, we argue that such optimistic perspectives may obscure the realities of social inequality, agist bias, and exploitative gendered care labour.

Keywords: aging, care, datafication, embodiment, gerontechnology, power.

Introduction

In many Western nations, digital technologies play a central role in the imagining and shaping of aging futures – optimistically portrayed as a “new era” of technologically enhanced or “connected” aging (Ghosh et al. 2014). Some digital tracking and monitoring technologies are marketed directly to consumers as products that encourage active, risk-averse lifestyles, while others form part of the growing e-health economy, enabling more home-based, efficient and cost-effective management of older age care. Taken together, what has been dubbed “Age Tech” is described by venture capitalist Dominic Endicott as “digitally-enabling the Longevity economy” (Woods 2019). The future imaginaries of Age Tech are expansive, encompassing digital health-tracking technologies, sensors for digital home care, assisted living technologies, and more, co-located in a landscape of data-emitting connectedness. Ghosh et al. (2014), for example, map the body, home, community, and spaces of care as domains to be organized through technologies that support older adults’ health and wellbeing through tracking and monitoring. When partnered with insurance and data industries, government budget-cutting austerity programs, and residential care planning around growing aging populations, it is a sector bound for global financialization, with predictions that “age-tech for the silver economy will be a multi-trillion-dollar global market within the next half decade” (Kutney & Wilson 2019). Case studies of a wide range of technologies have made it clear that these developments have been dominated by what Peine and Neven (2019) term an “interventionist logic,” where aging and aging populations are framed by Age Tech as problems for which technological innovation promises solutions. In particular, emerging reports on health, home, and community technologies related to older age care (Aging Analytics 2019; Kutney & Wilson 2019; Smith 2014) are fueled by an idealized vision of a “triple win” of

technological innovation simultaneously benefiting the government, the market, and older users (see Neven & Peine 2017).

At the same time, academic and professional gerontology has increasingly recognized technological innovation as having growing importance in later life, drawing attention to the digital divide between young and old, concerns about data privacy for older adults, and the promise of technology to respond to issues of older adults' isolation, inactivity, and loneliness (Dominguez-Rué & Nierling 2016; Moreira 2017; Neves & Vetere 2019; Prendergast & Garattini 2015; Taipale et al. 2018). This reflects what Peine and Neven (2021) have termed the "Latourian divide," where designers, engineers, and industry promoters focus on the devices and gerontologists focus on the social worlds into which those devices are introduced.

Age Tech designers, whose vision of aging is often limited to stereotypes of frailty, disability, and decline, have demonstrated a narrow understanding of older users and their negotiation of technological relationships, and have not fully considered how gender, class, ethnicity, or ability might impact how technologies are used (if at all). In response, gerontological researchers advocate more co-design initiatives with older users, more research attuned to social inequalities and diverse populations, and more qualitative approaches to the subjective experiences of growing older. Yet, as noted by Peine and Neven (2019), we are in a paradoxical time in that "gerontology has not developed the theoretical tools to grasp technology as an already inherent aspect of later life" (p. 2). We interpret this claim to mean that while gerontology has certainly been engaged in technological applicability to problems of aging, as mentioned above, the critical and often unsettling approaches to technology stemming from the literature outside of mainstream gerontology, such as those in the growing field of socio-gerontechnology, have yet to be adapted. Rather, gerontologists have found a common ground in a more traditionally optimistic vision of technological promise (Moreira 2019). Therefore, while Age Tech and gerontology share this optimistic vision, there remain crucial gaps in understanding how, for example, self-tracking, digital monitoring, tele-intervention, and bio-data collection can constitute aging subjects in devalued and, as we shall argue, socially and gender-divisive ways. Such problems are further related to the broader terrain of austerity-influenced neoliberal healthcare

regimes in many Western welfare states that have reconfigured care relationships, spaces designated for older adults, and human-machine infrastructures according to market-driven priorities.

In this study, we address these gaps by building on Peine and Neven's (2021) call for a turn to the *co-constitution* of aging and technology, which contends that design produces not just technologies, but "*ideas about ageing and older people*" (p. 2856, emphasis in the original). We sketch a framework aimed at nurturing critical research on aging and digital technologies, as well as the further development of conceptual and theoretical approaches, by highlighting three dimensions of power relations deserving further attention: (1) aging bodies and the power of numbers, (2) aging spaces and the power of surveillance, and (3) age care economies and gendered power relations. In these cases, the aging body and the role of datafication are key themes. In taking aging bodies as a unique entry point for understanding technologies and the datafication of care, we seek to make visible the shift from conventional gerontological ideals of healthy and successful aging to future imaginaries of technologically enhanced and coordinated life courses. Datafication, as described by Mejias and Couldry (2019), renders human behaviour analyzable through quantification and extracts value in the form of "predictive insights." As they note, "issues of power permeate apparently neutral forms of datafication" (p. 4); however, power relations and their effects are frequently rendered invisible.

We critique this ostensible neutrality with an analysis of the ways in which the datafication of aging and care expresses relations of power in technical and embodied ways (Martin et al. 2015). First, aging bodies and the power of numbers come together in ways that monitor and quantify older people through the datafication of their bodies, while aggregating and circulating personal data through standards of numerical risk. Here, technological industries can exacerbate agist cultural divisions of later life in "third" and "fourth" ages by associating the former with "active" consumer and lifestyle technologies and the latter with "passive" technologies of surveillance, assistance, and management. Second, aging spaces and the power of surveillance are deeply interconnected within care residences and programs and discourses of aging in place, whereby technological interventions are promoted as agents to transform living spaces into "smart" homes through tracking, connectivity, and safety surveillance. Third, in care economies where the presence of technological

inputs is increasing, gendered power relations are becoming more evident. The demands and expectations on mostly female healthcare workers and domestic partners to integrate body care with the data care of collecting, interpreting, recording, and relaying monitoring information adds to the long-standing invisibility and devaluation of care work.

Across these domains, power is an expression of the neoliberal governance and stratification of late life within and through the predominance of technical relationships of care, whereby human and non-human agents constitute each other in particularly productive ways. Our examples further identify how the lived experiences of the datafied older person surveilled resident, and gendered healthcare worker refract both wider biopolitical forces and negotiated possibilities beyond them. The focus on power also allows us to explore why current gerontological and policy strategies addressing growing aging populations, and programs for healthful longevity, active well-being, and aging in place, have become sites of technological interest and investment.

The three dimensions of power that we propose as a framework for advancing critical research at the intersection of aging and digital technologies are grounded in our collective reflections and analyses of the current landscape of gerontechnological innovation and research. In sketching this framework, we draw on published work in both aging studies and technology studies, including lines of research that the authors have, both collectively and individually, contributed to, as well as examples from policy documents, Age Tech advertisements and corporate texts. We turn now to an elaboration of the three dimensions of power identified, attending to the multiple arenas in which these originate and manifest.

Aging Bodies and the Power of Numbers

Digital health and care technologies create new priorities in the lives of older people based on numerical quantification. Some activities are found to be more beneficial than others, in what Pols et al. (2019: 106) term “turning events into numbers.” Historically, bodily measurement and quantified profiles have been integral to the medicalization of aging, where monitoring and recording heart rate, blood pressure, cholesterol levels, memory test results, muscle tone, and weight have been key features of health assessments in, and of, old age (Katz & Marshall 2018). However, increasing

concern over an aging demographic in the current healthcare climate has framed the promotion of technologies such as wearable self-tracking devices to enlist aging subjects themselves in self-tracking and production of data (Katz & Marshall 2018; Marshall & Katz 2016; Neff & Nafus 2016). These types of technologies are akin to what Lupton (2016) calls “pushed technologies” that “involve encouragement for people to monitor themselves from other agencies” (p. 103). The seductive magic of the self-tracking device is to create standards of personal success by measuring the activity and inactivity of the user in the form of numbers, such as steps and active minutes, compared with sedentary time (Marshall 2018; Oxlund 2012; Pickard 2011). Wellbeing and independence in old age require the health-literate subject to keep the body in constant motion, given that “the risks of inactivity, in addition to indicating irresponsibility, ground an ethical imperative for aging bodies to move, be active, and be tracked by wearable devices that both measure and motivate” (Katz & Marshall 2018: 65).

As Beer remarks, “measurement is powerful not just for what it captures and the way it captures it, it is also powerful because of what it conceals, the things it leaves out, devalues, or ignores” (2016: 60). For example, self-trackers and home surveillance monitoring systems cannot quantify contentment, leisure, emotional support, mutual dependency, social inclusion, collective activities, or overall fulfillment in life. Instead, older bodies are increasingly reduced to numerical outputs of activity/inactivity embedded within trackable divisions between fit/frail, independent/dependent, and risk-averse/risk-prone. And for older female bodies, already cast as weaker, needy, and fragile, Sanders’ (2017: 38) statement, “that the rise of wearable biometric technologies has significant implications for the augmentation and co-extension of biopower and patriarchal power” is particularly apposite.

The numbers produced through tracking create a *data double*, a numerical entity of biometric data through which self-knowledge and self-care are organized as a kind of techno-phantom identity (Haggerty & Ericson 2000; Ruckenstein 2014). The status of the data-double is based on a neoliberal view of the self-as-enterprise, assuming that more data equal more knowledge and control in an ever-expanding horizon of self-improvement and optimization. This doubling effect risks alienating meaningful self-care experiences, since intimate bodily data itself become unbodied and turn “the self-tracker’s attention away from the

signals and sensations of the embodied sensorium toward a technical sensing apparatus that privileges algorithmic analytics” (Smith & Vonhethoff 2016: 9). Whether the relationship between the user and the tracker is disciplinary and regulatory (Toner 2018) or messy and disruptive (Marshall 2018; Nafus & Sherman 2014; Pantzar & Ruckenstein 2017; Sharon & Zandbergen 2016), the authority of the power of numbers in digital health technologies prevails over other priorities, indicators, and experiences of bodily life. As Sanders (2017) remarks, “the personalized nature of this technology makes the relation of normalizing power to individuals seem so physically intimate and confidential that they eventually may no longer experience normative and disciplinary imperatives as issuing from external authorities” (p. 53).

The technological personalization of numbers becomes resources by which older adults are expected to use data to manage lifestyle behavioural modifications and interventions (Fotopoulou & O’Riordan 2016). For example, some European countries explicitly promote the use of self-tracking through mobile health applications as a lifestyle input to prevent and manage disease in later life.¹ Jeannette Pols and colleagues cite the Dutch minister of health as aiming “to have 75% of elderly and chronically diseased people – if they want and are able – to use health apps” (Pols et al. 2019: 98). Thus, technical self-care through data management is a form of labour one performs both for personal worth and as an enactment of responsible aging citizenship. As one respondent in a Canadian study of older users of fitness trackers argued, “if you’re community-minded, you generally want to cost your community as little as possible in health care costs” (Marshall 2018: 209). Thus, numbers not only represent fitness, performance, needs, risks, and capacities but also frame the practical truths by which important decisions are made regarding the allocation of resources and support. In this context, numerical authority and technical measurement are crucial resources in informing healthcare

¹ In the Nordic context, tracking, telehealth, and surveillance technologies are grouped together under the label of *welfare technologies*, a term that makes explicit the policy context that views such technological innovations as central to managing the problem of “increasing public expenses on labour intensive care in sectors that are burdened by the increasing numbers of elderly and chronically ill” (Kamp et al. 2019: 2).

policies for older people, such as those around aging in place or health promotion. In summary, as stated by Oxlund and Whyte (2014), the goals of measurement in the lives of older people are threefold: “to reveal hidden truths about the body in order to make treatment decisions; to assess need for care and services; and to track and manage health at home” (p. 218). The next section elaborates this third goal by looking at how surveillance devices and systems are used to manage health and safety in aging spaces and the residential experience in later life.

Aging Spaces and the Power of Surveillance

Aging in place has become an important social, economic, and political objective and generally refers to a person aging in their own home for as long as possible and avoiding institutional relocation. With changing demographics and geographically dispersed families, technologies in the home are promoted as ensuring greater autonomy and safety for “at risk” older adults as they age in place, while concurrently promising a reduction in cost, time, and burdens for their families and/or caregivers. These technologies include wearable and ambient monitoring devices that work in the background to track, collect, and calculate multiple data outputs into measured assessments of risk based on established routines of movement, activity, and location. Roberts et al. (2019) refer to the home of ambient-assisted living as “a preclinical space, a kind of waiting room serviced by sensors and systems of monitoring,” inhabited by those who are not quite “sick enough” to be brought into the clinic, yet not “well enough” to be metrically unaccounted for (p. 125). Monitoring technologies designed to support aging in place differ from those for self-tracking as discussed above, in that they are designed and marketed to enable data surveillance by others. Roberts and colleagues (2019) suggest that these remote monitoring systems have contributed to a form of “dys-tracking,” “connoting the passive, disconnected, frail and vulnerable subject bodies” to which these devices are attached or remotely monitored (p. 130). Caregivers can check in remotely to keep track of care-recipients’ comings and goings, their eating, sleeping and bathroom habits, whether they are taking their medication, their location in or out of the house, their gait, their heartrate, and the length of time they are standing, sitting, or lying down. Deviations from normalized patterns of predictability signal the need for

a response by a caregiver in the form of adjusted treatment, more involved care, further tracking, or removal from the home. Rather than promoting self-knowledge or health literacy on the part of the user, alarms and alerts are directed to the caregiver or a third party (Aceros et al. 2015; Gilleard & Higgs 2021; Neven 2015).

Such technologies are found to create *smart homes*. In taking up the question of whether smart homes for aging in place live up to their promise of independent living, Peek et al. (2017) define independence along three axes: (1) the ability to look after oneself, (2) the freedom to do what one wants, and (3) not feeling obligated to another. Although some older adults have expressed a great sense of independence with the presence of sensor monitoring, knowing that they always have someone “there” to keep them safe (Pol et al. 2016), for others, their presence has a clear impact on their behaviour in the home and fails to meet one or more of the above criteria (Berridge 2017; Mortenson et al. 2016; Peek et al. 2017). For example, in Berridge’s study (2017), some residents avoided deviating from established routines for fear of triggering alert systems, or simply rejected the monitoring systems altogether. Other research reports that participants tried “tricking the system” by turning on the shower or opening the refrigerator without bathing or eating (Mortenson et al. 2016: 110). In one case, a man described swinging his legs in front of a sensor that hangs on his bedframe to increase his movement data for the day (Pol et al. 2016: 489). These and other examples illustrate that while the respondents are acting of their own volition, the presence of the sensors and the looming threat of being institutionalized may have a direct impact on their conduct at home, and hence, undermine their autonomy.

Monitoring technologies inevitably involve some relinquishment of the user’s expectation of and right to privacy. As made clear in several research studies, this is one of the most important aspects of the power of surveillance and is often neglected by designers and policymakers as a barrier in the adoption of technology (Berridge 2016; Berridge et al. 2019; Carver & Mackinnon 2020; Chung et al. 2015; Garg et al. 2014). As stated by Berridge and Wetle (2019), for older adults, “privacy is not just an intrinsic value that is valuable for privacy’s sake, but rather, it is integral and necessary to enjoy other values like freedom, independence, and identity” (p. 7). In their study, while older adults and their adult children agree on primary definitions of privacy, they did not agree how privacy

would be impeded by passive home monitoring. Older participants worried about being “reprimanded” for not behaving properly or felt that, as one person said, being watched is like, “living in a nursing home in your own home” (Mortenson et al. 2016: 109). One woman developed a “sensor phobia,” and was so fearful of being “seen” by the sensors that she started hiding in her broom cupboard (Neven 2015). A number of social workers interviewed by Berridge (2016) admitted their need to be tactful when following up on an alert, recognizing that their clients may be more resistant to remote monitoring in the home if they were aware of the extent to which their activities were being monitored. Many were also aware that their monitoring and knowledge of their clients’ activities were uncomfortable invasions of privacy, particularly in relation to bathroom visits. In bathrooms, the risk of falling can be intensified if the time spent there is watched or measured, causing residents to feel rushed while trying to be careful with their footing (Berridge 2017).

A consequence of the power of surveillance embedded in passive remote monitoring is its transformation of the intimacy of home space, with the system itself becoming a kind of material agent (Mortenson et al. 2015; Oudshoorn 2012; Urban 2021). In addition to the physical alterations that come with the installation of sensors, the symbolic divide between private and public life represented by the home is dissolved, whereby older users are stripped of their control of what, how, when, and with whom private information is shared (Garg et al. 2014). Neven (2015) adds that for some individuals, the introduction of sensors can reconfigure the emotional meaning of their home, from being a place of refuge and safety to one that provokes feelings of anxiety and fear. Finally, while sensor monitoring is promoted as a solution to the risks of aging at home, appealing to the image of a home that is equated with independence, autonomy, safety, and control (van Hees et al. 2021), the home may also be an abusive or unsafe environment. In such cases, monitoring devices may contribute to the further victimization of an already vulnerable population (Carver & Mackinnon 2020).

Responding to the assumed passivity of older adults scripted into the design of monitoring devices, Joyce (2021) asks what would it look like if older adults could communicate with those tracking them? Reciprocal monitoring exists in other community contexts (Mortenson et al. 2016), and perhaps could be implemented in home monitoring to complement the need for user control and better address problems of privacy and need

for autonomy. If smart home systems are to be successful in achieving aging in place alternatives to institutionalized care or hospitalization and become more than just “technologies of deinstitutionalization” (Milligan 2009: 89), then the power relations implied by them must be recognized at the points of design, installation, operationalization, and interaction along with the imaginative creation of more reciprocal and relational technological models.

Care Economies and Gendered Power Relations

The third locus of power we explore is that implicated in the gendered and often invisible labour invested in and required by health and care technologies, and upon which smart home life and residence for older people depend. In addition to the care work inherent in tracking bodily activities such as bathroom use, eating, sleeping, and medication schedules, health and monitoring technologies demand a host of other (and new) lines of care work, including discerning deviations in data patterns or moments and responding to emergency calls and alerts.² However, strikingly absent from the descriptions of already-existing monitoring gerontechnologies and the promissory visions of future ones in both policy documents and much academic work are questions that ask: who ensures that devices are charged, operating, updated, and being appropriately used? What happens to the data produced? Who is responsible for reviewing and interpreting the data and making practical decisions based on them? Who will receive and manage information, such as notifications? Who will take appropriate actions to intervene, for example, to program reminders for medications? Such questions point to the importance of human actors, predominantly women, who are expected not only to operate but to fulfill and complete the workings of care technologies (see Strengers & Kennedy 2020; Wachter-Boettcher 2017).

As feminists have long argued, women, long-stereotyped as being naturally nurturant, are already burdened with the bulk of caregiving

² Thirty-one percent of caregivers surveyed by Fox et al. (2013) reported that they keep track of their family member’s weight, diet, exercise routine, or other health indicators or symptoms, with 23% of those using some form of technology to track another person’s health-related data, ranging from health apps to glucose meters.

labour both as private family members and as residential and institutional workers, and today, the management of care technologies also falls disproportionately to them. Thus, for women care workers, managing data care (updating, collecting, recording, interpreting, and relaying) becomes an added, but invisible burden to the already difficult and undervalued work of providing body care to older care recipients. And when they are not replaced by technology, carers' labour, (in)visibility, and conditions of care are reconfigured and redistributed by it (Milligan & Power 2010; Sousa 2013). Monitoring systems and devices implicitly operate with expectations that telecare operators and family care providers can be immediately, skillfully, and virtually available. These expectations assume a capacity and willingness on the part of family caregivers (if they even exist) both to partake in traditional care activities and to take on newer care responsibilities related to technological equipment and its data outputs. As Mol et al. (2010) assert, technologies "do not work or fail in and of themselves. Rather, they depend on care work" (p. 14). Furthermore, the intensification of older age care work through tracking and monitoring devices creates new unequal statuses and relations between skilled technical and "unskilled" non-technical labour (an issue beyond the scope of this article to elaborate).

Technologized gendered older age care labour is also linked to the wider political economy of health, even as it is rendered invisible in designs of smart home and domotic (home automation) devices that promise a reduction of paid and/or unpaid care providers (Milligan 2009; Roberts & Mort 2009).³ As neoliberal healthcare policies seek cost savings in care delivery for older people, they turn to the promise of technology in various areas that control labour, such as eHealth and telemedicine (Barakat et al. 2013), that further fragments or devalues care work. In their investigation of telecare systems promoted to older individuals living at home in England, Roberts and Mort (2009) suggest that they introduce a "tripartite

³ Feminist research has shown that time-saving domestic technologies neither relieved nor displaced women's work in the home, but expanded it (Cowan 1983). Berg's (1994) analysis of early versions of the "smart house" that captured the public attention by offering automated control over lights, heat and security, found these to be designed from the standpoint of the able-bodied, affluent male, while more affective tasks associated with social reproduction (cooking, cleaning, childcare, and social bonds) were largely ignored.

division of care”: monitoring, physical care, and social-emotional care. They argue that such care technologies both fragment and impose artificial boundaries around care tasks, ultimately undermining the complexities of care work and oversimplifying both the care experience and the complexities of social-spatial relations of care (see also Sousa 2013).

Assemblages of power, gender, labour, and technology have been problematized by contemporary feminist technoscience research on care (de La Bellacasa 2011; Martin et al. 2015; Murphy 2016). Here, care is positioned as an affective force that cannot be materially separated from instrumental forces of knowledge or technology, but rather frames important forms of knowledge production. Care work organizes technological operations as much as it is organized by them. Yet the invisibility of care work results in care being “othered” from the very thing on which it is acting (Barnes et al. 2016; Dalmer 2020). In practical terms, when cast as opposites, care and technology can keep particular lines of care work occluded or can reify these divisions between technologies and care. In the Canadian context, for example, Marier (2021) highlights a “carer blind” approach that continues to permeate supports for the country’s aging population, with services and assessments nearly wholly aimed at the older adult (at the exclusion of the care partner). The Canadian Healthcare Association’s 2009 policy brief “Home Care in Canada: From the Margins to the Mainstream” provides an example of how the integration of technologies appears to exacerbate this carer blind practice, as Marier notes. In this document, while the importance of both family care providers and information and communication technologies are separately recognized, curiously, in discussions highlighting the utility of technologies, caregivers are absent; they cease to exist. Their role in using and working the technologies or the additional labour these technologies impose on the carer are notably absent.

Perhaps, this division is mirrored in technological design itself, where most designers are men and script into their products the split between personal care as feminine (warm, loving, nourishing) and technological care as masculine (rational, effective, instrumental) (Mol et al. 2010; Pols & Moser 2009). Yet, as de La Bellacasa (2011) suggests, care also implies concern for those affected by sociotechnical assemblages, but “whose voices are less valued, as are their concerns and needs for care” (p. 92). However, the invisibility of domestic work and social reproduction-related

tasks within care practices for older adults persists, as Chivers (2018) and Storelli (2010) highlight, perhaps exacerbated by an unwillingness to acknowledge that care providers for older adults aging in place are often older adults themselves (Dalmer 2018).

As Sousa (2013) argues, it is crucial “to make visible the ways in which care for older people is (re)constituted through shifting conceptions of care” (p. 134). As new technologies redistribute care spatially and temporally, they intensify some aspects of care labour. They may collapse space and time (Couclelis 2009; Woods & Kong 2020), requiring a full-time vigilance for family care providers to be reached at any time in any location with a beep or buzz that initiates a series of decisions to be made. The vast amount of data requiring digesting and interpreting, where “even filtered data could be overwhelming” (Huber et al. 2013: 444), and the multiple daily routines and habits of older people requiring tracking and quantifying, push caregivers to merge physical and virtual worlds, serving as on-call data and information intermediaries. As a result, tracking technologies for older adults are marketed as – and lauded for – being immediate, continuous, and optimized, without, again, revealing the invisible work needed to compensate for the demands and costs of the device. One smart home company, Forma SafeHome, created ROSIE, a remote monitoring system marketed as providing “invisible companionship to seniors” while “giving their loved ones 24/7 access to critical information” (Forma SafeHome, n.d.). ROSIE,⁴ an acronym for “Remote Observation (for) a Secure Independent Living Experience,” includes activity tracking, doorbell video surveillance, stove monitoring, fall detection, emergency call buttons and real-time notifications, accessed and managed remotely through the caregiver’s smart phone or tablet. The caregiver is described on the company website as being “empowered” with the information needed to “analyze aging patterns and concerns” while the technology is

⁴ Lewis (2015) notes that many AI systems are created with female personae, from The Jetsons’ Rosie the Robot Maid, to Amazon’s Alexa and Apple’s original Siri (whose Norse name means “a beautiful woman who leads you to victory”), whose “helper” roles are often subordinate or submissive. A programmed female voice reportedly enhances users’ comfort and confidence with robotic care systems as they feel less threatened or intimidated as compared with a male voice, making the system (or robot) more accepted and welcomed in the home (Eyssel & Hegel 2012; Strengers & Kennedy 2020; Tay et al. 2014).

described as “non-intrusive,” “invisible,” and yet also a form of (female) companionship to the aging family member being cared for.

By thinking about the labour and gender relations of power compressed into the datafication of care, we can attend to the wider social relations and new boundaries between public and private spheres implied by the calculation and circulation of care data. We can also look more closely at the agency of caregivers for whom resistant and creative opportunities may emerge. For example, Winance (2010) suggests understanding care as a form of tinkering: “to meticulously explore, ‘quibble’, test, touch, adapt, adjust, pay attention to details and change them, until a suitable arrangement (material, emotional, relational) has been reached” (p. 111). This lens of care-as-tinkering acknowledges that care is not relegated to one body but to the many other people, devices, and tools that we use to regulate and monitor bodies and bodies’ actions, inputs, and outputs. It brings into focus the constellation of actors and activities that are knowingly, and at times unknowingly, put into play when people’s actions or routines are tracked. As Fotopoulou (2019) argues, “the challenge is thus to reinstate the materiality of data, to think about laboring bodies, invisible human practices, and social relations and activities” (p. 228).

Conclusions

In this study, we have reviewed aspects of self-tracking and surveillance health technologies whose quantification and datafication of care for older people reflect socio-technical power in three areas: (1) aging bodies and the power of numbers, (2) aging spaces and the power of surveillance, and (3) age care economies and gendered power relations. Our arguments urge a tempering of the optimistic claims that these and related technologies are solutions to keeping aging populations healthy and independent, while encouraging more desirable, efficient, and less costly forms of residence and care. We contend that to understand the growing centrality of technology in current systems of care and risk management, analyses should highlight the broader terrain of the neoliberal governance of health systems and austerity politics, and the age relations and gendered care labour relations, which they configure and endorse, including biases of ageism (Rosales & Fernández-Ardèvol 2020). As feminist research has demonstrated, bias and inequality become even more

invisible when technical and design discourses dissolve social inequalities and difference within neutral depictions of beneficial innovation and efficiency (Benjamin 2019; D'Ignazio & Klein 2020; Oudshoorn et al. 2016).

In underscoring the powers that accompany the datafication of aging care as complexly embodied, gendered and socio-technical, we seek to contribute to a view of aging futures that is less device centered and which resists oversimplified or stereotypical understandings of age, aging, and socio-technical power in later life. In doing so, we hope that our framework will foster a research agenda that looks to more creative future imaginaries of old age. In building on Peine and Neven's (2021) model of the *co-constitution* of aging and technology, our proposed framework thus carries implications not only for gerontological research but also for older adults. Promising directions are suggested by recent work that draws on critical age studies and science and technology studies, variously described as new materialist gerontology (Höppner & Urban 2019; Wanka & Gallistl 2018) or socio-gerontechnology (Peine & Neven 2019; Peine et al. 2021), that stresses the manner in which both technologies and aging lives are "co-constituted in a social field, comprised of actors, discourses and power relations" (Wanka & Gallistl 2018: 2). Within this field, not only are technologies social actors but older people and caregivers are technological agents and technogenerarians (Joyce & Loe 2010). In addition to tinkering with technologized care, they create technologies of their own (Bergschöld et al. 2020), make their own "little arrangements" to enhance autonomy within existing socio-material conditions (López Gómez 2015), reframe the nature of technological innovation in professional care practices (Bergschöld 2018), do repair work to ensure digital systems function appropriately (Schwennesen 2019), challenge negative aging images scripted into care technologies, such as companion robots (Neven 2010), contest demeaning age-based digital divide stereotypes (Neves et al. 2018), organize living spaces to prevent falls in imaginatively technical ways (Mahler & Sarvimäki 2010), and based on different social status identities, refuse remote passive monitoring technologies (Berridge et al. 2019). These and other studies provide a glimpse into the opportunities for a more diverse and co-participatory gerontechnological culture. As the power relations shaping aging futures become increasingly located and expressed in technical ways, understanding the agential interactions between material, technological, human, design, and environmental

relationships becomes more vital in contesting the health regimes and gender inequalities gathered into Age Tech datafication, tracking, and surveillance systems.

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The internet multiple – How internet practices are valued in later life

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Abstract

Internet practices of older adults are multifaceted and go beyond a “use” and “non-use” binary. In this article, we suggest a valuation approach towards Internet practices in later life that explores Internet practices not as “use” or “non-use,” but rather asks which forms of Internet practices are valued in later life, and which ones are de-valued. For this valuography, we draw upon different data sources, including interviews with older adults, to explore the multiple “goods” and “bads” through which Internet use in later life gets valued. The findings suggest two registers of value: autonomy and innovation. Valued Internet practices in later life are therefore done by an autonomous, older individual and include innovative technologies. We conclude that a performative, reflexive, and value-oriented understanding of Internet practices sheds light on the “Internet Multiple,” or the many different shapes the Internet takes in older people’s lives that go beyond a “use” and “non-use” binary.

Keywords: socio-gerontechnology, digital cultures, technology use, valuation studies, valuography.

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Introduction

We live in a digitized society in which engagements with technologies to access and use the Internet are omnipresent. Gerontological research indicates that older adults generally use the Internet less often, that they have less Internet competencies, and that significant age disparities in the uptake of and attitudes toward new technologies persist (Chen & Chan 2011; cf. Lee et al. 2019; Peek et al. 2014). There is also considerable evidence highlighting that most older adults *do engage* with the Internet in one way or the other; they might, however, do it in different ways than usually expected by studies on technology use in later life (Bergschöld et al. 2019; cf. Kania-Lundholm 2020; Loe 2010).

This ambivalence points to the fact that in a digitized world, there is arguably no such thing as a complete non-use of digital technologies, and the boundaries between using and not using the Internet are not fixed, but rather processual and fluid. Research has indicated that Internet practices encompass not only using or not using the Internet but also involve a plurality of engagements with the Internet, with usage practices (e.g. using the Internet for the first time), non-usage practices (e.g. stop using the Internet after failing to use it in a desired manner), hybrid or proxy practices (e.g. letting others use the Internet for them), to name a few. Using and not using the Internet is, therefore, are heterogenous phenomena that need to be studied in the context of both users' and non-users' everyday lives (Müller et al. 2015; Reisdorf & Groseli 2017), and focusing only on Internet use in later life runs the risk of making other valuable engagements with this technology invisible, and, in the long run, harming the self-perceptions of older adults as "incompetent" or "non-users," as "technology may be influenced by (perceptions of) ageing and in turn change what it means to age which can in turn influence perceptions of ageing" (Peine & Neven 2020: 2859).

Highlighting the diverse and manifold engagements that can be found in older adults' lives - even in the lives of those older adults who are usually understood as Internet "non-users" (Gallistl et al. 2021), however, open up the question why these engagements are made less visible in research and policy discourses on digitalization in later life. As most studies in this field usually apply binary conceptualizations of Internet use and non-use in later life (Fernández-Ardèvol 2016), they run the risk

of ignoring such valuable engagements with the Internet that take place outside of a “use vs. non-use” binary. Why are these engagements with digital technologies less visible in the research and policy discourse on digitalization and later life?

In this article, we suggest that this does not take place by accident; rather, it is the result of *valuation practices* that value some forms of Internet use in later life more than others. We argue that the relevant difference that shapes Internet engagements in later life is not the one between using and not-using the Internet; however, engaging with it in a way that is generally *valued* versus engaging with it in a way that is not *valued*. Drawing upon the sociology of valuation (Helgesson & Muniesa 2013; Lamont 2012), we therefore ask which forms of Internet practices are valued in later life, which ones are de-valued, and what are the registers of value with which Internet practices become (de-)valued, mapped, and categorized into “goods” or “bads”? And how do these registers relate to the binary of *using* and *not using* the Internet in later life?

To answer these questions, we present a valuography (Dussauge et al. 2015) of empirical data from different sources based on which we identify and discuss two registers of value, which are important in ordering Internet practices in later life: autonomy and innovation. *Valued* Internet practices in later life, as we argue, are reduced to Internet use that is done by an autonomous, older user, which consequently *devalues* practices of shared or proxy usage. Furthermore, *valued* Internet practices in later life are *innovative*, or done with and through new technologies, which consequently devalues the engagement with (older) technologies that are already embedded in the lives of older adults. Finally, we discuss our results against the backdrop of the current literature and argue how aging research can profit from deploying a valuation approach, as well as what valuation studies can gain by focusing more attention on later life.

A Valuation Approach toward Internet Practices in Later Life

The concept of value, in its manifold meanings, has been an ongoing subject of debate in aging research. On the one hand, a gerontological approach toward value has become visible when discussing the valuation

of (later) life itself, especially when the research focuses on the end of life. Such studies often draw upon the self-evaluations of biographies in which older adults are asked to reflect on the value their life has or has had (Lawton et al. 1999, 2001; Jopp et al. 2008). These studies explore the value of and the attachment to life in old age, and the concept of value is often applied to describe “the meaning and purpose of the individual’s total life” (Lawton et al. 2001: 26), which usually covers and is measured using items such as “Life has meaning for me” or “I feel hopeful right now” (Gitlin et al. 2016). Research in the field of critical gerontology, on the other hand, has drawn upon questions surrounding values and worth to explore how some forms of ageing – for example, healthy, active, or productive ageing, and the practices connected to them – are more valued than others by a society (Katz 2000). Through imperatives of active and productive ageing, a valuable later life is framed as “busy, creative, healthy, and mobile” (Katz 2000: 138) and governed by respective *activation policies*, ranging from increasing retirement ages to the marketing of anti-aging products (Van Dyk et al. 2013). In such accounts, value as a gerontological concept is understood as a *collective* good, as societies negotiate the values through which certain forms of life are worth more than others. In both of the accounts mentioned above, gerontological research on value and worth moves away from economic understandings of value, and rather focusses on the negotiation of the different values that are relevant for older individuals and for aging societies.

In moving away from an economic understanding of value, gerontology’s approaches to value show certain similarities with understandings within the sociology of valuation (Doganova et al. 2014; Helgesson & Muniesa 2013), which claims that value is not a stable entity that can be measured in economic worth, but is rather something that is constantly collectively (re)negotiated, evaluated, stabilized, and enacted in everyday life practices. Value is thus a situated and enacted practice, instead of an economically measurable constant. Valuation studies, therefore, do not look at values but rather at the processes through which manifold forms of value are “produced, diffused, assessed, and institutionalized across a range of settings” (Lamont 2012: 201). Looking at valuations means looking at “everyday inquiries about what is desired, cared about or held precious” (Vatin 2013: 32) and shifting “from coping with the value of things to describing valuation as an activity” (Hennion 2017: 70). Applying this

approach to Internet practices means looking for the diverse and ambivalent ways through which the diverse “goods” and “bads”¹ of Internet practices are evaluated, as well as questions on how it comes to be that some forms of Internet practices in later life are valued more than others.

To explore these diverse valuations of Internet practices in later life, we need to start by viewing the *not* Internet as something that can (or cannot) be used, but as an omnipresent part of social practices. Such practices can be described as “temporally and spatially dispersed nexus[es] of doings and sayings” (Schatzki 1996: 89), “which consist of several elements interconnected to one other” (Reckwitz 2002: 249), including bodily and mental activities, artefacts and things, knowledge, attitudes, and affects (Shove et al. 2012). Approaching the Internet from this perspective implies understanding it as a constellation of practices, consisting of “doings” like opening a web browser, or issuing a transfer of money via online banking, but also looking up a number in a phone book to avoid Google, as well as “sayings,” like talking about what you have seen on the Internet and talking about why you do not want to use the Internet or writing a post on social media. These doings and sayings, again, comprise a variety of interconnected elements, comprising materialities that include technological devices (e.g. a computer, tablet, or smartphone), competencies, skills, and knowledge about the Internet, or meanings, including valuations of Internet uses (e.g. as a waste of time or an absolute necessity) (cf. Shove et al. 2012). It is the latter that is the focus of this study.

This then allows us to comprehensively view and describe the wide range and pluralism of Internet practices without a priori selecting or hierarchizing them based on their function, assigned benefit, or the conceptualization of use and non-use. Internet use, from this perspective, contains everything that happens in, about, and with the Internet – from closing a browser window to maintaining a YouTube channel to watching porn, to reflecting upon reasons as to why not using the Internet is a good choice. The question “what is Internet use?” from such a

¹ In using these terms, we want to highlight that we understand valuations as ordering practices that locate phenomena along different axes of normative judgements. We therefore use “goods” and “bads” as plural terms to highlight this diversity of normative orientations of valuations practices.

praxeological perspective (Wanka & Gallistl 2018) then turns into “how is Internet use?”

Such a perspective, hence, is built on the premise that there is a plurality of engagements with the Internet in later life that go beyond practices of using or not using the Internet. Nevertheless, how can it be that we have learned to make sense of the Internet through the binary of using or not using it? It is exactly at this point when *valuations* come to matter in Internet practices in later life. While Internet practices might hence be diverse, multifaceted, and encompass almost everything a person can do in a digitized world, valuation practice provides a hierarchical order to these omnipresent Internet practices, as they map and organize different Internet practices through the different axes of goods and bads, real or not real, and actual and not actual. Acknowledging the multiplicities of values (Dussauge et al. 2015) behind such hierarchical orders, this study aims to reconstruct the different *registers of value* through which the value of internet use is mapped.

These registers of valuing, as Heuts and Mol (2002) find, “indicate a shared relevance, while what is or isn’t good in relation to this relevance may differ from one situation to another” (p. 129). For exploring the valuation of Internet practices in later life, this implies that even though Internet practices might be mapped towards an economic value (e.g. when choosing the right device according to price), there are many other “goods” and “bads” at play that direct and order Internet practices in a hierarchical manner. For example, it might be “good” to use the Internet to stay in touch with your children and family, just as it might be “good” to use the Internet for memory training in later life, while it is considered “bad” or problematic to not use the Internet at all or to use it too much (as suggested by Gallistl & Nimrod 2020). Based on such a perspective, we therefore ask the question, which forms of Internet practices are valued in later life, which ones are de-valued, and what are the registers according to which they are (de-) valued, normatively mapped, and categorized?

When we have come to see the diversity and multifacetedness of Internet practices, we may then, second, ask why so few of them are represented in the public discourse, for example, in the media, policy debates, or research. How come certain Internet practices are more visible and valued than others? How come some Internet practices seem to be more

“precious and cared about” (Vatin 2013: 32) not only by older people but also by gerontological research or policy-making than others? A reflexive perspective, as has long been proposed in science and technology studies (cf. Knorr-Cetina 1981), sensitizes us to the fact that research itself is embedded in, and thus biased by, societal structures and discourses. The way we define, operationalize, measure, and depict Internet use when researching and writing about it is a powerful practice itself that significantly contributes to the discursive representation, the meanings, and the valuations attached to it (Moreira 2016). Therefore, there might be many different experts who decide on which forms of practice are valuable and which are not, and who establish and diffuse the registers of valuing that are relevant for the valuation of particular practices. Some of them might be individuals (e.g. older adults), some of them might be collectives (e.g. research groups and projects) or institutions (e.g. the European Commission), and some of them might even be harder to grasp (e.g. innovation discourses surrounding the aging and technology nexus). In the following valuography, we aim to take the perspectives of these different experts on Internet practice in later life into account and ask the question, what is *valued* Internet practice in later life?

Methods

This article situates its empirical exploration as a valuography that includes empirical reflections that are oriented toward “an empirically oriented and analytically sceptical research programme of values as enacted” (Dussauge et al. 2015: 268). In the following, we therefore list two registers of value that, drawing on empirical data, demonstrate how configurations of Internet practices shape the values that are at play in a particular situation.

However first, who is an expert on valued Internet practice in later life? What are the sites at which valuations of Internet practices in later life can be evaluated? To enable a multi-perspective view on the multiplicity of values (Dussauge et al. 2015), we decided to draw upon different data sources to gain expertise knowledge on valued Internet practices in later life. These data sources stem from two different research projects that were conducted at the University of Vienna between 2016 and 2021. Within these two projects, we focused on three perspectives on values in

our analysis: funding bodies and their mission statements, project proposals, and qualitative data that were gathered within the projects. The latter served the purpose of integrating older adults' perspectives into our valuography.

The EnterTrain project (2016–2019) was funded by the European program Ambient Assisted Living and aimed to develop a personalized gaming platform that could be used by older adults in the comfort of their private homes. The aims (and values) of this project were threefold: first, it aimed at achieving technological interoperability by integrating and connecting different Ambient/Active and Assisted Living (AAL) systems and services to the gaming platform, which was developed for older users. Second, it aimed at developing a personalized technological solution that was tested to be able to adapt to its users' mobility status and behavior. Third, and most importantly, the project aimed to increase the quality of life of its older users by supporting the development and maintenance of self-esteem, motivation, and physical activity (<https://cvi.tuwien.ac.at/project/entertrain/>).

The ACCESS project (2018–2021) was funded in the third call for funding "Ageing and place in a digitizing world" of the European More Years Better Lives Joint Programming Initiative (<https://jp-demographic.eu>). Taking older adults' obstacles and barriers toward digital technologies as its point of departure, the project aims at developing new, socially embedded learning opportunities for older adults, especially for those with low digital competencies. Within the project, enabling older adults to use digital technologies autonomously is, therefore, a central value, which will be tested through informal, non-formal and formal learning, as well as in practice labs and using demo kits.

Within the ACCESS project, we draw upon project descriptions and the call for proposals under which this project was funded. In addition, we include data that were collected and analyzed within the project from 15 semi-structured interviews with older adults (65+) in Austria who self-identify as "non-users" of digital technologies. Data were analyzed using thematic coding (Flick 2016). For sampling, an open call was made and addressed older adults (65+) who self-identify as "non-users of the Internet." We distributed this call through municipalities, neighborhood centers, pensioner clubs, local associations for older adults, and nursing homes. The final sample consists of people between the ages of 69 and

88 years, with a mean age of 79 years. Interviews lasted for 65–126 minutes and were audio recorded, transcribed verbatim (in German), and analyzed with the data analysis software MAXQDA 2018. Interview quotes were translated from German into English by the authors.

Registers of Valuing in Internet Practices in Later Life

In line with Heuts and Mol (2013), we identified two registers of value from both the review of current research on aging and the Internet and data derived from the projects EnterTrain and ACCESS (see above).² Such registers, the authors outline, “indicate a shared relevance, while what is or isn’t good in relation to this relevance may differ from one situation to another” (p. 129). These partly overlapping, partly ambivalent registers circle around notions of autonomy (register 1) and notions of innovation (register 2), and will be explored in more depth in the following.

Register 1: Autonomy

A first register relevant to valuing Internet practices in later life that we found in our data has to do with autonomy. In the data and examples of projects that are used for this study, we see this play out in two dimensions: first, as valuing practices that enable autonomous interaction with the Internet over those practices in which a variety of actors are involved (e.g. in shared or proxy Internet use), and second, as valuing Internet practices that are functional for maintaining a generally autonomous lifestyle over those practices where the Internet is used for purposes aimed at fun or entertainment. Valuable Internet practices in later life are, hence, those that are carried out by an autonomous, older person, or with autonomy in later life as a goal.

In the study on self-proclaimed older non-users of the Internet, which was conducted in the ACCESS project (see above), this valuation of valuable Internet use became visible in how older non-users of the Internet negotiated and valued their engagements with the Internet during the interviews. Far from total non-users who had never engaged with the

² The identification of two registers can be criticized as reproducing binary thinking, and we are well aware of the fact that a wide variety of registers can be found in other data.

Internet in one way or another, most of these self-proclaimed non-users describe regular engagement in Internet practices, despite also stating that they mostly did not wish to engage with digital technologies at all in the beginning of the interview (Gallistl et al. 2021). Most interview partners, therefore, regularly engaged with the Internet, however, in a way that they did not assess as the “real” or “right” way of using the Internet. Interview partners often highlight that they did not “really” (IP4 [79, f]) use the Internet, or were using it “just for the basic stuff” (IP8 [85, f]), which often included communication apps, social media, or platforms for streaming videos and other kinds of media.

In the interviews, “really” (IP4 [79, f]) using the Internet, or using the Internet in the right way, connected to experiencing yourself as an independent user of this technology who is in control of what is happening online at all times. One of the interview partners, who had just described how she regularly used her smartphone to stay in touch and share photos with friends and family, explained, “but I’m far from being able to use everything, so I am not in control of it yet.” (IP4 [79, f]). Being able to use the Internet in the “real” or “right” way was therefore connected to feeling autonomous and in control while doing so; in her mind, it was therefore related to using the Internet autonomously and independently.

One consequence of this register of valuing was that shared Internet practices – using the Internet with or through your friends and family – were consequently devalued as “not really” using the Internet. One of the interview partners, for example, explained that when she needs “something, I have someone who helps me anyway, who, let’s say, writes something [via e-mail] or looks something up. (...) Something about a treatment for dogs and cats, [my friend] printed that for me.” (IP15). Another interview partner describes how she regularly asks her daughter to look up relevant information on the Internet: “I often ask my daughter something like ‘We are going on vacation; how is the weather there?’ And she takes out her phone, pushes some buttons ‘It’s 20 degrees there’. And this is just one example.” (IP13)

However, even though these engagements in Internet practices were at times strikingly successful in that they produced the desired results for interview non-users, they were not perceived as “really” using the Internet. At times, interview partners even described how they were “using” other persons for their purposes and even felt bad about it: “Internet

stuff... – [my son] looks stuff up for me. I mean, I do *participate* in the Internet. I say something like ‘Look up this hotel’ or something. But, yes, I do use and take advantage of him. I have to admit that” (IP14).

This register of valuing, therefore, narrows down Internet practices to individual Internet usage, which is deemed to be “better” when performed autonomously – hence, without help. On the one hand, such an understanding makes other Internet practices that are not strictly “usage” invisible; for example, practices that involve talking, thinking or knowing about the Internet, or even refusing to use it. On the other hand, the register of autonomy devalues practices of Internet use that require the help or assistance of another person; for example, being shown how to use a search engine by a grandchild or caregiver or having other people research on the Internet for you.

Beyond these engagements with the value of autonomy of older non-users, the value of autonomy – of using the Internet as one, independent user – is also visible in current research on this topic. We find this resembled in, inter alia, hegemonic operationalisations in standardized, quantitative surveys. Even though reviews on the topic claim to take different kinds and aspects of Internet practices, for example, measuring different kinds of proxy Internet use, more seriously into account for a long time (Hunsaker & Hargittai 2018), most large-scale studies on Internet use in later life usually apply rather simple yes/no binaries on Internet use and usually focus on access and use of the Internet, with only few or no follow-up questions on years of use, frequency of use, context or types of use or involved actors. Often, a single, dichotomous question is the only variable that describes Internet access, which not only conflates different types of motivations for and challenges in usage but also makes practices of shared or proxy usage invisible. The largest survey on age and aging in Europe, the Survey of Health, Age and Retirement in Europe (SHARE), for example, contained one single question on Internet practices in its last wave (Wave 7): “During the past 7 days, have you used the Internet, for e-mailing, searching for information, making purchases, or for any other purpose at least once?” which could be answered with either “yes” or “no” (SHARE 2021).

The second dimension in which the register of autonomy in valuing Internet practices manifests shifts the focus from the interaction between an individual person and the Internet – as implied above – to the wider

life world of older adults, in which Internet practices are embedded. This register of valuing becomes visible through the funding bodies that address technological development for the older population. The European AAL Joint Programme, through which one of the projects under scrutiny here was funded, lists as the first goal of its funding strategy to “foster the emergence of innovative ICT-based products, services and systems for ageing well at home, in the community, and at work, thus increasing the quality of life, autonomy, participation in social life, skills and employability of elderly people” (AAL Joint Programme 2021). Innovative technologies, in that sense, are mainly used to enable aging well “in place,” which includes ideas around autonomy, independence, and not being in need of (institutional) care (Wiles et al. 2011). Technology use in later life, hence, is mainly directed toward autonomy in later life, and technologies are used as instruments to enable and support this autonomy.

Using digital technologies and appropriating new Internet practices in later life, hence, are expected to contribute to or be oriented toward maintaining autonomy and independence. This register of value, therefore, narrows down what the Internet in later life should be mainly used for the purposes of staying and maintaining autonomy in later life. Furthermore, this first dimension (implicitly) narrows down by whom the Internet should be used in later life – namely, a mostly independent, single-older user, who is independently in control of the activities he or she is doing online.

Register 2: Innovation

A second register relevant to valuing Internet practices in later life that we identified in the data has to do with innovation. It has been established that innovation discourses that position innovative technologies as a normalized, legitimate and acceptable solution to the alleged problems connected to demographic change shape technological developments for an aging population (Neven & Peine 2017). With regards to the different registers of valuing that are relevant in Internet practices, we see this play out across two dimensions in the data: first, as valuing Internet practices that involve innovative technologies over those which involve older technologies and, second, valuing Internet practices of early adopters over those of other user groups.

The first dimension targets the innovation of technological artefacts that are involved in Internet practices. Campbell (1992) has described this as a general societal “desire for the new” (p. 48), for which innovation research has found various explanations – ranging from economic growth to social comparison, creation of self-identity, mental stimulation, or the “Diderot Effect,” that is, the belief that people only replace technologies rationally once they no longer work or can be replaced by better ones (Ingram et al. 2007). The value of innovation, or the desire for the new, that is both manifested in and satisfied through new and innovative technologies, was also visible in the analyzed interviews with older non-users of digital technologies. Throughout their life, they had engaged with – at the time – innovative, new, and therefore desired technologies on numerous occasions, and in the interviews, these instances were often described as affective moments, which were highly appreciated by the interviewed older adults. One of the interview partners highlights how, during his youth and childhood, saving money and buying the latest technologies were something that would ensure respect and admiration from other children in the neighborhood: “There was a microphone that you could use to sing, talk and record yourself. Yes, I was the boss there, in my neighborhood, where I lived. When I went over to my neighbors, they would say something like: ‘Here, sing something!’ and then I would record it and they would say ‘Wow! That is amazing!’” (IP9).

For most interview partners, however, this had significantly changed in later life, as most of the interview partners did not wish to engage with digital technologies, and the digital technologies they had at home were often “old” technologies instead of new ones. One of the interview partners, for example, describes how she has digital technologies at home; however, she does not use these technologies because they are hand-me-downs from her granddaughters: “Well, she brought me this [tablet], because she bought a new one. I guess it is an old version or something. It’s lying around in the back somewhere” (IP11). Internet practices that involved older technologies – a hand-me-down from her granddaughter – was not highly valued by the interviewed older woman.

The register of innovation has also been a longstanding topic in research about technologies, in general, and was often connected to the question regarding who picks up which practices and devices at what point in time. In her influential theory on diffusion of innovations,

Everett Rogers (originally 1962; 1995) argues that innovation must be widely adopted to self-sustain. She, therefore, differentiates between four groups of people: early adopters as the first to deploy innovative technological practices, followed by the early and late majority and, finally, the laggards as the last group to adopt a new practice. Whereas early adopters are usually framed as young and well educated, laggards are perceived to be older, less educated persons – a labelling that is both agist and classist, and empirically inaccurate (Essen & Östlund 2011; Peine et al. 2014).

The first dimension of the register of innovation is thereby closely entangled with its second dimension, which can be pointedly summarized as follows: Internet practices that involve early adopters – in the interview often portrayed as younger people – are hierarchized over those involving laggards – in the interviews often portrayed as older people. Abridged, this implies whatever the Internet practices of younger people are, they will be valued higher than the Internet practices of older people – even if both resemble each other at some point in time. For example, when younger people refrain from using certain messenger services or do not use the Internet at all, they care about their data privacy or go on a digital detox, while older people doing the same are framed as overcautious and technology averse (cf. Grenz & Pfadenhauer 2017)

This is in line with what gender studies describe as devaluation theory, claiming that disadvantaged groups are culturally devalued in a society, in general, and, as a result, the occupations and tasks of these disadvantaged groups are not only less culturally but also economically valued. Studies (e.g. Mandel 2018) suggest that as soon as the proportion of disadvantaged groups in an occupation increases, wages tend to decrease. As outlined above, similar processes can be found when older adults take up technological practices, in general, and Internet practices, in particular – they become devalued. However, this is not always or necessarily the case. As shown by Peine and colleagues (2017) in the case of e-bike use, older adults can, in fact, be the first to engage in innovative technology practices that only later diffuse to younger age groups. Retro culture points to another such example, in which marginalized and often forgotten practices are rediscovered (cf. Hogarty 2019) – a phenomenon Stuiver (2006) describes as “the retro side of innovation” (p. 147). Even if similar

developments have not yet so much affected Internet practices, they can very well do in the future (cf. trends like digital detox).

In the study on older Internet non-users, which was conducted within the ACCESS project (see above), this register of value was most visible when interview partners evaluated their own competencies in engaging with new, digital technologies – and often found that they were insignificant compared with the younger generation. One of the interview partners explains how she does regularly interact with her phone to use the Internet, “but when I look at my grandson typing away on it, all the things he gets out of it – I am a zero” (IP8). This register of value therefore meant to devalue one’s own competences and engagements with the Internet; however, it also meant to construct the Internet practices in which younger adults were involved as valuable, while Internet practices in which older adults were involved were devalued. One of the interview partners further explain how she is successful in finding how to get to certain points in the city where she lives with Google. However, as soon as her grandson displays how he interacts with Google, she feels less competent: “I know how that [Google Maps] works, alright? And my grandson tells me, ‘Grandma, you just have to put it into the search bar!’, Yes, but I don’t know where I have to click to get to the search bar. I mean, if push comes to shove, I know how to handle myself. Yes. But compared to how in control he is with these things...” (IP8).

Discussion

This article developed against the backdrop of a digitized society, in which engagements with digital technologies and the Internet in later life have become omnipresent. These engagements of older adults with digital technologies, we argued, are diverse and multifaceted, and far exceed the scientific discourse in aging research that tends to reduce them to binary questions regarding the use or non-use of the Internet. However, as we have argued using a practice-theoretical perspective of valuation studies, it is not really so much the difference between using and not using the Internet that is an important topic of research for gerontology, but rather interacting with it in a way that is generally valued versus using it in a way that is not valued.

We asked the questions, which forms of Internet use are valued in later life and which ones are de-valued? What are the different axes of diverse “goods” and “bads” through which Internet practices in later life are hierarchized and mapped? We were therefore far from defining and measuring the value of Internet practices in later life, but rather explored how it is that some forms of engagement with the Internet become more valued than others. We also abstained from defining our crucial terms – what is value and where can it be found – and instead looked at processes of valuing Internet practices in later life, meaning that we explored what valued Internet use looks like in later life, which (older) users should be involved with it, and for which reasons the Internet should be used.

To approach the question regarding which Internet practices are valued and which are not, we included three perspectives: funding bodies and their mission statements, project proposals, and qualitative data that were gathered within these projects. The latter served the purpose of integrating older adults’ perspectives into our valuography (Dussauge et al. 2015). While these diverse experts on Internet use in later life undoubtedly have diverse, and at times contradictory, perspectives on what constitutes valued Internet practices in later life, we were still able to retrieve two different registers of values that these three groups of experts seemed to agree on: the autonomy and innovation of Internet practices in later life. Valued Internet practices in later life were, therefore, Internet practices that were done by an autonomous, older individual and were innovative in the sense that they included new, innovative technologies.

Both of these registers of value are, however, two dimensional in themselves: Autonomy plays out, first, as valuing autonomous interaction with the Internet and, second, as valuing Internet practices that are functional for maintaining an autonomous lifestyle, in general. Valued Internet practices in later life are, hence, those that are done by an autonomous, older person, or are done with autonomy in later life as a goal in mind. The register of innovation plays out, first, as valuing newer Internet practices over old ones and, second, as valuing Internet practices involving younger people over those involving older people. As Heuts and Mol (2013) have pointed out, however, such registers are often in tension with one another, leading to clashes and compromises. If you are expected to interact with the Internet autonomously, hence without any help, but you are also expected to engage in the most recent practices and deploy the

latest devices for it, this requires – especially with the fast, technological developments we are facing – an enormous amount of work and, accordingly, time to be put into, staying up-to-date and learning new Internet practices basically every day. Here, another register of value that we did not discuss in detail in this article, as it does not specifically target Internet practices as such but later life more, in general, becomes relevant: scarcity of time. Being confronted with the amount of time required to become a “valued” Internet user, older adults might react by claiming that they would not waste the time they have left on this endeavor (for a more in-depth discussion on “wasting time” in later life, see Wanka 2019). Hence, it becomes clear that there are a variety of registers of value, either targeting Internet practices, later life in general, health, or other realms, that come into play here, overlap, and potentially contradict one another. Mapping these registers more carefully, for example, by drawing on situational analysis (Clarke 2007), and using more data to do so would be an endeavor worthwhile.

Focusing on the two registers we used as examples on in this article, we can, however, already draw a central conclusion of particular value for valuation studies in aging research. Taking a reflexive stance on research practices in the field of aging and technology reveals how limited the understandings of Internet practices as (autonomous, innovative) Internet use resembled in research often is. And even if such understandings, and their respective operationalizations, can provide significant insights, they also limit and reduce what we can find out about the manifold diversity of Internet practices and technology practices, in general. Asking not only whether older adults use the Internet (and if so, how long, on what device, etc.), but how they think, talk and feel about the Internet, where, when, and how they encounter it in their everyday lives, which skills they develop and practices they engage in in place of using the Internet autonomously themselves (e.g. engaging in neighborhood networks instead of social networks, reading real maps to get around), etc. With a broader understanding of Internet practices, the research could extrapolate new fields and topics apart from functional use to maintain autonomy, like the Internet humor of older adults, the porn they consume, or the forms of cyber mobbing they experience. Such findings could help shed light on what could essentially be described as the “Internet Multiple” (cf. Mol 2002), or the many different forms and shapes the Internet as a seemingly stable

entity can take in threading through different lives, life stages, unequal living conditions, and experiences and contexts. Understanding this multiplicity of Internet use in later life might then also enable a deeper understanding of the digital inequalities that shape later life: How, when, and for what purposes the Internet is used in later life differs significantly by sex, education and income and studies have, for example, highlighted that older adults with lower socio-economic status tend to use the Internet more extensively for entertainment purposes than others (Gallistl & Nimrod 2019). A valuation approach towards Internet use might also question how the socio-economic difference shapes the subtle differentiations between “valued” and “devalued” forms of Internet use.

The field of Socio-Gerontechnology (Peine et al. 2021), emerging at the intersections between age studies and science and technology studies, has started addressing some of these questions. Based on a notion of “co-constitution” of aging and technologies, socio-gerontechnological research departs from the assumption that technology is influenced by processes, practices, and discourses of aging, and can, in turn, shape images of aging and aging identities (Peine & Neven 2021). This implies that the devaluation and invisibilization of older adults’ Internet practices might lead to harm, scarring, or even stigmatization of older adults’ identities. Intensifying these discussions in age studies and Science-and-Technology-Studies (STS) seems promising in finding more nuanced and complex approaches towards Internet practice in later life that go beyond framing older adults as laggards or non-users. Another aspect that our reflections on the different registers of valuing Internet practices in later life highlight is the concept of performativity of valuing practices. Valuing Internet practices was not done by an external expert, who distantly reviewed how older adults engage with digital technologies and who organized their engagement in valued and devalued practices. Rather, the case we have presented here shows how valuing is not a judgmental or reflexive activity, oriented toward transparent normative judgments, but actively mixes with carrying out research on the topic, receiving the funding to do so and – finally – deciding on which forms of Internet practices to engage in and which ones to refrain from in later life (on the performativity of valuation, see Heuts & Mol 2013). The valuation of Internet practices in later life was therefore connected with practices of the diverse

“experts” we analyzed here, and the two registers of value we identified were not abstract normative expectations toward digital engagement in later life but were rather formed through and, in turn, formed practices – of funding bodies, project teams, and older adults. For research on aging and technologies, this highlights that engaging with the Internet in later life is not an instrumental but rather a normative activity, as it actively connects and relates to different, normative ideas of why the Internet should be used, for which reasons the Internet should be used, and in which way the Internet should be used. Taking these normative dimensions of Internet practices in later life more closely into account enables gerontology to draw a more comprehensive picture of the diversity of Internet practices in later life. In addition, it might enable a deeper understanding of digital inequalities in later life and how they are reproduced through normative judgments of digital “goods” and “bads,” of a certain digital lifestyle, or of a certain digital habitus (Ignatow & Robinson 2017).

A question that we could not address in this article, but that is of central relevance to this argument, is where registers of value come from – how they emerge and who is involved in making and shaping them – and this question basically targets the issue of power. As we have outlined, many actors are involved in registers of value, including policymakers, funding bodies, technology developers, researchers, and older adults themselves. By discussing the registers of autonomy and innovation in more detail, we have ourselves taken a rather top-down approach to the issue, reconstructing registers, which we have found cutting through different societal layers, from the policy level to the level of everyday lives. However, if we looked more closely, and separately, at one of them, we may likely find a range of other registers that overlap with, and contradict, the register of autonomy and innovation.

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Transcending borders and stereotypes: Older parents' intergenerational contacts and social networking through digital platforms

By ANOOP C CHOOLAYIL* & LAXMI PUTRAN

Abstract

Older adults are often portrayed as incompetent digital citizens, mostly stemming from the popular perception of older adults as “digital immigrants.” The purpose of this research study was to study how older adults can effectively engage in digital platforms. Following a qualitative approach, 30 older parents who have emigrated children (15 males and 15 females) from Kerala, India, were interviewed who were active users of Information and Communication Technologies (ICT). The findings show how the respondents embraced digital technologies stemming from perceived emotional benefits associated with intergenerational contact, without which they would not have ventured into the digital space. From seeking emotional goals initially, the respondents gradually started pursuing intellectual goals in the digital world. The varying degrees of expertise of older adults in the digital space indicate that they cannot arbitrarily be categorised as digital immigrants. Instead, they are “digital citizens” who gradually better themselves in social networks, information literacy and social participation online.

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Keywords: older ICT users, digital divide, digital citizenship, digital literacy, socioemotional selectivity theory.

Background of the Study

Life in the present era is marked by an overwhelming trend towards digitalisation. The term “virtual” has become synonymous with reality in the present world of digital connectedness. This digital connectedness gradually evolved from the beginning of the 1990s with the advent of the internet. Since the establishment of the World Wide Web in the 1990s, digital platforms have produced revolutionary changes in almost every sphere of social life. The internet evolved from an elite platform to an everyday feature in a very short span of time. With this evolution, the internet opened up the possibilities of virtual connectedness, which became the “new normal” in the early 2000s. However, with the popularisation of the internet, an unnoticed intangible divide came into existence, that of digital natives and digital immigrants (Prensky 2001), with the former being individuals with the digital ecosystem programmed to their fundamental existence and the latter being individuals who deal with the digital as a learned phenomenon. While the digital natives engage efficiently in ICT, digital immigrants pursue to familiarise themselves with technology through conscious learning efforts (Dingli & Seychell 2015). The notion of “digital natives” is sometimes theorised as superficial arising from a sense of moral panic, referring to a state of affairs where a topic of public interest gains more attention and prominence than factual backing in favour of the phenomenon (Bennett et al. 2008). Although the idea of “digital natives” is sometimes termed as superficial, the existence of a digital divide, expressed as a generational gap, cannot be denied (Kania-Lundholm & Torres 2017). Digital divide, in plain terms, refers to the disparity between people having access to resources pertaining to ICT in contrast to people without it. The reasons for the digital divide could be socio-economic, geographical, educational, attitudinal or generational (Cullen 2001). The generational aspect of digital divide is often extrapolated to draw assumptions regarding the status of older adults.

Older adults constitute a population that is traditionally assumed to be on the wrong side of the digital divide vis-à-vis digital immigrants

as they could learn using ICT only at adulthood, and hence, face some difficulties with ICT compared with those who grew up with the internet (Wang et al. 2013). Sometimes, the divide is taken a step further to describe them as “digital aliens,” given the popular belief that they are aloof from the digital way of life (Vigouroux-Zugasti & Bourret 2019). Studies on the digital divide and lower engagement rates of older adults in the digital horizon have been attributing the trend to be the result of multiple factors, including poor access to the digital platforms (Kania-Lundholm & Torres 2017), lack of interest (Heart & Kalderon 2013), and limited relevance and need (Selwyn 2004; Selwyn et al. 2003). The minority of older adults who engage in the digital world are highly stratified by age, gender, marital status and education (Selwyn et al. 2003), and the subset of older adults who consider themselves good at ICT perceive themselves as exceptions to the general older adult population (Kania-Lundholm & Torres 2015). Research studies suggest that the nature of digital engagement of older adults and the skillset they develop depend to a great extent on the ease of access to technology (Schreurs et al. 2017) and a sense of need or motivation to engage in such platforms (Morris 2007).

Digital Citizenship

The idea of digital citizenship is often discussed in association with the digital divide. Digital citizenship denotes the capacity of an individual to participate in a society online (Mossberger et al. 2008). The term implies concepts like “... access, participation and societal integration” (Schou & Hjelholt 2018: 3), which, in turn, are linked to the idea of the digital divide. Digital citizenship is a concept that emerged in developed nations; however, it is still in a germinal or seminal stage in developing nations. Access to ICT, which is a foundational requirement for digital engagement, is near universal in developed nations. However, in the case of many developing nations, access to digital platforms is a work in progress. Digital citizenship is argued to be an essential element to integrate fully into modern societies (Shade 2002). With the idea of citizenship getting shaped increasingly by digital communication (Shelley et al. 2004), people assumed to be on the wrong side of the digital divide end up being perceived as technologically unskilled to perform as fully functional digital citizens.

The effectiveness of digital citizenship often revolves around the question of being digital natives and digital immigrants. Digital immigrants are often perceived as a group that “remain obstinately tied to older media, and who are failing to catch up with the times” (Thomas 2011: 10). The notion that digital immigrants are reluctant and slow to embrace digital technologies consequently leads to the idea that digital immigrants possess lesser potential to become effective digital citizens. Thus, the terms digital immigrants and digital citizens are precariously linked. The question of so-called digital immigrants being digital citizens at par with the digital natives is the one that falls within the scope of the debate on the digital divide.

Although digital citizenship was originally conceptualised in the political sphere, it bears significant implications for older adults who are believed to lag in adapting themselves as digital citizens due to computer anxiety and technophobia (Dijk 2009). This study explores the patterns of ICT usage among older adults and their success in becoming digital citizens. The aim is to address what constitutes meaningful digital interactions for older adults and how they make sense of their digital life. Based on the results, we argue that older adults can be successful digital citizens, putting efficient use of ICT for things that they deem to be useful.

Digital Divide and Older Adults: A Background Analysis of Kerala, India

Despite mass digital literacy programmes, India is still considered digitally poor (Srivastava 2020). It is estimated that around 90% of the population in India is digitally illiterate (Digital Empowerment Foundation 2018), despite being the top digitally dexterous nation in the world (The Economic Times 2020). The case of the digital divide, hence, is a factor beyond the duality of digital natives and digital migrants in India. The digital divide in India is a complex phenomenon having its roots in multiple factors, including disparities in internet availability, teledensity¹ and mobile phone access (Singh 2010). Such disparities create a privileged section in the society who have resources to access digital platforms, unlike

¹ Teledensity is the number of telephone connections per 100 individuals.

in developed nations where access is near-universal. The Government of India has been rolling out policies and intervention strategies to minimise the rampant digital divide in the country. The country has been implementing three major digital literacy² programmes: the National Digital Literacy Mission, the Digital Saksharta Abhiyan and the Pradhan Mantri Gramin Digital Saksharta Abhiyan since 2014, aiming at mass digital literacy (Srivastava 2020).

With the popularisation of smartphones and affordable data plans since 2014, the pattern of internet access and digital involvement of people in India has been witnessing a positive leap (Majumdar 2018). In terms of data cost, India tops the world with the cheapest rate per GigaBytes of data at 0.09 USD (Cable.uk. 2020), and when it comes to smartphone penetration, India ranks 18th among the world nations (Newzoo 2018). However, when it comes to digital literacy, there exists a gulf between age groups. In a nation like India that is engaged in a fight to minimise digital poverty, older adults face a double burden when it comes to digital platforms, primarily due to the lack of access and the absence of opportunities to learn and adapt to these platforms. A total of 27.5% of the population aged 14–29 years can operate a computer in India, in contrast to only 2.5% in the age group 60+ years (Council for Social Development 2017).

Kerala as a southern state is a positive outlier in India, in terms of many developmental indices. Its Human Development Index³, literacy rate and health services are at par with the developed nations (Parayil 1996). The state has been making constant digitalisation efforts. When it comes to the population that can operate a computer, the state has shown steady improvements. The state has the highest smartphone coverage in India, with 65% of the phones used being a smartphone (Thomas 2018). It is found that 77.5% of the population, aged 14–29, can operate a computer. However, the corresponding percentage of people aged 60+ years is only 4% (Council for Social Development 2017). Hence, it could be argued that there is a generational gap in terms of digital usage between young

² Digital literacy refers to the skillset required to communicate with others and access information using digital technologies.

³ Human Development Index (HDI) is an average measure of life expectancy, education and per capita income.

people and older adults in the state of Kerala. This study focuses on the exceptional section of older adults who are active in digital platforms.

Digital Life as Socioemotional Selection against the Background of Migration in Kerala

Based on the results from our selective sample and socioemotional selectivity theory, we argue that older adults can engage in the digital world with ease and become digital citizens over a very short period with the right motivational factor, namely inter-generational contacts. The socioemotional selectivity theory proposes that owing to a perceived sense of decreasing time left to live, older adults prioritise emotional goals over intellectual ones, thus giving preference to meaningful social relationships that provide emotional well-being (Carstensen et al. 1999). Thus, socioemotional selectivity theory suggests that older adults engage and invest their time and effort, in what they perceive to be emotionally rewarding. A future time perspective is an aspect of the socioemotional selectivity theory, which suggests that with a perception of decreasing lifetime, individuals tend to involve in goals that are more emotionally than intellectually rewarding. The primacy of an individual's goals is determined by the individual's shift in the time perspective, from the time being perceived as "expansive/open-ended" in middle age to "limited/running out" during the late adulthood (Gruhn et al. 2016). The key reasons – other than the lack of access – for older adults not to invest in the learning of digital platforms include lack of interest (Heart & Kalderon 2013), limited relevance and limited need (Selwyn 2004; Selwyn et al. 2003). Hence it could be assumed, according to the theory, that if proper emotional reward is involved, older adults will invest in learning the skills associated with digital platforms. Given such a foundational motivation, they could become digital citizens gradually.

Traditionally, Indian culture is marked by a solid intergenerational bonding. Children are believed to be responsible for their older parents, and parents have emotionally invested in their children (Chadda & Deb 2013; Kumari & Dhruvarajan 2001; Smith & Majmundar 2012). Globally, older parents who are "left behind" due to transnational migration often experience mental traumas and health-related difficulties (Thapa et al. 2018; Torres et al. 2020). With the migration to the Middle East and Europe,

the nature of intergenerational bonding took a new turn in India as well. Kerala, with its high migration rates, has witnessed problems with intergenerational contacts and bonding. It is estimated that there are around 2.1 million emigrants from Kerala working across the globe (Rajan & Zachariah 2019). Older parents of the state reportedly experience loneliness, anxiety and a sense of being left out as a result of the emigration of their children (Rajan & Balagopal 2017; Zachariah et al. 2001). However, the data revolution and increased smartphone coverage in the state offered an alternative to older parents to maintain intergenerational contacts. In this study, we argue, from the perspective of the socioemotional selectivity theory, that maintaining intergenerational contacts has served as a motivational factor for older adults to embrace the digital way of life.

Once the socioemotional selection of ICT is made, the potential to pursue further benefits of ICT is always present. Older adults often transcend the emotional goals they originally pursued to seek avenues of ICT that they deem useful. This embracing of digital life, beyond immediate emotional goals, gradually turn older adults into digital citizens through gradual “naturalisation.” The idea of naturalisation is associated with citizenship, wherein a person becomes a citizen through prolonged exposure and embracing a state. In this study, we argue that older adults making a conscious socioemotional selection of embracing digital technologies ascend gradually in the digital spectrum to become digital citizens of varying degrees of expertise – a sort of naturalisation of the digital space.

Methods and Materials

Since the focal point of this study was to explore how older adults embraced digital technologies in their personal lives, a qualitative research design was employed. Qualitative research captures “the meaning individuals or groups ascribe to a social or human problem” (Creswell 2013: 44). In order to examine how older parents who have emigrated children effectively mastered digital technologies to pursue intergenerational contact and to understand the implications of this digital mastery, the framework of qualitative enquiry was put to use. Adopting a qualitative design with open-ended questions could capture the personal experiences of the participants, which facilitated a nuanced understanding of the meaning that the participants ascribed to ICT in facilitating their lives.

Participants and Procedure

As the study was made from a qualitative vantage point, the emphasis was to capture the lived experiences of the participants and the personal meaning they had ascribed to ICT. The respondents were recruited through purposive sampling, which ensured the selection of respondents “that are most likely to yield appropriate and useful information” (Kelly 2010: 317), enabling the researcher to study the central themes and questions in detail (Bryman 2012).

In order to ensure the selection of appropriate respondents, the researchers employed a set of criteria for participant recruitment. Only the persons meeting the following criteria were recruited for the study:

- Aged 60 years or above,
- Had at least one emigrated child,
- Owned a smartphone and considered themselves skilled (at least to some extent) in ICT,
- Had started using smartphones after the emigration of their child/children.

The respondents were recruited from the Kottayam district of Kerala state, India (Zachariah et al. 2001). In order to identify potential participants that met the selection criteria, a snowball sampling technique was employed. The snowball sampling procedure employed by the researchers involved identifying a few members of the intended population who were then asked to identify other members of the population (Handcock & Gile 2011). Only one older adult from a household was chosen if both the parents owned smartphones. The purpose was to ensure equal representation of both men (n=15) and women (n=15). In terms of the population characteristics, the respondents formed a subset of the older adult population that, in contrast to the majority of the national population, had access to and skills in digital platforms.

The research focused on two primary areas:

- How were older parents who had emigrated children initiated into the digital world?

- How did older ICT users continue their digital lives after their initiation into digital technologies?

The data were collected using in-depth interviews of the participants through video conferences in the local language, and then translated verbatim to English for analysis. Attention was paid to ensure that the translated content did convey the meaning of the original content. From a constructivist vantage point, knowledge is created in the interview, with both the interviewee and the researcher actively participating and interpreting (Yeo et al. 2013). Open-ended questions were employed in the interview to elicit responses that revealed newer dimensions of the research problem, which were followed-up to reach conclusions and two sets of coding with inter-coder agreement has helped to attain data saturation (Fusch & Ness 2015).

Data Analysis

The content gathered from the respondents were analysed in two phases. The data that were collected to map the first research question, that is, the factors that motivated the older adults to embrace digital platforms, were initially analysed from the theoretical lens of socioemotional selectivity theory using a deductive approach. In this phase, a thematic analysis was done from the theoretical standpoint of Socioemotional Selectivity (Bengtsson 2016). The data were analysed to locate emerging patterns pertaining to “motivation” and “sense of need” associated with digital engagement. The content was scrutinised until an inter-coder agreement was obtained.

While the first phase was informed by the theoretical framework of socioemotional selectivity theory, the second phase involved a grounded theory approach (Charmaz 2014). The aim was to understand how the respondents pursued digital technologies beyond the immediate emotional goals. The initial coding process involved “open coding” by the researchers and comparing and combining the codes. In this phase, the aim was to locate concrete narratives by the respondents on their perceived ICT engagements. The ICT usage in multiple domains, beyond the scope of communicating with the children, were identified and coded. These engagements were then further grouped according to the purpose of the

engagement as axes. The engagement of the older adults in ICT, beyond networking, fell under the axes of utility, information, entertainment and spirituality. From assessing the axes, the core category was developed to subsume and integrate all the lower level categories (Table 1), as the core category is essential for “the integration of other categories into a conceptual framework or theory grounded in the data” (Hallberg 2006).

The content pertaining to basic digital platform usage was analysed using SPSS 25 - a software program for statistical analysis in social sciences. The nature of digital connectedness was plotted using UCI NET- a software package for social network analysis (Borgatti et al. 2002). The content from the in-depth interviews was analysed using Atlas.ti 9. Textual analysis of the content was done using Voyant Tools (Sinclair & Geoffrey 2016) to detect patterns of commonalities.

Findings

A total of 30 respondents aged 60 years or above participated in the study, out of which 15 were men and 15 were women. Most of them (97 per cent) were aged 71 years or younger. All of them were accessing ICT through smartphones, and all of them were using video calling and instant messaging applications.

Women respondents were found to be engaging more in ICT usage than men. When comparing the usage of multiple services, it was found that ten female respondents were using social media compared with eight male respondents. All the female respondents but only twelve male

Table 1. Outline of the content analysis

Core category	Categories/ Axes	Open codes
Digital life beyond emotional goals	Utility	Shopping, banking
	Information	News, local updates, learning
	Entertainment	Video streaming, social media
	Spirituality	Online prayer services, spiritual video streaming

respondents were users of video streaming services. Online banking services was used by six of the women and three of the men. Online shopping services were used by five male and five female respondents. Online news portals or news services were used by twelve female and ten male respondents, respectively. However, there were no significant associations in the usage patterns based on gender, as indicated by chi-square tests or Fischer's exact tests.

Digital Life as a Socioemotional Selection

The content pertaining to the respondents' getting initiated into digital technologies was analysed within the framework of the socioemotional selectivity theory. The theory emphasises the prioritisation of emotionally rewarding elements over intellectual pursuits by older adults (Carstensen et al. 1999). The data from this study suggest that the older adults embraced digital technologies due to a perceived motivation at the emotional level – maintaining intergenerational contacts. This motivation takes place in two intertwined phases: (1) perceiving digital life as a need and (2) perceiving the emotional value of embracing digital life.

Digital Life as a Perceived Need

The starting point of embracing digital technology for most of the respondents was a sense of necessity. Almost all the respondents could identify a sense of need to embrace digital technologies triggered by the emigration of their child or children. This need paved the foundation for digital engagement. When enquired about their initiation into the digital world, the respondents reiterated the role of their children's emigration. Respondent 1 noted how the smartphone was the only choice in maintaining constant contact with the children:

"I was not at all into smartphones or digital things except for watching TV. I had to learn this for my children. If they were living with me, I would not have needed a smartphone." (R1, 66 year old man)

The narrative highlights how the participants felt the need to connect with their children, which would not have been possible without the

assistance of technology. The respondents were quick to recognise the benefits of ICT in facilitating intergenerational contacts. They identified technological knowledge as a “need” to maintain quality interaction with their children. Respondent 25 emphasised how ICT platforms offered an economical and effective means to ensure intergenerational contact:

“The problem with children working abroad is that they can’t come home often, not even once a year sometimes. WhatsApp video call is a practical option for parents like us. At least it is better than earlier when we had to wait for their phone calls as it was expensive to make calls to England. Now it is cheaper and easier, and we can even see them, at least virtually.” (R25, 69 year old woman)

They have accepted virtual meetings with their children through ICT as a viable alternative to face-to-face contact. For instance, respondent 22 commented:

“My children can’t come home too often. Though I want them to stay with me as I am getting older, I realise that it is practically impossible. These video calling apps provide us with a practical alternative to keep in contact with our children though it is not an alternative for being there for real.” (R22, 72 year old man)

Digital technologies were the only means for all the respondents to maintain intergenerational contact with their emigrated children, which was of emotional value to the older parents. Most of them opined that they would not have learned to use a smartphone if their child/children had not emigrated, implying how embracing digital technologies was a “Socioemotional Selection” of the respondents. The choice was made purely due to emotional necessity. The goal was emotional in nature, and digital technologies were the means. Embracing digital technology was not just a choice for the respondents but also a necessity that was paired with a perceived emotional reward.

Perceived Emotional Value of Embracing Digital Life

As the socioemotional selectivity theory suggests, older adults tend to focus on emotionally important relationships, and hence, prioritises goals pertaining to emotional regulation (Carstensen et al. 1999). During the interviews, almost all respondents were motivated to embrace digital life

due to a perceived emotional goal to maintain the emotional bond with their child/children. Most of them reiterated how they were rewarded emotionally by embracing digital technologies in the form of frequent and better communication with their children. They emphasised how video calling and instant messaging platforms had transformed the nature of their interactions with their children, in terms of both quality and frequency. The perceived need to embrace digital technologies originated from the identification of potential emotional rewards/value associated with the use of ICT. The sense of “need to use ICT” and “perception of emotional reward” are intertwined, which motivate the older adults socioemotionally. Respondent 2, for instance, pointed out the perceived emotional joy gained through intergenerational contact by ICT:

“Three of my daughters are settled in the UK. They visit us once in two or three years, which is really saddening for us. Since we got this phone, it has been easy for us to see them, at least virtually. It is very much helpful though it can’t replace the joy we get when they are really with us. My grandchildren call me once a month, and I am so happy about that.” (R2, 65 year old woman)

The facilitation of intergenerational bonding, which is a key element in the studied local culture, is realised by ICT for most of the respondents, and the value they ascribe to ICT is connected to their perceived bonding opportunities. For instance, Respondent 7 commented:

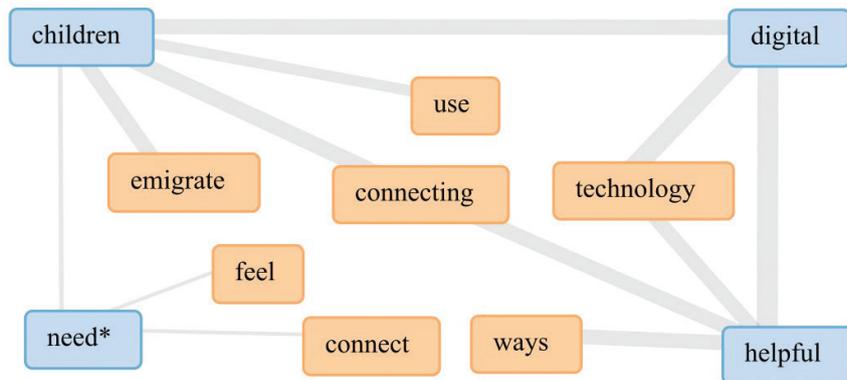
“I now use Facebook and Whatsapp, which are really useful in keeping in touch with my children and their family. They are all abroad. Video calls and instant messaging has made the distance disappear. This is very practical and convenient. Now my grandchildren know me better. If not for these technologies, they would be coming home once in two or three years, and I would have been a stranger to my grandchildren.” (R7, 63 year old woman)

It was this emotional aspect that attracted the respondents to make the selection of technology-assisted intergenerational contacts. Thus the interviews suggest that older parents of emigrated children embrace the digital life motivated by a socioemotional selection, that is, the perceived emotional reward of better communication with and relationships to the child/children and their families have motivated the respondents to learn digital technologies.

A key term analysis of the interviews showed that the participants were reiterating the usefulness of digital technologies in connecting with their emigrated child/children. Four recurrent terms: “children,” “digital,” “helpful” and the variations of the term “need” – like “needing,” “needful,” “needs” etc. – were analysed to see textual linkages to plot thought patterns associated with intergenerational contacts through ICT (Figure 1). The links are plotted in such a manner that the thicker the lines connecting the key terms, the more frequent the association of the terms.

The linkage of key terms reveals how the term “digital” is associated with the key terms “children” and “helpful,” further linked by the term “connecting.” The network indicates how the respondents perceived the “digital platforms as a helpful way to connect with their children who had emigrated. The response patterns revealed a sense of “perceived helpfulness” offered by “digital technologies” in meeting the ‘perceived need’ to connect with the emigrated children, reiterating the concept of ‘digital life as a socioemotional selection.’”

Figure 1. Thought patterns of the respondents in terms of perceived usefulness of technology in connecting with their emigrant children.*



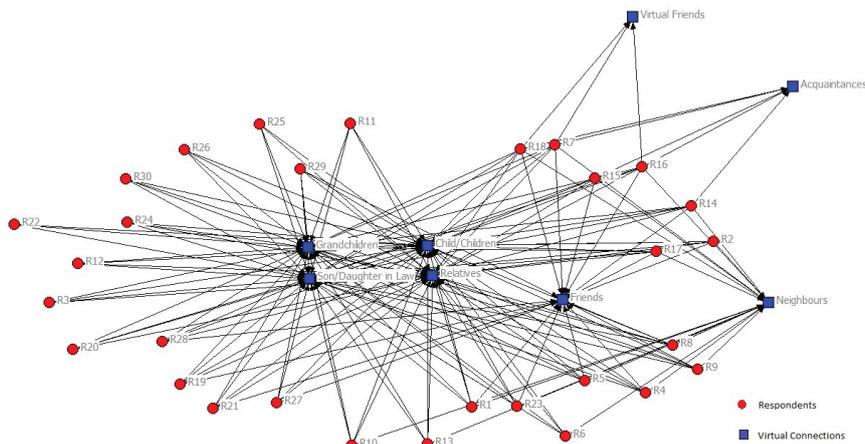
*, Generated using Voyant Tools from the interviews of the respondents.

Continuing the Digital Lives: The Stage after the Initial Socioemotional Selection

As discussed in the previous sections, the starting point of embracing digital technologies, as reported by all the respondents, was a perceived emotional need to connect to their child/children and grandchildren. However, the interviews suggest that the digital social circle of the respondents expanded beyond the circle of their child/children and family. The majority of the respondents maintained virtual relationships with their relatives (97%) through digital platforms. However, when it comes to connecting with friends (60%) and neighbours (53%), not all use virtual platforms. A very few maintain virtual connections with their acquaintances (17%). Only a few respondents (10%) initiated new virtual friendship relations. As depicted in Figure 2, the centrality of the digital connectedness of older adults revolves around their immediate family. Friends, neighbours and acquaintances fall outside the central spectrum of digital connectedness.

The respondents having no digital connectedness with friends, neighbours, acquaintances and who did not initiate any new virtual friendships

Figure 2. Network of the digital connectedness of the older adults**



** , Generated using UCINET from the interviews of the respondents.

were asked the reasons for this non-engagement beyond immediate family.

Respondent 3 who did not have any digital connection with friends, neighbours, acquaintances and also had not initiated any new virtual friendships commented:

“My phone helps me connect with my children. Everything else is secondary for me. I don’t connect with people who I have no emotional connection with. I talk with my neighbours and friends, but I don’t need to connect with them as often as I need to connect with my children. I would rather engage in casual conversations with them only when required.” (R3, 64-year-old woman)

Respondent 5 who maintained digital connections with long-term friends and neighbours but had not initiated any new virtual friendships and connections with acquaintances online commented:

“I have a lot of friends back from my home town. We shifted to Kottayam almost ten years before. Since then, I was not able to contact them, but after I got this phone, I often make video calls with some of them who have a smartphone. They are part of a lot of my memories, and it is a great happiness to keep in touch with them. I am not connecting with people who are just acquaintances because I have no memories of them. I am not excited to talk with strangers either. That is why I am not into virtual friendships in social media. Also, my children have warned me about online scams. So I am cautious about the people I talk with.” (R5, 67-year-old man)

The respondents were not very enthusiastic about making new virtual friends online. Those respondents who had initiated new virtual friendship relations in social media commented that their contacts with such virtual friends were limited.

For instance, Respondent 18, who had virtual friends on Facebook, commented:

“I started using Facebook for connecting with my friends and family. I started getting connection requests from unknown people later on, and I connected with a few. However, I don’t communicate with them often. In fact, most of the conversations are limited to some greetings and forwarded messages.” (R18, 61-year-old woman)

Respondent 7, who also had virtual friends on Facebook, commented:

“Though I have virtual connections on Facebook, I seldom communicate with them. I did not initiate any connection with strangers. Rather, some people started sending me connection requests, and I accepted them. Though I answer if someone messages me, I don’t engage in a proper conversation with any virtual friends on Facebook.” (R7, 63-year-old woman)

The responses from most of the respondents suggest that the limited online networking beyond immediate family was mainly due to a perceived hierarchy in the emotional value of connections. The responses regarding limited digital connectedness beyond the first-degree relatives fell under two major themes: limited emotional attachment and a consequent lack of interest in establishing new connections over digital platforms due to the absence of perceived emotional value. The general trend in the results suggests an association between the perceived emotional value and digital connections. The more the respondents were emotionally connected to someone, the more certain was the digital connection with that person, given that the person too had access to a smartphone.

Also, almost all the respondents cited concerns over online scams and other security reasons for not making virtual friends. The alertness of the participants regarding potential scams, especially financial scams, is a key finding, as older adults are often considered vulnerable to online financial scams (Brancaccio 2019).

Beyond Networking: Older Adults on Exploring the Possibilities of the Digital World

Data from the interviews suggest that the primary motivation of the participants to start using smartphones was to connect with their emigrated children. However, once the respondents were familiar with the technology, they started exploring other possibilities offered by their digital devices. The data from Table 2 show how the respondents made use of their smartphones beyond the purpose of networking. It was found that 90% of the respondents used video streaming applications, 73% used news portals or applications, 33% made use of online shopping applications and 30% used mobile banking facilities. The analysis of the interviews shows that respondents explored the possibilities of the digital world in four main categories other than maintaining intergenerational contacts:

Table 2. Socio-demographic profile and basic digital involvement of the respondents

Age Group ($n = 30$)		
Age category (years)	Frequency	Percentage
60–63	5	16.7
64–67	15	50.0
68–71	9	30.0
71 and above	1	3.3
Education ($n = 30$)		
Level of Education	Frequency	Percentage
Primary level	10	33.3
Secondary level	9	30.0
Senior secondary school	5	16.7
Graduate level	5	16.7
Post graduate level	1	3.3
Gender ($n = 30$)		
Gender	Frequency	Percentage
Male	15	50.0
Female	15	50.0
Device		
Device	Frequency	Percentage
Smartphone	30	100
Video calling usage ($n = 30$)		
Usage status	Frequency	Percentage
User	30	100
Instant messaging applications usage ($n = 30$)		
User status	Frequency	Percentage
User	30	100.0

(Continued)

Table 2 . (Continued)

Social media usage (n = 30)		
User status	Frequency	Percentage
User	18	60.0
Non-user	12	40
Video streaming applications usage (n = 30)		
User status	Frequency	Percentage
User	27	90.0
Non-user	3	10.0
Online shopping usage (n = 30)		
User status	Frequency	Percentage
User	10	33.3
Non-user	20	66.7
Online banking usage (n = 30)		
User status	Frequency	Percentage
User	9	30.0
Non-user	21	70.0
Email usage (n = 30)		
User status	Frequency	Percentage
Non-user	30	100.0
News applications usage (n = 30)		
User status	Frequency	Percentage
User	22	73.3
Non-user	8	26.27

(1) information seeking, (2) entertainment, (3) utility services and (4) spirituality.

Information seeking mostly involved following news on different platforms, and some respondents were learning to cook. On the entertainment front, the respondents were reporting how they used video streaming platforms to watch movies and other contents. Banking and online shopping were the most common utility services reported by the respondents. Spiritual content was accessed by many respondents across different video streaming platforms.

These factors point to the fact that older adults explore the potential of learning newer possibilities in the digital world, which implies that they are potential digital citizens. Digital citizenship, in its basic understanding, emphasises the capacity to use digital media and interact with people over digital platforms (Mossberger 2009). The idea is also discussed in terms of media and information literacy (Kim & Choi 2018; Simsek & Simsek 2013). On an advanced understanding, it means the capability of a person to take part in a society online (Mossberger et al. 2008). Concurring with these understandings of the idea of digital citizenship, it can be observed that the respondents of this study are digital citizens in varying degrees. The participants could use digital media and interact with people online, had media and digital literacy in varying degrees, and could participate in a society in varying degrees.

Older ICT Users' Perception of their Position in the Digital World

The respondent group of this study constitutes a subset of the population that is a positive outlier among the older adult population of India in terms of ICT usage. The participants were asked to explain their position in the digital divide from two standpoints: (1) the position in terms of fellow seniors and (2) the position in terms of young people. Most of the respondents considered themselves to be good at using ICT because of their interests. They consider themselves "exceptions" to the general older adult population, who cannot handle ICT as efficiently as them. When pitching themselves against young people, most of the older respondents considered themselves not having the expertise that the young people have in ICT. However, the respondents identified "perceived usefulness" as the motivation to pursue ICT usage. A good number of the respondents

believe that they have expertise in the areas they deem useful, and that they have the potential to gain expertise in any aspects of ICT if they deem it useful. Given the fact that young people have prospects of more usefulness with ICT, their perceived superior expertise is understandable. This does not make older adults neither digital natives nor digital aliens. They constantly evolve in the digital spectrum, learning and imbibing the digital way of life.

Discussion and Conclusion

The starting point of this study was the exploration of a subset of the older adult population, which is a positive outlier in the Indian context in terms of digital know-how. The overall digital literacy among older adults in India, especially in Kerala, is not at par with the global standards (Council for Social Development 2017). Unlike that of the developed nations where “access” is almost universal, the case of developing nations like India is different. In such cases, the opportunity to avail the resources to access the digital world is a key element. Besides limited access, the most important reasons for older adults not to use ICT are the lack of interest (Heart & Kalderon 2013) and limited relevance and need (Selwyn 2004; Selwyn et al. 2003). The study focused on a subset of the population that had access to and perceived relevance in pursuing digital technologies.

Once the right motivation with an emotional output was involved, the participants in this study developed a sense of interest and relevance associated with ICT use. This sense of interest and relevance of ICT, in turn, made the older adults embrace digital platforms, primarily for emotional reasons for maintaining intergenerational contact and later on it expanded to other fronts of digital life. In this process of transcending the initial motivation of emotional rewards, older adults embrace digital technologies to seek intellectual goals as well. The active engagement of the older adults, in both the emotional and intellectual front at varying levels, makes them digital citizens in different degrees. The respondents were seen to be exhibiting different traits of digital citizens, like using digital media and interacting with people over digital platforms (Mossberger 2009), having media and information literacy (Kim & Choi 2018; Simsek & Simsek 2013), and having the

capacity to take part in a society online (Mossberger et al. 2008). These traits effectively make them digital citizens.

Most of the older adults who participated in this study suggest that there are varying degrees of digital expertise, and that young people have better proficiency in ICT. However, this does not make older adults non-digital citizens. The digital way of life can be conceptualised as a “spectrum” rather than a “binary.” There exists no watertight compartmentalisation of aliens/immigrants and natives. Instead, it is a spectrum of people embracing digital life in varying degrees according to perceived usefulness. Just like any spectrum, the digital way of life is constituted of components that are different but integral to the spectrum. Any attempt to arbitrarily classify one component as unimportant or less important would be contradicting the nature of the spectrum.

The respondents of this study consider themselves as efficient in using ICT for the purpose that they deem to be useful points to the fact that they are part of the digital spectrum. The participants of this study were of different levels of expertise and practice in terms of ICT usage, implying that ICT engagement is not categorically segmented in terms of age. It is more nuanced and complex. Hence, assuming older adults to be lesser digital users is illogical. They could be considered digital learners who are gradually venturing into increasing digital involvement. They are successful digital citizens in so far as they can efficiently use ICT for what they need and want. The nature of their engagement in comparison with their younger counterpart may suggest differences in the degree and/or frequency of usage; however, the idea of being a digital immigrant is unimportant as long as one possesses the potential to be a citizen through naturalisation. In the case of digital life, digital citizenship through naturalisation can be conceptualised as a forward movement of older ICT users in the spectrum of digital life through gradual steps. Starting with a gradual transcendence from emotional goals to intellectual goals in the digital world, older ICT users are equal digital citizens in the digital spectrum. Even though the digital divide – expressed as a generational gap – exists, the idea of digital citizenship in varying degrees of expertise suggests that older adults progress in the spectrum of digital life through engagement and interaction that they deem useful.

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Beyond the silver gamer: The compromises and strategies of older video game players

By *GABRIELLE LAVENIR**

Abstract

The experience of older adults who play video games illustrates the contemporary challenges of ageing and the strategies that ageing individuals set up to navigate them. The ethnography of a video game workshop dedicated to older adults in a French cultural centre offers an opportunity to examine how a group of 15 women aged 60–82 years exert their agency as technogenarians (Joyce & Loe 2011). In order to fully engage in their play, the workshop's participants have to manage complex and sometimes contradictory expectations concerning who counts as a player and what is an acceptable way to play. They cobble together available discursive resources to manoeuvre around notions that interfere with their practice. The result is a distinctive play style through which the participants reclaim a right to subvert expectations and, at long last, play.

Keywords: technogenarians, silver gamers, successful ageing, video games, ICT, play.

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Introduction: Technogenarians and Video Games

“Alien-killer seniors!,” “At seventy, they discover video games: ‘Down! Jump! Come on, jump!’,” “Video Games: Retired people say Wii!”: over the past decade, pun-heavy headlines about “silver gamers” have proliferated in the French media. They echo the growing interest of medical professionals, policymakers and industry players for older adults who play video games. In that coverage, the prevailing perspective frames older adults’ play as a strategy to combat age-related health issues. In line with the scientific literature on older adults and video games, the media coverage of “silver gamers” portrays older adults “as a particular vulnerable group whom society should try to maintain through the use of technology in order to keep the costs of medical treatment and care down” (Iversen 2014: 6).

The situation of older adults who play video games illustrates the contemporary challenges and contradictions of ageing. It sheds light not only on the injunction to active, healthy and successful ageing but also on older adults’ complex and rich relationship with technology. From land-line phones and walking aids to brain training games and home automation systems, technological devices shape the experience of ageing: they assign a certain identity (old, frail, in need of supervision) to individuals, they facilitate surveillance and external intervention and they restrict the scope of possible actions and interactions (Domínguez-Rué & Nierling 2016; Katz 1996). However, older adults do not merely endure technology: as technogenarians, “[e]lders creatively utilise technological artefacts to make them more suitable for their needs even in the face of technological design and availability constraints” (Joyce & Loe 2011: 1).

The study of a video game workshop dedicated to older adults in a French cultural centre constitutes an opportunity to examine how a group of 15 women aged 60–82 years exert their agency in this context. Using ethnographic data collected during the 2014–2015 season of the workshop, including overt and non-participant observation of the 15 participants and semi-directive, biographical interviews with 9 participants, this article explores how older adults negotiate their relationship with video games in order to manage age-related expectations and representations.

The present article argues that playing video games in old age is challenging because older individuals cannot comfortably inhabit the

category of “gamer.” Indeed, different sets of discourses on ageing and video games are at odds: successful ageing intersects with techno-optimism but clashes with the widespread understanding of old age as decline and moral panics about new media. These discursive tensions lead to contradictory expectations and limited possibilities for older players, who manage the situation by devising their own way of playing and talking about video games.

The analysis examines three aspects where specific discourses and practices interact to shape the experience of older video game players. Firstly, debates about the dangers of video games shape older adults’ play. Participants in the workshop manage the tension between the moral panics of the 1990s and recent efforts to rehabilitate video games by setting up a distinction between deviant games and play and good games and play. Secondly, older adults contend with the discrepancy between their identity and the figure of the “gamer.” To counter the association of video games with youth and masculinity, which fuels a sense of incongruity, participants argue that their age and gender guarantee a good-natured and harmless practice of video games. Thirdly, the high value placed on instrumental and productive play shapes older adults’ perception of video games. The category of “silver gamer” itself is problematic for older adults who play games: it does constitute a useful discursive resource to justify their play but it also constrains and disciplines their practice. Overall, participants compromise with notions that video games are dangerous, inappropriate or instrumental in order to design a way to play video games that is both acceptable and enjoyable for them.

Theoretical Frame: A Critical Perspective on “Silver Gamers”

The present study is situated in the broader field of ageing and technology studies. It engages with critical studies that interrogate the disciplinary dimension of technology for older adults. The research draws on paradigms steeped in the social sciences that examine the uses and representations of technology in old age, as well as the social dynamics and power relations that they materialise (Östlund 2004). It is based on the emerging field of research on older adults and video games, a topic that remains understudied, particularly in a social and critical perspective.

The theoretical framework and methodology of this study find their inspiration in Hacking's call to study what happens "between discourse in the abstract and face-to-face interaction" (Hacking 2004). Drawing on the respective work of Erving Goffman and Michel Foucault on psychiatric asylums, which illustrate that categories are not merely descriptive but shape people by defining the possibilities and meanings available to them, Hacking analyses the "looping effect" through which individuals transform the categories that shape them. To make this looping effect visible, Hacking calls for a model that brings together Goffman's focus on the ways in which institutions label individuals through interactions and material conditions and Foucault's study of the genealogy and transformations of disciplinary discourses. In the case of older adults and video games, Hacking's model proves particularly fruitful: it drives the analysis to take into account not only the various discourses at play and their contradictions but also how these contradictions play out in practice and what that means for older adults' play in a very concrete and practical sense.

The combination of Hacking's model and the ethnographic approach has yielded a wealth of empirical data. The cross-analysis of data collected through interviews, observations and discourse analysis provides a nuanced picture of older technology users' practices. It enriches the collection of in-depth case studies that form the basis for the literature on older adults and video games in the social sciences. It corroborates the major results of this literature, including the variety of older players' motivations and preferences, the techno-enthusiasm that underlies the figure of the "silver gamer" and the importance of listening to older players themselves (De Schutter & Vanden Abeele 2015; Iversen 2014). The present study complements the existing research with a focus on collective, institutional play and older players' reflexive and ambivalent embodiment of the "silver gamer." In that sense, the present study not only contributes to the discussion about older adults' creative and skilful uses of technology but also about their agentivity within the constraints of contemporary old age. Grounded in ethnographic methods and in a distinctive space, this research does not aim to provide a general overview or classification of older players' preferences and motivations. Instead, it engages with the situated experience and perspective of these 15 women,

who in turn provide an insight into the challenges faced by older adults who play video games.

Literature Review: Ageing in and through Technology

In a social constructivist perspective, old age is a social and cultural phenomenon that is shaped by representations, implemented in institutions and material conditions (from state pensions to care homes) and actualised through interactions with others. Old age is an experience structured by the effort to reconcile a sense of continuity and coherence of one's identity with the reconfigurations permitted or imposed by old age (Caradec 2003). Insofar as ageing individuals share this experience, the category of "older adults" proves relevant for analytical purposes although it remains critical to acknowledge the heterogeneity within this category.

Ageing brings complex and sometimes contradictory representations to coexist. The contemporary experience of old age is marked by the predominance of the biological and medical prism that frames the ageing body as declining and frail (Katz 1996). In a capitalist, work society, the ageing individual becomes problematised as non-productive and burdensome (Kohli 1988). In response, the discourse of successful ageing urges individuals to take personal responsibility for their health through consumerism and self-reliance, in line with neoliberal governmentality (Rudman 2006, 2015). Discourse entails a normative and disciplinary dimension (Marhánková 2011).

Technology features prominently in the experience of ageing. It may smooth out age-related changes or it may highlight them, sometimes to the point of threatening one's sense of self (Gucher 2012). This proves particularly salient for gerontechnology, that is, technology explicitly designed for older adults, which draws on the techno-optimistic belief that ageing is a problem that innovative technology can solve (Peine et al. 2021). Even when its implementation fails, it shapes old age by enforcing specific expectations and norms (Domínguez-Rué & Nierling 2016; Marshall & Katz 2016).

As "grey cyborgs," older adults have a complex and intimate relationship with technology (Dalibert 2015; Joyce & Mamo 2006). Joyce and Loe coin the term "technogenarian" to emphasise older adults' agentivity and

creativity with technology despite its constraints (2011: 1). Older adults actively use, adjust and reject technology in order to age comfortably. This practice stands in sharp contrast with injunctions of performance and productivity (Loe 2011). Persistent representations of tech-hostile elders tend to erase their nuanced decision-making regarding technology use and equipment, which takes into account the perceived usefulness and meanings of a technology in relation to already-available and already-mastered technology (Caradec 2001). This highlights the crucial role of the life course and past experiences with technology, that is, technobiographies, in older adults' relationship with technology (Buse 2010). Technology is imbued with social and affective meanings that shape its uses (Sawchuk & Crow 2012). The experience of technology in old age is structured by the material conditions and other embodied identities of the ageing individual.

The scientific literature on ageing and video games has been growing exponentially since the early 2000s with two dominant perspectives: the medical approach, which examines why older adults should play, and the game design approach, which examines how to get older adults to play (Iversen 2014). Both frame video games as a strategy of self-management for older adults with a strong emphasis on health. De Schutter and Vanden Abeele's "Gerontoludic Manifesto" calls for a shift in the literature and a renewed emphasis on the playfulness rather than the potential usefulness of games (2015). Social sciences research on video games and older adults provides stimulating insights into the matter. The genres most often mentioned are puzzle and match-3 games, as well as games that recreate classical games (such as chess or sudoku), which is consistent with the fact that those genres are the most played overall (Nap et al. 2009). Older adults participate in a variety of genre and play styles from MMORPGs (massively multiplayer online role playing games, where players gather in vast online worlds to act out adventures, often including fighting monsters, solving quests and gathering resources) to plane flight simulators (De Schutter 2011). Older adults seem to play mostly on their own, in their homes and often at fixed hours for a fixed amount of time (Quandt et al. 2009). Overall, the 2008 Ludespace study estimates that one-third of people over 60 years had played video games at least once in 2012 in France (Berry et al. 2013).

Methods: Making Older Adults' Play Visible

In the study of older adults' video game play, the challenge lies in making their practice visible. Not only are video game players relatively rare among older adults, but those who do play tend to minimise and underestimate their practice. They remain very discrete, if present at all, in online and offline spaces and communities dedicated to video games. Consequently, the very few spaces explicitly dedicated to older adults and video games constitute precious opportunities to study their play and listen to their perspective.

The present article draws on the ethnography of a video game workshop for adults over 60 years old. The workshop takes place in a cultural centre dedicated to digital arts and culture in a large city in France. It was initiated in 2011 by the coordinator of the gaming space, a large room with consoles and tablets freely accessible to visitors. Each of the 2-hour, weekly sessions brings together a half-dozen participants and two organisers. Sessions start with a presentation of the week's theme (e.g. platform games or women in games) and games by the organisers. Participants then wander among the eight available consoles and play between one and four games per session. In 2014–2015, there were 15 regular participants, all women between 60 and 82 years with an average age of 69 years old. Most participants started attending the workshop either because they regularly visited the cultural centre and noticed the workshop or because they were looking for stimulating leisure activities to fill their free time. Within this group of relatively young older adults, most have no visible health issue or disability. All of them have or had a career and a higher education degree; a participant describes the group as "middle class." However, the group is not homogeneous in terms of economic capital: some cannot afford to buy a second-hand computer while others take international vacations several times a year.

The fieldwork was conducted over 7 months, from September 2014 to March 2015, and consisted of the observation of 13 two-hour workshops involving 15 participants and 2 organisers and 17 interviews, including 9 with workshop participants and 8 with individuals who are involved in initiatives to encourage older adults to play video games or who make games for older adults. When doing preliminary research on video games and older adults, the researcher had identified the workshop

and contacted the organisers, who allowed the researcher to attend the workshop as long as participants agreed. Because of the troubled history of scientific research on old age, which has contributed to disciplining and de-humanising older adults (Katz 1996), the research project placed a particularly strong emphasis on participants' consent and approval. Many participants actively engaged with the research with the explicit goal of "setting the record straight" and combatting reductive stereotypes on "gaming grandmas."

Observation was non-participant, but overt, in order to ensure that participants had control over their involvement in the project. The researcher introduced herself and her project to the participants at the beginning of the year and before each individual interview. While the researcher could sit with participants to watch them play (asking for permission each time), she did not interfere or participate in their play. Although she was familiar with most of the game genres and mechanics featured in the workshop, the researcher usually discovered games alongside participants during the workshops. Nine participants agreed to an interview, which consisted of a semi-directive, one-hour-and-a-half interview that included questions about participants' life story, play practices and video game biography. Interviews took place either in the cultural centre (but outside of the time and place of the workshop) or in nearby cafés.

"It Was More Like an Enemy": Recovering from the Moral Panic on Video Games

A primary site of discursive tension lies in the debates about the effects of video games: are they dangerous or enriching (Carbone & Ruffino 2012)? The women who attend the workshop are thrown into the normative struggle that opposes proponents and detractors of video games. Participants themselves are receptive to both the moral panic over a violent and addictive practice and to the rehabilitative discourses that stress the cultural value of games. They resolve those contradictions by enforcing a distinction between good and appropriate and bad and dangerous games or play styles.

The moral panic of the 1990s left a lasting mark on the representation of video games. Its arguments regularly come up in participants' comments and interviews as most participants discovered the existence of video

games in the 1990s context of anxiety and reprobation. French mainstream media started covering video games at that time, and the themes of violence, pathology and addiction emerged over the next decade (Bogost & Mauco 2008). Right-wing politicians, then in the parliamentary minority, made video games a political argument in the debate over safety and civil order. Moral entrepreneurs such as a police union and a Christian association further fuelled the debate. Several denunciations of video games overlap in this media panic: video games as a trigger for mental illness, as moral deviance and as a devalued practice of lowbrow culture. As a result, most participants come into the workshop with suspicion towards video games:

[Before coming here, what did you know about video games?] I knew about addiction. ... I'd seen some unbelievable stories about it on TV. The guy who stops eating, it's because he's spending all his time on it. ... You see a teenage girl, her mother tries to get into her room, the girl barricades her room, insults her mother, "Bitch, leave me alone, I'm on my video game." There, that's what video games do to people. The mother says, "But listen, you have to go to class, it's 2 p.m., you've been lying in bed since this morning, you haven't done your homework. Forget the video game, you haven't even been outside." And the girl keeps playing, and then a psychotherapist comes in and tries to solve the conflict. I thought, "But how can you become like that, a total addict?" (Anne, 62)¹

However, over time, various stakeholders have worked towards mitigating the effects of moral panics. The video game industry, supported by the video game trade press, has made enthusiastic claims about the psychological and social benefits of video games (Carbone & Ruffino 2012). Meanwhile, professionals in the field of cultural production argued for the cultural and artistic value of video games. In their wake, politicians and policymakers have defended the video game industry as a bastion of French creativity and technological innovation (Dauncey 2012). In this context, the participants often revise their initial judgements: "Because I was biased, I thought that the only video games out there had violence, war... And video games with unrealistic bimbos" (Catherine, 63). The figure of the newcomer, the person who attends the workshop for the first time, is central to participants' re-evaluation of video games: "there are always newcomers who come here because they have heard that [video

¹ To protect participants' anonymity pseudonyms have been used in this study.

games are] dangerous, because they're afraid of video games, because they want to know if ... people get addicted to it" (Mireille, 60). Participants are not merely at the receiving end of an effort to legitimise video games: they also take part in this effort.

The workshop challenges participants' early opinions of video games but without fully offsetting them. Despite organisers' insistence that video games do not make players violent, participants continue to be wary: "And now, it's true that with the [2015 Paris terrorist attacks], we've shown that video games can incite [violence], that the scenario of the attacks was inspired by a video game" (Nicole, 62). Participants' technobiographies contribute to their ambivalence towards video games, as their early encounters with video games have shaped their outlook on the practice. Even though two-thirds of them did not play video games before coming to the workshop, and half of them still do not play outside of the workshop, all have had experiences with video games before. Many participants first heard about video games in their professional life, for example, as teachers using educational games or employees in the Information and Communication Technology (ICT) field witnessing the advent of the video game industry. When participants recount these experiences, it is in terms of curiosity and even enthusiasm. However, many also came across video games in their role as caregivers for children and teenagers, when their children, nephews and nieces or pupils started playing or asking for consoles and games. In that context, the beginning of their relationship with video games was marred by conflict and anxiety: "I fought a lot with [my children] because they were always playing video games and I didn't understand what they were doing. At the time, I was angry because they played instead of doing school stuff, tidying up; at the time it was more like an enemy" (Isabelle, 60).

In order to accommodate their ambivalence, participants create a distinction between good and bad games, as well as good and bad ways to play video games. Overall, it is the absence of violence that makes a video game acceptable. A participant explains that the workshop reconciled her with video games because it introduced her to non-violent games: "I discovered a whole new world here, a variety of video games that I had no idea existed, a lot of beauty, a lot of fun, a lot of poetry, humour... In short, an absence of violence. There isn't any violence at all in many, many, many games" (Catherine, 63). The category of "violent" games is

remarkably broad: it not only includes depiction of violence or war but also any mechanism that forces players to fight against another (player or non-player) character. However, as participants become more familiar with different genres and titles, they amend the classification, adding nuance and including redemptive criteria such as artistic value or humour:

And [...] in the end, we are sometimes charmed by games that... For instance, I remember the game *Street Fighter*. I used to see my children play *Street Fighter*, I thought it was horrible, because the graphics are made so that the characters look absolutely disgusting, repulsive. And in fact, when you play it, you can clearly see that it's a second degree kind of humour and that, on the contrary, it's fun. You have fun choosing the characters that seem the most horrible to you, and you take a lot of pleasure in it, it's very funny. (Danielle, 64)

The tolerance for violent play extends to their children and grandchildren, to the point that a participant considers that games have to be at least a little violent to be interesting:

And I've looked for, because I asked [organisers], games that are still a bit violent, because a kid at 16 wants something violent. So I asked them about fighting games and all that, but they weren't hyper violent, hyper dangerous things. And that way I could make him play a lot of things and buy a lot of things that weren't silly, eh? (Mireille, 60)

Participants also devise a specific play style to distance themselves from violence and addiction. They insist on setting spatial and temporal limits to their play in order to protect themselves from the dangers they associate with video games. Among participants who play outside of the workshop, most have decided not to buy a console (which would allow them to play the workshop's games) because they would spend too much time on it. Their play outside of the workshop is predominantly a fragmented, interstitial style of play. Participants also value collective play and usually play single-player games together, passing the controller back and forth, even when there are enough consoles for each of them to play on their own. This collective practice is intentional, claimed and even theorised:

But hey, I feel that I am not only an observer, I am an active observer. That is to say, I experience the video game through, even if I'm not the one holding the controller, through the actions of other people. I think that ... we go much further together than we would be able to on our own. (Danielle, 64)

Altogether, discourses are constraining, but they are also malleable. Older players make sense of the existence of opposing perspectives on video games (as either dangerous or valuable) by differentiating good and bad ways of playing video games. This distinction allows them to participate in both discourses at once while distancing their own practice from decried representations of play and contributing to the rehabilitation of (certain) video games.

“But She’s A Bit Crazy”: The Precarious Intersection of Age, Gender, and Video Games

For the women who attend the workshop, it is unexpectedly complicated to inhabit the identity of “someone who plays video games.” The entrenched figure of the “gamer” essentialises video games as something that is “for boys” and participants are acutely aware that they depart from expectations. In order to manage the feeling of not-belonging, they draw on the very elements that set them apart, that is, their age and gender.

The relationship of participants with video games is shaped by the intersection of ageing and gender. Old age transforms the experience of gender. Older men face the devaluation of their masculinity, closely related to the notion of a powerful and youthful body, although certain categories of men benefit from the association of old age with power and authority (Calasanti 2004). The experience of old age is one of exclusion and invisibility for women as their aging body limits their ability to comply with the norms and expectations of femininity (Gilleard & Higgs 2014). Masculinity affects men’s relationship to their body, which has direct consequences on their healthy life expectancy, while gender inequalities heavily weigh on women’s ageing, especially in terms of their economic situation.

Several representations converge to reinforce the idea that older women are both uninterested and unskilled in video games. Technology and ICT in particular continue to be constructed with masculine qualities by their designers, their promoters and their users (Jouët 2003), while dominant representations frame older adults as reluctant to change and unable to comprehend new technology (Caradec 2001). The representation of video games as “a boy thing” is prevalent (Thornham 2008). This representation

is fuelled by the video game industry's focus on teenagers and men as its core demographic. The hostility of many gaming spaces and communities towards women (Consalvo 2012) contributes to a gendered cultural barrier to participation in video games (Vossen 2018), and the identity of "gamer" is unequally accessible to players who do not fit the image of the male, white, heterosexual and cisgender gamer (Fron et al. 2007; Shaw 2013). Participants also occupy an uneasy position insofar as they are adults who indulge in play, which is an activity culturally reserved for children. The association of play with silliness and a lack of productivity proves problematic for adults in general (Deterding 2018; Thornham 2011) and particularly for older adults, who are always at risk of being denied personhood if they show signs that could be interpreted as senility (Gilleard & Higgs 2011). Video games are themselves particularly associated with youth, whether through the figure of the "gamer" or because of their status as new media.

Participants frequently refer to their supposed lack of skills with digital technology in general, in contrast to the assumed natural competence of children, as does a participant talking about her great niece:

Oh, this is depressing. With the Iphone, she was very, very fast. She's doing very well. Very quickly I had downloaded games for her, Frozen, videos, songs, nursery rhymes. At some point, I can't remember how old she was then, I would tell her "Wait, I'll find it for you", and she would say "No, let me do it" and in two seconds she would do it. That's the difference. (Nicole, 62)

Because of the position of invisibility and marginality that participants occupy as older women who play video games, participants are uneasy when it comes to acknowledging their practice. They sometimes downplay it to the point of denying that they play video games. During interviews, several participants initially stated that they did not play at all, only to mention a variety of games and play practices over time. Participants also express discomfort at the idea of occupying a space in which they feel they do not belong:

Yes, but I would never have gone to the gaming room. Because I used to come [to the centre] in the afternoon, and I always saw the children playing. And for me, it was groups of children who came to play. A video game workshop, I wouldn't even have thought of going there. (Catherine, 63)

As documented by the literature on older adults and video games, participants sometimes incur the judgement of their (adult) relatives and friends and adapt the visibility of their play accordingly (De Schutter & Vanden Abeele 2008; De Schutter et al. 2014; Quandt et al. 2009).

It's "But she's a bit crazy, at her age she started playing video games." Well, I also do sewing classes on Monday afternoons. Yesterday afternoon, I went there, it was very funny, we were talking about whatever and then one of the participants said: "Ah well, we had planned to hold the workshop on Tuesday morning". I say "I can't go, I have my video game workshop". They were like [*mimes astonishment*]. It felt like I'd said something inappropriate, almost rude, because they looked at me with such stupefaction! (Mireille, 60)

A participant even wonders: "Some may not even talk [about the workshop] to their husband. ... I actually want to ask them. Do you tell people what you do on Tuesday mornings?" (Anne, 62)

The women who attend the workshop also use their identity as a discursive resource to valorise their play. It is there that the intersection of age and gender fully comes into play. Being a woman compounds and intensifies the marginalising effects of being an older player but participants' position as older women has specific and even facilitating implications for their play. To begin with, participants draw on the assumption that the combination of their age and gender makes them immune to the temptation of violent and addictive forms of play:

[Fieldwork notes] Three participants play the adventure game "Mirror's Edge". They play the tutorial and learn how to move around the city. But as soon as the tutorial teaches them how to fight, one of them leaves. And when they have to learn how to use a gun, the other two get up and leave. They say that the game isn't interesting, that it's a game for boys. One says that the game tries to trick people into believing that it's not a boy's game, because the protagonist is a woman, but it doesn't fool them.

In the same vein, participants distance themselves from the play style they associate with men. The men who used to attend the workshop constitute counter-models:

They were nice, for sure, but they were coming in at 10 AM on the dot, they were leaving at 12 PM sharp, so there was no friendly chitchat, although

we tried. And then they were much more interested in the technical aspect. And also, when you took the controller and played better than them, you could see that it annoyed them, even if they didn't show it, you could see it very well. (Isabelle, 60)

Turning essentialist representations of age around, participants use their age and gender as signifiers of wisdom and moderation that guarantee their ability to play “dangerous” games in a safe manner. The women who attend the workshop also cite their age as the reason why they deserve to play, in line with Barrett and Naiman-Sessions’ findings on members of the Red Hat Society who reclaim a right to play in old age (2016). As a participant sums it up, “One of the women, that’s good to know, once said, ‘But I play because in my life I’ve never played, I’ve only ever worked’” (Mireille, 60).

It is no coincidence that this video game workshop for older adults is exclusively attended by women. This phenomenon finds its roots in the affinity of the successful ageing discourse with the performance of femininity, as well as in the gendered experience of leisure and technology over the life course. Marhánková highlights how gender shapes lifestyles in old age, with a higher involvement of women in leisure activities, collective endeavours and learning situations (2014). Delias notes that, among middle class “baby boomers,” women actually draw on their former low-paying secretarial or teaching careers to domesticate computers, while men in executive or managerial positions have usually not been in direct contact with computers during their work life and find themselves disadvantaged in retirement (2019). The technobiography of the workshop’s participants echoes these findings and illustrates that gender mediates the relationship of older adults with technology in complex ways.

To summarise, participants struggle with the fraught category of “gamer,” which is neither accessible nor desirable for older women. Many players, including some older players, manage this issue by minimising the visibility of their play, thus avoiding any categorisation. For their part, participants attempt to design a new category in which they value their age (and gender) as a positive influence on play rather than a stigma among players.

“We Don’t Need a Pretext”: Extricating Oneself from Successful Ageing

Besides the discourses and representations relative to video games (and their effects, players and norms), the workshop is also a space where discourses about ageing abound. The most prevalent one, the discourse of successful ageing, constitutes a resource for participants to legitimise their play as part of a strategy to age healthily and productively. However, despite their overall compliance with the demands of successful ageing, the women who attend the workshop stay away from the figure of the “silver gamer.” While they borrow some of its arguments, such as “playing video games is a way to remain open-minded and up-to-date in old age,” they reject the most emblematic arguments of the “silver gamer” media discourse, which focus on health and grandparenthood.

The successful ageing discourse easily finds its way into a workshop dedicated to video games for older adults. Successful ageing and redemptive discourses about video games share the premise of technological solutionism: (digital) technology provides a solution to individual and social challenges by providing people with tools to improve themselves. In order to counter anxieties about the negative effects of video games, proponents of video games rehabilitation have argued that video games have *positive* effects on health, social integration and cognitive performance (Carbone & Ruffino 2012). As a result, video games fit well within the discourse of successful ageing, in particular in its emphasis on self-maintenance and self-improvement through technology (Iversen 2014). This discourse finds its way into the workshop mostly through the journalists who regularly attend the workshop. Journalists for TV programmes, magazines, newspapers, from both mainstream media and senior-oriented media, carry specific representations of older players into the workshop. As most participants do not talk about the workshop with their relatives and friends, it is mostly through journalists that they receive feedback about how their play is perceived. In that sense, journalists play a decisive part in participants’ negotiations with the discourse of successful ageing.

Firmly set in the “third age,” participants have affinities with successful ageing, which gives them hope about postponing the fourth age and its losses (Gilleard & Higgs 2014). Most of the women who attend the workshop are in their sixties, with a (former) professional career, a

middle-class income, a higher education degree and live without a disability. Many attend multiple cultural, artistic or sporting activities, in an associative, institutional or informal setting. This includes for instance sewing workshops, sculpture workshop and multimedia training workshops. These activities are combined with family obligations that take up their time: the care of children, grandchildren or grandnephews and nieces, as well as sick or dependent parents and in-laws. Two participants still work full- or part-time and many of the retired participants volunteer in non-profit organisations or associations. A participant concludes: "I can't imagine a retired person being out of the loop, retired people are hyperactive" (Michèle, 62).

Participants feel the weight of an injunction to stay active in retirement. They explicitly identify, and sometimes resent, the "social pressure" to remain a useful member of society in old age: "So they tell you, 'you have to be active', OK, but how?" (Michèle, 62). The workshop provides participants with an opportunity to be active in old age while still enjoying themselves and keeping a modicum of control over their time: "When you're retired you simply *have* to be a volunteer, I'm telling you [she laughs], and I thought, 'I still want to have fun'. So I was looking for an activity that was at least a little enjoyable, a little relaxing" (Nicole, 62). Such choices are part of a process of selective optimisation and compensation to accompany age-related changes in abilities and interests (Caradec 2018). As a participant explains, "[The workshop] has become an extra activity. When you get older you have less activities. I used to go to the gym every morning, then I had to stop because I was in too much pain. So often one activity replaces another" (Danielle, 64).

Participants have an ambivalent relationship with the successful ageing discourse. They borrow and adapt some of its arguments while keeping their distance with its core premise, namely that ageing is problematic. This matches the findings of the literature on older adults' perspective on successful ageing. Older adults often attempt to achieve (some of) the expectations of the successful ageing discourse (Marhánková 2011). However, they often refer to other value systems that prioritise comfort (Loe 2011), freedom (Van Dyk et al. 2013) or fate (Jolanki 2008) in old age. It holds particularly true for the many older adults for whom successful ageing is simply out of reach because of their health or age (Balard 2013).

Participants reject the predicament that they play for their health. They do believe that video games have positive effects on players' health but insist that it is not what motivates them to play. They dismiss a perspective that defines them as first and foremost an old person, frail and declining and erases their individuality:

I don't remember what media it was for, an article that was a bit about video games and health, and it tried to argue that video games were good for preventing ageing. And that annoyed me a bit, really, because it meant that we were really reduced to our age group. ... And I had the impression that we were all lumped together and that we were something like "the grannies who had come here to fight their Alzheimer's." That irritated me to no end. It was really from a medical point of view. When you see us playing, it's not like that at all! Of course, it can be a motivation, it's true that [playing video games] unlocks abilities, that's for sure. But is it really about preventing illness or degeneration? (Anne, 62)

Participants sometimes mention the supposed beneficial effects of video games to legitimise their practice. But they do so with no reference to their age or to illnesses associated with ageing: "it develops your imagination, your reflexes, ... It is an intellectual exercise that you have to perform" (Isabelle, 60).

The women who attend the workshop also firmly reject the "grandma narrative" that journalists sometimes use to frame their reporting. A participant sums up their discomfort:

We'd like people to say we're going to the video game workshop because we want to go there, we want to discover things. And we don't go because of some other reason. Because when they say "They go because they have grandchildren and they would like to know if it's dangerous or not for the grandchildren," well no, it's not true. ... We don't need a pretext. ... Just because we are older, we don't have the right to be interested in anything else [than our age]? And that's always annoying. They always write stuff like "Grannies hanging on to their joysticks", but no, we just play ... There's always something a bit housewifey, a bit condescending, "the little grannies," and it's very unpleasant. (Mireille, 60)

Indeed, most participants are not grandmothers, and even those with grandchildren resent a discourse that assigns them to a narrow, family-centered identity. As a matter of fact, only one of them has ever played with young relatives.

Overall, players retain a degree of control over their experience despite the weight of expectations and injunctions. And even when participants are well positioned to embrace the category of “silver gamer,” they resent its focus on old age, health and grandparenthood. This selective adherence to the figure of the “silver gamer” illustrates that discourses, while constraining the material conditions and interactions around play, remain malleable. Participants’ play is a discursive practice that shapes understandings of ageing and video games.

Conclusion: Carving Out a Space for Play in Old Age

Older adults who play video games have to carve a space where their play is meaningful in a context saturated with contradictory and constraining discourses about video games and ageing. The moral panic of the 1990s still lingers and fuels concerns about addiction and violence in video games. The representation of the “gamer” perpetuates the notion that video games are the domain of “boys.” Both elements foster a sense of unease and circumspection among the women who attend the workshop. As a matter of fact, they often feel that they do not belong among video game players. Meanwhile, rehabilitative discourses that value video games and their positive effects on players defuse the remnants of the moral panic and provide participants with arguments to defend their play. The successful ageing perspective’s emphasis on self-work and health maintenance through technology provides another source of justification for older adults who play video games. However, the women who attend the workshop barely draw on either of these discourses despite their potential for the legitimation of their play. Indeed, while they seemingly emancipate older adults from representations of declining and tech-averse elders, they merely replace the traditional image of old age as decline with the spectre of the fourth age. Ageing remains a devalued and stigmatising identity that individuals do their best to discard. In the workshop (and in other areas of their life), participants resist and contest these understandings of old age through discursive practices and the construction of new categories and meanings.

Participants deploy a variety of (sometimes conflicting) strategies in order to keep certain identities at a distance: the addict hypnotised by mind-numbing games, the ageing woman who engages in a desperate

fight against neurocognitive decline, the grandma whose real motivation is to spend time with her grandchildren. Participants produce a reflexive commentary on their video game play, particularly when they are interviewed by journalists or in conversation with sceptical relatives. They have learned to deftly adapt their arguments in order to fulfil the expectations of whomever they face. This explains why interviews with participants are replete with contradictory statements and claims that are incompatible with observations made during the workshop, particularly regarding their motivations to play and their opinions about video games. During interviews, participants shifted their discourse from a very critical outlook on games to an affectionate account of the role of play in their lives when they figured out that the researcher also played video games. Games, then, are about making time for themselves, spending time with like-minded women, having fun even during hard times and pursuing lifelong interests.

In practice, this means that the older women who attend the workshop implement a distinctive way to play video games to accommodate their interest in video games in a complex discursive context. Participants enforce a distinction between acceptable and unacceptable games and between acceptable and unacceptable play based on representations inherited from moral panic and "gamer" culture. They value games that they perceive as non-violent and a play style that emphasises collaboration, a strict control of the time spent playing and a professed disinterest in competition or performance. This fosters a form of collective play that accommodates varying degrees of mastery over the technology and the gameplay. Of course, older adults are not the only category of video game players who prefer occasional play, collective play, or non-antagonistic play. But these play styles constitute an intentional and successful response to the set of constraints specific to older players, whose access to video games remains precarious.

Participants' experience highlights the complex intersection of age and gender in video game play and the weight of gendered understandings of ageing on their practices as players. Participants are doubly marginalised among video game players: as older adults and as women. However, the effects of gender mitigate the effects of age to an extent. Not only does the gendered life course provided participants with specific opportunities to discover video games and domesticate ICT but it also turned around

participants' expectations and representations about older women to their advantage. If older women are supposedly particularly weak and frail, then they must be wholesome gamers, unthreatened by addiction or violence. Older women can also find in video games a leisure compatible with the convergent expectations of femininity and successful ageing. A video game workshop is indeed something that denotes an active and dynamic old age, that is, supposedly productive (in terms of health maintenance), with a social component, but also childcare compatible and able to fit in the domestic space. Finally, the use of playfulness as resistance (here, to age-related expectations) is itself a gendered strategy, especially when it takes place within the masculine-coded context of digital technology. Their singularity, as older women who are visible in a space dedicated to video games, becomes a source of pride:

No, we don't play *Assassin's Creed* the same way that others do, it's true, but we do play. When we play *Prince of Persia* or *Assassin's Creed*, we go for a walk. We go on the rooftops, in the houses, we look at the landscapes, the costumes, the characters. Of course, our goal is not to kill everyone. But why can't we play like that too? Honestly? ... We can do like [a participant], two hours in front of *Journey*, walking her character around very calmly, with a lot of zen, beauty, aesthetics, and be fascinated by the game's art for two hours, just like in a painting exhibition. ... When it comes to video games, we have to fit into boxes. Well no, we don't fit into boxes. (Mireille, 60)

Ethical Statement

Ethics approval was not required for this study, as it was conducted in France, which has no legal requirements or existing procedures for the ethical evaluation of research with human subjects (with the exception of clinical trials). The study was conducted in keeping with the ethical standards of the university and with the (verbal) consent of the participants and organisers. The author declares that they have no conflict of interest as the research received no funding.

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Considering the role of material gerontology in reimagining technology design for ageing populations

By HELEN MANCHESTER¹ & JULIANE JARKE²

Abstract

The promise of technology to provide solutions to the global concern of ageing populations has largely been unfulfilled. We argue that this is, in part, related to design processes that fail to take account of the rich material lives of older people, and that often adopt stereotypical views of older people as frail, vulnerable and unskilled. We draw on empirical data from two co-design projects, to suggest the contributions that material gerontologists could make to design teams creating technologies for ageing populations. We suggest material gerontologists bring three key elements to interdisciplinary design teams: (1) making visible the intra-action of humans and non-humans in co-design processes; (2) reconfiguring co-design response-ably with older adults; and (3) reimagining possible outcomes of technology design. We believe that this approach can result in the design of products, services and innovations that respond better to the heterogeneous needs and life-worlds of older adults.

Keywords: co-design, intra-action, socio-gerontechnology, material gerontology, ageing, response-ability.

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Introduction

Digital health technologies, trackers, social media, smart home devices, assistive technologies and advances in robotics are increasingly vital to our everyday lives as we age. At the same time, technology designers in the growing field of gerontechnology often struggle to move beyond biomedical models of ageing which assume that ageing bodies can be “fixed” through technological innovation and therefore tend to adopt an interventionist logic where ageing is seen as a “problem” to be solved (Peine & Neven 2020; Vines et al. 2015). Over the past few years, gerontologists have begun to engage critically with the digitalisation of social life with some important work emerging in relation to digital health (Katz & Marshall 2018), everyday digital technology use (Kania-Lundholm 2019), the use of technologies in care settings (Neven 2011), Ambient Assisted Living (Endter 2016) and robotics (Bischof 2017). This critical work has suggested that despite the rhetoric, technology designs for an ageing society have not lived up to expectations and there are increasing calls for new approaches to the design of technologies that do not view older people as necessarily vulnerable, in need of care or unskilled in the use of technologies (Manchester 2021; Neven 2011; Peine et al. 2015; Wanka & Gallistl 2018). This research raises at least three important questions: What imaginaries about ageing and later life are inscribed in gerontechnologies? How do these technology designs reconfigure ageing and later life? (How) can older adults be involved in the design of gerontechnologies and refigure stereotypical (or even harmful) inscriptions? In this article we are interested in how the field of material gerontology and the involvement of material gerontologists in technology design projects for and with older adults might help to unpack these questions.

Material gerontologists have moved away from biologically determined ideas of later life and instead see ageing as an embodied and material experience (Katz 2019b; Twigg 2013). This line of research extends the frame of analysis in gerontological research from a social constructivist understanding of old age, that foregrounds social practices, to the exploration of ageing bodies and materialities. In this framework, age and ageing are understood as:

“[C]o-products of human interactions, discourses, things, technical artifacts, possessions, and mobilities, among other things. From such a perspective, ageing becomes a

complex process in which human bodies and all kinds of materiality can be involved.”
(Höppner & Urban 2018: 2)

Material gerontologists, and specifically those following “new” materialist approaches, adopt a relational ontology in order to explore entanglements between humans and non-humans such as objects, technologies and spaces and aesthetics, and their co-constitution (Buse et al. 2018; Cozza et al. 2021; Gallistl & Wanka 2021; Höppner & Urban 2018). This foregrounding of bodies and materialities is both an ontological and an epistemic move. *Ontologically* ageing is understood as a material “doing” (Wanka & Gallistl 2018) and not simply a bodily or socially constructed process. Material gerontologists draw attention to different phenomena in relation to age and ageing including emotions, atmospheres, the entanglement of bodies and material objects in the lives of older people. *Epistemologically*, material gerontology can challenge traditional concepts of ageing and how we research it. It has led to new methods including walking interviews, methods that focus on the mundane, and interrogation of things and their meanings in contexts (Twigg 2021). Studies have focussed on reasserting the importance of the body, and its social constitution (Katz 2019b ; Twigg 2004), on materialities that make up age such as dress as an expression of identity and agency (Twigg 2008, 2013), the role of lifelong objects in stories told about age (Höppner 2015; Manchester 2018) and the importance of mundane objects to our emotional lives as we age (Buse et al. 2018). Another focus has been on ageing spaces and environments exploring, for instance, how the material alongside the social might enable different imaginaries, metaphors or “atmospherics” associated with age and ageing to become visible (Braedley 2019; Buse et al. 2018; Keady et al. 2020). In studies of technologies and ageing, materialist scholars have tended to explore the everyday experiences of older adults with technologies, providing rich accounts of the co-constitution of older people and technologies. For instance, Urban’s (2017) research on the daily routines of older people living with assistive living technologies examines the relations between ageing bodies, sensors and algorithmic formulae embedded in the technologies. However, so far, few studies have applied these concepts to the understanding of technology design, or co-design processes (see e.g. Endter 2021; Jarke 2021; Manchester 2021, for exceptions).

In this article, we adopt a materialist perspective and suggest its value in making visible taken for granted assumptions inscribed in the contexts of ageing and technology design practices. This involves taking seriously ageing bodies and the complex and fascinating material and embodied lives of older people, while locating these elements within wider systems of power and economic and political infrastructures. In doing so, we argue that material gerontologists can support technology design processes that critique imaginaries of ageing that are inscribed in gerontechnology designs and also begin to actively engage in reconfiguring these inscriptions, alongside other actors. In the following section, we explore some of the work that has been done in co-designing ageing technologies and point out what material gerontologists might offer to this field. We subsequently draw on our own experiences, as material gerontologists leading two design projects, and suggest three contributions that material gerontology might bring to co-design practice.

Co-Design, Ageing and Technologies

In the last two decades the design of gerontechnologies has been partly shaped by approaches such as human-centred, user-centred, or co-design. Such design approaches critically engage with power relations in design practice, exploring how design decisions are made, how institutional frames influence design or the differential knowledges and decision-making power of different stakeholders, including the designer in the process (Bratteteig & Wagner 2016; Lee et al. 2018; Light et al. 2015). This important work has supported an approach to gerontechnology design that questions assumptions made about older adults and includes older adults in the design process, taking seriously their everyday lives and their concerns (Baker et al. 2019; Vines et al. 2015; Wallace et al. 2020).

However, as Rice (2018) suggests, co-design research predominantly centres human agency and relations of power between humans and there has been less focus on the non-human as agentic. We argue that this anthropocentric positioning has the effect of sidelining the material and non-human actors participating in these processes, including the various effects of the technologies and design objects themselves as they come into relation within a co-design process. In this article we therefore

suggest that new materialist approaches can support participatory design projects to *foreground* the entanglement of bodies, things and technologies, situated in wider systems of power, in order to explore their agentic role in the lives of older adults. Taking Haraway's (2016) concept of response-ability seriously, we ask how material gerontologists might facilitate a change from "us" (humans) speaking *for* non-human others in co-design processes (Taylor 2018: 81).

To explore how a materialist framework may refigure gerontechnology design practice, we follow Haraway's call for response-ability (2016) and adopt Karen Barad's new materialist concept of intra-action which emphasises that human and non-human actors do not pre-exist their "intra-action" as independent entities (Barad 2007: 33). In technology design projects, this can help to shift the focus of inquiry from the bodies of older people to the ecology of practices and performances that co-produce ageing (bodies) (Höppner 2017).

In line with Barad's goal "to work in thinking about the ways in which particular entanglements matter to the production of subjects and objects" (Barad 2007: 232), we see co-design as a sociomaterial process that produces specific subjectivities and materialities. This suggests we need to look relationally and symmetrically at what entities become, do and produce when they intra-act in co-design processes, because intra-action asks us to foreground "the dynamics in between elements instead of elements" as independent entities (Dörrenbächer & Hassenzahl 2019: 29). Hence, in co-design practice, we need to provide interventions, materials, atmospheres, and spaces that inspire and enable participants and the material world to *respond* to each other and themselves (Dörrenbächer & Hassenzahl 2019) and to engage in "a collective knowing and doing" (Haraway 2016: 34). Co-design practice-ings are a communal attempt to be "response-able with" (not for) others (Haraway 2016: 20) by considering the socio-material entanglements of design practices themselves (Pihkala & Karasti 2018). This, so Pihkala and Karasti (2018: 2) argue, shifts attention in co-design practice from the "socio-material as a background or context in which things occur, to understanding it as entanglements of constantly reconfiguring forces through which things and issues come to matter." The design outcomes then might better *respond* to the relational interconnections and lived experiences of older adults.

As researchers and designers we are part of this intra-action, and as our own active interventions unfold we are continually engaged in making ethico-political decisions around response-able engagement. This draws attention to the “apparatus” of co-design which can support us to attend to certain phenomenon and intra-actions as the design process unfolds, and ignore others. What is required from design researchers is to find ways in which a range of human and nonhuman actors can participate in co-design processes and can “cultivate their response-ability” (Lindström & Ståhl 2016: 44). Drawing on ontologies and epistemologies of material gerontology, and particularly Barad and Haraway’s new materialist thinking, we suggest that material gerontologists could have a key role to play in this. Through our own involvement in two co-design teams we identified three contributions material gerontologists could make to technology design processes which we outline below.

Making Visible the Intra-Action of Humans and Non-Humans in Co-Design Processes

In many instances, co-design projects are interested in improving the *interaction* of older users with technologies. Material gerontologists can enable design teams to switch from a focus on interaction between (pre-existing) people and (envisaged) technologies and instead explore how humans and non-humans are co-constituted through *intra-action* by focussing on the dynamic sociomaterial assemblages of ageing. To support this claim we describe methods and approaches that helped to draw attention to these unfolding entanglements. In so doing, the rich materialities of the lives of older adults cease to be merely background or context, but are foregrounded; their intra-action becoming central for the further design process. This can be achieved through including and inviting non-human actors into the design process and then making participants’ (differing) relations to them visible and tangible.

Reconfiguring Co-Design Response-Ably with Older Adults

In the field of co-design for ageing populations there has been a focus on human to human agency and power relations and there has been less focus on the non-human as agentic and response-able. Response-able co-design

recognises that agency is not held in individual humans or objects but rather unfolds in practice through intra-action. This represents a shift from an anthropocentric vision of the lives of older adults to one where the apparatus of design attempts to enable new alliances to grow and/or new boundaries to become established between human and non-human actors. Recognising the various effects of the choices made about the staging and framing of the co-design process (the “apparatus”) also means understanding researchers’ agency in moving beyond critique to build response-able interventions designed in many ways to reconfigure, or at least raise new questions, about old age.

Re-Imagining Possible Outcomes of Technology Design Projects with Older Adults

Through building response-able co-design processes, material gerontologists can disrupt imaginaries of age and ageing often held by gerontechnology designers. This can support a reconfiguration of ageing bodies and contexts of ageing, and enable new, previously unidentified problems, and assets to emerge within co-design processes. This, in turn, can lead to designers responding differently to older participants and considering different kinds of outcomes, that might include, but are not be limited to, technology designs. These new outcomes could potentially refigure the harmful inscriptions of age that we often see reproduced in gerontechnology designs.

In order to illustrate how these three contributions might play out in practice, we investigate two co-design projects involving older adults, led by the authors. We present and reflect on both projects through these three elements and provide implications for the involvement of material gerontologists in technology design processes with older adults.

Methodology, Methods and Empirical Material

The methodology adopted in both of the projects can be characterised as critical co-design (originating in Science and Technology Studies) that demonstrates a move away from understanding “innovation” as the design of “novel” products for market and towards a focus on innovation as an exploration of sociomaterial relations in order to ask questions of

existing practices and begin to explore and design new ones (Bjorgvinsson et al. 2012). The two authors' approach to co-design is similar in that both projects worked on foregrounding interdependencies and the need to build connections between all actors who were among those collaborating. Both co-design projects also foregrounded relations between materialities (including bodies, objects, technologies and spaces) and relations between materialities and social constructions of ageing within the design process.

In addition, material gerontology is tied up with feminist knowledge politics in focussing on situated knowledges in communities (not isolated individuals) and a politics of engaged, accountable and response-able positioning in relation to the phenomenon of ageing. This epistemological position privileges building connections and hope for the transformation of systems of knowledge, practices and ways of seeing (Haraway 1988: 585). Ethically, this involves "an enlarged sense of inter-connection between self and others, including the nonhuman or 'earth others'" (Braidotti 2013: 48).

The specific methods that we adopted during our design processes differed and will be explained below. However, methods in both of the projects focused on inviting in, attending to and making visible the unfolding of sociomaterial arrangements and relations during the co-design processes. In order to do this, we needed to record, map and play back the processes to our participants in multiple ways in order to bring them out into the open, making them tangible to those taking part and ourselves. We adopted a variety of techniques such as taking photographs, using visual stimuli and maps and writing fieldnotes in order to do this work.

We present here two very different technology design projects to consider the three elements that materialist approaches might bring to the co-design process, not in an effort to compare across the two projects, but rather to offer two contrasting but similar examples of the contribution of materialist thinking to co-design with older adults.

Tangible Memories: Community in Care

In our first empirical case, we draw on data collected during *Tangible Memories: Community in Care*, a 22 month interdisciplinary project funded by the Arts and Humanities Research Council in the UK, led by Helen

(author 1). The overarching objective of the project was to co-design innovative social technologies to support democratic community building in care homes. The specific research questions asked: How do we build connections in increasingly ageing communities? How do we get better at sharing personal stories and oral histories in ways that build community as well as creating new academic insights? How can we harness the evocative power of lifelong objects and the new potentials of digital technologies to support these processes?

Material objects, including cherished, mundane and neglected objects, have been found to be important containers of memories and to support older adults to tell stories about their lives (Buse et al. 2018; Hallam & Hockey 2001; Kirschenblatt-Gimblett 1989). In order to connect digital and material lives the project team drew on research in computing that foregrounds our embodied experience of the everyday physical world (Dourish 2001) and recent work in developing tangible and Internet of Things (IoT) technologies to embed technology in everyday objects (see Vaisutis et al. 2014).

The multidisciplinary, cross-sectoral team included Helen (author 1- a material gerontologist), an oral historian, an anthropologist, computer scientists, partners from charity Alive activities, a charity that runs activities in care homes and advocates for better quality of life experiences for older adults in care, an artist-maker and a small interactive design studio. The three sites chosen for the study were deliberately varied and included a dementia care ward run by a large charitable organisation, an extra care facility, (where residents have their own flats but can buy the care they require), and a privately owned and run home.

Making Visible the Intra-Action of Humans and Non-Humans in Co-Design Processes

Visits to the settings together were an important first step in beginning to highlight the unfolding entanglements of sociomaterial actors and intangible elements that often remain invisible in caring practices (Mol 2006; Mol et al. 2010). From these initial visits and our¹ desk-based research we had identified some of the key political, economic and social infrastructures

¹ In these empirical sections of the article where “we” and “our” are used, we are referring to the project team, unless otherwise stated.

of care work which had influenced technology design processes in the past. For instance, care is often delivered under considerable time pressure and usually allocated in relation to individual biomedical needs over social, cultural and embodied needs (Ward et al. 2016). Care workers have a low status as a profession and are often also poorly paid. Thus, they may choose not to engage affectively in the context of their waged labour role (Puig de la Bellacasa 2017).

While recognising these taken for granted constructs of care, we were also interested in understanding and drawing attention to the intra-actions of the different materials, texts, technologies and human relations and how they aligned and were contested in forming practices of care (McFarlane 2011). In order to understand this better we conducted “A day in the life of” ethnographies, shadowing care workers and residents and, in the process, attempting to understand, at least partially, elements of care that had been less well documented in the past.

Although necessarily partial accounts these ethnographic encounters drew our attention to artefacts like the “space invader like” checkbox records and charts that care staff were required to complete but we also noticed the importance of touch in activities such as nail painting, and stroking of hands. A resident introduced us to Charlie, a blackbird who sings outside their window everyday, and we also noticed how the sound of the tea trolley created a familiar and often comforting rhythm to the day for some residents. We attended to technologies such as wrist monitors and alarms – with embedded sensors that collected data about the person and their bodily functions as they go about their daily lives. Although problematic for some, we discovered that they also ensured a degree of confidence to others in being alone in their rooms and flats. One resident with epilepsy told us that she wears the alarm but would rather rely on care staff members who, she felt, could predict when she is likely to next have a fit due to subtle changes in her behaviour.

Through this first phase the team began to understand how the care practices in the settings follow biomedical logics of care. However, a materialist approach also enabled the team to attend to and discuss the embodied, more-than-human and material intra-actions of caring practices in order to make visible and tangible practices that might be normally rendered invisible in processes of technological design for older people. Paying attention to the co-production of ageing and care for older people

through human and non-human intra-action in the ethnographic stage, while taking seriously the partialness of our work, enabled the project team to begin to find openings for technology design that is built from the “stuff” that seemed to matter – the sunny spot in the garden or the brass plaques made by Elizabeth’s (one of our participants) now dead spouse.

Reconfiguring Co-Design Response-Ably with Older Adults

Our research “apparatus” attempted to draw attention to the dynamic intra-action between human and non-human phenomena in making practices of care that might build community and connection. This approach brought certain phenomenon to the fore and, we hoped, would enable new alliances to become established. Our focus was on agency as dynamically co-produced between all bodies (human and non-human) in practices of co-design for age care settings. We recognised our own agency in our co-design work which we saw as response-able interventions designed in many ways to reconfigure, or at least raise new questions, about age and age care.

Following the ethnographic phase the team began to develop methods of co-design that is built from some of the “things” we noticed earlier, such as the importance of the blackbird and nature in residents’ lives, or how sounds and smells can create certain emotional responses and mark time. We worked with residents over time to understand their everyday material lives, and the importance of mundane, as well as cherished objects in the ongoing production of their subjectivities. We did this through one-to-one conversations in their own rooms, and observations in dining rooms, lounges and other public spaces. In these engagements with older people, objects and materialities we found that they would often say that “they didn’t have any interesting stories to tell,” and we observed that they had “lost” their most cherished objects or that the environments and aesthetics of the care settings (e.g. the arrangements of furniture, the constant noise of the TV and the disconnect with the natural world outside the settings) did not encourage them to build social connections.

We identified a need to intervene response-ably through our co-design process to achieve our goal of building community and connection among older adults and carers and with the material actors we had identified as important. We therefore conducted a series of design workshops where we brought new materials, sounds, and smells into the care settings in order

to attempt to reconfigure the environments of care. When we conducted a workshop in the dementia care facility on money we brought old and new money and gave purses with money to the participants to spend. One participant, suddenly having a purse and cash in her hand after years without it, started to use the money to barter for cake on the tea trolley, intra-acting with the trolley, cake and researchers and performing past experiences that she had clearly excelled at in life outside of the care setting. We also asked them to bring along objects they felt close to or that had a story attached to it. Edith, a resident in the extra-care facility, brought along a copper plate crafted by her husband as a present for her birthday some years ago. She told the story of their relationship through the plate – referring to his craftsmanship and care to detail, reflecting on their lives together through the materiality of the object. These objects, smells and sounds were able to create temporal links between the past and the present, and supported older adults to share stories of their lives and make new connections with each other and with non-human materials, in meaningful ways.

At this stage it was the researchers and designers who were “staging” the co-design work, and largely the artefacts and approaches we brought in that were creating these relational reconfigurings. A particular issue that arose during the co-design process was the difficulty of involving care staff due to the political, economic and social constructs of care that led to them being overworked and with little time “budgeted” for engagement. As response-able researchers we wanted to find ways to involve care staff who were entangled in the politics, economics and sociomaterial worlds of the care settings. We sought to bring them into the co-design apparatus in order to design technologies that might support their work, and in the process improve the sense of community and connection in the care settings.

The design team worked to disrupt the way that the settings were materially and socially configured in order to engineer a removal of the carers’ responsibilities for the labour of (bodily) care, at least for a short time. We designed a series of events to reconfigure the lounge space in each of the settings into a communal space, inviting care staff, residents, families and other practitioners to come and enjoy tea and cake while they experienced the prototypes that were developed. The design team took on the normal roles of care staff by serving tea and cake, manoeuvring wheelchairs and other aids and washing up. The sound of music, bunting, and our novel technological prototypes worked together to transform the lounge space

from one where residents would routinely be sitting in armchairs around the television to a space rather like a party, festival or market place, where we hoped new relations would be made possible. Within this redesigned space our prototypes and design artefacts, including a virtual reality (VR) headset, a musical cushion and a mock-up of a storytelling app, were novel artefacts, which, when they came into relation with human actors, were able to create new, if not always lasting, connections. For instance, a musical cushion prototype was a beautifully stitched patchwork cushion (found in a local charity shop) to which Radio-frequency identification (RFID) tags in the form of buttons played music when a listening device was placed over them (see Figure 1). Residents, staff members and families not only shared their own memories and experiences with similar artefacts (patchwork cushions) but also shared the bodily surprise of the music suddenly playing.

Figure 1. The musical cushion prototype



Re-imagining Possible Outcomes of Technology Design Projects with Older Adults

While we started our project with a desire to design technologies to build democratic community “problems” were also “made” through the unfolding intra-action of bodies, materialities, space and human actions in the process. Through framing and staging our focus on these sociomaterial intra-actions we began to unpack current practices of care in order to understand how they often worked to diminish relational, emotional and embodied aspects of care.

Through staging our co-design to attend to human and non human, technologies and materialities we worked to discursively and materially constitute the older person, carers and practices of care differently. Through this process, for instance, we noticed that living with loss as we age can be better understood as complex intra-actions across time and space, involving material lives, embodied experiences and relations with and among humans and non-humans. In their stories older people often described the loss of relationships with humans, animals, as well as nature. They also told about the loss of cherished objects that made sense when emplaced in lifelong homes but made less sense when brought into care settings. This understanding, that became visible during the process, did not necessarily require or call for a simple technological solution, rather it required co-designs that considered the complexities and dynamic nature of the wider sociomaterial arrangements around any technological design.

While we had co-designed some prototype technologies and had been using them together in all the settings, we knew that the technologies alone would not bring about the kinds of changes to caring practices that we had all come to understand were needed. In the extra care setting we worked to co-design a room to be filled with evocative objects (donated by residents or procured in local charity shops), smells, a wall vinyl with an illustrated local map and our technology designs, as a space to encourage storytelling and community building (a Parlour of Wonder). The process of co-designing the room involved the bringing together of personal and historical artefacts and taking seriously material and sensory elements. The room itself has been adapted for different uses including for family and wine parties and for a story circle to meet. The co-design process was

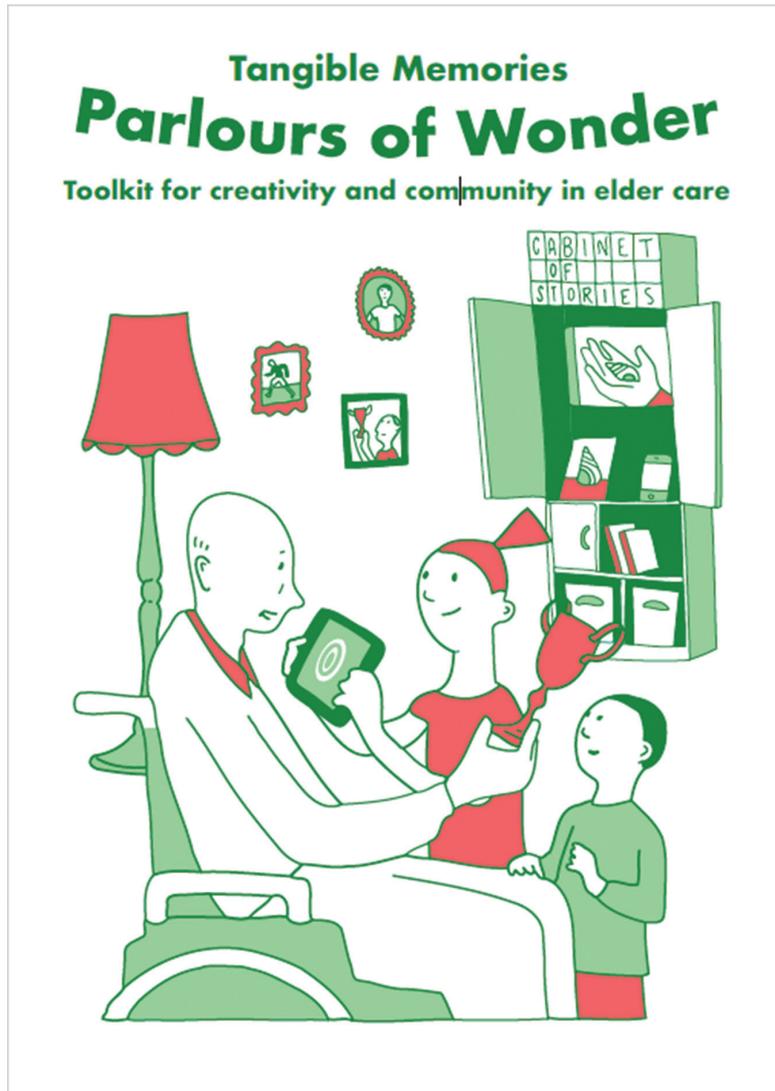
also written up as an easy to follow “blueprint” that could be adopted by other settings (Manchester & Stand + Stare 2018). We also designed a training toolkit (see Figure 2) (Manchester et al. 2018), and a coaching process for care staff (in partnership with our charity partners), to counter the lack of confidence many felt due to a lack of training in facilitation. These artefacts worked alongside our technologies to offer others a method/ or apparatus to build community and connection in care settings.

MobileAge

The second project we draw upon is *MobileAge*, a 36 month interdisciplinary project funded by the European Commission in which Juliane (author 2) was involved. The overarching objective of the project was to co-create digital public services with older citizens based on open government data. While an increasing number of civic actors engage in the design of open data-based technologies, they rarely include older citizens. Our interest was in the development and evaluation of methods that would allow older (and also non-tech savvy) citizens to become co-designers of (open data-based) digital public services. Specifically we aimed to enable civic open data use of older adults, increase the digital inclusion of older adults, and co-create sustainable digital public services for older adults.

Overall, we conducted six co-design projects in four European cities and regions. The multidisciplinary, cross sectoral teams across the sites included social scientists, software developers, designers, computer scientists, local and regional government, social and health care service providers as well as older residents. We report here on two co-creation projects that were conducted in City 1. The focus of these two projects was on social participation, in particular with respect to neighbourhoods and ageing-in-place (Urban 2021). In the first project, a core group of eleven older adults co-designed a digital district guide over a period of 8 months. In the second project, the core group included five older adults and seven social care services providers. In addition, a total of 46 older residents became engaged for shorter periods of time/activities. Jointly they co-designed a digital walking guide comprising the interactive presentation of seven walks in the district. In both projects, printed versions of the digital services were also produced and distributed through local social care service providers.

Figure 2. The Parlours of Wonder Training Toolkit



Making Visible the Intra-Action of Humans and Non-Humans in Co-Design Processes

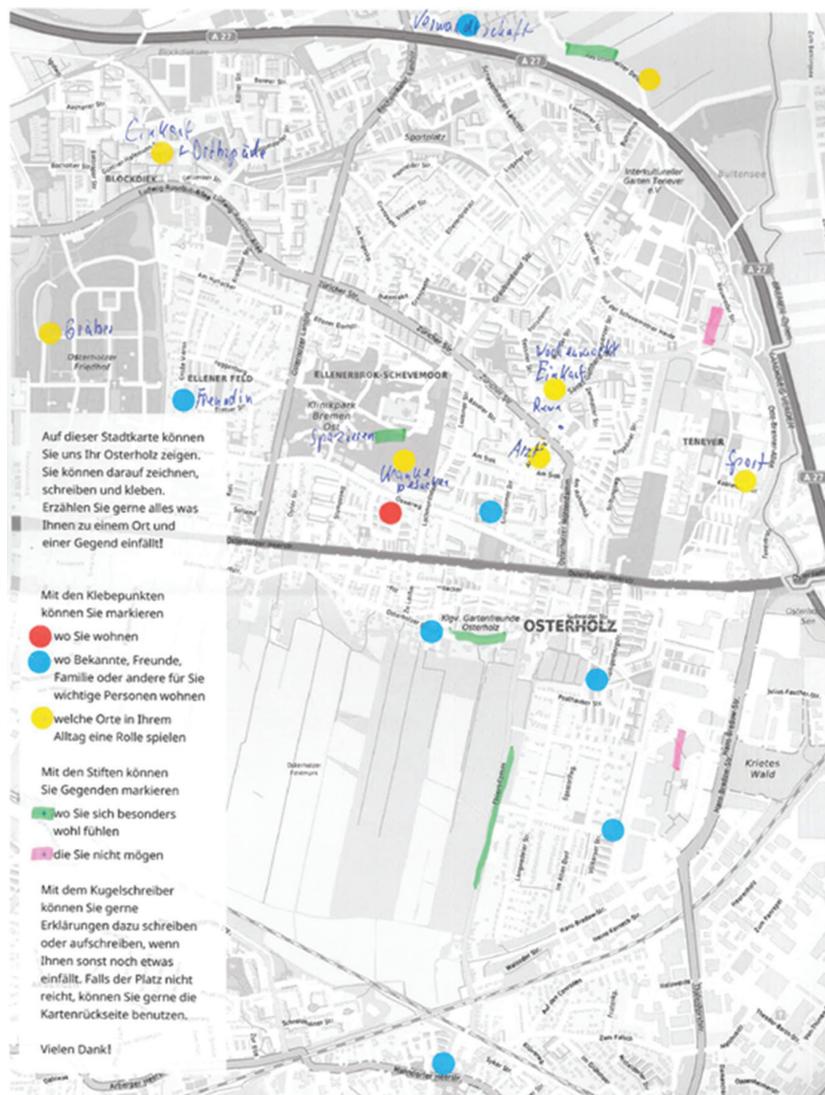
Participants of both co-design projects in *MobileAge* stated that the main reason for participating in the project was not their interest in technology (design) but rather to do something for their districts and its residents; to improve living conditions and the general public perception of the district. One of the first steps in our co-design process was hence to “invite” the district into our co-design activities and decentre the role of technology (and open data).

For the first two meetings we developed a card game about the district. In the first meeting participants were asked about places in the district that they particularly like or that are important to its residents. In the second meeting, we included pictures of the places that were named and asked participants to confirm the relative importance of a place with stickers. The use of this card game served several purposes. Firstly, the intra-action of older adults with the card game, the relating of workshop activities with the lived experience in the district, allowed participants to assume the subject position of knowledgeable and resourceful older participants. Secondly, it also made visible some of the different relations that participants had with the district.

In order to tease out these different relations and experiences of ageing in the district, we developed a set of materials through which participants could document their everyday lives in the district in more detail and reflect about it. The materials included a pack of district maps, postcards, a camera, a photo album and media diary. Participants were given 2 weeks to engage with the materials and were told they could choose the ones that “spoke” to them the most and did not have to complete all of them.

One of the materials was a map of the district in which participants were asked to highlight where they live (red dot), where family and friends live (blue dots) and which places (e.g. location of General Practitioner/Doctor (GP), sports club, shopping) are important (yellow dots). Participants were also asked to highlight areas that they particularly like (in green) or dislike (in pink). Figure 3 depicts the map produced by participant 5. Many participants considered the ways in which their socio-spatial networks in the district had changed after they retired. In addition, many stated that the map made their intra-actions within and to the district

Figure 3. Map as produced by participant 5, depicting their socio-spatial networks in the district



visible in a way that was not necessarily apparent to them. For example, some maps demonstrated that intra-actions with the district mainly took place within close proximity to the home of participants while others had more expanded networks (e.g. participant 5).

While the card game was a product of a group of participants identifying relevant places in the neighbourhood, the maps focused on the individual socio-spatial intra-actions of participants. They allowed participants to document their individual intra-actions with the district and consider how they produced them individually as older residents. In subsequent interviews a number of participants reflected on how much smaller the district had become as their everyday movements became more restricted due to reduced mobility or a city infrastructure that was not supporting the needs of its older residents (e.g. public toilets, benches to rest, street lighting). These changing relations became visible through the self-documentation materials.

Reconfiguring Co-Design Response-Ably with Older Adults

In a next step, we included the maps and other materials in our co-design workshops. In a dedicated session, we exhibited all (anonymised) maps depicting socio-spatial networks and asked participants to jointly review and discuss them. Through this intervention, we framed the joint exploration of practices of ageing in the district as part of our joint co-design work. We asked participants about the differences they could detect between the maps, whether these differences were important and how they came about. Figure 4 shows two cut outs of maps from two different participants and how they highlighted the same area/place differently. Rather than understanding these highlights as “static” relations to space and intangible concerns, they became part of a dynamic intra-action between participants and the materialities they invited into our co-design process. The participants jointly explored why they perceived of the “same” place so differently; why for some this was a place of joy and recreation while for others the same place caused uncomfortable feelings. Intangible concerns, related to the lack of knowledge about certain places became visible in these conversations. For instance, the participants would not “risk” a visit to some places because they thought it was unsafe or ugly or difficult to reach. They reflected on how their actual mobility in the district was

Figure 4. Cut-outs of two maps from two different participants highlighting the same place as recreational (green highlight) and unwelcoming/dangerous (pink highlight)



largely determined through the places they already knew. Places were not just abstract, but rather brought into the design process and situated in the placemaking practices of individual participants. Our co-design work was hence configured as an apparatus in which participants were able to

articulate the specific material arrangements that made places welcoming to them or not (e.g. the fact that public toilets or benches are nearby, that the place included green areas or that the streets/squares are well lit in the evenings).

While the maps allowed participants to consider material arrangements of their neighbourhoods, the ways in which they invite the district into the co-design process are limited. In the second co-design project, we therefore used a different way of *staging the sociomaterial arrangements in which older adults live and perform their age* through exploring a neighbourhood together. In a first exploratory walk, 14 older adults joined through an announcement from a local senior citizen centre. We provided each participant with a notepad and pen and a list of potentially interesting information and aspects about the walk. We asked them to take notes of the kinds of things and information they considered important while we walked. After the walk, we sat together in a local café and compared and discussed notes. The points and priorities differed depending on the participants' relative health and mobility (e.g. one participant required a walking aid and was more attentive to curbs and the existence of benches), their knowledge and attitude about the area (e.g. if participants considered an area to be "unsafe," information about lighting was considered important), and their interest (e.g. some participants were particularly interested in the history of the area; others were more interested in recreational aspects). Based on these considerations, we developed a note taking template for subsequent walks (see Figure 5).

The walks were planned by older residents themselves and always included an opportunity to stop for either lunch or coffee at a café, citizen centre or meeting place. During these walks, we not only collected information about the walks but also about the physical infrastructure that was missing (e.g. if there was a long stretch of walk without any benches or broken benches) and the history of the places we visited. Many could tell stories about the places we visited and also stories about themselves relating to the places. For example, one of the cafés we repeatedly used as a stop, was a former ironmongery shop turned into double use as a second hand furniture store and café run by charity (see Figure 6). While sitting there, participants recollected their encounters with the former owner and their quests for special screws.

Figure 5. Picture of template for walks



Re-Imagining Possible Outcomes of Technology Design Projects with Older Adults

The stories and lived experience of older residents became an important reference for the ways in which participants wanted to describe the walks. They were complemented with practical issues such as missing benches on the way or broken city infrastructure. Such information was collected and subsequently reported to the local council that included them in their planning considerations. The walks did not only allow participants to explore their neighbourhood but also to actively reconfigure and reimagine it, including what it meant to age in this place. For example, through the installation of new benches walks became feasible to older residents who would not otherwise be able to walk for longer periods of time.

Hence, similar to *Tangible Memories*, the initial “problem focus” of *MobileAge* shifted. Inviting the district into our co-design process and making walks an essential part of our co-design methodology, shifted the

Figure 6. Interior of the former ironmongery



focus from open government data to the sociomaterial arrangements that participants lived in. The participants' engagement with maps and subsequently their own bodily experience when undertaking walks, enabled them to consider a change in sociomaterial arrangements in their neighbourhood that would be of benefit to all.

The participants realised that some relations to the district were cut off, as they did not want to visit them because of fear or lack of information or could not visit certain places because of lack of benches and/or public transport. Attending to these materialities allowed us to imagine a different sociomaterial arrangement, one in which an information service about walks in the district lowered the hurdle to explore new areas. We subsequently co-designed a digital district guide for which participants defined and described walks. The descriptions featured the information that we collected during our walks, including various historical accounts about the places along the walk. Some of these places were previously unknown, and had seemed out of reach or risky. A shorter version of the

digital district guide was printed in a booklet so as to reach all older residents. Through our co-design activities and the resulting guides, (some) relations to the district were repaired and re-established. The co-design process allowed participants to configure sociomaterial arrangements, in that they determined that it was important to maintain a strong relation with their district, not only from afar but through the actual bodily experience of walking in the district. In this way, the co-design project's focus became about re-making and re-designing sociomaterial arrangements in the district rather than simply developing an open data-based technology in the form of a digital district guide or digital walking guide.

Discussion

In this article, we have presented three contributions that we feel material gerontologists can make to co-design processes.

The first contribution relates to how material gerontologists can support design teams to pay attention to and *make visible the ways in which humans and non-humans intra-act in sociomaterial assemblages of ageing*. For example, in *Tangible Memories*, the team explored the relations of older residents with wrist monitors and alarms and discovered that, although problematic for some, they supported others to feel confident in being alone in their rooms and flats. The relations of older residents with such devices hence differed and their intra-actions produced different phenomena; some giving confidence and others producing the feeling of being surveilled. Similarly, in *MobileAge*, the aim was not to consider older participants and the district separately but to foreground their *relations* and *relationality*. This was achieved, for example, through the card game where participants articulated their different relations with the district (e.g. places they considered important for the district) or through maps in which participants documented their socio-spatial relations and movement. Overall, we illustrated the importance of spending time, and designing methods, at the beginning of a co-design process that go beyond recording social interactions between humans or interactions between older adults and technologies. Rather, material methods helped us to understand and make tangible the dynamic intra-actions between humans and non-humans through which ageing is “done” (Wanka & Gallistl 2018). In particular, we worked to make visible the presence and entanglement

of humans and non-humans in the contexts in which we were working – the district and the care settings. In this way the issues that were previously not brought into conversations around re-designing care or re-modelling the district were brought into the design conversation in the early stages. Such a design conversation becomes “response-able” in that the entanglement of bodies, things and technologies, situated in wider systems of power (e.g. in relation to designing care settings or modelling the district) are brought to the fore. This matters because through making these elements tangible and inviting them to the design process we found that new kinds of designs and, indeed, new kinds of “problems” emerged.

The second contribution relates to the research apparatus that material gerontologists can bring to co-design processes. This apparatus foregrounds an understanding of agency as co-produced dynamically between human and non-human actors during co-design processes. For example, in *Tangible Memories*, the design team observed how the environments and aesthetics of the care settings did not encourage older residents to build social connections. In staging their co-design interventions the design team therefore took care to reconfigure the sociomateriality of the care setting, through taking on the roles of carers, and the addition of music, bunting and novel technological prototypes. The purpose was to transform the lounge space from a passive space. In *MobileAge*, the design apparatus (e.g. through an exhibition of anonymised maps) invited participants to articulate the specific material arrangements that made places in the district welcoming to them or not. Overall, our case studies have drawn attention to how our research apparatus were able to bring certain phenomenon, that might have previously been ignored, to the fore, and in the process new relations and alliances were able to emerge. Through approaching research as active, respectful engagement with other actors (human and non human), we believe material gerontologists can support design teams, and those working and living in later life settings, to reconfigure stereotypical imaginaries of ageing and later life and potentially bring about a transformation in our approach to “doing age” – in our two cases involving transforming practices of care and a neighbourhood for older people to enable ageing in place and increased wellbeing and quality of life.

Evidence suggests that gerontechnology designs have often failed to live up to expectations in supporting older adults to lead rich and

fulfilling lives. Our third contribution relates to the role material gerontologists might play in influencing the outcomes of co-design processes and taking response-ability seriously. As Martin et al. (2015: 635) argue:

“Response-ability encourages a practice of making oneself available to respond without knowing ahead of time which phenomena will call one’s attention or what form the response should take.”

In *Tangible Memories*, the outcome was not a technology design but rather, “a Parlour of Wonder,” a site for new connections between human and non human actors. Similarly, in *MobileAge*, the focus shifted from merely building digital prototypes (such as the digital walking guide) to engaging in practices that re-designed the district itself and made it more accessible and response-able to its older residents. Our empirical data suggests that the involvement of material gerontologists in co-design processes can lead to a reframing of taken-for-granted ideas about the lives of older people, and in our cases, at least partially, rescripting current logics of care or discourses of “ageing in place.” As a result of this the outcomes of our co-design processes tended to decentre the technologies themselves in innovations for ageing futures, or at least demonstrate the need for other additional designs that support the technologies to become embedded in ageing contexts.

Conclusion

We started this article with a set of questions that we identified as of increasing importance in relation to ageing and technology: What imaginaries about ageing and later life are inscribed in gerontechnologies? How do these technology designs reconfigure ageing and later life? (How) can older adults be involved in the design of gerontechnologies and refigure stereotypical (or even harmful) inscriptions? We have tried to unpack these questions through suggesting three contributions that material gerontology can bring to co-design processes.

The first relates to inviting materialities to become participants in the design process which, in response to our first question, can enable design teams to consider imaginaries about ageing and later life, that are not abstract and stereotypical, but rather build from the entangled, unfolding

material and social lives of older participants. The imaginaries considered can become, at least partially, responsive to these complex relationalities. In our second contribution, we highlighted how the practice-ing of a response-able co-design process may (re-)configure technology design processes in later life contexts to allow designers to cultivate the response-ability of all actors in modes of doing age and ageing. In so doing, and in answering our second question, co-designers may consider how specific technologies refigure ageing and later life and (in relation to our third contribution) re-imagine alternative outcomes of technology design. In response to the third question from our introduction, we recognise the anthropocentric traditions in co-design practice that foreground the participation of human actors and suggest that, in order to reconfigure harmful inscriptions of age, it may be helpful to understand and cultivate the response-ability of all actors in the co-design process.

To date, few material gerontologists have been involved in technology design processes or often we are asked to get involved with “ethical issues” or stand alone ethnographic elements of design processes that are not fully integrated into engineering led projects. We have tried to illustrate the contributions that material gerontologists can make to technology design processes for ageing contexts when they are embedded in, or even lead, co-design processes. We believe that where material gerontologists are involved in co-design, taking seriously the interconnections between older adults, ourselves and other human and non-human actors, products, services and innovations can be designed that respond better to the needs and life worlds of older adults; they become *response-able with* and not for ageing populations. Design approaches have much to offer to gerontologists too – especially those who are interested in engaging with older people and other publics and those who wish to intervene in creating more creative, connected later lives for all.

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