



Feeling our way: methodological explorations on researching touch through uncertainty

Carey Jewitt, Ned Barker & Lili Golmohammadi

To cite this article: Carey Jewitt, Ned Barker & Lili Golmohammadi (2023): Feeling our way: methodological explorations on researching touch through uncertainty, International Journal of Social Research Methodology, DOI: [10.1080/13645579.2023.2173423](https://doi.org/10.1080/13645579.2023.2173423)

To link to this article: <https://doi.org/10.1080/13645579.2023.2173423>



© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 07 Feb 2023.



Submit your article to this journal [↗](#)



Article views: 530



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 1 View citing articles [↗](#)

Feeling our way: methodological explorations on researching touch through uncertainty

Carey Jewitt, Ned Barker and Lili Golmohammadi

Department of Culture, Communication & Media, University College London, London, UK

ABSTRACT

This paper argues that methodological uncertainty, such as that experienced by the social research community through the COVID-19 pandemic (2020–2022) is, and has always been, a vital part of the research landscape. Whilst recognising the many damaging effects of the uncertainties of the pandemic on research and researchers, we home in on the potential of the challenges raised by uncertainty as a force for methodological innovation. We introduce three InTouch project research studies conducted during Lockdown and reflect on the methodological challenges raised by the change and uncertainty of the pandemic. We describe our use, adaptation and reorientation of creative, sensory, and speculative methods to overcome these challenges. We reflect on how we mobilised the uncertain methodological terrain of digital touch and social research in the pandemic as a resource for methodological innovation.

KEYWORDS



Online probes; sensory ethnography; speculative research; uncertainty; touch; digital

Introduction

This paper discusses the methodological uncertainty experienced by the social research community through the COVID-19 pandemic (2020–2022), how we used creative, speculative and sensory methods in our research on digital touch to navigate, manage and/or overcome these challenges, and how we mobilised uncertainty as a productive resource for methodological innovation.

Uncertainty about the potential of social research to capture people's lived experiences and questions of what matters are not new, indeed they are at the core of a substantial and long-felt sense of methodological restlessness and dissatisfaction over the past decade or more (Mason & Davies, 2009). Uncertainty has inspired calls for new 'lively' social methods and 'turns' to better capture people's lived practices and experiences (Lury & Wakefield, 2012; Vannini, 2015). In short, methods constantly evolve in response to uncertainty and the changing phenomena that social researchers notice, seek to understand, and capture (supported by technological development, for example, audio recorders, cameras, video recorders). Methods are taken up, adapted and re-orientated to reflect such changes, and as we show in this paper, can lead to methodological innovation.

Through the period 2020–2022, the pandemic has amplified uncertainty. In turn, this has foregrounded the need for agile research methods that can attune to change. The restrictions on physical touch and social distancing in response to the pandemic also brought attentiveness to the significance of sensing bodies and touch newly to the fore. Newspaper headlines told of the human need for touch, a crisis of touch deprivation and its effects, people developed new contactless hugs and greetings, and the possibilities of self-touch and comfort and remote touch were widely

CONTACT Carey Jewitt  c.jewitt@ucl.ac.uk  UCL Knowledge Lab, Dept. Culture, Communication & Media, IOE UCL's Faculty of Education & Society, University College London, 23–29 Emerald St, London

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group. This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

discussed (Leder Mackley & Jewitt, 2022). These pandemic effects have shaped social research and its use of methods (Nind et al., 2021).

In this paper we home in on the potential to flex methods, arguing that uncertainty can productively provoke methodological refinements and innovation that contribute to understanding phenomena – in this case digital touch.

This paper presents and discusses three examples from the InTouch project – a five-year European Research Council project, which aims to enhance socially orientated understandings, research methods, and the design of digital touch. Digital touch refers to the digital mediation of touch sensations or experiences by a broad range of technologies (e.g. haptic wearables, virtual reality, bio-sensor applications, and tactile robotics) (Jewitt et al., 2020). It looks beyond the psychological, psychophysical and neuroscientific to encompass the complexity of touch being distributed throughout the body and embedded in societal, cultural touch norms, etiquettes and practices and individual lived experiences (Jewitt, Chubinidze, et al., 2021; Jewitt, Leder Mackley, et al., 2020). This includes face-to-face co-located touch or remote touch and digitally mediated touch interaction between people, people and objects or machines; a digital transformation that will ultimately give rise to new social forms of touch and other sensorial communication and ways of being in the world. Understanding bodily knowing through research on and with the body is a founding feature of the project, which combines a multimodal (Jewitt, Bezemer, et al., 2016) and multisensory ethnographic (Barker, 2022) in collaboration with design methods in Human Computer Interaction (HCI) to better understand the social and sensory implications and potentials of digital touch and to inform its design. Through this lens, we explore how participants know and tell through touch and bodily interaction, and their sensorial and material environments. The pandemic disrupted the methodological core of InTouch, and required us to evolve our materials, researcher positions, and methods to retain the essence and liveness of a multimodal and sensory approach.

The three examples we present make use of creative, sensory, and speculative methods – methods which are themselves attuned to uncertainty. We reflect on these methods in the context of the UK COVID-19 pandemic restrictions, which provided an additional layer of challenge to the complexities of researching touch. We reflect on how we stretched, adapted and re-orientated our methods to navigate these challenges and the uncertainties of digital touch. We interrogate our practices in response to COVID-19 restrictions with attention to the potential methodological learnings for touch and sensory research more generally beyond the particularities of the pandemic – rather than seeking to compare our approach with our pre-Covid-19 plans or to it was better or worse.

The paper reflects on the uncertainties of a ‘post-pandemic’ research context and the potential to harness these for methodological innovation. It discusses five ways that social researchers can use creative, sensory and speculative methods in response to the challenges of uncertainty amplified by the COVID-19 pandemic, including pivoting research, reconfiguring materialities, being sensorially present, working with the dynamics of disruption, and reconfiguring participatory dispositions. The paper concludes by arguing navigating uncertain times and terrains (such as the emergent landscape of digital touch) can inform methodological innovation to help us feel our way together through change and uncertainties.

Background

First, we situate the paper in a discussion of methodological innovation, the methodological uncertainties of the pandemic and the uncertainties of researching touch.

Methodological innovation

While claims for methodological innovation in qualitative social science research methods are widespread, there is a considerable debate, and some scepticism, within social science regarding the validity of such claims (Wiles et al., 2011). Many social science scholars situate their work at the vanguard of methodological innovation, for example, amid the turn to visual, multimodal, and affective experiences (Mason & Davies, 2009), advancements in digital technology, and interdisciplinary collaborations (Xenitidou & Gilbert, 2009). However, sceptics consider methodological innovations as exaggerated fads overly concerned with novelty – a trope of the progress narrative of qualitative research (Travers, 2009). To a large extent, this debate centres on different conceptions of methodological innovation. For some, it includes the use of existing methods in reformed ways (Xenitidou & Gilbert, 2009) while for others it is restricted to the creation of new ways doing things (Taylor & Coffey, 2008). Bengry-Howell et al. (2011) suggest that innovation usually draws on the traditions of existing methods, either inside or outside of social science, while Xenitidou and Gilbert (2009) propose three categories of methodological innovation – inception, adaptation and adoption. A second-consideration key to the debate of methodological innovation, is the extent to which it must be accepted, and widely taken up, by the wider research community (Wiles et al., 2011): for some it needs to be widely taken up, for others that a method has not yet filtered through to the mainstream that makes it innovative.

The social turn to the multimodal and the sensory, together with the methodological challenges of researching the digital, have intensified interest within social science in mobilising creative research methods (Wiles et al., 2011). Exploiting methodological synergies across this disciplinary frontier is valuable for social research, opening it up to different perspectives, generating imaginative research questions and making available a wider range of methodological tools for creative use (Bengry-Howell et al., 2011). Further, it has been argued that the broad cultural, social and political context of the arts and arts-based methods are particularly suitable for tackling fluid contemporary challenges (Dunne & Raby, 2013).

In this paper, following Jewitt, Xambo, et al. (2016), we understand methodological innovation as novel research practice outside of the mainstream and as both the expansion of methods within its originating discipline (e.g. sensory ethnography) and the transfer of methods, concepts, knowledge and practices across disciplinary borders to be adapted, reformed or remixed. We argue that touch and its digital re-imagining places new methodological demands on social science that challenge existing methods. Specifically, we illustrate and discuss the innovative potential of expanding and re-situating creative design, sensory and speculative methods within the social sciences.

Methodological uncertainties and the pandemic

As discussed above, over the past decade or so there have been many calls for ‘lively’ social research methods orientated to notions of uncertainty and the unfolding ‘becoming’ of the social world (Lury & Wakefield, 2012; Vannini, 2015). There is acknowledgement that qualitative research should and can speak to notions of uncertainty, a preoccupation for doing science in the ‘post-normal’ turn (e.g. Gibbons et al., 1994; Nowotny, 2016; Funtowicz & Ravetz, 1993;).

The pandemic has caused havoc in many contexts and for many people’s lives including for research and researchers. Against that backdrop, the efforts of social researchers to capture and understand people’s lived experiences in this complex and uncertain time has, in some contexts, motivated methodological creativity and innovation (Nind et al., 2021). This has included a turn to autoethnographic methods as being particularly well-suited to the pandemic conditions as access to participants became restricted and ethically problematic, as well as the use of photo-elicitation and walking methods, both of which offer a flexibility that can respond to changing contexts (Harris & Holman Jones, 2020; Lee, 2020; Markham & Harris, 2020). Researchers have used expressive

methods and adapted sensory and material methods for use in social distanced ways, for example, smell walks (Allen, 2021). Diary methods (e.g. video diary entries responding to daily questions and prompts) were frequently used as viable ways to account for 'lived' experiences during COVID-19 (Saltzman et al., 2021). As we discuss later in this paper, the development and adaptation of ethnographic practices to the particularities of researching touch in the pandemic drew on the emergent and flexible character of ethnography. Ethnography is methodologically attuned to working with uncertainty. The challenge of accessing communities due to social distancing measures led much research, including ours, to move online and reposition digital ethnography as a mainstream alternative to ethnography (Howlett, 2021). This involved mobilising the potential of digital ethnography to enable new or different entries into one another's spaces/lives, to extend a field site in time and space, and/or to offer a mediated approach to establishing co-presence and rapport with participants (Hall et al., 2021). Given the sense of remoteness generated by the physical restrictions of the pandemic called for the generation of new techniques to enhance a sense of sensorial 'being there' (Barker, 2022; Howlett, 2021, p. 5), our response was the use of a three-part technique of feeling with, demonstrating and disrupting which we describe later in the paper.

This paper proposes the use of creative and speculative social research methods as a way to reappraise uncertainty and to engage with it as a motivating methodological resource. We discuss our use of design-led and speculative methods (e.g. rapid prototyping, cultural probes and speculative narratives). These are infused with ambiguity and intended to inspire and provoke new perspectives on everyday life (Gaver et al., 2004) – methodological characteristics that underpin our rationale for their take up. They offer a playful and engaging means for research participants to think through current and future technologies, systems and objects from different perspectives including in tactile, bodily ways (Jewitt et al., 2019, 2022). Rapid prototyping is a form of designing through making which involves developing an idea quickly in three-dimensional form, usually with simple materials such as paper, card, tape, recycling packaging, and everyday low-cost objects. Cultural probes are an informal, design-led method involving 'packs' comprised of physical objects (such as disposable cameras and postcards) with accompanying 'evocative tasks'; provocation-styled questions or instructions designed to open up new perspectives on everyday life (Gaver et al., 2004). Cultural probes provide empathetic and accessible ways to research sensitive and difficult to voice areas (Goopy & Kassan, 2019; Kassan et al., 2018), and were thus particularly appropriate to a study that places touch at its centre.

Uncertainty and researching touch

Touch is the first sense through which people apprehend their environment, provides significant information and experience of the world (Fulkerson, 2014), is central to communication (Finnegan, 2014) and personal relationships (Field, 2001). It is often connected to a sense of certainty. Indeed, people engage in 'fact-checking' by touch: touch provides a higher-level of perceptual certainty than vision (Fairhurst et al., 2018).

Researching touch is challenging as it is difficult to 'access' people's touch experiences, we often lack the vocabulary to describe it, and social methods are underdeveloped in relation to touch. Against that backdrop and the uncertainties of the pandemic, the emergent digital touch landscape itself is characterised by the constant flux of prototype development from rings and bracelets that use vibration and thermal feedback to enable a touch sensation to be sent to and received on the finger, hand or wrist, to support personal relationship communication and well-being; jackets or suits that can enhance immersive experiences (e.g. the Teslasuit) through embedded electrostimulation and biofeedback, which gives a sensation of touch and convey emotional and physiological states; bio-sensing in the form of baby smart monitors differently enter the space of parent/infant touch interaction as part of parenting practices; and in tele-robotics (operating a machine/robot from a distance) leap motion sensors are used to recognise and detect visual touch gestures, and hand and digit movements to provide appropriate haptic engagement. Taking contexts such as

these, this chapter draws out how (and where) touch is being re-conceptualised through the work of designers, computer scientists and engineers, and differently so by the media and the public, in the realm of the digital (Jewitt, Leder Mackley, et al., 2020). In the unsettled digital space, there is less transparency concerning where a touch comes from, who or what is touching, and how immersive (tactile) experiences and a sense of remote connection and presence are created (Jewitt, Chubinidze, et al., 2021; Jewitt, Leder Mackley, et al., 2020; Price et al., 2021). In short, digital touch experiences raise new questions for what counts as touch and trouble the relationship between touch, truth and certainty in myriad ways.

The pandemic confronted the InTouch project's ongoing research with a rapidly changing touch landscape during the emergence, spread and containment efforts of Covid-19. The place and role of touch in society was severely disrupted in the wake of the pandemic (and to some extent continues to be). The remote, no-touch social conditions of COVID-19 provided another layer of complexity and uncertainty to everyday life, and to the researching of touch and its digital re-mediation. The ethical uncertainty of touch (while always present) was amplified, especially during the early days of the pandemic when little was known about the transmission of the virus via touching others and objects impacted on our use of cultural probes. Social distancing measures also minimised proximities and touch, abruptly and acutely challenging the viability of social research on and through touch. This forced our methodological move online which in turn triggered the need to rethink our engagement with the physicality of touch and sensory ethnography practices. At the same time, the pandemic brought a heightened public sense of the significance of human touch and the potential for digitally mediated touch experiences, which provided new levels of resonance of our research with participants and society more generally.

In this paper, we reflect on navigating change and uncertainty as a productive resource for researching digital touch during the UK COVID-19 pandemic and how responding to these challenges led to methodological innovation.

Researching touch through uncertain times

The InTouch project combines multimodality and sensory ethnography approaches (Jewitt & Leder Mackley, 2018) with artistic (Jewitt, Van der Vlugt, et al., 2021) and design-based methods (Jewitt et al., 2019). The starting point for this interdisciplinary approach is our focus on a holistic and expanded account of digital touch, which goes beyond cutaneous physiology and psychological affects to embrace the social, sensory and affective dimensions of touch and the body (Jewitt, Leder Mackley, et al., 2020). Despite social research interest in bringing the body back in, notably the embodied turn in social science research (Shilling, 2012; Thanem & Knights, 2019), many methodological strategies that attend to the body continue to be limited by their being fundamentally talk-based (Chadwick, 2016). In contrast, our interdisciplinary approach researching touch *through* touch to account for the multimodal and multisensorial qualities, experiences and feedback of embodied processes of meaning-making (Jewitt et al., 2019). Attending to what it means to touch and to be touched can increase awareness of the embodied character of experience (Puig de la Bella Casa, 2009). Added to this, artistic methods can allow 'new forms of voicing, thinking, feeling and being to emerge' (Renold, 2017, p. 40).

Below we outline the methodological adaptations and reorientations we made in response to the context of change and uncertainty in three InTouch case studies that were interrupted by the pandemic. We look across these three examples to reflect on how we brought the social significance of sensing bodies and touch newly to the fore, and mobilised the uncertainty of digital touch and social research 'post-pandemic' as a resource for methodological innovation.

Example 1: re-orientating design-led methods for researching loneliness and digital touch

Touch and loneliness are intimately connected and provide a key ‘market’ area of digital touch development. How people frame touch and digital touch in loneliness is, however, an area where the role of the body and the senses have received little attention (Bound Alberti, 2019) and provides the focus of an InTouch case study.

Pre-Covid-19 study design

The original, pre-Covid-19, study involved people aged 18 plus, recruited via community and adult education centres in London. The study design included a series of three in-person group workshops (mapping and rapid prototyping methods and shared resources such as tactile ‘mood boards’), combined with cultural probes for participants to respond to independently in the time between the workshops. Design methods – particularly speculative and open-ended methods such as cultural probes and rapid prototyping (see background).

Adapting for uncertainties

The study had just begun when, due to Covid-19, the UK went into its first lockdown (March 2020). The aim and focus of the study remained the same, however UK lockdown restrictions, combined with the uncertainty of whether the COVID-19 virus could spread through the touch of people and objects, demanded we re-orient the study methods for a fully digital and online format, and led us to expand the scope of our recruitment as the pandemic conditions combined with recent loneliness surveys, spotlighted particular potential ‘at risk’ groups. This refocused the participant recruitment to centre on three different demographics: young people aged 18–24 years, people aged 25–55 working from home for the first time, and people aged 70 plus. They were recruited via Twitter, email, and community groups and organisations working with people who had experienced loneliness. Two groups (with 4 participants) were recruited for each of these demographics. This refocused the participant recruitment to centre on three different groups: young people 18–24

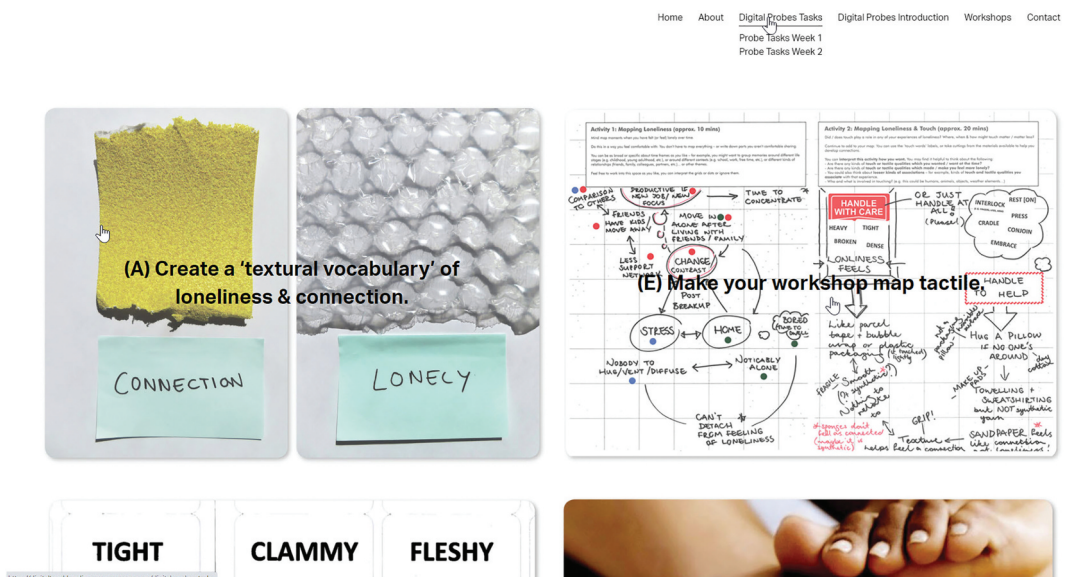


Figure 1. Loneliness & Digital Touch website.

years, people working from home for the first time, and people aged 70 plus. They were recruited via Twitter, email, and community groups and organisations working with people who had experienced loneliness. Two groups (with 4 participants) were recruited for each of these demographics.

The core plan of original study design – the three workshops combined with cultural probes – remained, but we made a number of adaptations for deploying them online. Cultural probes have evolved over time in part through their trajectory from design, to HCI, to social research (Golmohammdi, 2022). For this online study, we created the online probes as website (Figure 1). This reflected the original design-ethos of cultural probes as a ‘pack’ that offers participants a choice as to which tasks they select and respond to. Completed tasks (‘returns’) could be sent back via email or the project WhatsApp. The Week 1 online probe tasks were still designed to be open and evocative (in the spirit of the original cultural probes) to prompt participants’ thinking in different ways. For example, in Week 1, one task asked participants to ‘Create a “textural vocabulary” of loneliness & connection’, and another, to ‘Feel & film an object of connection’. The Week 2 tasks were oriented towards helping participants to research and develop their prototype ideas. While some of the Week 2 tasks departed slightly from the original ethos of being ‘evocative’ (Gaver et al., 1999), they still served as provocations for imaginative reflection and developing thinking; e.g. Task L, ‘Engage your workshop prototype with different parts of the body’. These tasks led into the broader reflections on digital touch and loneliness.

These online adaptations created an uncertain and changed relationship to materials in the project, which proved to be a valuable research resource for this study. Traditionally, the physical resources used in rapid prototyping, mapping, and cultural probes are curated and provided by the researcher for participants to select from. In the case of online probes, researchers provide the tasks but not the physical objects and materials that are a key feature of cultural probes, and which act as useful ‘reminders of what to do’ for participants. In this study, each task on the probes’ website was supported with an accompanying visual, which ‘stood in for’ these objects and materials. In some cases, the visual related directly to a task, while in others the link was more unexpected or abstract. Different tasks also suggested a range of response mediums to address both the uncertainty about material availability and the varying levels of confidence and preferences participants might have for working in different ways (Golmohammdi, 2022). For example, a task to ‘Capture a lonely moment’ suggested responding via a hand-written note, collage, sketch, map or photo.

Cultural probes are designed to be used in (and engage with) participants’ lived spaces and so tend to generate personal responses. The customised and ‘analogue’ tactile character of cultural probes is also a key part of their appeal to participants and researchers. Yet the online probes still enabled participants to engage with materials and in-situ touch within their own environments. For example, in response to the task, ‘Make your workshop map tactile’, participants integrated materials or objects with personal histories in their responses, adding material cuttings or placing objects on top of their maps. Participants also adapted the online probes in other ways. For example, one participant responding to the ‘Capture a lonely moment’ task chose to write his note on the back of a postcard of his home city, which he’d bought but failed to send to his family when he’d first moved there; his transition to this city had been one of the main periods of loneliness he had highlighted through the mapping in the week 1 online workshop. Pre-stamped and addressed postcards with a question printed on the back are a popular cultural probe format – in this example, the participant introduced their own postcard that linked to a lonely experience he had previously shared.

Shifting from researcher-led resources to participants’ home resources led to increased personalisation in the rapid prototyping in the Week 2 online Workshop, when participants were asked to design their own digital touch technologies around loneliness. In one example, a participant prototyped a programmable ‘information string’ using a strip of stitched together textiles that could be wound around different areas of the body and even connect with other technologies. The soft, flexible, malleable design offered an alternative vision of digital touch to the predominantly hard materialities of digital technologies that had initially been a barrier for her. Access to her own textiles enabled this participant to express colour and pattern that were equally important to her –

and which articulated touch in less common ways; for example, feeling ‘an electric shock at the edge’ when she placed certain colours or patterns next to each other. Being at home facilitated more in-situ imaginings of touch and digital touch in other ways too: in the workshops, for example, some participants spontaneously demonstrated comforting-feeling materials or objects in their homes. After making their prototypes in the Week 2 Workshop, participants also reflected on using these from their own homes during the week leading up to the third online workshop, and this in turn led to further insights about if and how they might (or might not) use their technologies.

Example 2: re-orientating a sensory ethnography of tactile labour and industrial robots

Our second example draws on an InTouch study to explore how emerging robotic technologies influence the social and sensory qualities of touch in the context of industrial work. The research objectives were framed through our social orientation to touch (Jewitt, Leder Mackley, et al., 2020), recognising the social importance of tactile labour and for understanding the technological mediation of touch in industry as new generations of robots rapidly enter production processes (Pawar et al., 2016). While touch matters in industry, it is rarely explicitly focused on in industrial ethnographies (Barker & Jewitt, 2021) or Human-Robot Interaction research. The case study set out to redress this.

Pre-Covid-19 study design

The original study design was a multi-site sensory ethnography of collaborative-robots in five UK field sites. Being physically in the field may be viewed as a pre-requisite of crafting ethnographic knowledge of the senses. The field researcher entered the selected industrial sites – a waste management centre and a glass factory, with the aspiration to become a tactile apprentice (Barker & Jewitt, 2021; Barker, 2022). Inspired by the long tradition of apprenticeship in industrial ethnographies and Pink’s notion of sensory ethnography (2015) our pre-Covid-19 approach was guided by an aim of *learning how to touch* with others and machines. There were three sensory methods that underpinned this overarching approach: participating in touch; closely observing touch; and conducting pre-planned and impromptu sensory interviews. When immersed in industrial settings, the field researcher actively sought to ‘get close to the action’ wherever possible, to participate through direct touch or close tactile encounters as an empathetic route into the workers sensory and tactile experiences (Pink et al., 2017). Touch experiences were explored spontaneously in-situ as participants went about their duties or *demonstrated* a touch activity. When possible, the fieldworker would *feel with* the worker and probe their experiences by asking what happens when normal practices are *disrupted*. These moments created opportunities for co-workers to apprentice the ethnographer through touch and gesture. The method of closely observing touch generated thick descriptions that accounted for the subtleties of touch and touch experiences. Sensory interviews were also undertaken to expand from these touch experiences to wider social issues and themes. This approach produced insights into how touch works and helped to flesh out the social and sensory conditions of labour and to expose the implications of introducing new technologies into these industrial settings.

Pivoting sensory methods online

We had completed fieldwork in the two sites (a waste management centre and a glass factory) when UK COVID-19 lockdown measures (March 2020) interrupted the study. The study was immediately forced to respond to the rapidly changing industrial, social, and tactile landscapes that it was embedded within. The intended method of becoming a tactile apprentice was no longer possible as direct access to the field was restricted and data could not be collected through in-situ tactile

participation. There was a period of reorientation, including consideration of whether to stop or pause the study, before deciding to continue the empirical fieldwork through a series of online sensory interviews (using the MS Teams platform. After initial scoping conversations with potential participants, we devised a set of semi-structured interview protocols that were tailored to each of their areas of specialism. The topic guide sought to elevate tactile engagements and reflections (through the techniques introduced below) whilst exploring the past, state-of-the-art, and futures of tactile tele(robotics) in relation to social and sensory themes encountered through the completed fieldwork (see Barker & Jewitt, 2022). These interviews ($N = 4$) were recorded then transcribed with screenshots of key touch gestures/demonstrations accompanying the text.

The study pivot online created physical, sensory and temporal distance between the fieldworker and the environments where the participants were located that posed serious challenges for becoming a tactile apprentice. We briefly recount our use of a three-part technique (feeling with, demonstrating and disrupting) through which the ethnographic objectives and methods were re-orientated to overcome these challenges, and the broader questions raised for the future directions for this methodology.

Feeling with

While the significance of sensory dynamics remains, working remotely presented a physical gap between the fieldworker and the participants sensory environments that blocks well-rehearsed routes to sensing and knowing through 'being there'. First, a 'feeling with' technique was used to re-establish empathetic routes into the sensory experiences of the participants. This naming was chosen in recognition of touch being a whole body and sensory experience or *feeling* and a desire to participate *with* participants as much as possible whilst not being there. *Feeling with* was pursued in the online sensory interviews through exploring the researcher and participants' material surroundings in response to what the participant was saying or doing. This technique was used to probe participants' abstract discussion of touch with my sensory imagination, for example, 'I would imagine that would feel similar to [. . .]', to explore and gain a sense of what it might feel like to be touched by, or touch through, a robot *together*.

During interview exchanges, it was at times hard to judge when and how to engage with our material surroundings in relevant and non-distracting ways. Moving and touching did not always easily translate to an online context where it is the norm for people to sit still and look directly at the screen. Forcing a different type of interaction and arriving at a joint sense of feeling that brings the ethnographer closer to the participants sensory world was a challenge. Like all aspects of ethnography, it requires continual practice and reflection.

Demonstrating

This second-part of the technique – demonstrating, was designed to extend a close observation of touch to the online sensory interviews to generate descriptive accounts of sensory phenomena. This was needed as the chance for serendipitously observing touch was diminished online. In the context of this research and with the previously noted limitations of language for expressing sensory and tactile experiences, demonstrations were thought to provide a powerful way of communicating and clarifying nuanced sensory experiences, complex ideas and concepts. We stimulated demonstrations by inviting participants to 'show me' at moments where physically re-enacting might flesh out an example. While sometimes it was difficult to bring this technique into the fast-paced nature of the interviews, in practice, participants would demonstrate without cues to communicate their point and the researcher's role as a tactile apprentice became to examine and probe these tangible examples further. This technique was also sharpened through practice, we asked participants to have at hand materials to draw on to physically demonstrate their work, and encouraged them to demonstrate to enable us to observe and enact touch and not only to talk about it. The demonstrations formed a useful reference point for us to explore in detail together.

Disrupting

Disrupting touch, the third element of the technique, aimed to bring our senses closer to abstracted imaginations, or technical articulations, of the ‘future of touch in industry’. One reason for emphasising this technique was to foreground the social and sensory contexts of touch and its implications as a counter to the tendency of roboticists, when imagining and articulating the future of touch in industry, to gravitate to explaining technical functions or industrial value. We employed a technique of disruption to elicit sensory reflections around imagined touch futures, for example, asking participant questions around activities that went, or might go, wrong. This provided specific and tangible entry points into conversations around implications for workers sensory experiences. Such disruptive scenarios encouraged participants to reflect on their experiences and bring these closer to their imaginary for a future touch in industry.

The three-part technique (see Barker, 2022) outlined above is a methodological innovation born out of the uncertainty of the pandemic. Whilst challenging, it successfully built around the underlying principles of becoming a tactile apprentice (e.g. participating in touch and closely observing touch) that had guided the practical methods central to the ethnography when physical access to the sites was permitted and sought to accentuate their essence and coherently translate them to the online context.

Example 3: sensory experimentation and speculation on interactive skin

Our third example draws on an InTouch study of Interactive Skin technology. Interactive Skin is an emerging class of skin-worn epidermal devices that are compatible with human skin and augment and interact directly with the human skin and body. They are very thin (often thinner than a human hair); elastically deform or stretch with the user’s skin; and continuously monitor physiological parameters (Nittala et al., 2019). Unlike other wearable devices interactive skin feels and behaves like parts of the body, and sits within the broader field of human-computer integration in which computational and human systems (i.e. the body) are closely interwoven (Mueller, 2020). It is a collaboration between social researchers and an HCI lab, aimed to better understand the social and sensory implications and potentials of interactive skin and to inform its design.

Pre-Covid-19 study design

The pre-Covid design for this study was to be a sensory ethnography (see example 2) in the HCI lab. The intention was to use video observation and sensory ethnographic interviews over an intensive one-week visit followed by close analysis, described as a focused ethnography (Knoblauch, 2005).

Creative, sensory and speculative methods

In response to UK COVID-19 Lockdown (including a travel ban), we initially paused the study and rescheduled it, then, nearly a year later as restrictions persisted, we pivoted to conduct the work remotely. In response to being remote spatially and temporally as well as acutely feeling the disciplinary, social and sensory distances between us and the participants we slowed the research pace by extending the timescale from an intensive one-week study to a slower one-month interaction with follow-up encounters, data-sharing and reflection over several months on the grounds that understanding would take longer and be harder to achieve when you are not physically present. We also redesigned the study methods to combine cultural probes (see example 1) and sensory methods (see example 2). Unable to digitally ‘hang out’ in light of the ethics of the pandemic (e.g. added stress on participants, and home/work realities), we adopted an explicitly participatory and speculative research approach to help reach across our disciplinary differences (e.g. a primary difference being the lab’s focus on material and technical design, and our focus on the social use of interactive skin technologies, regulation and ethics) and to foster dialogue.

Sensory entry points

We used sensory methods in an effort to be sensorially present with participants in their research spaces. First, we requested an online-guided video walking tour of the lab during which we asked our guide to handle and demonstrate materials and equipment. Second, this was followed by online interviews with each of the eight team members (participant-collaborators). Confronted with the cold flat screen of Zoom, and the challenge and limitations of conducting sensory research remotely, we sought to find ways to research through touch into a contactless environment. The interviews were conducted in participant-collaborators working spaces, homes and offices, surrounded by objects – their materials, tools and prototypes, we sought to enliven these spaces by encouraging them to touch, inviting them to have their objects to hand for the interview. In response to the sensory possibilities of online research encounters we drew on the method outlined above in example 2 (feeling with, demonstrate and disrupt) to experiment with ways of ‘being present’ and to develop ‘proxy feelers’ for use in remote (online) interview contexts (Barker, 2022). Participants interacted with these sensory touch objects intuitively or in response to the interviewer’s prompting to demonstrate or re-enact an experience or process or to illustrate a tactile feature (e.g. thinness and flexibility), concept or idea (e.g. categories of sensation). The method of ‘proxy feelers’ helped to strengthen Zoom’s visual display of touch interaction and the interviewers’ use of empathetic mirroring (Pink, 2015) as a way to connect with participants touch experiences. The interviewers used props (e.g. cling film, stretchy materials and objects at hand) in mimicking participants’ actions through the ‘demonstrate, feel and disrupt’ process to prolong and probe the social and sensory aspects of their interactions.

Third, working with the sensory interview data, we developed a pack of probes (a method outlined in example one) to aid our understanding of how collaborators conceptualised touch in the context of interactive skin and to remotely attune them and heighten their awareness of the sociality and sensoriality of touch experiences. The probes invited participant-collaborators to engage in a series of touch-attuning activities (see Table 1).





The probe experiences, while undertaken individually in participants’ homes, created a shared experience among the participants and with us as researchers. The above methods provided data and built a shared experiential starting point for collaborative speculative work.

Speculation and emergence

Through our experimentation with remote sensory research and the uncertainty generated by the pandemic, we became acutely aware of the unsettled character of Interactive Skin technologies. This uncertainty, together with our use of creative methods, led us to reflect on and question our research disposition, and the problem of seeking methodological certainties in such an uncertain emergent space and this led us to speculative methods. Speculative research is an approach designed to provoke contemplation, examination of values, implications and ethics, and foster collective reflection through doing/making, for example, on the role an existing or near-future technology plays or might play in our lives. It is underpinned by a shift in focus from, the probable to the possible and informs the development of inventive approaches (Savransky et al., 2019). This resonates with social researchers’ call for lively methods to investigate the open-endedness and sensuousness of the social world (Lury & Wakefield, 2012). Speculative research works to envision or craft futures that do not yet exist, to provoke ideas and new ways of thinking (Ross, 2017). This approach resonated with the experience of the COVID-19 pandemic during which speculation had become a dominant aspect of thinking and managing the everyday. We dived in.

We used a half-day speculative design workshop to explore the emerging themes from the study (inspired by Alexander et al., 2018), and asked the study participant-collaborators to ‘Imagine it is 2071. Interactive skin interfaces have happened: they are ubiquitous. People love them! How did we get there?’. The discussion was recorded using sticky notes and annotations on Miro (an online collaborative platform) and researcher fieldnotes. Thematic analysis of the data generated themes on participant-collaborators’ discourses and imaginaries of interactive skin focused on social,

Table 1. Four examples of cultural probes from the Interactive Skin Probe Pack.

Probe title	Instruction	Accompanying Image	Return
Daily Exercise 1	Feel and explore your skin and environment. Take your shoes off and walk on the floor. Lie down and roll on the floor.		List 3–7 things that you felt or noticed
Daily Exercise 2	Enact different touches to a) comfort, b) protect, and c) connect.		Sketch/storyboard 3–7 things that you felt/noticed
Hack a skin sensation	Choose a daily routine when you touch your or another's skin: human, animal, plant... Use/ imagine using an unexpected object(s) to 'hack' a skin sensation		Choose a medium from the list below to capture the experience: Make a 30–60 second video Sketch the experience Photo series
Make a Tactile Inventory	Explore your environment (indoors/outdoors) to find 3–7 textures that you associate with skin to make a mini 'tactile skin inventory'		Make: A series of 5–10 second videos A list words (any language) A visual collection

material, and sensory experiences and ethics. The data analysis (of the sensory tour, interviews and probe returns) informed the development of a speculative narrative in the form of a 'found archive' including a mix of fragments (e.g. a newspaper article, guidelines, research journal, correspondences, and an advert) situated on a projected 50-year future-timeline, the incompleteness of which points to multiple uncertain futures. We worked with the research data using a speculative approach combined with the practice and principles of ethnographic writing (Atkinson, 2015). This writing process enabled us to engage imaginatively and in innovative ways with social questions about how people might live with interactive skin, to inform its future design and development. Figure 2 shows an example of a speculative fragment in the form of an advert for a future Interactive Skin technology.



Pureskin® Ageing is no longer skin deep

Re-imagine yourself

Optional Layer subscriptions available

PureSkin Aesthetics® Subscription includes
Beauty-Skin enhanced volume & skin resurface
Youth-Patch instantly enlivened skin
Chameleon-Skin hide-and-seek effect

Compatible with all devices ◦
 Reliable ◦ Discreet ◦ Breathable ◦
 Light & flexible ◦ All skin tones ◦ 24
 hr no-skin-fusion ◦ Powered by the
 human skin ◦ Private ◦ Hacker proof
 ◦ Bio-degradable

PureSkin Health® Subscription includes
Skin-Alert renders heightened sensations
Skin-Assist sub-milli-meter precision touch
Skin-Protect monitors UV & toxic substrates

All products are fully compliant with national, regional and global health and security regulations when used in accordance with manufactory guidelines when regularly upgraded.

Figure 2. Example of a speculative fragment in the form of an advert for a future Interactive Skin technology.

Collectively, the fragments prompted discussion of Interactive Skin futures, the challenge of social concerns that may emerge, and design directions of Interactive Skin applications.

In summary, given the uncertainty of research during Covid-19, combining sensory ethnography, online probes and speculative narrative methods across the three case studies outlined above enabled our approach to unfold and build across them in participatory ways to feel our way together.

Discussion: feeling our way together through uncertainty

The COVID-19 pandemic and resulting UK lockdown threw the methodology of InTouch project into free-fall. In the previous section, we set out and discussed the methodological adaptations and reorientations we made to successfully overcome the challenges we faced. We harnessed uncertainty as a productive resource for methodological innovation that enabled us to experiment with creative, sensory and speculative methods (and their combination), to develop lively research attuned to in-situ-imaginings, sensory apprenticing through empathetic routes and proxy feelers, future facing approaches and novel outputs. These innovations stretched our methods – extending their reach beyond the physical to the remote, albeit with different feelings and limitations, in ways that together added texture to the research of ‘feeling our way together’ through uncertainties.

We now take a step back from our methodological journeys to reflect on five challenges raised by change and uncertainty for social research, how these were amplified by the COVID-19 pandemic, and how they were harnessed for methodological innovation. These include pivoting research, reconfiguring materialities, being sensorially present, working with the dynamics of disruption, and reconfiguring participatory dispositions.

Pivoting research: from delay to pause and reorientation

Fitzgibbon (2021) suggests that the temporality of decision-making during research throughout COVID-19 became rushed and often needed to be revisited. When the first UK lockdown was

introduced, amid this fast-changing and unfolding sequence of events our focus was on keeping our planned research studies and methods intact and on track. We considered delaying the research and waiting for our study sites to safely reopen and return to ‘normal’. However, the question of how touch practices in these settings would be affected in the longer-term remained unclear. External and pragmatic factors including funding extensions and our commitments to other research projects increasingly meant that delay was not a viable option. Instead we took a moment to pause (Rahman et al., 2021), took stock of where we were in the research to help decide how to proceed, this sustained period enabled us to revisit and revise previously stated aims, questions, sites, and methods. While the distinction between delaying and pausing is subtle, it is significant. Delay implies an assumption of restarting as planned, waiting for the uncertainty to pass and a sense of pre-pandemic ‘normality’ to return. Pause implies a different break, a breath and the potential to regather and rethink.

In studies one and three, we found moving forward to remotely access our research sites and participants was viable using creative, sensory and speculative methods to facilitate empathetic routes to participants’ sensory experiences (Pink et al., 2017). In study two, this pause led us to the decision to stop new fieldwork in the remaining field sites (i.e. a construction site where labourers wear exoskeletons), and instead to reorientate to online sensory interviews, and deeper analytical work with data collected prior to lockdown. That change in pace enabled us to both innovate our sensory methods and to trace emerging analytical themes that informed a new fourth site – the ‘future of touch in industry’. Our reorientation across the three studies signals a process-style of decision-making that emphasises the emergent and reflexive character of qualitative research. This style of decision-making offered us a way to account for complexities and to navigate uncertainties and helped us to avoid the limitations of overly linear approaches (i.e. a rigid set-linear direction with limited opportunity for iteration and reflection). By pausing, looking back, and reorientating our methods, we were able to feel our way through the uncertain terrains of both digital touch – an emergent technological space in flux, and the pandemic.

Reconfiguring engagement with materiality

Engaging with the rich materiality of touch and digital touch was at the heart of the three studies introduced in this paper. The pandemic introduced considerable methodological uncertainty as to how to work with materiality remotely and required us to adapt our methods of engagement with participants’ material practices and environments. This changed our relationship to the materials used in the project and prompted methodological innovation. The shift from materials from the researcher to materials from participants supported personalised and novel outcomes in the context of our use of creative design methods for social science in the form of online probes (examples 1 and 3), rapid prototyping responses (example 1), and our innovation of sensory methods in the form of proxy feelers (examples 2 and 3). That participants were situated in their homes, labs and offices and using materials they had to hand gave them more agency and control of their meaning making, and in turn enhanced the participatory character of the research. Their selections and uses of materials brought their worlds to life differently across the studies, and gave us improved insights into their relationships with touch that would otherwise not have been made felt. Our efforts to draw our material worlds into the ‘looking glass’ of Zoom, handling materials we brought from our home environments to mirror participants experiences in the hopes of achieving empathetic connection between us generated a new playful, shared space of tactile exploration.

Being sensorially remote and present

In addition to reconfiguring our methodological engagement with materials, moving our multi-modal and multisensory approach online required the development of new remote embodied practices of engagement. The techniques we outlined in the three examples explicitly targeted

and amplified sensory and tactile exchanges and sought to bridge the gaps created by ‘being there’ differently. Our approach was built around the underlying principles of becoming a tactile apprentice that had guided the practical methods central to our ethnography when physical access to the sites was permitted (i.e. participating in touch and closely observing touch) (Barker & Jewitt, 2021). We innovated our methods by making use of a mix of methods including the three-part process of feeling with, demonstrating and disrupting, the use of proxy-feelers, and probes to attune participants to touch, and rapid prototyping. We reflected on the material and bodily means involved in our methods in an effort to accentuate their lively essence in their translation online. Where appropriate and possible, we used these methods in real-time exchanges (online workshops and sensory interviews), which given our focus on touch and the sensing material body held more potential for participation and collaboration over some other mediated methods (e.g. asking participants to make video diaries). This raised the need for us to be aware of and critically reflect on the question of the extent to which, and how, digitally mediated methods substitute for being remote and present.

Practicing and refining these methods is an ongoing process. As we have shown, the methods can yield insightful sensory data when employed effectively, and albeit in novel ways, they retain the potential to gain sensory empathy through proximity and to serendipitously encounter and observe touch.

Working with the dynamics of disruption

Collectively the methods outlined in this paper align to the dynamics of disruption and offer an example of how qualitative research might recognise and mobilise the potential of uncertainty for methodological innovation. Creative and speculative methods offer inspirational and fragmentary clues about participants’ lived experiences (past, present and future) and reintroduce uncertainty and challenge linear ways of approaching design as a purely problem-solving exercise (Gaver et al., 2004). While the experiential focus of sensory ethnographic methods is methodologically attuned to working with the particularities and uncertainty of the field.

The COVID-19 pandemic and the regulations it prompted, had a profound and far-reaching effect on the role of touch in the context of the three studies presented in this paper – personal relationships, robotics in industry, and Interactive Skin technology development. It was also a catalyst for the reimagining of touch and technology and their place in society more generally. Our research was immersed in the dynamic shifts and continuities of the wider social and industrial contexts and awareness of collective reimaginings of touch in a moment of crisis. Our study of touch and loneliness (example 1) was conducted during the pandemic as touch (initially considered a site for transmitting the virus) became more regulated both in the production and distribution of goods, the relationships between people, and the discourses and sociotechnical imaginaries of touch in the media (Leder Mackley & Jewitt, 2022). In the case of robotics (example 2) our study unfolded in a context marked by rapid reorganisations of industrial processes, where forms of advanced industrial robotics were presented as technological solutions to fight coronavirus while maintaining industrial productivity (Kritikos, 2020). Alongside this, the future of emergent technologies, such as Interactive Skin (example 3), were seen as opening new possibilities for the future of touch communication. Attending to the dynamics between local and global themes was a new dimension introduced by uncertainty that shaped our methods and critically sensitised our analysis and outputs to foreground the need for human-centred digital touch futures.

Reconfiguring participatory dispositions

The research dispositions that informed our research and methodological adaptations added to the texture of feeling our way through researching touch at a distance, both *physically* (i.e. employ

remote rather than in-situ) and *temporally* (i.e. not touch in the here and now, but in speculating on the future).

We sought to adapt our research dispositions in ways that kept the essence of sensory method alive, even when operating at distance, and emphasised the need to be sensitive to the emotive and ethical aspects of doing qualitative work on touch, which were heightened through the uncertainty generated by the pandemic. This required heightened reflexivity towards the ethical challenges and emotional contexts that produced through crisis and uncertainty. The need to mobilise such sensitivities or ‘felt responsibilities’ (Fitzgibbon, 2021) has been emphasised across the methodological literature for the ethical navigation of uncertain and shifting contexts, for example, in participatory research (Hall et al., 2021), qualitative inquiries (Rahman et al., 2021) and ethnography (Koppe, 2021). The uncertainty and stress felt by many during the pandemic (Hall et al., 2021) was infused throughout the three examples discussed in this paper, including participants engaged with notions of loneliness in a time of extreme social isolation and the participants working in industry who were coming to terms with their new co-bots. We paused to attune to our and participants’ embodied experiences of research and considered how our decisions, analytical processes and energies were affected. This facilitated the process of finding ways to manage the dis-comfort of uncertain conditions as well as the methodological risks generated by speculative and future facing methods.

Finally, as this paper suggests, being members of a large interdisciplinary project team afforded us the possibility to discuss and share our work, to engage with each other’s methods, to try out methodological adaptations with the team, and to reflect on how uncertainties were affecting our research designs and us as researchers: to ‘feel our way together’ with one another and the project larger team. That collaborative interdisciplinary research environment gave us the confidence to find new direction.

Conclusion

This paper has discussed the methodological uncertainty experienced by the social research community through the COVID-19 pandemic (2020–2022). It has recognised that while the amplified uncertainty of the COVID-19 pandemic was overwhelming, exhausting, and chaotic and an extremely isolating and ‘disembodied’ experience for many people, including researchers, uncertainty has always been a feature of qualitative research. Taking digital touch as our focus, we presented and discussed three InTouch studies that were interrupted by the pandemic to show how we adapted, remixed and reoriented to creative, sensory and speculative methods from a social research perspective in order to navigate, manage and/or overcome the research challenges of uncertainty that we experienced. We have reflected on these studies to present five strategies that we used to mobilise the potentials of uncertainty for research, that is, pivoting our research online, reconfiguring materialities, innovating ways to be sensorially present, working with the dynamics of disruption, and reconfiguring participatory dispositions. As we each struggle to feel our way together through change and uncertainties, we have argued that uncertainty while often uncomfortable and challenging can be a productive force provoking the expansion or transfer of methods concepts, knowledge and practices across disciplinary borders, in ways that can lead to methodological innovation.

Acknowledgements

We would like to thank the participants who took part in each of the three case studies discussed in this paper and our InTouch colleagues for their feedback and ongoing support on the development of the methods discussed.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This research was funded by the European Research Council (ERC), grant number 681489.

Notes on contributors

Ned Barker is a Leverhulme Early Career Fellow at UCL Knowledge Lab and co-Chair of UCL Collaborative Social Science Domain Early Career Network. His work is focused on exploring the complex relationships between the body, technology, and society. Ned's current project, *BiohybridBodies*, is funded by the Leverhulme trust and aims to better understand how Living Machines may come to affect our bodies, lives, and societies. His recent methods related publications include *Moving Sensory Ethnography Online* (Sage 2022) and *An Ethnographer Lured into Darkness* (Springer 2020).

Lili Golmohammadi is a collaborative researcher, designer, and facilitator working across design, technology and social science. Her interdisciplinary practice draws on a wide variety of media, methods and processes, including a close engagement with materials and design-led approaches. She is a UCL Research Fellow for the Textiles Circularity Centre (CX Research Strand), and a final-year doctoral researcher attached to the IN-TOUCH project at UCL, her research explores the relationships between loneliness, touch and emerging touch technologies.

Carey Jewitt is Professor of Technology and Learning at UCL Knowledge Lab and Chair of UCL Collaborative Social Science Domain. Her work explores how the use of digital technologies shapes interaction and communication, and engages with interdisciplinary methodological innovation. Carey is Director of InTouch an ERC Consolidator Award, which investigates the sociality of digital touch technologies for future communication and has led research projects (e.g., funded by ESRC, EPSRC, BA). She is a founding co-editor of SAGE journals, *Multimodality & Society*, and *Visual Communication*, recent publications include *Interdisciplinary Insights for Digital Touch Communication* (2020) and papers in *New Media & Society*, *Information, Communication & Society*, and *Qualitative Research*.

References

- Alexander, J., Roudaut, A., Steimle, J., Hornbæk, k, Bruns Alonso, M., Follmer, S., & Merritt, T. (2018). Grand challenges in shape-changing interface research. In Proceedings of the CHI 2018, Montreal, QC, Canada, 21–26 April 2018; ACM: New York, NY, USA,
- Allen, L. (2021). The smell of lockdown: Smellwalks as sensuous methodology. *Qualitative Research*, 146879412110076. <https://doi.org/10.1177/14687941211007663>
- Atkinson, P. (2015). *For Ethnography*. Sage.
- Barker, N. (2022). Moving sensory ethnography online. In M. Perchard (Ed.), *SAGE Research Methods Cases*. Sage.
- Barker, N., & Jewitt, C. Filtering Touch: An Ethnography of Dirt, Danger, and Industrial Robots. (2021). *Journal of Contemporary Ethnography*, 51(1), 103–130. online First. <https://doi.org/10.1177/08912416211026724>
- Barker, N., & Jewitt, C. (2022). Future touch in industry: Exploring sociotechnical imaginaries of tactile (tele)robots. *Futures*, 136, 102885. <https://doi.org/10.1016/j.futures.2021.102885>
- Bengry-Howell, A., Wiles, R., Nind, M., & Crow, G. (2011). *A Review of the Academic Impact of Three Methodological Innovations: Netnography, Child-Led Research and Creative Research Methods*. Southampton (UK), National Centre for Research Methods (NCRM). <https://eprints.ncrm.ac.uk/id/eprint/1844> (accessed: 01.02.2022)
- Bound Alberti, F. (2019). *A Biography of Loneliness: The History of an Emotion*. Oxford University Press.
- Chadwick, R. (2016). Embodied methodologies: Challenges, reflections and strategies. *Qualitative Research*, 17(1), 54–74. <https://doi.org/10.1177/1468794116656035>
- Dunne, A., & Raby, F. (2013). *Speculative Everything*. MIT Press.
- Fairhurst, M. T., Travers, E., Hayward, V., & Deroy, O. (2018). Confidence is higher in touch than in vision in cases of perceptual ambiguity. *Scientific reports*, 8(1), 15604. <https://doi.org/10.1038/s41598-018-34052-z>
- Field, T. (2001). *Touch*. MIT Press.
- Finnegan, R. (2014). *Communicating*. Routledge.
- Fitzgibbon, A. (2021). Just because you can, doesn't mean you should. In H. Kara, S.-M. Funtowicz, S. O., & J. R. Ravetz (Eds.), *Science for the post-normal age*. *futures* 1993, Vol. 24, pp. 739–755.
- Fulkerson, M. (2014). *The First Sense: A Philosophical Study of Human Touch*. MIT Press.
- Funtowicz, S. O., & Ravetz, J. R. (1993). Science for the post-normal age. *Futures*, 25(7), 739–755. [https://doi.org/10.1016/0016-3287\(93\)90022-L](https://doi.org/10.1016/0016-3287(93)90022-L)
- Gaver, W., Boucher, A., Pennington, S., & Walker, B. (2004). Cultural probes and the value of uncertainty. *Interactions*, 11(5), 53–56. <https://doi.org/10.1145/1015530.1015555>
- Gaver, B., Dunne, T., & Pacenti, E. (1999). 'Design: Cultural Probes'. *Interactions*, 6(1), 21–29.

- Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994). *The new production of knowledge: The dynamics of science and research in contemporary societies*. Sage.
- Golmohammdi, L. (2022). How to use online probes for social science research. In M. Perchard (Ed.), *SAGE Research Methods: Doing Research Online*. Sage.
- Goopy, S., & Kassan, A. (2019). Arts-based engagement ethnography: An approach for making research engaging and knowledge transferable when working with harder-to-reach communities. *International Journal of Qualitative Methods*, 18, 1–10. <https://doi.org/10.1177/1609406918820424>
- Hall, J., Gaved, M., & Sargent, J. (2021). Participatory Research Approaches in Times of Covid-19: A Narrative Literature Review. *International Journal of Qualitative Methods*, 20, 1–15. <https://doi.org/10.1177/16094069211010087>
- Harris, A., & Holman Jones, S. (2020). Massive and microscopic: Autoethnographic affects in the time of COVID. *Qualitative inquiry*, 27(7), 861–869. <https://doi.org/10.1177/1077800420965570>
- Howlett, M. (2021). Looking at the ‘field’ through a Zoom lens: Methodological reflections on conducting online research during a global pandemic. *Qualitative Research*, 22(3), 387–402. <https://doi.org/10.1177/1468794120985691>
- Jewitt, C., Barker, N., & Golmohammadi, L. (2022). Creative probes, proxy feelers, and speculations on interactive skin. *Multimodal Technologies & Interaction*, 6(4), 22–42. <https://doi.org/10.3390/mti6040022>
- Jewitt, C., Bezemer, J., & O’halloran, K. (2016). *Multimodal Research*. Routledge.
- Jewitt, C., Chubinidze, D., Price, S., Yiannoutsou, N., & Barker, N. (2021). Making sense of digitally remediated touch in virtual reality experiences. *Discourse, Context & Media*, 41, 100483. article. <https://doi.org/10.1016/j.dcm.2021.100483>
- Jewitt, C., & Leder Mackley, K. (2018). Methodological dialogues across multimodality and sensory ethnography: Digital touch communication. *Qualitative Research*, 19(1), 90–110. <https://doi.org/10.1177/1468794118796992>
- Jewitt, C., Leder Mackley, K., Atkinson, D., & Price, S. (2019). Rapid prototyping as a method for social science: Researching digital touch. In L. Pauwels & D. Mannay (Eds.), *Sage Handbook of Visual Research Methods*, 2nd ed. 534– 552, Sage.
- Jewitt, C., Leder Mackley, K., & Price, S. (2020). Digital touch for Remote Personal Communication: An Emergent Sociotechnical Imaginary. *New Media & Society*, 23(1), 99–120. <https://doi.org/10.1177/1461444819894304>
- Jewitt, C., Price, S., Mackley, K., Giannoutsou, N., & Atkinson, D. (2020). *Interdisciplinary Insights for Digital Touch Communication*. Springer-Nature.
- Jewitt, C., Van der Vlugt, M., & Hübner, F. (2021). Sensoria: An exploratory interdisciplinary framework for researching multimodal & sensory experiences. *Methodological Innovations*, 14(3), 205979912110514. <https://doi.org/10.1177/20597991211051446>
- Jewitt, C., Xambo, A., & Price, S. (2016). Exploring methodological innovation in the social sciences: The body in digital environments and the arts. *International Journal of Social Research Methodology*, 20(1), 105–120. <https://doi.org/10.1080/13645579.2015.1129143>
- Kassan, A., Goopy, S., Green, A., Arthur, N., Nutter, S., Russell-Mayhew, S., Vazquez, M. S., & Silversides, H. (2018). Becoming new together: Making meaning with newcomers through an arts-based ethnographic research design. *Qualitative Research in Psychology*, 17(2), 294–311. <https://doi.org/10.1080/14780887.2018.1442769>
- Knoblauch, H. (2005). Focused ethnography. *Forum: Qualitative Social Research*, 6(3). <https://doi.org/10.17169/fqs-6.3.20>
- Koppe, Z. (2021). Ethnography in crisis: Methodology in the cracks. In H. Kara & S.-M. Khoo (Eds.), *Qualitative and Digital Research in Times of Crisis: Methods, Reflexivity, and Ethics*. 30–42, Polity Press.
- Kritikos, M. (2020). *Ten Technologies to fight coronavirus*. European Parliamentary Research Service, Scientific Foresight Unit, PE 641.543 April. https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/641543/EPRS_IDA2020641543_EN.pdf (accessed 02.02.2022).
- Leder Mackley, K., & Jewitt, C. (2022, in press) Sociotechnical imaginaries of remote personal touch before and during COVID-19: An analysis of UK newspapers. *New Media and Society*.
- Lee, S. Y. (2020). Now as a liminal space, writing as a patchwork: Autoethnographic reflections on the self in the middle of the pandemic. *Qualitative inquiry*, 27(7), 1–5.
- Lury, C., & Wakefield, N. (2012). *Inventive Methods: The Happening of the Social*. Routledge.
- Markham, A., & Harris, A. (2020). Prompts for making sense of a pandemic: The 21-day autoethnography challenge. *Qualitative inquiry*, 27(7), 928–941. <https://doi.org/10.1177/1077800420962487>
- Mason, J., & Davies, K. (2009). Coming to our senses? A critical approach to sensory methodology. *Qualitative Research*, 9(5), 587–603. <https://doi.org/10.1177/1468794109343628>
- Mueller, F. (2020) Next Steps for Human-Computer Integration. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI ’20). Association for Computing Machinery, New York, NY, USA, 1–15.
- Nind, M., Meckin, R., & Coverdale, A. (2021). *Changing Research Practice: Undertaking social science research in the context of Covid-19*. <https://eprints.ncrm.ac.uk/id/eprint/4457/> (accessed 02.02.2022).

- Nittala, A., Kruttwig, K., Lee, J., Bennewitz, R., Arzt, E., & Steimle, J. (2019) Like a Second Skin, in Proceedings of CHI Conference on Human Factors in Computing Systems (CHI '19), May 4–9, 2019, Glasgow, Scotland UK. ACM, New York, NY, USA.
- Nowotny, H. (2016). *The Cunning of Uncertainty*. Polity.
- Pawar, V., Law, J., Maple, C., Hadall, J., Morgan, B., Palmer, D., Schubert, D., Jenna, S., Cook, A., & Dybalova, D. (2016). *Manufacturing Robotics: The Next Robotic Industrial Revolution*. http://hamlyn.doc.ic.ac.uk/uk-ras/sites/default/files/UK_RAS_wp_manufacturing_web.pdf
- Pink, S. (2015). *Sensory Ethnography*. Routledge.
- Pink, S., Sumartojo, S., Lupton, D., & Heyes LaBond, C. (2017). Empathetic technologies: Digital materiality and video ethnography. *Visual Studies*, 32(4), 371–381. <https://doi.org/10.1080/1472586X.2017.1396192>
- Price, S., Jewitt, C., Chubinidze, D., Barker, N., & Yiannoutsou, N. (2021). Taking an extended embodied perspective of touch: Connection-disconnection in iVR. *Virtual reality*, 2. <https://doi.org/10.3389/frvir.2021.642782>
- Puig de la Bella Casa, M. (2009). Touching technologies, touching visions. *Subjectivity*, 28(1), 297–315. <https://doi.org/10.1057/sub.2009.17>
- Rahman, S. A., Tuckerman, L., Vorley, T., & Gherhes, C. (2021). Resilient research in the field: Insights and lessons from adapting qualitative research projects during the COVID-19 pandemic. *International Journal of Qualitative Methods*, 20, 1–16. <https://doi.org/10.1177/16094069211016106>
- Renold, E. (2017). ‘Feel what I feel’: Making da(r)ta with teen girls for creative activism on how sexual violence matters. *Journal of Gender Studies*, 27(1), 37–55. <https://doi.org/10.1080/09589236.2017.1296352>
- Ross, J. (2017). Speculative method in digital education research. *Learning, Media and Technology*, 42(2), 214–229. <https://doi.org/10.1080/17439884.2016.1160927>
- Saltzman, L. Y., Terzis, L. D., Hansel, T. C., Blakey, J. M., Logan, D., & Bordnick, P. S. (2021). Harnessing technology for research during the COVID-19 Pandemic: A mixed methods diary study protocol. *International Journal of Qualitative Methods*, 20, 1–8. <https://doi.org/10.1177/1609406920986043>
- Savransky, M., Wilkie, A., & Rosengarten, M. (2019). Introduction, the lure of possible futures: On speculative research. In A. Wilkie, M. Savransky, & M. Rosengarten (Eds.), *Speculative Research: The Lure of Possible Futures*, 1–18. Routledge.
- Shilling, C. (2012). *The Body and Social Theory* (3rd ed.). Sage.
- Taylor, C., & Coffey, A. (2008). Innovation in qualitative research methods: Possibilities and challenges (Working paper.121). Cardiff University. Retrieved from: <https://orca.cardiff.ac.uk/id/eprint/78184/> (accessed 03.02.2022)
- Thanem, T., & Knights, D. (2019). *Embodied Research Methods*. SAGE.
- Travers, M. (2009). New methods, old problems: A skeptical view of innovation in qualitative research. *Qualitative Research*, 9(2), 161–179. <https://doi.org/10.1177/1468794108095079>
- Vannini, P. (2015). *Non-Representational Methodologies*. Routledge.
- Wiles, R., Crow, G., & Pain, H. (2011). Innovation in qualitative research methods: A narrative review. *Qualitative Research*, 11(5), 597–604. <https://doi.org/10.1177/1468794111413227>
- Xenitidou, M., & Gilbert, N. (2009). *Innovations in social science research methods*. National centre for research methods report. Retrieved from <http://eprints.ncrm.ac.uk/804/> (accessed 02.02.2022)