

Touched Matter: material explorative approaches to investigate tactile relationships with responsive materiality

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Touched Matter: material explorative approaches to investigate tactile relationships with responsive materiality

Marika Grasso

A thesis submitted in partial fulfilment of the requirements of Sheffield Hallam University
for the degree of Doctor of Philosophy

February 2025

Candidate Declaration

I hereby declare that:

1. I have not been enrolled for another award of the University, or other academic or professional organisation, whilst undertaking my research degree.
2. None of the material contained in the thesis has been used in any other submission for an academic award.
3. I certify that this thesis is my own work. The use of all published or other sources of material consulted have been properly and fully acknowledged.
4. The work undertaken towards the thesis has been conducted in accordance with the SHU Principles of Integrity in Research and the SHU Research Ethics Policy, and ethics approval has been granted for all research studies in the thesis.
5. The word count of the thesis is 47,800 (including gutter).

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Date	February 2025
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Practice submission

1. Printed timeline with annotations
2. Annotated Portfolio with figures and text
3. Touchscreen Material exploration

How to read the Thesis with the Practice Timeline, Annotated Portfolio and Glossary

Reading key: The thesis file includes three printed documents and a touchscreen. The thesis is supported by printed material such as the Practice Timeline, the Annotated Portfolio, and the Glossary. The Practice Timeline is referred to in Chapter 2 (p.25). It visualises the periods of the COVID-19 pandemic concerning the Material explorations. The lines show the development and connection between projects discussed in Practice Chapter 5 (p.84). The Annotated Portfolio serves to expand visually on the practice work. It includes unedited notes from the Practice, which I expand upon in Chapter 5, and it follows a chronological order, referring to the timeline. The Glossary serves to group in alphabetical order all the key concepts and words used in the thesis, which are presented in the footnotes when first mentioned in the text. The appendix groups further explanations from the Contextual Frame Chapter 3 (p.31) and Methodology Chapter 4 (p.50). The practice timeline should be looked at in Chapter 2, the annotated portfolio for Chapter 5, and the Glossary, when needed throughout the thesis, to clarify terms.

Use of AI acknowledgement note:

This thesis has been edited using ethical and responsible editor programs such as Grammarly and ChatGPT, following Sheffield Hallam University guidelines. Importantly, this thesis deals with the embodied experience of touch, which is inherently human, while machines' language and computation intelligence deal with language processing. Therefore, I edited and elaborated on the thesis content for the definitive version.

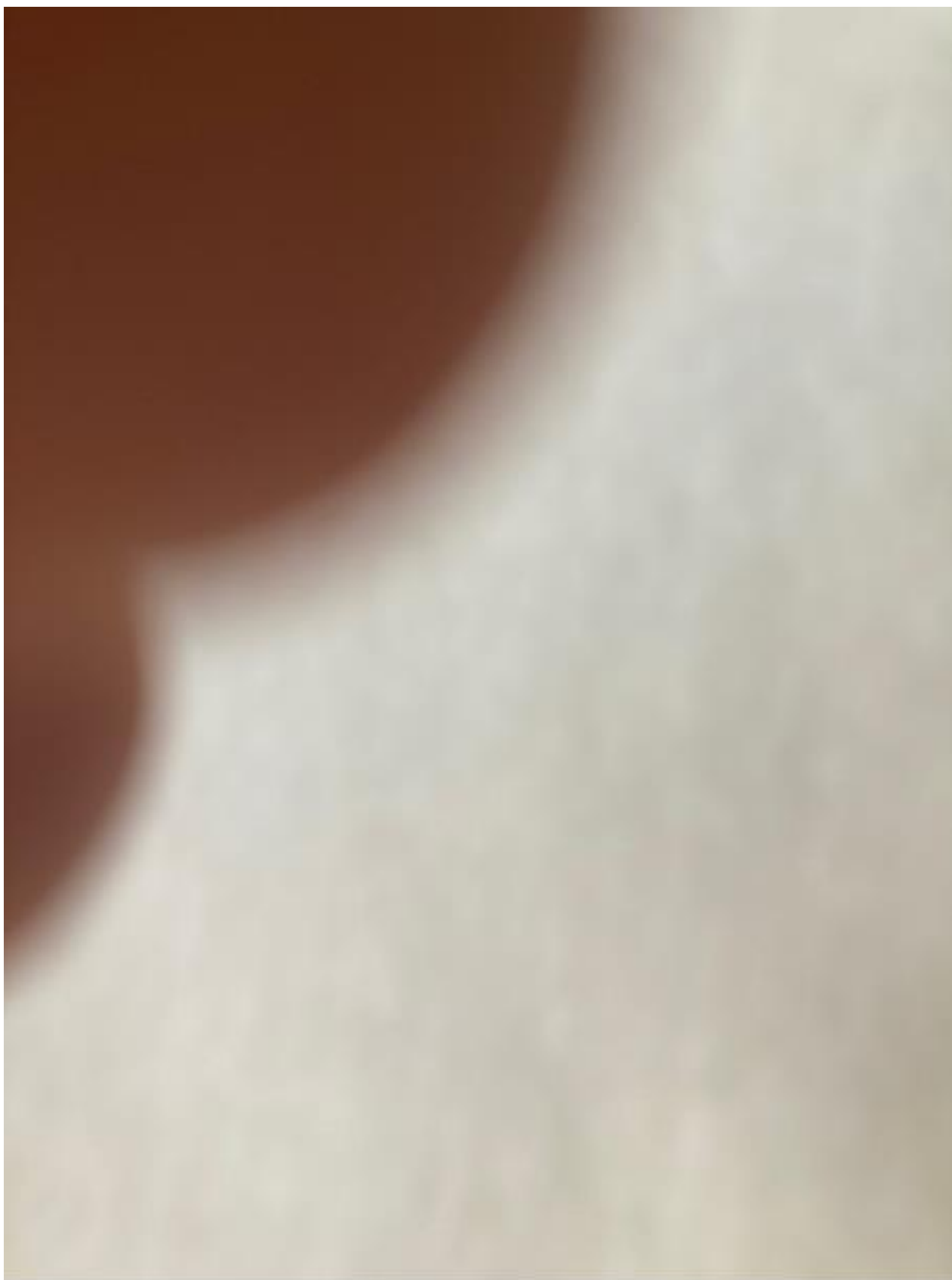


Figure 1. Picture of fingers on screen front camera of iPhone SE 2nd generation

Abstract

This thesis explores the mundane nature of tactile relationships with touchscreens, focusing on their material qualities through experimental approaches. The research addresses the question: What do we touch daily that is responsive to our touch? In the context of the COVID-19 pandemic, the study examines the significance and physicality of touchscreens and other responsive materials, including conductive threads, to understand their impact on tactile interaction. The pandemic's restrictions on physical interactions highlight the changing nature of tactile engagements, as well as the risks associated with contamination through touch and mundane contact with touchscreens. The research is a practice-led inquiry concerning the tactile relationship between skin and touchscreens.

Through material interventions and explorations in gallery and workshop settings, the thesis examines the interactions between the body and touchscreen as an embodied encounter (figure 1). Moving beyond the user-device relationship, the study is framed by the concept of 'intra-action,' which is explored through practice-led methodologies. The study focuses on the residual traces left on touchscreens, considering them as not merely passive objects, but as active participants. This research adopts a New Materialist perspective, where the touchscreen is viewed as a material agent, and the person is seen as a nervous, responsive matter, in physiological and philosophical terms.

The research contributes to understanding the tactile relationship with technology by identifying four key themes—Conductive, Broken, Wet/Soft, and Cared—that emerge from material explorations. These themes convey the diversity of encounters between the body and touchscreen, prompting a reconsideration of the everyday tactile engagements we have with responsive technologies. This work makes an original contribution to knowledge by examining the sensory and material dimensions of touch in relation to the materiality of e-waste, thereby expanding the discourse on embodied interaction with technology at the intersection of Art practice and Neurophilosophy.

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Chapter 1: Introduction

1.1 Introduction: What is touched?



Figure 2. Untitled, The Weight of Light, Conductive thread, diodes, batteries Lumen Gallery, London, May 2019 (Trevisani, 2019)

This thesis examines the tactile relationship between body and technology, focusing on the mundane tactile experience with touchscreens. Touch is framed as a sensory and embodied phenomenon, employed to explore the reciprocal, dynamic, and adaptive interactions between skin and responsive materials, through practice-led research. My inquiry arises in the domestic isolation of Covid-19 lockdowns asking: *What are the daily responsive materials that are touched?* Informed by my material practice, I observed mundane

gestures and interactions with everyday objects, choosing the touchscreen for its attention-grabbing agency, in a period of tactile isolation. My goal is to shift the user relationship with the touchscreens by employing material explorations, to investigate its composition, skin traces as the hidden liminal qualities of Touch encounters. My explorations aim to challenge conventional notions of materiality, moving beyond the touched object to position Matter as an active, responsive agent in the encounter, by building up from concepts as intra-action (Barad, 2007), volitional and emotional touch (Mason, 2016), care (de la Bellacasa, 2017) and Touch as awareness (Roazen, 2007). Drawing from the fields of New Materialism and Neurophilosophy, I examine tactile agency through art practice-led methodology, and iterative processes of making and disseminating.

A pivotal moment occurred during an installation at Lumen Gallery in 2019 (Figure 2), where a conductive circuit unexpectedly lit a diode through Touch, revealing the skin's latent electrical potential and sparking my exploration of how materiality can express conductivity, which I built upon to frame the encounter between touchscreens and skin. The work frames Touch as an intra-active phenomenon, where the body, the material (the touchscreen), and the environment are entangled through the concept of intra-action (Barad, 2007). The concept challenges traditional views of agency and materiality by positioning both the human body and technology as active participants in shaping knowledge. Touch as a mutual, ongoing encounter between nervous¹ bodies and responsive Matter is explored through a multi-disciplinary lens, including New Materialism, Neurophilosophy, and textile practices.

To elucidate the research process, the early chapters lay the theoretical and contextual groundwork as practice premises. Due to exploratory nature of my research, I introduce my artistic practice later to delve deeply into decision making and reflections, where the practice evolved alongside theoretical considerations earlier discussed. Firstly, I present the COVID-19 context and the literature as a framework for the practice; meanwhile, the methodology frames the description of processes and analysis. The practice discussion, organised in qualities (Conductive, Broken, Soft/Wet and Caring/Cared) follows to discuss the practice-led research unfolding as a dynamic interplay between material experimentation, embodied experience, and theoretical inquiry. The experience of lockdown prompted me to explore the responsive materiality of touchscreens from a bodily perspective, considering embodiment and technology e-waste in a post-pandemic world. The research methodology integrates material methods with Neurophilosophy and material-focused approaches, aiming to contribute to the intersecting fields of Fine Arts and Neurophilosophy by positioning my practice alongside that of other artists in describing processes, techniques, and theoretical borrowings.

¹ **NERVOUS:** This term is used in a dual sense—both poetically and physiologically. These meanings intertwine, as the electrical potential of synaptic transmission finds resonance in external elements such as touchscreens or conductive threads. When referring to the *nervous body*, I foreground the motor and sensory capacities of the flesh. In contrast, *nervous materiality* builds from a new materialist framework to relate the responsive and conductive properties of technological matter—such as the touchscreen—to the body's surface, treating both as sites of sentient exchange.

1.2 Roles embodied

Before delving into the research, I need to clarify my shift of roles throughout this PhD. I have navigated multiple roles as a maker, artist, and researcher, each influencing my approach to materiality. My background in fine art, textiles, and knowledge of material properties (coming from a waste management business familiar background) has shaped my understanding of how materials deteriorate and engage with the body. My practice has evolved from working with traditional materials to exploring more responsive ones, such as conductive threads and touchscreens, which challenge the traditional boundaries between the body and the material world, in terms of transmission. The COVID-19 pandemic compelled me to reassess my role as a researcher and artist, redirecting my focus from gallery-based experiments to material-led explorations conducted remotely, such as online residencies and postal interaction documentation. This evolution is key to understanding the structure of my research, as material interventions necessitate an intimate revaluation of the ethical relationship between the body and material. My roles merged and shifted to move from hands-on work to conceptual and remote forms of practice (e.g. Instagram polls), firstly, to then return to attentively engage in person afterwards.

1.3 Research Questions

In the context of the COVID-19 pandemic, I draw on New Materialism to explore the entanglement of physicality and meaning in responsive tactile encounters. Firstly, research on the epistemological dimension grounds itself in considering touch as an event, phenomenon, encounter, and intra-action (Barad, 2007). In this context, knowledge as comprehension is elaborated through embodiment and experience, underpinning the practice by embracing the co-creative potential of material interactions while acknowledging the ethical implications of these relationships.

"A phenomenon is a specific intra-action of an 'object', and the 'measuring agencies'; the object and the measuring agencies emerge from, rather than precede, the intra-action that produces them." (Barad, 2007, p. 128).

Building on Barad's definition of phenomenon, I employ Practice-led research to emphasise the experiential, subjective, and contextual aspects of knowledge production in embodiment and carnal knowledge (Barrett et al., 2013). Consequently, the study is based on the collection of empirical information through the interpretation of sensory information gathered by hand, skin observation, and visual and material process documentation. To recognise the vibrancy of Matter beyond my practice

expectations and intentions I build on Braidotti (2012) and Barad (2007) definition of agency² to address tensions as passive, active and "animate and inanimate" entities (Fox & Alldred, 2014). This approach shifts the focus from human-centred narratives to an entangled understanding of encounters, aligning with Barad's (2007) concept of intra-action, where knowledge is produced through dynamic interplay between parts.

The research questions that guide this study:

- RQ1: How can material explorative approaches identify qualities of intra-action when encountering responsive materiality?
- RQ2: What novel approaches to material exploration can be harnessed better to comprehend the intricate relationship between technology, physicality, and touch in the context of the post-COVID-19 pandemic?
- RQ3: How does existing literature on material exploration inform the process of engaging with touchscreen leftovers and conductive thread in a Practice-led methodology?
- RQ4: How can material explorative approaches and art practice investigate the tactile reciprocal impact between the touchscreen and the skin?
- RQ5: How does a touchscreen's wasted Matter serve as a sensory and phenomenological archive of touch, retaining traces of tactile interactions?

1.3.1 Aims and Objectives:

1. Investigate how wasted technological materials document tactile traces through art Practice-led research:
 - a. Employ Practice-led methods to manipulate touchscreen materiality, unveiling its composition, functions, and tactile qualities.
 - b. Identify tactile attributes of materials to formulate an embodied, sensory approach to engage with technological Matter materially.
 - c. Develop and document an iterative approach to artistic practice focusing on creating and disseminating provocative material exploration for participants and audience.
 - d. Analyse the visual, material, and written documentation resulting from the artistic practice and its subsequent dissemination by considering the influence of the COVID-19 pandemic on remote/hybrid engagement.

² AGENCY: "Agency is 'doing' or 'being' in its intra-activity. It is the enactment of iterative changes to particular practices – interactive reconfiguring of topological manifolds of space time Matter relations -- through the dynamics of intra-activity." (Barad, 2007, p. 178)

2. Construct a framework integrating the literature and material explorative approach to explore touchscreen and conductive thread materiality.

- a. Identify critical elements from neuroscience, New Materialism, Somaesthetic interaction, and textiles that shape the processes and meanings of material practices.
- b. Cultivate a material explorative approach under the New Materialist theoretical frame, including material methods, Art Based Methods, and textiles.
- c. Document systematically the interconnected and informative systems that bridge the practical aspects of the research with theoretical insights.

I formulated aims and objectives to challenge and explore the research questions from multiple perspectives, informed by the critical lens of the literature review. While I addressed the research questions by focusing on material behaviours, responses from those engaging with the materials, and my embodied and sensory reflections. In Chapter 4: Methodology (p. 46) and Chapter 5 (p. 73), I detail the mode of tactile engagement and the documentation process and narrate the material practice's reflective stages. Overall, I approach answering the research questions by organising the literature review, methodology, and practice discussions under a New Materialist perspective. To challenge anthropocentric and user perspectives, Matter is seen as having the capacity for enactment (Barad, 2007) and efficacy (Bennett, 2001). I aim to move beyond Matter viewed as inert by embracing the fleshiness of the practice. The first research question examines how a practice-led methodology with interdisciplinary connections can explore materiality and touch as a layered sensation, which is further explored in the second research question regarding material explorations that focus on the intertwined application of methods (Chapter 4). The third question explores interdisciplinary modes of overlaying different disciplines to consider tactile encounters through the lenses of New Materialism, Neurophilosophy, Touch, Art practice, Textiles, and Technology. Chapter 5 addresses the fourth and fifth questions by discussing material explorations, methods, literature, and practice moments of material engagement and dissemination. The research questions highlight how my research evolved to explore the "broken materiality" and hidden narratives within smartphones, relating these to the concept of textile softness and the creation of making tools. My aim and objectives ambitiously target unique intersections of technology, materiality, and touch through the lens of art practice. In Chapter 4: Methodology (p. 46) and Chapter 5 (p. 73), I detail the mode of tactile engagement and the documentation process and narrate the material practice's reflective stages.

1.4 Thesis outline

The following thesis structure presents an overview of disciplines, concepts, methods, and approaches. The chapters outline the PhD journey from its context and theoretical framework to the methodology, material explorations, and findings, concluding with reflections and contributions to the field.

Chapter 1: What is Touched?

This chapter introduces the research framework, questions, and objectives. It presents the concept of touch as both an embodied experience and a phenomenon of material engagement.

Chapter 2: COVID-19 Context

This chapter explores how the COVID-19 pandemic influenced the research process, shifting my focus towards digital and remote engagements with materiality.

Chapter 3: Literature Review

The literature review engages with key concepts from New Materialism, Neurophilosophy, Touch, Art Practice, Textiles, and Technology. It identifies gaps in the understanding of technological materiality and its relationship with the body.

Chapter 4: Methodology, Methods, and Analysis

This chapter outlines the practice-led research, methodology, combining material explorations, and interdisciplinary approaches. It details the techniques and tools used in the Practice-led research.

Chapter 5: Practice Discussion

This chapter synthesizes the findings from material explorations and presents thematic insights such as Conductive, Broken, Wet/Soft, and Cared. It links these findings to the theoretical framework and broader literature.

Chapter 6: Conclusion

The conclusion reflects on the contributions of the research, discussing the implications of the study for tactile encounters with technology and offering suggestions for future research directions.

Glossary

To ensure clarity of terminology, it serves as a signpost to read terms and includes key concepts like New Materialism, Neurophilosophy, Touch, and Technology Materiality. Keywords are defined in-text with footnotes and gathered alphabetically at the end of the thesis.

Annotated Portfolio

Chronological visual and written documentation of the research, highlighting material practice, supporting projects, and figures. It aims to present projects and visuals in parallel to the thesis to expand on the documentation and reflection of the Practice-led research.

Practice Timeline

It aims to accompany Chapter 2; it is a visual and annotated timeline linking material explorations to COVID-19 lockdowns. Highlights tactile qualities, keywords, disciplines, and methods, showing their interconnections. Annotated Portfolio and Practice Timeline present the exact keywords, dates, and main figures to create a cohesive language.

2. Chapter 2: Context of research: Tactile explorations during COVID-19 pandemic

2.1 Introduction

This section contextualises the influence of the COVID-19 pandemic on my material practice-led research. Table 1 (p. 25) outlines the pandemic timeline, spanning from its onset in March 2020 to the WHO's declaration of the end of the public health emergency in May 2023 (Sarker, 2023). The printed timeline highlights key events, illustrating the interplay between the pandemic and my practice. In March 2020, the COVID-19 pandemic, caused by an airborne viral disease, spread rapidly worldwide. Due to the virus's high transmissibility and unknown origins, the World Health Organisation (WHO) declared a pandemic on 11 March 2020 (World Health Organisation, 2023). Following Italy's lead, many countries implemented lockdowns, requiring people to stay home and minimise social contact to reduce virus transmission. Activities were confined in the domestic environment, this shift redirected initial studies planned for public and gallery spaces; I employed the bedroom as studio and workshop³, and social media as a platform to communicate isolation, tactile, mundane explorations and the touchscreen relationship. Consequently, the restrictions imposed by the British and Italian governments informed the ethical framework of the study; my fear of virus transmission influenced the planning and execution of gestural collections, which were approached through attentive practices (discussed in Chapter 4).

The first lockdown (from March to July 2020) was followed by a second (from October 2020 to December 2020), a third one (from January 2021 to July 2021), and a final phase of social restrictions

³ WORKSHOP: Has two meanings: (1) Workshop spaces at Sheffield Hallam for resin, silicon casting, metal, jewellery, and fashion embroidery studio explorations; (2) Audience and participant workshops focused on touch and sensorimotor engagement.

from autumn 2021 to summer 2022, characterised by gradually reopening public spaces under mask mandates and other regulations⁴.

Material explorations, dissemination, and gesture collection prioritised participants' health and safety, adhering to Sheffield Hallam University's ethical guidelines (Sheffield Hallam University, n.d.). The timeline submitted includes my activities in Italy, where I spent the summer during the pandemic (Table 1 in blue). Travel during this period was challenging and heavily regulated, leading me to relocate for extended periods to work in diverse environments. This resulted in fragmented perspectives: the more stringent restrictions in Italy further impacted my experience of touch and contact, amplifying the fear of transmission. Following the lockdown restrictions and the unknown nature of COVID-19, most people were attentive and fearful of transmitting or catching the virus; touch was sanitised and associated with the possibility of contagion. In grocery stores, the level of hand sanitisation, mask-wearing, and social distancing made it particularly evident how touching items was often preceded and followed using antibacterial gel. The lockdown guidelines required socialising under the guidance, including testing, wearing masks, and vaccinating to travel, which applied also to conferences and exhibitions. In this context, the smartphone was a casually handled, publicly touched object without the use of antibacterial liquid. I inspected it as a mindless, domestic, safe and mundane action until I viewed it as material to study. The solitary gesture of touch in the domestic environment and the consequent study with participants merge with the ethical questions raised by the New Materialist literature. In practical terms, during the COVID-19 lockdowns, I created my material explorations using available domestic and mundane objects (rather than exploring material conductivity with the material engineering department or a neuroscience research team), while considering the impossibility of sharing objects with the broader public, which consequently shaped the entire research journey. Using the laptop screen as a portal, I shared and discussed the literature and the practice with my supervisors through technological screens, the application Zoom⁵, and emails. The solitude and fear of transmission⁶ shaped the bedroom safety as the ground to interrogate mundane responsive materials and the agency of touch. When life was organised around the COVID-19 conventions of living (wearing masks, organising groceries, avoiding crowded spaces, and not touching others), I interrogated the touchscreen as safe personal material while searching for its responsive modes and creating circuits to find something that could express and respond to touch. The COVID-19 pandemic has shaped the understanding of touch as a health hazard in the public sphere, in opposition to touchscreen interaction as a gesture towards an intimate communicative tool, touched mainly by only one person, its user.

⁴ As Italian citizen I followed both health indications, firstly the one from the Italian Government (<https://www.gazzettaufficiale.it/eli/id/2020/03/08/20A01522/sg>) and then the British ones ([Withdrawn] [How to stop the spread of coronavirus \(COVID-19\)](#) - GOV.UK). Both changing by the day due to the lack of information regarding the virus.

⁵ Zoom is a video conferencing application widely employed during the lockdown to work, and communicated with colleagues, or access online conferences, and other public or private distance events.

⁶ Which I discussed in depth with the curator and anthropologist Miriam Barosco for our article for Alea Magazine, *Between the layers* (Barosco and Grasso, 2021).

Before the COVID-19 outbreak, my research question was about expressing electrical skin potential through materials such as conductive threads, silicones, and metals to explore self-awareness. During the second lockdown (see Table 1, p. 25), I realised that social isolation resulted in continuous engagement with the unknown layering and composition of the touchscreen. The mundane presence of technology was so subtle and constant that during the lockdowns in 2020 and 2021, it became an extension of my body. Mark Fisher (2011) describes the functioning smartphone as “electro-libidinal parasites”, whereas White (2022) builds on the presence of technology on the skin in adverse conditions. In the domestic space, the touchscreen relationship evolved from intimate to obsessive through Practice-led research, ultimately becoming an alien intruder. The attention-seeking nature of the object (Fisher, 2011), employed to connect with family, coworkers, supervisors, and friends, fades away in its afterlife as a broken touchscreen. Reflections on touch were influenced by authors such as Barad (2007) and de la Bellacasa (2017), as discussed in the literature review. Touch was considered an instrument to explore the entanglement between skin and Matter through material interventions, such as seaming and unmaking, to link with the philosophy of textiles (Dormor, 2020). The research unfolded with the evolving monogamous somatic sense of intimacy, violence, attentiveness, and un-layering the tactile relating with the touchscreen. The decision to investigate the broken touchscreen emerged gradually as I considered the ethical implications of what I touch, what is touched, and what everyone touches in response to my experience with COVID-19. The ethical issues of contact, contagion, and intimacy are explored in Chapters Conductive (p. 75) and Broken (p. 94). Due to the COVID-19 pandemic, this research explored touch and the tactile qualities of materials through art Practice-led research.

2.2 Practice-led research during COVID-19 pandemic

My practice evolved before, during, and after⁷ the COVID-19 pandemic; the restrictions impacted the sense of touch in mundane, practice, and dissemination contexts. In the Visual timeline, I organised the material exploration in the following list to design and clarify its place in the COVID-19 timeline, drawing it together with the [Material exploration spreadsheet](#) (discussed on p. 66). I organised the material explorations and dissemination modes chronologically, presenting the importance of the materials employed, the related literature review, and methods.

The time segmentation resulting from the COVID-19 lockdowns divided my practice time between online residencies and weekly experiments, to accommodate the instability and uncertainty of rapidly changing rules during the restrictions. Table 1 presents my research chronologically, organised by the various stages of the pandemic. The tactile qualities that emerged from my analysis partly respond to the health and social shifts in attitudes towards contact during the COVID-19 pandemic. Consequently, I adapted my approach to exploring touch, influencing how I conceptualised touch before disseminating

⁷ I specify how COVID-19 impacted my decision to explore touchscreen waste Matter in the practice subchapter Broken (p.106)

my work and inviting audiences to engage with it. The following table 1 summarises the content from the Material Exploration spreadsheet, presenting a timeline of all projects with keywords, related disciplines, and methods. Further details are provided in the annotated portfolio (A.P. p.30), organised chronologically.

YEAR	MATERIAL EXPLORATION
January-February 2020	touch-no see, see-no touch
First Lockdown	
March-April 2020	Mind Object series
April-May 2020	Theory of Screen-Mind
July-August 2020	Self-Residency (in Annotated Portfolio)
July 2020	Postcard from Future (in Annotated Portfolio)
Second Lockdown	
September-October 2020	Circuits to handle 1,2
Third Lockdown	
February 2021	Touchscreen Matter
March 2021	Broken Touchscreens transienttt
	Unmaking the screen
May 2021-May 2022	Post Screens (artefact) - Postal Gesture collection
May 2021-May 2022	Post Screens (video) - Postal Gesture collection
July-October 2021	Touchscreens Polls Instagram - Online Gesture collection
October 2021	
Public spaces Restrictions	
July 2021	Neuroaesthetics course making (attention and intelligence of the body)
July 2021	Beyond Touchscreens (exhibition)
September-October	Soft Tissue online workshop

Nov 2021-May 2022	Gesture analysis Tracing Marks (drawings)
March 2022	Caring screen Oorbit Soft and Wet
April-June 2022	3D mapping touchscreens, Screening
May 2022	Volitional Touch work
July 2022	Inert Matter-conductive
September 2022	Touched screens (DRHA22)
November-December 2022	Embroidered screens
2022 December	Cloth-screens
May 5th, 2023, End of Covid-19 Public Health Emergency	
April-June 2023	Digital Humanism Fellowship IWM
June 2023	Caring screen (IWM)
June 2023	TS 25 (Yorkshire Art Space, Sheffield)
November 2023	Gorilla Glass skin (Aalto)

Table 1. Material exploration chronological list with COVID-19 lockdown marking.

Table 2 derives from Table 1 and discloses how the global emergency affected the dissemination and gesture collection modes through technology. I classify how the material exploration was operated through meeting in person or by digital sharing (Instagram).

Year	DIGITAL SHARING (INSTAGRAM)	IN PERSON (touching exhibition)
2020	Mind Object series	touch-no see, see-no touch
	Theory of Screen-Mind	Circuit 1,2 to handle (by post)
	Self-Residency	
	Postcard from Future	
2021	Touchscreen Matter	Post Screens (artefact) - Postal Gesture collection
	Broken Touchscreens @tr.ansienttt	Post Screens (video) - Postal Gesture collection

	Unmaking the screen	Basketry hand making
	<u>Touchscreens Polls Instagram-Poll</u>	Beyond Touchscreens (exhibition)
	Neuroaesthetics course making	
	Gesture analysis Tracing	
2022	Volitional Touch work	Caring screen Oorbit Soft and Wet
		3D mapping touchscreens, Screening
		Inert Matter-conductive
		Touched screens (DRHA22)
		Embroidered screens
		Cloth-screens
2023		Caring screen 2
		TS 25
		Gorilla Glass skin (Aalto)

Table 2. Categorisation of the material exploration and artworks according to modes of sharing, either digitally or online (to be read in conjunction with an Annotated Portfolio).

Table 2 illustrates the modes of dissemination employed for the project. In the context of the COVID-19 pandemic, I reconsidered the role of touch within the digital sphere—its representation and implications—while remaining mindful and attentive to physical interactions when inviting audience engagement through material explorations. This categorisation partly addressed the research question: How does the technological waste document touch? With a tactile and material-centred research, I adapted my strategy to accommodate two distinct modes of tactile interaction, as detailed in Table 2. One involved safely sharing via Instagram, while the other entailed in-person interactions through postal delivery for collecting gestures and workshops to explore electrical potential transmission.

To synthesise Tables 1 and 2 provide an organised framework that illustrates how the COVID-19 pandemic influenced the design of the Gesture Postal Collection and Instagram Polls. Digital sharing became predominant, reflecting the project's adaptation to the new pandemic-related constraints. In the subsequent chapters, I aim to demonstrate how touch is the unifying theme throughout the research, explored through experiences, absences, suggestions, reflections, and sensory awareness. Touch weaves together various explorations, drawing on my touch experiences, interactions with participants, and engagement with online audiences. I delve into the qualities through an analytical process, first exploring the material practice of conductivity, where touch serves as both a transmissive and sensory tool. The

material perspective on the touchscreen—and the tactile engagement that shaped my material explorations during the pandemic—is further contextualised in the following chapter. The literature review offers a layered framework through which to identify key terms and examine tactile encounters, progressing in an overlapping manner from touch to technology.

Chapter 3: Literature Review

3.1 Introduction

This research⁸ weaves together insights from the disciplines of New Materialism, Textile, Touch, Neurophilosophy, Material Art Practice, and Technology to critically synthesise conceptual and methodological gaps around embodiment and the role of artistic practice in understanding tactile encounters with technology. In the literature review, I examine key literature to evaluate how it informs, shapes, supports, and enriches the conceptual framework of my investigation to build a materially grounded and posthuman perspective on Matter and Touch. In this chapter, I present the synthesis of key concepts, including Intra-action, Care, Awareness, and Volitional touch, which are interwoven with sub-concepts such as neuroplasticity and soft thinking, to illustrate the complex nature of touch as an encounter. I evaluate the key concepts through their connection to the phenomenon of touch, to highlight the current stance of posthuman studies in understanding a material-centred perspective, as the body becomes a composite of flesh and nerves.

I aim first to ground the key concepts within their respective disciplines and then thread them to other disciplines to highlight gaps in tactile phenomena research. To bridge disciplines and concepts, I employ the figures of touchscreen and conductive thread to connect textiles with the nervous system, pursuing them as metaphors to elucidate my critical stance. I discuss the materialisation of these concepts in the Methodology (Chapter 4, p. 46) and Practice (Chapter 5, p. 73) through the making processes. The literature review is organised by key terms and disciplines, beginning with New Materialism (Barad, 2007) and the concept of Intra-action (Barad, 2007) to explore the role of Matter, with attention to Care as encounter with technology (De la Bellacasa, 2017). The literature on touch is then examined through the lens of Inner Sensing as self-awareness (Roazen, 2007), followed by an analysis of how practice is framed

⁸ RESEARCH: for my research I intend: "the term "research" designates something as little homogenous as "science" or "art"; they are collective pluralities, assembling highly diverging processes that often trespass the categories of boundaries such as disciplines to be more closely related there than with some other members of their own faculty, subsequently grouping together more easily under their common interdisciplinary denominators, such as topics, methods and paradigms." (Klein, 2017)

as material technology embodied intervention. Next, I incorporate Neurophilosophy⁹ (Churchland, 1989) to consider the body as nervous materiality, focusing on different types of touch, Emotional and Volitional. Those key concepts are evaluated, with a focus on textiles and the technological broken object; in this manner, the narrative of the literature introduces posthuman ways of encountering to explain the neural materiality of the body and the literature surrounding e-waste technology. To conclude, I delve into Touchscreen technology (White, 2022). Importantly, touch is the thread that links meanings to the layering of key concepts and disciplines, and other literature is presented to sustain and position my practice-led research at the intersection of the listed disciplines.

3.2 Intra-action and New Materialism

I introduce the umbrella of New Materialism as scholars are concerned with rejecting anthropocentrism to encounter and embrace material agency (Sanzo, 2018). New Materialism is the primary lens for examining materiality to evolve a discourse on Matter's vibrancy and recognise its agency in a "more than a human world" (Haraway, 2007). New Materialist scholars' primary concern is placing humans in the material world and how "we produce, reproduce and consume our material environment" (Coole & Frost, 2010, p.3). I incorporate scholars such as Braidotti (2002), Haraway (2007), Barad (2007, 2012), Bennett (2011), and de la Bellacasa (2017) to individuate ethical and caring manners of Touch toward Matter. To follow, I draw on Deleuze and Guattari (2004) to employ becoming, diffraction and assemblage as key terms for analysis (p. 65). These are explained (p. 66) in consideration of the process of observing, organising, and creating meaning, following the line of searching for a relationship with technology within the post-humanist frame. While acknowledging the listed scholars, I explored novel research grounds when elaborating on key concepts intersected with the practice. I employ intra-action¹⁰ (Barad, 2007) as a concept to comprehend material presence and behaviours of textiles and touchscreens as Matter of the practice. As critical lens intra-action¹¹ pushes the understanding of energy exchange, it encompasses durability, decay, agency, past interactions, vibrancy, the composition of elements, and the relationship with other Matter. The term reflects that varied forces are active when an interaction occurs, in this case, through the phenomenon of touch. Therefore, the clear division between activity and passivity and subject and object is blurred through the flowing of forces between one another. New Materialism, through the work of Barad, serves to understand the blending between researcher, user, and

⁹ NEUROPHILOSOPHY: Explores neuroscience and philosophy intersections, focusing on how brain functions influence cognitive processes, consciousness, and sensory experiences. It provides a framework for understanding tactile interactions with technology like touchscreens, linking sensory experience with material engagement.

¹⁰

¹¹ INTRA-ACTION: A Baradian term contrasting with "interaction," reflecting Matter's capacity to transmit and conduct energies and power in a continuous exchange of information. (Barad, 2007)

participants with Matter through the attempt to experience this “dynamic of forces” (Barad, 2007). As Barad (2007) notably remarks, the Matter responds in its unpredictable ways, as it escapes complete understanding. Intra-action is introduced first as it shapes my awareness of my actions and my material capacity to respond, resist, and react unexpectedly. I employ this tool to know through touch within a system of reciprocal agency.

“When two hands touch, there is a sensuality of the flesh, an exchange of warmth, a feeling of pressure, of presence, a proximity of otherness that brings the other nearly as close as oneself.”

(Barad, 2012)

The quote, from “On touching-therefore I am” (2012), explains the fleshiness and sensuality of encountering the other, even when touching one’s own hands. “Perhaps closer” (Barad, 2012) to the other than oneself, the author explores the possibilities of reciprocity and connection through contact as a portal to experience an “infinity of others” (Barad, 2012). I believe sensorial ties and being are raised and aroused to perceive vibrancies on touching otherness in feeling the reciprocities of agency. This tactile encounter is the key to understanding the interlacing between the literature and practice to address the closeness with technological surfaces. Getting close through touch means considering and insinuating what lies beneath the surface. I draw from Barad (2007, 2012) to expand on the awareness of Matter's tangibility.

“Mattering is simultaneously, ...

...So, tangible”

Barad (2007:4)

I explore material agency through intra-action (Barad, 2007) Matter tangibility in the processes of alteration. Mattering is connected to the tangible phenomenon of touch in consideration of the pre-, during and post-phenomenon, which I employ to discover ways of shaping a horizontal consideration of relating. Mattering establishes a New Materialist presence of objects, revealing a state of extended being that uncovers novel qualities and possibilities of Matter. Mattering is expressed in the consideration of entangled beings, which I experienced in terms of sensual beings, in touching to feel, sense and being sensed. In this entanglement I attempted to exercise my agency in an aware, tactile manner, utilising volitional touch to investigate Matter, while also engaging in the exchange of energies through awareness of the being and practice (Roazen, 2007). Intra-action and Matter laid the ground for evolving a practical and behavioural sense of Care for the conductive thread and touchscreen. The concept of Mattering is excavated in including textile philosophy intersect between softness and shimmering (Dormor, 2020).

3.2.1 Becoming

Through intra-acting and mattering, the literature evolves into "becoming with" the Matter, with an ethical understanding of "accountability" and "obligation" towards the touched (Haraway, 2007b). The notion of technological waste is regarded under Haraway's technological posthumanism speculations (Ihde, 2003) as becoming part of the world through tactile relationships. With accountability towards technological Matters and their future, I situate the research in speculative futures and becoming aware of technological materiality, means of production elements and usage. Regarding technological Matter, dystopian and changing scenarios indicate views of expressing materiality in species structure (Haraway, 2007). Considering Donna Haraway's stance on technological relationships (Haraway, 2007b), the technological device—a composite of metal and polymers—possesses responsive and attention-grabbing capacities that inhabit the world beyond human agency with its aliveness (Bennett, 2010). The posthuman ground of research is concerned with the near future of inactivity and the waste of technology. The wasted Matter presents a vibrancy in the "Thing-power gestures toward the strange ability of ordinary, man-made items to exceed their status as objects and to manifest traces of independence of aliveness, constituting the outside of our own experience" (Bennett, 2010, p. xvi). The phenomenon of Touch encapsulates thinking beyond the mundane, the emergence of responsive materiality as manufactured to establish spaces for this Matter to manifest its vibrancy and aliveness (Bennett, 2010). Technological waste bears traces of past encounters, and I connote its presence by manifesting soft material agencies, in discussing Matter as textile, and through the evolving relation with Matter in my practice.

3.2.2 Textile philosophy

To deal with surfaces and soft materiality, Igoe (2021) defines Textile thinking¹² as: "The indivisibility of thinking, making, knowing with, in and of itself, bound up with the agency of materials themselves, becomes the premise of textile thinking." This seamless transition between actions relates to the tactile relationships that establish the foundation for mattering and intra-acting through practice, linking New Materialism to Textile Philosophy. The textile frame strengthens the Practice-led researcher's engagement with Matter by adopting a New Materialist accountability perspective. Ingold (2013) theorised that thinking while making and thinking of materiality is integrated with thinking about materials, which in an embodied matter connects to skin thinking (Dowdall, 2018). In depth, Textile philosophy (Dormor, 2020) offers a reading into tangible creative processes, in which the textile becomes a dense or shimmering surface, and making techniques such as folding, fraying, and seaming are employed to contemplate the encounter with the textile as both subject and object of caressing. Textile thinking is a research tool that

¹² TEXTILE THINKING: Theory by Igoe (2021) exploring how textiles influence design and artistic practices through flexibility, tactility, and materiality. It emphasizes material agency, sensory engagement, and ethical, narrative contexts.

enables to consider Matter as a surface by observing how it responds to the intentionality of making, beyond the idea of failure (Heinzel et al., 2019) Through practice-led research, I assimilate, and sense metals, glass, and conductive thread by examining their leftovers, letting them linger in their changing state without constraining expectations. Textile connects the theoretical ground and the making, and it is present in this contextual frame, serving as the glue (Dormor, 2020). It explains how I approach materiality as a surface that integrates tangible agency and softness into material thinking (Carter, 2004). Besides ethical approaches, Touch has a violent agency towards Matter (Dormor, 2022), it possesses caring qualities, and it can be juxtaposed with vision (Maurette, 2018). In terms of transmission, I contextualise the Matter in the philosophical view of electrical conduction (Heinzel & Hinestroza, 2020). The paper by Heinzel and Hinestroza (2020) provides a comprehensive philosophical inquiry into the nature and implications of electronic and reactive textiles. It highlights the transformative potential of these materials while carefully considering their ethical and social impacts, within the consideration of energies, and forces exchanges (Barad, 2007). By examining the intersection of technology and textiles, the authors contribute to understanding of how these innovations reshape the fabric of daily life and material culture.

While I draw inspiration from artists like Irene Posch, Edyth Dekyndt, and Jan Hopkins, the textile philosophy frame also extends to other artists with a resilient material practice, such as Rental Cohen, Tuur Van Bale, and Danny Arsham. To address my engagement with Matter, I introduce the concept of Carnal Knowledge (Barrett et al., 2013). The term refers to modes of knowing that go beyond the duality of subject and object, as well as the distance between them. The authors refer to Lucretius and Aristotle's modes of learning, which are in tension with the modes of thinking ruled by vision and distance, characterised by ideas. Different authors explain how embodied knowing relates to the under-skin knowledge of sensing¹³ and interlacing with Matter—materiality is discussed in its agential capacity to guide the artist into making through feeling. Drawing on a previous body of work, Barrett and Bolt (2010) discuss how art practice can offer novel modes of knowing and inform the development of research inquiries. Ethical discourses and affective material agency are concerned with investigating how to engage with audiences (Barrett et al., 2013). The authors frame the embodied sensing of art practices, which I am concerned with, as a means of understanding how theoretical and practical insights intertwine informatively with one another.

¹³ SENSE/SENSING: Considered in its holistic conception of carnal and bodily understanding, drawing from Damasio, as mentioned in Carnal Knowledge (2013).

3.3 Care as caring touch

The idea of Care cultivated the practice and the understanding of intra-action in terms of growing a sensitive and reciprocal relationship between the Matter and me. To build on the concept of Care, I draw on María Puig de la Bellacasa's *Matters of Care* (2017) to recontextualise technological touch as attentive agency, moving beyond mere functionality to embrace a relational understanding of materiality based on durability and reciprocal mutation awareness. De la Bellacasa argues the need to reframe Care by examining its political, ethical, and social dimensions. She emphasises how Care extends beyond human-centred practices, urging us to consider neglected "things" and the material world worthy of attention and responsibility. Building on de la Bellacasa's (2007) framework, I explore how notions of Care inform practices of repair and reuse, particularly concerning touchscreen technology. Through practice (in Chapter 5.d, p.165), I connect touch and vision to address Care in the evolving relationship with technology critically. My approach draws on the ethical concerns of de la Bellacasa (2007) to examine how tactile interaction expands and fills the gaps between digital surfaces and the physical body. Care is enacted through touch in terms of contact (de la Bellacasa, 2017), and it applies to various devices that are deeply entangled in daily lives. Care becomes a ground for healing through understanding the daily materiality of life, building on the intimate relationships formed during the COVID-19 pandemic.

According to de la Bellacasa (2009), "Understanding contact as touch intensifies the sense of co-transformative, in-flesh effects of connection between beings." Transformative Somatic interactions (Hook, 2024) with technology occur through physical technology and materiality experienced in flesh, colours, light, and form. De la Bellacasa's (2017) statement inspired the adaptation of the momentary absence of touch and the distance between person and object to expose the frailty of the material, which is used for only a few years. Touch and interaction foster intimacy with multifunctional tools that facilitate documentation, communication, expression, and coordination. What is at stake when we touch a touchscreen? Obsessive fingers disturb the touchscreen's electrical field, causing CO2 emissions, battery usage, device heating, and resulting in fingerprint desensitisation. Care is crucial in creating a non-hierarchical approach to Matter, adopting a New Materialist perspective in conjunction with textile thinking, which involves attentiveness, patience, and reciprocity. When in contact with Matter, I replace violent and aggressive actions with sensible change and intervention.

"Touch technologies and longings of being in touch match well. The remaking of sensorial experience through the intensification of digital touch feeds on the marketing of proximities in the distance and our investment of longing."

(p.107. de la Bellacasa, 2017)

The tactile sense of sensuality is reflected in the ethical frame of embracing how touch becomes a caring tool, in the liminal space of receiving and giving. The human-inanimate Matter relationship presents an ethical issue of contact, as it involves desire and longing. The development of touch technologies enhances the efficiency and speed of action, in which touch plays a crucial role in the rapidity and immediacy of responses. Still, it does not satisfy the desire for touch as a form of connection (de la Bellacasa, 2017). Maurette (2018) highlights the corporeality, flesh, and sensuality of touch by drawing on the carnal sensing described by the philosopher Lucretius. The question of attentiveness and Care arises when attempting to cultivate sensitivity (Lyon, 2021) towards the outer object in an embodied relationship between mind, body, and technological Matter. Through contact and agential awareness, the mutability of materiality became more evident, and it evolved in the sense of becoming through material exploratory approaches. To follow, I approach Care as attentive thinking and comprehending with softness, texture, and materiality, as the ethical ground of practice requires a sense of planning and thinking, which, through touch, goes beyond thinking to become feeling.

3.2.3 Soft thinking

Soft thinking aligns under the umbrella of Care to align with the sense of agency and intentions influence by soft materiality to elaborate on the exchange of forces within an intentional attentiveness.

“By extension, then we can infer that skin thinking places us within worlds and suggests that we cannot meet those worlds through reason and logic alone.” (Lyon, 2021)

I refer to touch as ‘skin thinking’ (Dowdall, 2018), a deeply embodied capacity to comprehend material otherness (Barad, 2012) through the skin. On the other side materials have their independent existence from the use of language, their layers of meaning, which rely on their history, performance, aesthetic, and physical qualities, and often do not come through wording but material testimonies of agency, as cracks, breakages, wear, tear, oxidation, etc. This world of material language is encountered, according to Lyon (2021), in the world of thinking in skin by the poet Harjo (2001), which the author and artist Lisa Dowdall rewords as skin thinking (2018:152). The term refers to the skin and the under skin underlying works of sensations. Thinking here is referred to as comprehension and feeling, terms of embodiment that dwell beyond rational cogitating. Importantly, Lyon’s workshop, Soft Tissue, programmed in 2021, was a mode to experiment and deeply explore tactile embodiment. I meditate on sensations and feelings and choose materials to focus on caressing, tapping, and digging in. I mention skin thinking (Dowdall, 2018) to iterate the importance of skin as an element to sense and understand the world, not only as a barrier but as a place where sensations are transformed. Skin, in its softness and capacity to comprehend the environment’s textures, temperatures, and roughness, relates to thinking of material softness around us, extending it to become a textile, to create a non-hierarchical New Materialist relationship through art

practices. I direct the dermal nervous comprehension towards a material thinking which bridges the body to understand and feel Matter.

3.3.2 Material thinking

From a material practice perspective, creating with Matter involves layers of engagement, where thinking, making, cultural context and the physicality of the hand converge. Carter (2004) defines this as "material thinking," a collaboration between hand, eye, and mind. It concerns the weaving process of creating art between the warp (cultural myths, lines, and the definition of place and identity) and the weft (local invention, creative work), which unfolds through the process of making. One comes from thinking, making, being, and embracing Matter in its essence and adjusting; accordingly, the other comes from the making of the hand to find conciliation with Matter's physicality. In every weave, there are holes between the yarns, inexplicable moments of glueing. The holes reside in different layers of engagement and intimacy within the relationship, with each party persuading the other to change. For Carter (2004), collaboration is "joining hand, eye and mind in the process of material thinking." It supported my understanding of the relationship between myself and the material, which led me to consider collaborative materials. This Material-centred thinking creates bridges between art practice, Neurophilosophy, and agency. The intangibility of the relationship between the person and the material leaves a vast space for thinking about the presence of the material, aside from perception and physical contact. According to Carter (2004), creative research can question the materiality of thoughts. *Material Thinking* (Carter, 2004) explores the relationship between the artist and matter by allocating space to the Matter in the exhibition space and considering the creation process, which is a collaborative effort between the Matter and the maker. Through material thinking, holes are acknowledged as inexplicable moments of feeling in the making. Carter likens these gaps to a woven fabric, where each thread represents cultural and creative influences, while Bardt (2019) describes the material's "inventiveness" in responding unpredictably to intention. This collaborative exchange between maker and Matter transforms both, embracing the sensory and intangible aspects of material relations as a source of knowledge and creation, which is explored through the embodiment of knowing through making (Mäkelä, 2007).

3.4 Tactile awareness

Following the stance in which Care raises ethical issues in the practice, firstly conveyed and explored through trying to embody and investigate intra-action I aim to analyse how touch and awareness are connected through a literature review focus on history of the sense, and embodiment. This section draws on key perspectives that informed the exploration and application of touch within the research process

through sensorial and philosophical lenses. Starting with the physiological aspects of touch, I delve further into analysing the layered dimensions of skin sensorialities. Touch accompanies the person through the life cycle; it is the first sense developed, even before birth (Field, 2014) and works in a continuum, without breaks, until death. Through life, the tactile sense works in the continuum, and Matter becomes the documentation of tangible actions by being touched, marked, brushed, or perceived.

3.3.1 Defining touch agency

The definition of touch is fragmented across various paragraphs, encompassing agency, encounters, Care, flesh, somatosensory organs, nervous qualities, and awareness. The literature lays the groundwork for explaining touch as a tool for developing my exploration of agency through materiality. Embodiment and art practices are presented to convey a relationship through making, emphasising the connection between knowing and the body through touch. The discourse on textiles is an extension that celebrates the softness inherent in the making process. This context enabled me to explore how touch is intertwined with the things we encounter daily. The broken object is technology, which is related to thinking as a material being and presence, and its performativity in the mundane and the after-functioning life, when the touchscreen becomes a layered system. I examined touch and conductive thread to demonstrate the transmission and conduction of information as technology becomes a reactivated Future Archaeology Matter. To draw together these different threads of knowledge means analysing the mutation of a soft, transmissive, continuously shifting relationship with the body and the touch of the touchscreen. Touch is the tool, the object of research, and the finding in its equanimous operating. The somatic sense is defined as a faculty that enables the simultaneous experience of the external world and perception of the self, as Roazen (2007) emphasises. The author expands on the collaborative potential of touch with other sensory modalities. Contextually, Kearney's work (2021) is particularly relevant in framing the discussion within the context of COVID-19 (p.25), reconnecting with notions of transmission and contagion shaped by the shifts in social behaviours during lockdown. Maurette (2018) explores the philosophical and sensorial aspects of touch, while Classen (2012, 2015) critically examines the sense through historical and cultural transformations. I draw from Maurette (2018) to focus on the action and consequences of touch as an encounter and phenomenon, to find a perceptual and experiential take instead of a phenomenological one as argued by Deleuze and Guattari (2004), Derrida (2000), Irigaray (1993), and Nancy (1993). Touch is a reciprocal and constantly occurring phenomenon in a person's life; the body touches clothes and objects, it touches different portions of itself, while the organs touch each other and move. Later in this section, I place the sense in the current context to explore the practice of being in touch, touching, being touched, and navigating the awareness that evolved from sensing. The intricacy and entanglement of touch with life are laced with the very intimate, private capacity of staying in the world; it permeates life from the day of conception, which escapes static definitions of its agency.

3.3.2 Touchers

To focus on the tactile aspect of the research, I call the participants the touchers, referring specifically to the intentional touch towards material explorations. The toucher's word provides a frame for relating to participants and audiences through the touchscreen materiality.

To distinguish between mundane and constant touch sensing, the study examines the specificity of the sensing and being sensed by the touchscreen. I draw on the work of authors Roazen (2007) and Maurette (2018) to explain tactile perception and self-awareness. To locate the somatic sense in the contemporary world, I orient myself through the cultural history of touch as the "deepest Sense," as stated by Classen (2012), considering the changes in behaviour around touch from the Middle Ages until modern times. The Modern Touch chapter presents the electric creed (2012:185) as the use of touch to perceive electricity as a vital, pervading fluid in everything. In the 19th century, electricity was activated by touch, allowing it to switch on and off. At the same time, the body remained a lousy conductor, making the nervous system a battery without reserve, to the point of administering electrotherapy to recharge in a peaceful world (Classen, 2012). In the domestic domain, the energy tension is referred to as the "electrosphere" by Dunne (2005), which encompasses devices and mundane instrumental presence.

Today, surfaces like glass touchscreens provide a smooth experience compared to the tactile diversity of objects, and digital touch substitutes physical touch with visual and auditory feedback in haptic interactions (Paterson, 2005). Touch and technology evolve in parallel, impacting sensory experience compared to physical touch (Paterson, 2005). Digital Touch is the subject of concern in the book by Jewitt and Price (2024); touch is approached as a social sense holistically when digitally mediated, extending beyond touchscreens and mundane interactions with technology, to consider the complexities of the latest technological innovations in robotics, wearables, virtual reality, and biosensing. Touch, as a "way of feeling" (Hoggan, 2013), is considered a lens for sensing and understanding "how, what, whom, and when we touch" (Jewitt & Price, 2024) in a critical manner, while considering the speculative future of technology and its impact on touch. The authors portray technology as intertwined in daily life, influencing modes of communication, while the material and cultural environment influences and shapes technology (Jewitt, 2008). Touch is defined as a "part of a holistic sensory bodily system that is biological/physiological, social and cultural" (Jewitt & Price, 2024). Through twelve case studies, the authors (Jewitt & Price, 2024) argue the formulation of propositions for touch futures, considering a complex scenario in which touch technologies reshape the mundane future landscape, the consideration of what the experience of touch is, and how it can be addressed in new forms that divert from the sensory body. This new setting requires a new perceptual system to adapt to technology, which may raise ethical issues related to the cultural diversity of touch (Jewitt & Price, 2024). The investigation of touch towards touchscreen and technologies navigates speculative future moments of touch; attention is needed in an embodied manner as a tool of knowledge and understanding the world beyond being a multimodal

tool for communication. I try to relate to how others interact with their touchscreens, going beyond my sensations and body.

3.4 Neurophilosophy: emotional and volitional touch

As touch emerged as critical sense to try to explore intra-action, meanwhile practicing care, I aim to explain how the embodiment of those is linked to neural connections, and then in particular to the distinction between volitional and emotional touch. Firstly, Neurophilosophy is the branch of neuroscience that departs from a structuralist view of the brain to find a middle ground with the philosophy of the mind. I included this discipline to explain the embracing of the person and as a nervous Matter in its relationship to responsive Matters. As a counterpart to New Materialism, it supported my exploration of conduction and transmission as intra-action (Barad, 2007), which I found helpful because Neurophilosophy is the internal constellation to navigate the biology of the nervous flesh in material, metaphorical and embodied manners. I employ Neurophilosophy to link touch physiology, brain, circuit understanding, philosophy, speeds of stimuli and the Matter of synapsis. I use Neurophilosophy to draw together different sub-disciplines, such as Neurobiology¹⁴, Neuroaesthetics and Neurophenomenology to frame the understanding of body as layered material, connected by nervous threads. This section draws from the contents of the training and courses I attended during the PhD: Neurobiology of Everyday Life by Peggy Mason on Coursera¹⁵, and Activist in Neuroaesthetics in Cognitive Capitalism by Saas-Fee Summer Institute of Art¹⁶, and the Human Brains talk by Prada Foundation. I undertook these courses to comprehend and find the gap in knowledge in bodily tactile experiences, to understand the inner processes of touch to be translated into material explorations. Authors like Elena Agudio (2011) draw on a mental journey to include humanistic knowledge with the novel discoveries of science by considering memory and imagination. She draws connections between the work of classical artists and the recent developments of EEG and fMRI to observe the brain's happenings while engaged in distinct cognitive tasks (Agudio, 2011). The content collected from these different outputs formed an understanding of the up-to-date framework that influenced the research and mostly the view on the human side of the investigation. The fields of knowledge I draw from are linked to understanding the person as a material part of the research. Through the work of Edelman (2004), Mason (2016), and Churchland (1989), I explain how neuroscience creatively influenced the research. In this paragraph, I frame nervous touch through motor hierarchies to speculate about the processes of touching touchscreens. I identify through Neurophilosophy that the body inhabits motor hierarchies to enact a kind of awareness that works in an

¹⁴ Neurobiology deals with nervous system biology by underpinning its cellular functioning and tissues, it also includes physiology, pathology, and anatomy.

¹⁵ I completed the course during the COVID-19 lockdown. It included studies of the development of the nervous system, pharmacology, the functioning of the autonomic nervous systems, and peripheral nerves, with the study of how vision, olfactory, taste, auditory, and tactile senses function.

¹⁶ In 2020 I completed this training to consider how to bridge in a critical manner art practices, ethical issues and neuroscience in the COVID-19 historical period.

intra-action (Barad, 2007) between the skin and inner organs, working at incredible speeds (Damasio, 2020). Bodily speeds and complexities that machines have yet to reproduce; technology does many things but does not understand us. Technology cannot comprehend my embodied sensations of working with conductive and technological Matter or even my experience of touching my iPhone daily. The somatosensory sense is an intelligent organ I employ in caring terms to navigate the relationship with technology, which converged into considering my work of touching technology.

3.4.3 Embodied Knowing and the Mind-Matter Relationship

Drawing on Mäkelä's (2007) concept of "Knowing Through Making," I delve into how artefacts¹⁷ and material explorations embody knowledge generation. This occurs through processes such as textile and casting techniques, as well as the inherent properties of materials. This exploration evaluates embodied thinking, perception, and learning through a tactile relationship with material experimentation. Touch is both a research instrument and a tool for discovery in the iterative modes of material practice. In the Practice chapters (p.83), I further analyse how the sense of touch is explored and embodied in the literature. Touch is examined as a dynamic relationship between practice, technological materials, and self-awareness. I consider Bardt's (2019) work on investigating the creative relationship between Matter and mind.

Bardt's (2019) exploration of materiality provides a critical framework for understanding the collaborative relationship between maker and Matter. Bardt emphasises that Matter resists total subjugation to the maker's will, instead behaving unpredictably to shape new creative possibilities. The resistance shapes the distance between the artist's intentions and the material's features, becoming a space to explore as a fluid structure evolving through constant engagement with materiality. Bardt's insights show how materials often act as co-creators, prompting unexpected outcomes. According to Bardt (2019), the material's response is an enticement to novelty, allowing the artist to explore a novel circuit of interaction with the Matter, forming a flowing material dialogue that mutates both. In this process, the essence of the material is revealed through the maker's responsive adjustments. I apply Bardt's (2009) perspective to explore the broken touchscreen materiality, as its inert state is "undressed" through making, revealing unexpected textures. My process becomes an exploration of material agency and a comprehension of mutation, bridging creation's sensory, conceptual, and material realms.

Given touch's embodied nature, it is essential to consider its role in conveying sensations of longing, belonging, transmission, and contagion through tactile surfaces. The skin as a sensing element within the research, exploring how reaching out to others shapes the exploratory sensing of Matter. In examining the

¹⁷ ARTEFACTS: defined as touchscreen materials presenting fingertips samples, before being altered, or simply being present to be observed.

relationship between the maker and the touchscreen, I reflect on the skin as a nervous system interface positioned at the intersection of cognitive behaviours and transformative Matter. Salinas (2023) effectively illustrates how, in art practice, the maker-Matter relationship intertwines. Salinas (2023) cognitive-behavioural approach to decision-making in the artistic process encompasses practical, cognitive, and material considerations, which I draw from in navigating the non-hierarchical fabric of relationships between surfaces and bodies.

I draw from the maker-Matter relationship that unfolds over time and through various processes to gain a deeper understanding of the touchscreen. Intra-action and deterioration emerge as crucial elements that drive material exploratory research. In considering the tactile and labour-intensive nature of the maker and participant's engagement, I draw on Dormor's (2020) concept of "derma," where she describes the Caressing and inter-intra-dermal interaction between the artist and the audience in sensing textiles. Dormor's (2020) definition of epidermis and dermis¹⁸ clearly states the layers forming the border between the internal and external life of the person. The layered borders are porous surfaces allowing communication in a complex system of responses through blood flow, nervous elaboration, ageing, irritating, soothing and transmitting. The layers become a tool for becoming borderless when encountering the world (Barad, 2007). Although when touching the self, the somatosensory system elaborates on self-awareness when exploring the skin as a surface and otherness (Barad, 2012), meanwhile sensations travel through the layers of the dermis, influencing the entirety of the body. Dormor (2020) is concerned with the dermis in the context of textile artwork representation and cloth relating, I wonder how the nuances of borders work in sensing the mundanity of materials and how the dermis can be questioned by materially exploring and communicating it. The body-brain decision-making process is guided by a unique awareness that requires a consistent self-awareness of sensing (Roazen, 2007), which is constant throughout the epidermal sense. From a Neurophilosophy perspective, the issue of understanding consciousness is still ongoing. I employ art Practice-led research and material approaches to explore aspects of tactile experiences of the touchscreen to consider parallel and diverse takes on daily engagement with technology. To simplify the complexities of touch, I focused on broken, non-functioning Matters, which opened the conversation on contact and Care, disclosed in the rest of the sub-chapter.

¹⁸ "Structurally the skin is formed of three layers: firstly the epidermis or surface of the skin, a protective layer which is constantly regenerating itself; below that is the dermis, the thickest layer, and the one responsible for the skin's pliability and mechanical resistance, but also involved in body temperature regulation, containing the sense receptors for most forms of touch, pressure and pain, blood vessels, nerve fibres, sebaceous and sweat glands and hair follicles; and lastly the subcutaneous layer, made up mostly of loose connective tissue and fat, which enables it to act as a protective cushion as well as aid insulation. The dermis, then, is the powerhouse of the skin in terms of touch, containing sense receptors for light touch, deep pressure and vibration, pain, temperature changes and itchiness. The dermis receives and transmits information about these different forms of touch to the brain, offering a site for establishing subtle blends and changes in relation to the world. Where the dermis is the site for reading the world, the epidermis is the site for the world's reading of the body, making it the external communicator. The other touches the epidermis and vice versa, while the dermis receives information about that other." (Dormor, 2020:104)

3.4.2 Plastic nerves

De Oliveira (2020) defines neuroplasticity as the ability of the brain to adapt on diverse levels to stimuli in pharmacological, biochemical, and neural networks. Through new experiences and development, the brain can reassess its modularity throughout life. Touch and interaction with technology require the brain to adapt to digital technology through repetitive gestures. Brain neuroplasticity interlaces with body adaptability, expressed in gestures and a complex input and output system (Churchland, 1989).

Churchland's (1989) approach to Neuroscience was novel in criticising mechanistic and structural representations of brain function, which overlooked the complexities of considering inputs and outputs. According to Churchland (1989), the Mind is interlaced with the human experience of the world for a complete understanding of how the person responds to stimuli through the employment of the nervous system. Brain and Mind merge to analyse the event; as an art practice researcher, I aim to gain exhaustive knowledge to interpret conductive touch and its experience. These different researchers on the mind give me the framework to understand how to undertake the research by considering and evaluating each element properly, and mostly, they are the base to ground the methodology and help build a non-hierarchical frame for the making. As a practitioner and maker, I employ this literature review to introduce the key concepts I translate into materiality. In contrast, the same materiality allows me to conduct and consider the research. In parallel to Churchland's vision on Neurophilosophy, I draw from Gerald Edelman's (1987) theories¹⁹. According to the neuroscientist, experiences influence the reorganisation of brain plasticity, enabling its strengthening or weakening (Edelman, 1987), which I employ in considering the body and the brain together as responsive, evolving materiality.

3.4.3 Exploring somatosensory interaction in the electro sphere

The somatosensory relationship with technology becomes an engaged exploration of person-thing relationships, compared to other mundane objects. Due to the frequency of touching, handling, and thinking with the device, a sense of caring comes with the speculation of someone far in time finding this obsolete object, which profoundly influences the contemporary mundane. In the COVID-19 context, I inquired how touching technology, more persistently, gravitated towards changing tactile sensing to engage more often actively and intentionally with materiality. I aim to consider the effect of the metals and the overheating (White, 2022) functioning technologies and how the skin and human agency imprint the devices—navigating both as surfaces and materials, in the domestic environment.

In *Hertzian Tales*, Dunne (2005) introduces the idea of the “electrosphere”, a domestic space inhabited by functioning mundane objects that create an energetic network. Dunne's (2005) concept of the

¹⁹ Edelman's (1987) Theory of Neuronal Group Selection (part of his theory of Neural Darwinism) works on the neural development and natural selection of pathways. In simplistic terms, he states in an interview how in the immensity of brain intrinsic abilities, pathways are never repeated in the same modularity (in between the brain's sections).

‘electrosphere’ highlights the pervasive but invisible presence of electromagnetic fields and signals in our everyday environment. By bringing attention to this hidden aspect of our technological landscape through critical design, Dunne encourages a deeper understanding and critical reflection on how electronic products shape our experiences. This approach broadens our aesthetic appreciation²⁰ and prompts us to consider the broader implications of living in an electronically saturated world.

3.5 Touch, Technology and the Broken Thing

In this section, I highlight the impact of technology on tactile sensations by discussing an interaction-focused literature and criticising the gaps in evaluating wasted technology. The liaison between a person's touch and the computer's Matter lies in the daily, repetitive, functional, and emotional engagement (White, 2022), a mix of feelings and sensations that I elaborate on by dissecting and conserving for future reference. While considering the research's intra-active qualities, the touchscreen and the conductive artworks live in the utility sphere of interaction. Interaction is the dissipating sphere in which the technological object lived before it became non-functional. The non-functioning allows one to see the broken thing (Heidegger, 1964) in its elemental metal components. The research draws from Touchscreen Theory by Michele White (2022), in which the author, considers the object, how it coexists with us, and how the sensing body interacts with it. The smartphone, in its functioning capacities, is an attention-sucking device (Fisher, 2011) designed to hold attention with multitasking possibilities at our fingertips (White, 2022). The research became an exercise in understanding the independent behaviours of Matter.

3.5.1 Ontophany

This section draws from the work of Kimball and Grossman (2021) on our relationship with screens during the COVID-19 pandemic. The paper serves as an essential testimony to creative collaboration during the COVID-19 pandemic; the longing for shared spaces and physical touch led to a search for the edges of screens and an exploration of technology's impact on intimate spheres. Working beyond the precise edge of the computer screen to explore the dimensionality of indoor, domestic isolation was the

²⁰ To create in this new technological setting, "Designing with the Body: Somaesthetic Interaction Design" by Kristina Höök (2022) presents a comprehensive interaction design approach focusing on the body and bodily experience. Höök (2022) explores how designers can create more engaging, meaningful, and embodied user experiences, considering a holistic view of human interaction with technology. Although my research prominently deals with materiality and non-functioning devices, I believe it is important to acknowledge the work on Somaesthetic Interaction Design, to highlight in the mundane and intimate context issue concerning human-computer interaction.

focus of Kimball and Grossman's (2021) paper. The collaboration through technology was critical to developing thoughts at the edge of materiality. Behind it, their discourse on embodying art and feeling technology helped me resolve the dimensionality of exploring the touchscreen. While their discourse evolved through collaborative work between humans, I elaborated using the touchscreen. From the paper (Grossman & Kimball, 2021), I cite two passages drawn from Esrock (2001) and Sobchack (2004) regarding my sensorial practice, the creation of circuits, and the filling of spaces between the Matter of art, technology, and the nervous body.

"Art enters each of us through the body. Related research on aesthetic perception has shown that encounters with visual art involve bodily, somatosensory processes that bring viewers into intimate relationships with the art objects they behold, physically impacting what is 'constitutive of our sense of self."

(Esrock, 2001: 234)

Esrock's statement was compelling during the COVID-19 pandemic; Grossman and Kimball concluded their reflections on the perceptual experience of art through the screen, questioning how this relates to somatosensory and neural processing. Importantly, intimacy was a current state of being in the domestic environment and the skin, creating an intrinsic sensorial work to fill the emptiness behind and around the laptop screen.

"Technology is never merely used, never simply instrumental. It is always incorporated and lived by human beings who create and engage it within a structure of meanings and metaphors in which subject-object relations are not only cooperative and co-constitutive but dynamic and reversible."

(Sobchack 2004: 91)

The placing and context of the two quotations of Sobchack (2004) and Esrock (2001) in Kimball and Grossman's (2021) paper are an exciting way to reconnect to the idea of contact, longing, and liminal spaces; they add layers of sentiments and a desire for touch, which I mentioned in the introduction about the COVID-19 context. I draw on this connection to consider how material art practice manifests itself in time by composing the agency of the hand with the material, thereby expressing the mind's intentions (Bardt, 2019). The dynamism of technology as a medium (McLuhan, 2001) works by considering the screen-tool as a combination of metal and polymers, contrasting with the flesh. During a presentation titled No Time for the Virtual Future (University of Warwick), he describes the perennial need to perform for technology to keep the efficient, good machine work that gives a sense of satisfaction. Taken as an entangled vortex of relationship with technology, words and experiences lose meaning; the present critical view of a dystopian future addressed by Fisher (2011) creates a sense of consumption and content creation through technology as communicative digital malaise, happening in the constant interaction with

electro libidinal parasites (Fisher, 2011, 17:04) (iPods). Fisher is concerned with what happens to us, as an experiment in which the speed of technological communication overtakes daily activities, asking how to question technological products without being reactionary.

Most importantly, he highlights the issue of technology not being enough to deliver culture and meaning and being a product that is constantly available to be grabbed and used to interact with the world in a system of dissipating *jouissance*— a positive opposite pole to desire, (Fisher, 2011) an aftermath of pleasure, a sensation beyond (Braunstein, 2003). The "electro-yearning", "attention-sucking" (Fisher, 2011) handled smartphone object becomes this critical eye and a thing to study in terms of excavating the relationship with it, especially in a material physiological manner. In its past life as a responsive, needy object, knowing the touchscreen unravels the limitations and frustration that technology-improved productivity can bring. Nevertheless, it does not fit into human life. As COVID-19 has passed, the engagement with the touchscreens has become more intertwined and connected. The infiltration into the unknown tool of communication is a mode to explore its performativity and functionality. Fisher's (2011) point of view is necessary to balance out the view on technology that can expose uncomfortable layers of mundane reality, which I explore after its usage.

3.5.2 The broken thing and the extended body

For my material explorations, I employed Heidegger's concept of the broken thing (1962), where I consider touchscreen material compounds as fragmented assemblages of metal and polymers. The object's breakdown reveals its material essence and offers new opportunities for engagement. To frame the act of attending to broken and overlooked materials, I adopt de la Bellacasa's (2017) key terms: "attachment," "response-ability," and "more-than-human relations". These terms emphasise an ethical and relational approach to dealing with wasted Matter intra-act, highlighting potential agency for transformation within caring material practices. According to Heidegger (1962), broken things let one perceive their essence once they lose their expected functionality. From this notion the fractured state of a touchscreen becomes a departure to investigate material qualities. By examining screens' polyurethane, glass and film components as neglected materials, I engage with their tactile and visual qualities. The broken touchscreen is located as a site for rethinking technological materiality and its potential for reinterpretation. The once interactive object, symbolising an active part of mundanity (McLuhan, 2001), shifts into being recognised in intra-action (Barad, 2007) in technological manners concerning its materiality and flesh. In its novelty, wasted technology symbolises the absence of activity, a non-functioning object I aimed to challenge through the following practice. Using touchscreens and iPhones as materials provided a framework for considering technology as an active participant in relational processes. As McLuhan (2001) suggests, technology resides within the tools through which we come to know both ourselves and the world. His work offers means to further interrogate technology both as a

medium and as a material thing. Building on McLuhan's concept of remediation, Neidich (2006)²¹ argues that the content of one medium is always another medium. He proposes that when a tool or medium—such as a hammer—acts as an extension of the body, it enables the body and its senses to function as a medium themselves, thus shaping cognitive and perceptual experiences.

This notion of medium applies to the research in considering that I am surrounded and exposed daily by technological tools, objects of the study and tools to work, which infiltrate and direct (as I use my smartphone and computer to undertake the PhD) the study through their tactile presence. The broken thing is placed in the context of Digital Humanism²² when I undertook my Fellowship at IWM to investigate digital materiality about its manifesto stating (Lee et al, 2021) how technology needs to be framed around human life and ethical practices concerning labour and privacy. Nonetheless, I criticised the manifesto for overlooking the material issues surrounding production, waste, and mundane interactions.

3.6 Conclusion

To frame this research, I brought together key concepts that illuminate the gaps encountered through practice. Central to this enquiry is the notion of intra-action (Barad, 2007), which frames the exchange of energies not as linear or directional, but as relational and emergent. Intra-action is enacted and embodied through ethical engagements with matter, particularly when working with broken or discarded technologies. This perspective reconfigures the human–technology relationship, foregrounding mutual responsiveness and material agency. Within this framework, the concept of care (Puig de la Bellacasa, 2017) emerges as a mode of attentiveness to both material and relational conditions. Care is not only ethical but also methodological, guiding how I approach materials, technologies, and processes of making. It attends to the fragility of broken matter, the slowness of touch, and the responsibilities embedded in tactile engagement. As such, care becomes central to both practice and theory. The study of awareness further contributes to an understanding of touch as a tool for sensing, perceiving, and knowing. Drawing on Neurophilosophy insights, the body is conceptualised as nervous flesh — a composite of neurological processes, affective states, and somatic perception. Awareness in this context is not abstract but material, arising through contact and mediated through practice. The distinction between emotional and volitional

²¹ According to the idea of remediation from communication theorist McLuhan's, in which the content of any medium is always another medium (McLuhan, 1964). Therefore, the importance of a medium (seen as a bodily extension) is not just a Matter of a limb or anatomical system being physically extended (as in the hammer-as-tool sense). It is a Matter of altering the ratio between the range of human senses (sight, hearing, touch, smell), which has implications for our mental functions (having ideas, perceptions, emotions, experiences, etc.)(Neidich, 2006)

²² DIGITAL HUMANISM: An interdisciplinary approach examining the relationship between humanity and digital technology, emphasizing the balance between technological advancement and human values. It critically reflects on how digital interactions, like those with touchscreens, shape sensory engagement and ethical implications.

touch enables a more nuanced exploration of how touch operates, both as an involuntary response and an intentional act. This differentiation proves especially relevant in art practice, where touch becomes a form of agency. It frames the body not only as a site of sensation, but also as a thinking, doing entity engaged with the world through haptic means.

This literature review has connected these four concepts to critically engage with how touch mediates the relationship between body, material, and technology. In doing so, it has drawn upon multiple disciplinary perspectives — from new materialist philosophy to textile thinking — to reframe technology as a material and domestic presence. Technology is presented not solely as a tool, but as a broken and responsive object, encountered in everyday life and reimagined through artistic exploration. Finally, I situate this theoretical synthesis within the broader context of practice-led research and art practice, incorporating ideas such as ontophany, textile philosophy, and material thinking. These have allowed me to fragment and reconfigure the experience of touch into elements that include the body, the broken touchscreen, and contact as a form of knowledge-making. This layered review has helped construct a conceptual narrative that not only grounds the research but also sets up the analytical framework developed in the methodology and practice chapters. The entanglement of these concepts and their articulation through practice form a critical foundation for the project's original contribution to knowledge.

Chapter 4: Methodology: Material Explorative approaches in practice-led research

4.1 Introduction

In this chapter, I outline the methodology and demonstrate how it supports the aims and objectives of my practice-led research into the tactile relationship between skin and touchscreens.

This study takes a practice-led approach to explore the tactile relationship between skin and touchscreens.

In this chapter, I introduce the research questions, aims and objectives and justify my methodological decisions and explain how they support the study. I explain how the New Materialist theoretical frame influences the practice-led research, and the methods employed (material methods, art-based methods, textile, sensory methods, embodiment, and reflexivity). My methodology explores touch as a phenomenon of intra-action (Barad, 2007) with responsive Matter through art practice. The following paragraphs are crucial to set the canvas into which I embroider my encounters with responsive materiality, to explain ethical and caring manners by looking at touch, making, and becoming in a co-transformative journey with Matter. I build on scholars such as Braidotti (2002), Haraway (2003, 2007), Barad (2007, 2012), Bennett (2011), and de la Bellacasa (2017), referring to the New Materialist Almanac (COST Action IS1307, 2018) as a key point for bringing together scholars. Through material

interventions, I investigate the relationship between material, touchers, and my own behaviours, documenting and organizing the tactile traces left on broken touchscreens. I explain the methods and their entanglement to one another.

Following the methods, I explain how I designed Modes of tactile engagement to structure my material explorations. I then outline the process of material practice analysis through material critical interpretive analysis, employing material engagement theory to guide the analysis. The chapter concludes by presenting the emergence of material qualities as key findings. The research practice is rooted in textile and soft thinking, which interweaves with embodied research on touch—both my own sense of touch and that of participants—culminating in a material practice that merges tactile and sensory exploration with theoretical insights.

4.2 Research questions

During the COVID-19 pandemic, I employed a practice-led approach, I examined the material behaviour of touchscreens and conductive threads to investigate the entanglement of physicality and meaning, drawing on concepts from New Materialism, somaesthetic interaction with technology textiles, and neuroscience. The study addresses tactile encounters through practice-led research, emphasising experiential, subjective, and contextual knowledge (Barrett and, Bolt, 2013). Empirical data was gathered through sensory engagement—by hand, skin, observation, and material practice to investigate tactile phenomena. This iterative process embraces the complexity of tactile interactions, highlighting embodied sensing, material responses, and ethical considerations. In this chapter I address the research questions (p.21), and the Aims and Objectives (p.22). I present the methodology, and methods are critically employed to address the research questions from multiple perspectives. This means organising the research in engagement terms by considering material behaviours, participants' responses, and my embodied and sensorial elaborations. In the analysis section (p.76) and the practice chapters (p.84) I present the organised documentation and narrate the stages of reflection entangled with material practice.

The research questions that guide this study:

- RQ1: How can material explorative approaches identify qualities of intra-action when encountering responsive materiality?
- RQ2: What novel approaches to material exploration can be harnessed better to comprehend the intricate relationship between technology, physicality, and touch in the context of the post-COVID-19 pandemic?
- RQ3: How does existing literature on material exploration inform the process of engaging with touchscreen leftovers and conductive thread in a Practice-led methodology?

- RQ4: How can material explorative approaches and art practice investigate the tactile reciprocal impact between the touchscreen and the skin?
- RQ5: How does a touchscreen's wasted Matter serve as a sensory and phenomenological archive of touch, retaining traces of tactile interactions?

Aims and Objectives:

1. Investigate how wasted technological materials document tactile traces through art Practice-led research:
 - a. Employ Practice-led methods to manipulate touchscreen materiality, unveiling its composition, functions, and tactile qualities.
 - b. Identify tactile attributes of materials to formulate an embodied, sensory approach to engage with technological Matter materially.
 - c. Develop and document an iterative approach to artistic practice focusing on creating and disseminating provocative material exploration for participants and audience.
 - d. Analyse the visual, material, and written documentation resulting from the artistic practice and its subsequent dissemination by considering the influence of the COVID-19 pandemic on remote/hybrid engagement.
2. Construct a framework integrating the literature and material explorative approach to explore touchscreen and conductive thread materiality.
 - d. Identify critical elements from neuroscience, New Materialism, Somaesthetic interaction, and textiles that shape the processes and meanings of material practices.
 - e. Cultivate a material explorative approach under the New Materialist theoretical frame, including material methods, Art Based Methods, and textiles.
 - f. Document systematically the interconnected and informative systems that bridge the practical aspects of the research with theoretical insights.

4.3 Practice-led methodology

I employ a practice-led methodology as this material-centred research allowed the exploration of novel grounds of tactile tensions and the creation of knowledge in exploring patterns of making, in parallel with threads of thoughts and polls of emotions. As framed by Candy (2020) this type of research path unfolds in encountering through art practice what it means to be human in “conscious reflective process” (Candy, 2020). The influence of New Materialist literature is closely intertwined with the practice’, as the setting of the premises of making. My explorative material practice allowed me to consider how Matter is actively part of knowledge creation in a carnal manner (Barret and, Bolt, 2013), in connection with the

embodiment and neural motor hierarchies, building up the awareness of agency and movements. As described by Barrett and Bolt (2010), practice-led research emphasises experiential and subjective engagement, with knowledge emerging through the making. This empirical approach centres on sensory and embodied experiences, with creative decisions shaped by the researcher's role in the process. I built from a practice-led methodology by handling and experimenting, I developed a situated understanding of materials shaped by their social and cultural contexts (Barrett and Bolt, 2010). This research employs various methods to address the research questions and investigate touch through iterative material explorations. The methods are described concerning the material (Art practice and Textile methods), embodiment (Neurological perspective), reflexivity, and sensory approaches. Material explorations were analysed through Interpretive Material Critical Analysis within a New Materialist framework, addressing the notion of wasted responsive materiality and documenting human touch through material intervention. According to Barrett and Bolt (2010), practice-led methodology links theory and practice as knowledge-generating processes (Dormor, 2020). These explorations integrate making, reflecting, and theorising, combining theoretical insights with practical outcomes (discussed further in the practice chapters 5a. Conductive, 5b. Broken, 5c. Soft/Wet and 5d. Caring/Cared). Embodiment and neuroscience contribute to reflections on carnal knowledge (Barrett and Bolt, 2013) experienced through the nervous system. Situated in the context of the COVID-19 pandemic, the research incorporates diverse dissemination modes, including exhibitions, workshops, installations, and experimental events. I borrowed from multiple methods and practices; this approach examines how making, disseminating, altering, and breaking materials can reveal new ways of questioning mundane relationships with technology. A key aim is to shift from a utilitarian view of smartphones to a material perspective, using defunct devices as a disruptive tool through sensory, reflexive, and ritualistic modes of interaction. The practice-led methodology (Candy, 2020) underpins a material-focused exploration within a New Materialist framework. The sensory and embodied practice decisions reflect my agency in the creative process (Barrett and Bolt, 2010). Drawing on Bourdieu's (1990) reflexivity and Carter's (2014) material thinking, the study explores how material practices can reimagine social relations, challenging boundaries between human aliveness and material deadness. Barrett and Bolt (2010) incorporate Heidegger's concept of "handleability," highlighting the role of hand sensing in material knowledge production. This idea connects to Ingold's (2013) notion of thinking through making, where materiality actively participates in knowledge creation. Applying New Materialist perspectives, the research acknowledges the vibrancy and aliveness of Matter (Bennett, 2010), reflecting on perceptual and material transformations. To conclude the employment of practice-led methodology, the New Materialist theoretical frame is challenged and practised in its "throughness,"²³ which means meeting, entangling, and tactilely encountering using material methods, textiles, reflexivity, and embodiment. The "throughness" of the chosen methodology permits the navigation of tensions and troubles by studying the relation through my

²³ "Throughness" is a term I invented while writing the thesis to highlight the being with and through the chances of the intra-acted materiality (Barad, 2007).

nervous and epidermal materiality and the making/unmaking agency. Delving into comprehension and understanding of materiality through making, I draw from Mäkelä's work (2007, 2020) to explore the diversity of moments, when making, and when creating distance to the material, especially in the overlapping of my role as maker, researcher, and artist. I clarify and unfold these embodied complexities through the methods descriptions and the Practice Chapters (p.84).

4.4 Entangled methods

Entangled methods are non-hierarchical organisational methods that represent an intra-active (Barad, 2007) encounter with Matter comprehension through an iterative process of observation, making, reflection, and dissemination. The New Materialist methodological contextual frame is based on the tangible relating to Matter, lacing a sense of responsibility toward objects that might soon have forensic and evocative power (such as the touchscreen). To embody the mutations of myself and the materials (touchscreen and conductive thread), I envision both as surfaces exchanging agency, responses, and behaviours (Carter, 2014). The intertwining of methods and reciprocal influence is informed by Textile Philosophy (Dormor, 2020) to evaluate techniques and modes of making. This supported my acknowledging and surpassing the maker-to-Matter agency (Bard, 2019) to address encounters and sensing. The New Materialist contextual frame connects all the methods in a non-hierarchical mode, creating a functioning system of interconnections to address the research questions. The New Materialist concepts, such as Entanglement and Intra-action (Barad, 2007), influenced the employed modes of the methods. With Matter, I refer to the conductive thread, touchscreens, and, when describing the practice, the other materials employed, such as cotton, thread, clothes, textile, metallic threads, alginates, silicones, resins, paints, and gilding materials. In practice, the entangled methods merge and follow each other in a diverse order.

“New Materialism de-privileges human agency, focusing instead upon how assemblages of the animate and inanimate together produce the world, with fundamental implications for social inquiry methodology and methods. Key to our exploration is the materialist notion of a ‘research-assemblage’ comprising researchers, data, methods, and contexts.”
(Fox & Alldred, 2014)

I employ Fox and Alldred's (2014) take on methods to meet with the inanimate through intra-action (Barad, 2007). The ‘research assemblage’ (Fox and Alldred, 2014) works in the visceral, carnal, and sensorial tie with the inanimate other. The methodology's theoretical framework incorporates different methods that tackle the research question elements: Intra-action, Touch, the Person and Material, and the Modes of tactile engagement (p.63). I interlaced these methods with practice-led methods, such as

studio²⁴ practices, altering, modifying, and layering disregarded technological Matter to shape an intimate, intrinsic sense of collaboration with and through Matter.

My methodological inquiry establishes a material, exploratory approach to understanding physical encounters between the somatic sense and responsive Matter (see Glossary, p. 188) beyond usage and performance. Through practice-led research, I draw on Haraway's (2007) notion of accountability in mundane encounters with performative and responsive materials explored in studios, workshops, and galleries. As both researcher and artist, I reflect on my agency in touching and being touched by disregarded and crafted materialities, collaborating with objects through Care (de la Bellacasa, 2017) and interventions that provoke reflection on repetitive interactions with technological surfaces, shifting between daily use and waste. Care was a means to enact my agency, which evolved with the progress of the research. However, tactile technologies and other objects have a history of development, fascination, and production to consider. From a Posthuman perspective, Care is an agent for the conservation of Matter (de la Bellacasa, 2017) or, at the very least, the understanding of its material waste when it stops expressing itself in the digital realm of our agency. I employed broken touchscreen materials to consider their composition, past use, and new relations through the introduction of conductive thread, fostering a caring and explorative touch.

Grounded in a New Materialist theoretical framework, the research acknowledges how contemporary technologies mediate interspecies (Haraway, 2007) and ecological tactile relations (de la Bellacasa, 2017). Material and textile methods are the key method for deconstructing objects and meanings, dismantling the materiality of touchscreens and my preconceptions. Reflexivity, material methods, Neurophilosophy, carnal knowledge, and textile practices (Igoe, 2020) are central to this inquiry, enabling new modes of relating through tactile means in contexts where functional interactions, such as touchscreens, dominate touch. Considering Barad's (2007) concepts of intra-action and phenomena²⁵ the research reflects on the ethical implications that arose during the COVID-19 pandemic, particularly the fear of viral transmission. Touch is both the research tool and subject, prompting critical inquiry into what is touched at every stage of the process. Neurobiology and Neurophilosophy²⁶ inform my understanding of the nervous body in this context. As a researcher, I became both participant and material through artistic and sensory experiments, treating myself and participants as composites that support artwork creation and tactile engagement.

²⁴ Within studio space, I mean a room where I could settle for a month, have time to build mood boards and inspiration walls, lay out past work and new materials to use, read, write, and run simple testing of Matter.

²⁵ "A phenomenon is a specific intra-action of an 'object'; and the 'measuring agencies'; the object and the measuring agencies emerge from, rather than precede, the intra-action that produces them." (Barad, 2007, p. 128)

²⁶ NEUROPHILOSOPHY: Explores neuroscience and philosophy intersections, focusing on how brain functions influence cognitive processes, consciousness, and sensory experiences. It provides a framework for understanding tactile interactions with technology, such as touchscreens, by linking sensory experience with material engagement.

4.5 Methods

In the following sections, I first introduce various methods. Next, I explore the intersection of these methods with the research iterative system, taking into consideration ethical procedures and the role of participants as touchers. Next, I explain the practical undertaking of the research through Modes of tactile engagement, categorising the relationships between Matter, participants, researchers, and makers for different projects. I consider the Matter-researcher/artist relationship by exploring the tangible, intimate, and behavioural changes that occur due to prolonged making, crafting, and intentional engagement times (Bardt, 2019). To define touchscreen and conductive thread qualities, I employed art practice, textile and sensory methods under the practice-led methodology (Barrett & Bolt, 2010). This research follows Barrett and Bolt's (2010) definition of practice-led research as the generation of new knowledge through practice, where artefacts and processes of making are not secondary outputs but act as both method and outcome. In this sense, the artefacts produced—whether installations, stitched interventions, or broken touchscreen experiments—are understood as epistemic contributions in themselves (Biggs, 2002; Mäkelä, 2007; Borgdorff, 2012; Nimkulrat, 2009), embodying insights that emerge only through material engagement. I describe in practical terms the undertaking of research in the Modes of Tactile Engagement, and I discuss the insights that emerged from their application in the Practice Chapters (p. 84).

4.5.1 Art Practice

Art practice underpins this practice-led research as the primary method through which knowledge is generated. Following Barrett and Bolt (2010, 2013), Candy (2020), and Sullivan (2010), art practice is not only the site of production but also a mode of inquiry, where making and reflecting are inseparable processes of knowledge creation. This position resonates with Biggs (2002) and Mäkelä (2007), who emphasise that artefacts are not supplementary to research but are central to it, “giving a voice to the artefact” as a way of embodying answers to research questions. Borgdorff (2012) and Carter (2004) similarly argue that the artefact itself carries epistemic weight, enacting “material thinking” that reveals insights unavailable through text alone. For Nimkulrat (2009), artefacts embody tacit knowledge and materialised thought, underscoring the epistemological role of making in artistic research. Within this framework, I refer to material methods (Woodward, 2020) as a sub-method, providing a useful language to articulate the multi-sensory, embodied, and material dimensions of practice. While originally situated in the social sciences, I adapt material methods here to describe how textile-based and tactile experiments engage with responsive technological matter, particularly broken touchscreens and conductive threads.

Woodward (2020) also identifies art-based methods (ABM) as part of the broader field of material methods—approaches that “centre material and objects as part of a creative, embodied multi-sensory process” (p. 67). In this study, I acknowledge ABM as embedded within material methods and useful

tools to frame through my practice. Material methods and ABM allow for naming and individuating methods to communicate and present the art practice in a structured manner.

Practical applications of these methods included residencies such as *@tr.ansienttt* and *@Oorbit*, and projects like the *Gesture Collection* (2021). Across these contexts, material methods supported iterative experimentation and reflection through textile processes such as stitching, breaking, layering, and unmaking. Whether undertaken in domestic spaces during lockdown or in gallery settings such as S1, these experiments allowed me to observe material behaviours, record tactile traces, and explore encounters between skin and surface. By combining reflective writing, visual documentation, and material probes, I created a critical base for analysing touch as an intra-active phenomenon (Barad, 2007). Ultimately, this practice-led methodology positions art practice as the overarching method, with material methods functioning as supportive tools alongside textile thinking and embodied inquiry. Within a New Materialist frame (Barad, 2007; Bennett, 2010; de la Bellacasa, 2017), this integration clarifies how iterative making, observing, and recontextualising touchscreen residues became a way to produce new knowledge about the entangled qualities of technology, matter, and touch.

Material methods underpin this practice-led research by addressing the tactile relationship with responsive materials. As Woodward (2020) explains, material methods are “ways of carrying out research within the areas of material culture and materiality as well as the expansion of creative methods as they move into the multi-sensory embodied, visual and material” (p. 2). While traditionally situated in the social sciences, I apply them here as a maker and touchscreen user, focusing on tactile intra-action (Barad, 2007) through material experimentation and art practice. Within this framework, art-based methods (ABM) are mentioned not as a separate or overarching category but as a subset of material methods. Woodward (2020) identifies ABM as approaches that “centre material and objects as part of a creative, embodied multi-sensory process” (p. 67), embracing unpredictability and generating insights through creative practice. I adopted these methods during residencies such as *@tr.ansienttt* and *@Oorbit*, as well as in projects like the *Gesture Collection* (2021). In these contexts, ABM informed iterative experimentation and reflection, while remaining embedded in the larger structure of material methods and practice-led inquiry.

Practical applications of this method included the use of diverse media techniques, particularly around touchscreens and conductive threads. These experiments—whether in domestic spaces during lockdowns or later in galleries such as S1—were informed by textile thinking and embodied approaches. This layered engagement with materials allowed me to observe behaviours, record tactile traces, and explore encounters between skin and surface. By combining reflective writing, visual documentation, and material probes, I generated a critical base for analysing touch as an intra-active phenomenon. This practice-led methodology positions material methods (with ABM as a component) alongside textile thinking and embodiment, all within a New Materialist frame. This integration clarifies how the research mobilises

practice to produce new knowledge: through iterative making, observing, and recontextualising touchscreens and their material residues, I explored the entangled qualities of technology, matter, and touch.

4.5.3 Textile

Textile thinking (Igoe, 2021) adds depth to the research by revealing unexpected material qualities and responding to failures and discoveries (Pallasmaa, 2009; Malafouris and Koukouti, 2022). Textile methods—fraying, unmaking, folding, seaming, and layering—expand on the tactile perception of soft touchscreen technology. Textile methods highlighted the learning from failures and mistakes when techniques such as embroidery were precisely enacted but resulted in unexpected outcomes ((Heinzel et al., 2019)). Iterative techniques and openness to outcomes connect textile methods with ABM, bridging crafting and process findings. Drawing on my textile background, I applied these methods to dissect and alter materials, including touchscreens, informed by juxtaposing patterns, colours, and consistencies. Inspired by Edith Dekyndt’s work (2020), I explored states of Matter—solid, liquid, and gas—in materials like resin²⁷, silicone, and textiles. Textile methods positioned material interventions within gallery spaces, enhancing their narrative beyond the studio.

4.5.4 Sensory Methods

My research examines touch through interaction and sensory engagement, rather than focusing on personal experience. Interaction refers to the time spent touching screens and the absence of touch when devices become waste (Fisher, 2004). In 2023, people spent an average of six hours daily on screens, with three hours on smartphones. My weekly average (March 2024) was 2 hours and 42 minutes daily, with 61 pickups. The thesis explores interaction and intra-action collaboratively, focusing on the afterlife of touchscreens and their use. The COVID-19 pandemic created a shared context for tactile investigation, raising questions about the materiality of technology in mediating communication and social interaction and drawing on sensory auto-ethnographic methods as “sensory experiences” and “sensory experiences” (Pink, 2015). I use writing, drawing, textile-making, and material experiments to reflect on relationships with touchscreens and conductive threads. Embodiment and sensation are central to these methods. Creating and altering artwork relies on intuitive responses to the material, supported by knowledge and experience, to explore touch and its materiality.

²⁷ RESINS: Polymer-based substances used in various technologies, including touchscreens, for durability, optical clarity, and moisture protection. They influence tactile experience, contributing to touch-sensitive surfaces’ feel and performance.

4.5.5 Embodiment and Neuroscience

Woodward (2020) describes embodiment in material methods as a multi-sensory cognitive way of knowing materiality. Expanding on this, I conceptualise the body as innervated flesh and sensory organs. Drawing on Damasio (2014) and Mason (2016), I investigate how skin and brain perceive and respond in creative practice, integrating New Materialism and practice-led methodologies. Following Barrett's *Carnal Knowledge* (2013), I highlight how perceptual and sensory elaboration of inputs precedes language. Embodied neuroscience, positioned as a bodily material method, supports the study of responsive surfaces through sensory and motor hierarchies. In exploring tactile stimuli, I documented my embodied experience primarily through reflective writing, translating between the nervous system and textiles to examine material sense. Neurobiology classes informed my understanding of the CNS and PNS as analogous to fibres and textiles, emphasising their connective qualities across muscle, skin, and organ layers. Using my body's proportions, I employed embodied methods to interrogate touchscreen responsiveness (e.g., *Inert Matter*, 2022), addressing its altered and archaeological qualities. The embodied awareness connects the nervous system to tactile interactions within gallery and workshop settings. I distinguish between mundane and intentional touchscreen interactions as Volitional and Emotional touch (see Practice chapter, p.84). The former relates to everyday smartphone use, while the latter explores deliberate engagement with wasted material. Neuroscience informs this study by examining decision-making processes in movement and touch, where the touched object elicits further motion and responses. Inspired by Pierre Huyghe's *Umwelt* (2018) (see p.99), I explore how motor-sensory systems engage with objects and express electrical potential. Huyghe's integration of neuroscience into perceptual and embodied experiences aligns with my inquiry into speculative material realities. I developed an embodied nervous method to examine the interplay between the brain, body, and technology, focusing on responsiveness and decision-making. The reciprocal dynamics between touchscreens, conductive Matter, and skin positions embodiment as a bridge between the body and touchscreen materiality.

4.5.6 Reflexivity

Reflexivity as a method, through writing, drawing, and making, became the personal filter to understand the sensorialities of touch and the relationship between the participants and the Matter. "Reflexivity is a process through which we as researchers examine our backgrounds, values and perspectives shaping our ways of seeing, designing, and participating in research" (Finlay, 2002). Reflexivity is a tool employed with the purpose of infiltrating and self-scrutinising self-awareness in knowledge comprehension, research building and living (Skukauskaite, 2021). In practice, I employed reflexivity in my daily making, shaping a distance between my role as an artist, maker, and researcher. The literature review informs the content of the writing in conjunction with my own tactile sensing and simultaneously informs the change of the inquiry. I employed reflexivity in the daily research material explorations and for the analysis (p.76) to

bring together the tactile perceptions and the use of writing to acknowledge my biases and material expectations. While sensory methods function for making, reflexivity works in the building of awareness regarding the researcher's background and history (Skukauskaite, 2022). Drawing from Woodward (2020), material methods reflexivity is defined as a critical awareness of the researcher's role in relation to the material studied and the participants while acknowledging my own personal perspective (Barrett, Bolt, 2007).

4.6.2 Ethics and Touch

To work on tactile encounters meant considering how to involve participants in an ethical manner. In the initial stage of the PhD, I considered working on tactile engagement in a gallery space, but then I had to focus on domestic environments. My ethical considerations were informed by Sheffield Hallam Ethics and Integrity guidance to design work with participants that would be safe, include clear information about the research, consider health and safety, and ensure the right of the participant to withdraw from the research. The ethical consideration of involving participants happened during the COVID-19 pandemic, and it included both the research in person and the use of social media to gain poll responses. I followed the ethical university guidance (Sheffield Hallam University, 2025), which advises researchers on how to inform the participants through an Information Sheet and then gain consent through the standard Consent Form, which informs the participants of their right to withdraw from the research. The ethics application was approved in 2020 with number ER22275666.

4.6.3 Participants and Consent form

The participants were recruited to engage with the touchscreen through exhibitions, material explorations delivered by post, or social media. The diversity of engagement required different measures of recruitment, ethical approval and modes of engagement, also influenced by the COVID-19 pandemic. Table 4 list the number of participants for the project, and the request for consent form. I named the participants "touchers" to find a specific perspective for exploring the marking and moving on the touchscreen. As this research intersects with my art practice, I also considered my engagement, and my skin as that of a participant when reflecting over material behaviours, and my responses. Digital participation was initiated through social media platforms such as Instagram. Following the Association of Internet Researchers Ethical Guidelines (Brake et al., 2019), I informed my Instagram audience about using polls and their involvement in my research. This was done through recurrent Instagram stories and posts, ensuring transparency about their participation by responding to the polls. The digital approach allowed me to explore participants' touch remotely, addressing safety concerns during the COVID-19 pandemic. I planned a Gesture Postal Exhibition in 2020 to address the restrictions on physical

interaction. This approach enabled participants to explore touch-related material from their domestic isolation. Participants received sanitised materials altered for safe tactile encounters, packed with guidance for interaction. To avoid viral contamination, materials were sanitised and incubated for three days, and participants were advised to keep the package outside their homes for an additional three days before opening. When restrictions eased, in-person exhibitions strictly adhered to health and safety protocols. Hand sanitisers and masks were available during these events, ensuring participants could safely interact with the materials.

Material exploration	In person	Number of Participants	Consent forms
Beyond the touchscreen (2020)	V	1	V
Gesture collection postal (2020)	V	19	V
Gesture collection: Instagram poll (2020)		100	X consent implied by interaction
Inert Matter	V	5	V
Cared screens (2022)	V	3	V

Table 4. List of material explorations with participants from which data was directly collected

I employed an information sheet to inform the participants about the study and their rights and the consent forms to collect their approval for video recording and the collection of materials touched by them; both documents, and the Instagram consent informative text, are in the appendix (p.204).

In this section, I discuss the use of Instagram to communicate, share, and gather users' responses regarding the touchscreen's tactile qualities. I employed my Instagram account @marikajasminegrasso to collect responses for the Online Gesture collection. The Online Gesture collection runs parallel with the postal gesture collection. The Instagram poll Gesture collection partly concerns the contrast of rigidity and the meeting for dissemination and collection purposes with the touchscreen functioning surface, which compliments my practice and the previous paragraphs. My Practice-led inquiry converged into Instagram because it facilitated engagement with audiences through online residencies (such as @tr.ansienttt and @Oorbit) during the COVID-19 pandemic lockdowns.

4.6.4 Anonymity and Confidentiality

Throughout the research, I adhered to ethical standards to maintain the anonymity and confidentiality of the participants. Participants were identified as "touchers" to anonymise their involvement. Digital interactions via Instagram polls were designed to collect aggregated, non-identifiable data. In postal and in-person engagements, participant identifiers were excluded from the documentation. All Participation traces, including touch imprints and interactions, were stored, and shared without compromising individual privacy.

4.6.5 Right to Withdraw

Participants were informed of their right to withdraw from the study at any point without providing a reason. For digital interactions, withdrawal was facilitated by allowing participants to opt out of polls or unfollow the research account. For postal participation, participants could choose not to interact with or return the materials. In in-person settings, withdrawal was communicated as an option before and during the engagement, ensuring participants felt no obligation to continue.

4.6.6 Health and Safety (and Ethics During COVID)

The challenges of investigating touch during social isolation prompted me to develop a heightened sensitivity to health and safety concerns. The university's ethical guidelines provided a framework for protecting participants and myself during participatory research. In practical terms, this included sanitising materials, ensuring proper incubation periods for postal materials, and employing remote methods for participant involvement. Ethical considerations extended to the physical exhibitions, where protocols like mask-wearing and hand sanitising stations were implemented to ensure participant safety. In appendix 7 the Risk Assessment form is attached.

4.6.7 Health and Safety Working with Touchscreens: Negotiating Best Practice

In 2020, I utilised campus facilities like the White Building to explore the materiality of touchscreens, as the resins in collected broken touchscreens and iPhones stored at home posed toxicity risks. The volatile nature of the materials necessitated a safe and appropriate workspace, preventing disruption to my domestic space. The ethical approach to working with these materials evolved to include practices ensuring health and safety, such as ventilated environments and proper disposal methods. My initial research focused on working in isolation, informed by a literature review on touch, including studies like the Radio 4: Touch Test (Hammond, 2020), which explored touch ethics in public spheres. These considerations framed touch as both a need for connection and a potential risk, influencing my methods for safe material explorations. By integrating these best practices, I ensured the research upheld the safety of all involved while addressing the ethical complexities of engaging with toxic materials and tactile interactions.

4.7 Modes of Tactile Engagement

After presenting the methods, I present through Table 5 the tactile modes of engagement with touchscreen surface and conductive thread. I define this relationship by presenting Matter as the centre of the interaction. In the following text, I refer to my work as material exploration in the capacity of studio, workshop (laboratory) and domestic experimentation with the Matter of the touchscreen. I also refer to material interventions in the gallery space for exhibition of participants' engagement or for the gesture collection.

Practice-led research methodology
(Employment of material explorative approach
under New Materialist theoretical frame)

Types of encounters	<u>Process</u>	Methods	Artist Reference
1)Matter+Artist/Researcher (studio and workshop practice)	<u>unmaking,</u> <u>observation, re-</u> <u>layering,</u> <u>transforming,</u> <u>mutate, cover,</u> <u>stitch, unveil,</u> <u>embroider.</u>	Material Methods, Textile, Art Based Methods	Asselberg, Dekyndt
2)Matter+Researcher+Touchers (Gesture Collection)	<u>failure (happens in</u> <u>relation to humans'</u> <u>expectations) design</u> <u>tactile encounters,</u> <u>prototyping modes</u> <u>of touch.</u>	Use of material as probes, material provocative methods, Embodiment.	Arsham, Rental Cohen and Tuur Van Balen
3)Matter+Touchers+Researcher (displaying matter)	<u>placing, displacing,</u> <u>relate to space,</u> <u>disturb, alter, design</u> <u>interaction</u>	Material methods, Art Based Methods.	Hopkins, Huyghe
4)Touchscreen+Participants +Researcher (Instagram pools)	<u>observe, write,</u> <u>infiltrate, dissect,</u> <u>and disconnect</u>	Material use for tactile interaction, provocative methods.	Schwartzman

Table 5. Methods of application and categorisation for material projects

Table 5 presents the tactile knowledge evolved to address the research question and the changes in my role between observing, manipulating, disseminating, and reflecting. The methods are first organised by type of material encounters, referring to how materials intertwine relationships with the researcher and

the participants. In Table 5, I present the material focus by organising it under the type of encounters, which are expanded upon in the following paragraph:

1. Matter and Researcher/maker
2. Matter and Researcher and participants
3. Matter and Participants through workshops
4. Matter and Participants through exhibitions.

These encounters are partially chronologically organised. The COVID-19 restriction had an important impact on finding ethical modes to collect touch imprints and reflect on touch as a sensorial and making tool. Table 5 contextualises the methods under the research question about what is touched when touching the touchscreen. It presents the methodology and the employment of material explorative approaches to show the organisation of the encounter by relating processes, methods, and references to the artist's work. Table 5 shows how I employed different Practice-led methods to manipulate touchscreen materiality, unveiling its composition and functions by cultivating a material-based practice that seamlessly merges elements of art and textile practices with the principles of New Materialism. I developed and documented an iterative approach to artistic practice that revolves around creating and disseminating thought-provoking material explorations. The four columns create an organised narration of what I underwent for the research; it simplifies the merging and layering of the day-to-day research work. Methods like material and textile methods are repeated and prominent, while others refer to specific projects. I undertook the material explorations and interventions in separate locations, which shaped the research into framing materiality accordingly. The following categorisation serves to consider how I engaged with the Matter in the different modes of engagement:

1. In the bedroom, it was a conductive functioning surface, like a brain.
2. In the workshop, it was unresponsive dissectible skin.
3. In the gallery, it became an intelligent, broken, unresponsive body.

4.7.1 Matter and researcher/maker

This mode of engagement reflects on a non-linear, iterative process of sensing, altering, observing, and documenting. These engagements took place across various settings: the studio, workshop, and initially, my own bedroom. My material approach was inspired by artists such as Asselberg, who repurposes disused MacBooks, and Dekyndt, whose works reflect on the potentiality of waste material. Their practices informed my understanding of e-waste as both inert and responsive, and helped me frame material thinking not only as making, but as being in relation with matter through care, resistance, and decay, as in the experiment for Touchscreen Matter in figure 3.

Material Practice Process: literature review on touch, vision, and agency, translating theoretical reflection into material plans, material sourcing, experimenting with matter (touching, scrapping, breaking, juxtaposing), observation, reflection, documentation, and iteration of the process.

Figure 3. Touchscreen Matter (2020) is an example of an observation of experiments for further practice.

Projects:

4.7.2 Material, researcher, and touchers

This mode of engagement emerged during the COVID-19 pandemic as a response to physical distancing requirements. It involved sharing tactile works by post, with the material artefacts acting as witnesses and recorders of touch. The aim was to explore how materials might carry and archive gestures in the absence of direct, co-present interaction. The Postal Gesture Collection (2021) exemplifies this method, building on earlier experiments such as Circuit 1 and Circuit 2 (2020), initially tested and shared with assessors (Figure 4). These works allowed the Matter—specifically the altered touchscreen and conductive thread—to take central stage in facilitating intra-action between the toucher and the artefact, with minimal intervention from myself.



Figure 4. Circuit 1,2 (2020) with my fingers testing the circuits before sharing.

This approach was inspired by the work of artists such as Arsham, Rental Cohen and Tuur Van Balen. These artists treat material not merely as a surface or medium but as an active participant in meaning-making. Arsham's eroded sculptural objects evoke speculative temporalities and physical transformation; Rental Cohen and Tuur Van Balen installations explore material origins and invite viewers into exploring unknown material mundane composite. Their practices resonate with my use of materials not just to represent or display, but to activate emotional, sensorial, and conceptual responses—especially through degradation, repair, and tactility. Matter, in this context, becomes a carrier of narrative and experience, as well as a platform for shared agency. Process steps included: as alteration, prototyping and testing formats, structuring the gesture-collection and documentation process, adjusting materials for postal dissemination and remote interaction, enacting the interaction and documenting touch, receiving materials back, analysing traces of touch, iteration – repeating or adjusting the cycle based on feedback or outcomes.

This remote and materially sensitive method enabled the study of the affective and behavioural responses of participants. It also introduced a layer of uncertainty and decentralised authorship, opening space for unexpected material encounters.

Projects:

- Circuit 1, 2 (2020)
- Postal Gestural Exhibition (2021)
- TS# 25 (2023)
- Gorilla Glass Skin (2023)

4.7.3 Matter, researcher, and touchers (modes of display)

This mode of engagement focuses on touchscreen material during public exhibitions, where I created spatial and aesthetic conditions for touchers to encounter matter sensorially. This phase followed the previous tactile investigations and involved both conceptual design and curatorial decision-making. The intent was to decentre functionality, drawing attention to material presence and its affective charge. Artists such as Pierre Huyghe and Jan Hopkins informed this method: Huyghe's installations invite ambiguous interaction, while Hopkins' textile works explore emotional depth through material transformation. These practices encouraged me to create displays that allowed a distance between the artist and the work, allowing viewers to construct their own sensory relationships with the altered touchscreen.

Display process included: revisiting embodiment and material studies, selecting materials, analyse space bodily behaviours, tailoring and adjusting work, documenting spatial interactions and object transformations (Figure 5), observing, critically reflect, generate novel material interventions.

Despite pandemic-related constraints, these installations allowed an embodied investigation of touch's presence and absence. The mode of display itself became an experimental method, revealing participants' hesitations, gestures, and their interpretations of digital matter's life and afterlife.

Exhibition Projects:

- Beyond Touchscreens, CHI Conference (2021)
- Touched Screens, DRHA Conference / Stanley Picker Gallery (2022)
- Inert Matter (2022)
- Cloth Screen (2022)



Figure 5. Inert Matter circuit activated by touchers in S1 (2022)

4.7.4 Touchscreen, researcher, and touchers (on Instagram)

Figure 8 illustrates how Instagram was used as an experimental platform to mediate touch remotely, particularly during pandemic lockdowns. Through stories, polls, and visual provocations, I encouraged followers—mostly familiar with my PhD—to engage reflexively with the concept of touch and the materiality of the touchscreen. Following the model of Practice-led research online, I shared iterative stages of material inquiry and invited participation via simple yes/no questions. This engagement built upon the practice of digital material methods (Woodward, 2020) and was influenced by Schwartzman, whose Instagram practice blurred the line between touch, witnessing, and digital proximity.

Instagram was not simply a dissemination tool but an interactive method: by treating visuals and questions as tactile provocations, I explored how digital interfaces could simulate, question, and complicate embodied engagement. The Digital engagement process included: posting initial ideas, early experimentation, creating images and tactile questions, publish polls, collecting replies and feedback (Figure 6), refining questions, conclude interaction through online exhibitions or further posts.

This method proved valuable in shaping how I approached remote and public forms of interaction, offering insight into the shifting proximities of human–screen–matter relations.

Projects:

- Gesture Collection (2021)
- @tr.ansienttt Residency (2021)
- @Orbit Residency (2021)

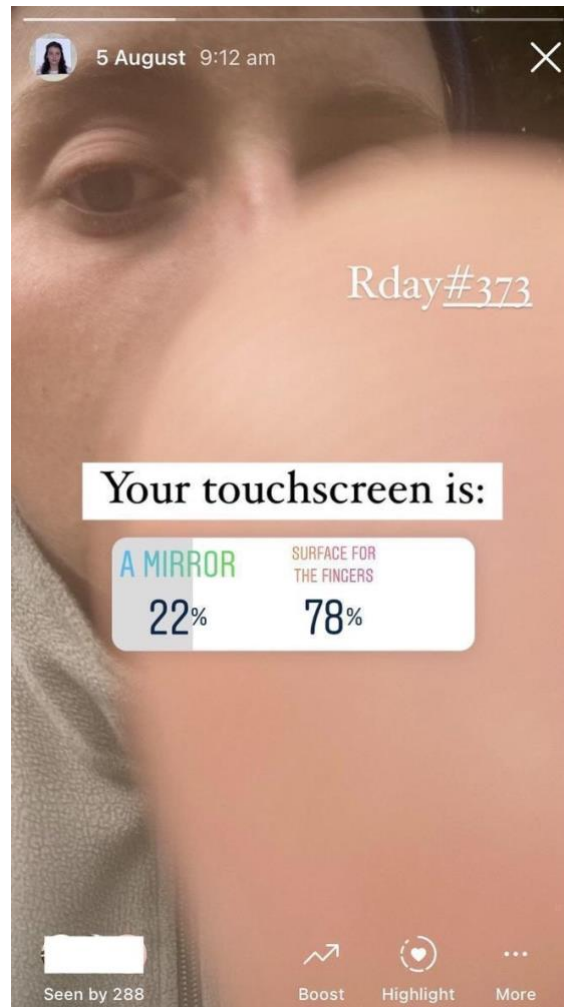


Figure 6. Instagram poll question with results (2021).

The Modes of Tactile Engagement demonstrate my way of finding meaning by studio work, exhibitions, mail and social media. By defining the limits, borders, and the channels to get in touch with matter, I organised my material exploration to fit the changes of distance, use of methods, and artistic reference.

The methods and modes of investigation can be synthesised in an iterative mode, considering the art of Practice-led research. The primary iterative process unfolds as follow:

- Reading and research on material interaction, material composition, and interaction with technology; field research as exhibition and display; and training in neurobiology and Neuroaesthetics.

- Studio practice and artistic material exploration of material behaviours.
- Touch and Gesture collection is available through exhibitions and online dissemination.

Across all modes of tactile engagement, I acknowledged the limitations of documentation in capturing the temporal evolution of matter. Touch operates across time, and this unfolding nature of material change is central to the methodology. My engagement with matter is not only physical but conceptual, shaped by the recognition that materiality may act independently of cognitive expectations, as argued by Bardt (2019). The persistent disjunction between mind and matter recalls the Cartesian dualism explored by Blum (2019), a tension which I further examine through the lens of Material Engagement Theory (Malafouris, 2013) in the subsequent chapter. The methodological approaches adopted are inherently iterative and interwoven. The research progressed through ongoing cycles of theoretical and contextual study on material interaction and sensory technologies, followed by studio-based experimentation and artistic exploration. These phases led to tactile and gestural data collection via exhibitions and online platforms, which were subsequently analysed and reflected upon in writing. This process, in turn, informed further rounds of material alteration and conceptual development. This Practice-led methodology demonstrates how touch can function as a critical and creative method of inquiry. The entanglement of making, sensing, analysing, and displaying material offers a rich terrain through which the qualities of matter may emerge—not as fixed or pre-defined, but as relational, situated, and affectively charged. This chapter establishes the foundation for the following analysis, where the qualities identified through these modes of engagement are explored in relation to the research questions and the broader context of posthuman, material-centred inquiry.

4.8 Analysis

In this section, I detail the analysis process I undertook. The analysis builds upon the methodology to articulate the meaning-making process derived from my material explorations, as documented through visual, written, and tactile records by both participants and me. It is organised chronologically, reflecting the iterative nature of the practice, particularly in response to COVID-19. Using a reflexive and interpretative approach, I examine connections between projects to explore how art practice methods inform our tactile relationship with touchscreens. This Practice-led research draws on Woodward's (2020) open evaluation of "what things are" (Woodward, 2020, p.140), referencing moments of making, participant responses, embodied interactions, and links between material explorations and theoretical perspectives. Here, analysis involves distancing myself from the material outcomes to evoke the "vibrancy" of Matter (Bennett, 2010) and my interactions with it (Barad, 2007). I used Material Engagement Theory (MET) (Malafouris, 2013) to structure the analysis as a framework for interpreting the dynamic exchanges between body, brain, and Matter. MET helps to position this study within New

Materialism by considering the responsive nature of touch-sensitive materials like screens. This framework guides an interpretative critical analysis that aligns with the relational inquiries of New Materialism, focusing on touch and the agency of material.

4.8.1 Material Engagement Theory

Material Engagement Theory²⁸ (MET) (Malafouris, 2013) highlights material agency in shaping behaviours and actions, identifying material encounters and manipulation as critical elements in shaping human cognition. The theory emphasises that cognition extends beyond the brain, including the body and environment. I applied MET to navigate the question of how tactile qualities can be explored through material agency and intra-active exchanges (Barad, 2007). MET's framework helps interpret the documentation by examining the following:

- Material exploration: Unlike MET's focus on ancient material explorations, my analysis considers how the embodied, sensory engagement with contemporary materials (e.g., touchscreens, conductive threads) shapes both my responses and those of participants.
- Technology's physicality: MET informs an analysis of how contemporary technology influences touch behaviours and how reciprocal interactions affect tactile engagement with screen surfaces.
- Cultural practices: I examine how habitual touchscreen usage shaped my material practices, particularly during and after the COVID-19 pandemic.
- Embodied and symbolic meanings: I explore how responsive Matter interlaces physical and sensory meanings in interactions with tactile surfaces through an interpretative lens.

While MET's archaeological context examines historical artefacts, my approach analyses present-day technology interactions, adding a personal, embodied perspective to the research.

4.8.2 Interpretative Material Critical Analysis

I build a reflexive, interpretative approach grounded in critical analysis parallel to MET. Drawing on Butler (1993) and Rose (2023), I consider how materials reflect and challenge power dynamics, exploring how touchscreens influence understanding of reciprocal changes between Matter and research. Rose (2016) notes that critical analysis involves examining how figures (or materials) construct meaning within broader social, cultural, and political contexts.

To structure the analysis:

²⁸ MET explores the mutating relationship between Matter and people, it embraces the nuances between mind, body and Matter, drawing from archaeology and philosophy.

- I categorise project notes and document material properties, production time, behaviours, and relevant literature chronologically, aligning with Wolcott's (1993) emphasis on temporality as a meaningful structure.
- I apply a categorisation system for each material exploration, aligning figures and written records to underscore the pandemic's influence on tactile interactions.
- I develop an interpretative system that considers embodiment and reflexivity, enabling me to re-engage with the material processes of making, sensing, and sharing.

This material-centric analysis examines the touchscreen's lifecycle and suggestive meanings, situating it within workshop, studio, and gallery contexts. I combine visual, video, material, and written documentation to convey touchscreen Matter's dynamic, embodied qualities in a critical material analysis framework.

4.8.3 Analysis process

In this section, I will detail the analysis process of how I gathered the diverse projects and organised them into a spreadsheet, visuals, and material to find the connecting thread between one another and the research findings.

1) Stages of evidence collecting from the documentation of an iterative approach to artistic practice that revolves around creating and disseminating thought-provoking artwork:

- Gathering of visual documentation, such as photos and videos (captured by my iPhone) from professional camera photos and the Photos app, from the making, exploration, and dissemination processes.
- Collection of written notes and reflections from Scrivener and Drive docs.
- Gathering and cataloguing of the various material explorations according to the employed techniques.

2) Organising evidence in chronological order, including the impact of COVID-19 on the research process, material explorations, and display and dissemination.

- Printing photo documentation (e.g. Figure 11) was employed to visualise the research chronologically (January 2020-December 2023).

3) Distilling of meaning:

- Distilling meaning from the categorised projects between spreadsheets, material exploration, and visuals simultaneously by considering the Matter's relation to the body and brain when perceiving and making processes through touch (while disrupting the chronological order).

4) Connect the findings by a research trajectory that encapsulates a linear embodied narrative of the emerging qualities and their interconnections (Figure 6).

4.8.4 Evidence, documentation

I select the research evidence by employing a reflexive and interpretive perspective on written documentation and video and visual documentation of processes, outcomes, and dissemination. Through the analysis, I aimed to merge the learnings from researching the touchscreen Matter and the modes of presenting it to the touchers. Kagan (1990) states that the meaning escapes the objective reading of the object, but they are "creations of the perceiver" (p.8). In analysing the evidence, I play a triple role as a user-perceiver of the touchscreen, a maker perceiving the changes imposed and a researcher perceiving the object in its mode of dissemination. The analysis consists of organising the documentation into distinct categories by translating documents from Scrivener, hand notes, drawings, and Word documents into the appropriate table of the [spreadsheet](#). The process relates to transposition, copying, pasting, relocating, and rewriting the evidence in an organised manner. Through the analysis, I discovered the interlacing between the different projects by considering the literature, the critiques, the artist references, the outcomes from the gestural collection, and especially the realisation of what happens in the workshops and the studio. The chronological spreadsheet is the tool to make sense of and analyse the material and written documentation resulting from the artistic practice and its subsequent dissemination. It is integrated with the visual documentation to recall the nature of the different projects and their outcomes. The strategy is to make sense and let the qualities emerge from finding connecting threads of similarities by comparing the projects and often by juxtaposing different artworks from different projects. Therefore, according to Merriam (1998), analysis is finding sense in the evidence by employing a process. In this case, reflexive and critical interpretation analysis combine to allow the material qualities to emerge.

4.8.5 Emergence of material qualities through analysis

Before discussing the findings of the analysis, I must acknowledge my limitations in employing a New Materialist theoretical frame and applying diffraction as a "thinking tool for analysis" (Sauzet, 2018). Diffraction is a tool for analysing the tensions between the researcher's knowledge-making practices and the ethical implications of these practices for the world (Sauzet, 2015). I approached the analysis with openness, considering the encountering and the becoming of touchscreens and my practice in the broader context. Drawing on Deleuze and Guattari's (2004) concept of "becoming," this process can be understood as a dynamic interplay between the materiality of the touchscreen and my embodied-making practices, forming an ever-evolving assemblage. The carnality, embodiment, and sensuality of being a maker interlaced an exclusive resonance, shaped by affective flows between myself and the material, a relationship disrupted only by participants' under-designed tactile interventions. This resonates with Deleuze and Guattari's (2004) notion of assemblages, where the material and the maker co-create new potentials and meanings. Therefore, the openness to the gathered documentation concerns the exclusivity

of the relationship between the Matter and me while acknowledging its place within a larger assemblage of tactile interactions, technological materialities, and participant engagement. The qualities, as analytical themes, emerge from the initial organisation and analysis of the different material experiments and their dissemination. In a manner close to a grouping analysis, it is held together by the research question on comprehending the material behaviours of the touchscreen and the conductive thread in response to tactile engagement on my part as a maker and from the audience. The different studies use facets of the phenomena of touching the touchscreen and engaging with its leftovers to explore what kind of impact the skin leaves on its surface. The chronological organisation of encounters with the leftovers of the touchscreen resulted in finding the qualities of the Matter. The qualities emerge from the analysis of practice and the experiments; these qualities are only discovered through touch.

I analysed the material explorations, starting by cataloguing them into a spreadsheet. As mentioned earlier, they were divided by the techniques and elements employed. Cataloguing and separating the materials supported sensorial critical thinking, which allowed the qualities to emerge. Visual sensemaking considers the materialisation of diverse evidence in a series of figures that include sensing analysis as tactile and embodied and can allow the materials and figures to be ambiguous and affective (Robson, 2022). Sensemaking is concerned with narrational and quality findings through messy Practice-led evidence. I employed the layered analysis to shape new knowledge grounded in the diversity of the evidence collected and the “experiences encountered within the lifeworld of individuals” (Sullivan, 2010, p.69). The findings not only emerge from the spreadsheet but shape the definition of the tactile relationship with the touchscreen, asking what the facets of the tactile relationships are. I study the phenomenon of touch, considering the tactile evidence grounded in the embodied experience and making sense of visuals and materials using analysis. The primary emerging outcome of the spreadsheet was the identification of future making; it exposes the capacities of the material intervention to explore the research question further. While simultaneously concluding each project, it connects with future projects in the iterative process. However, each project can be materially and visually explored (e.g. Figure 7) to allow other iterations and material studies.

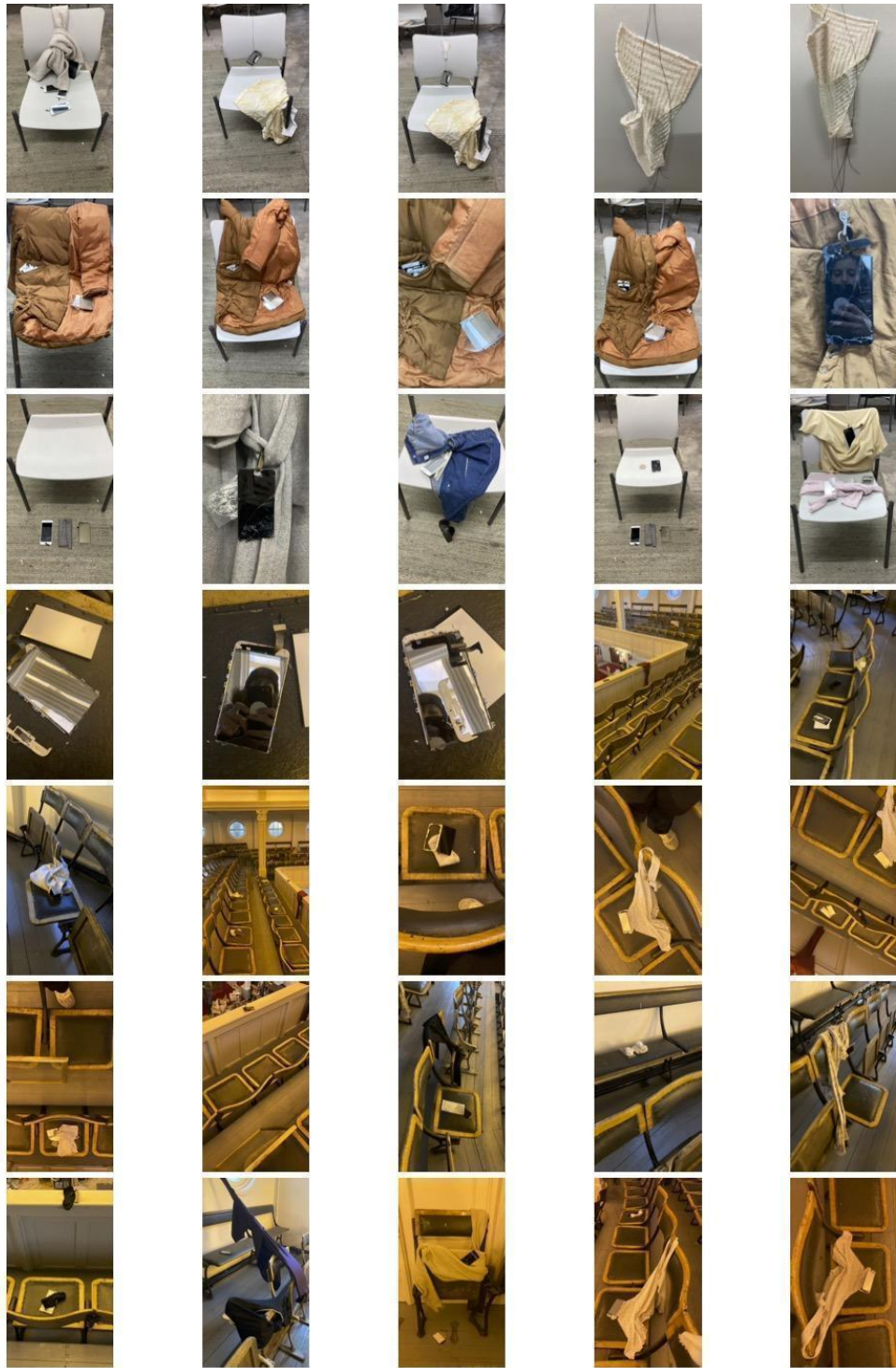
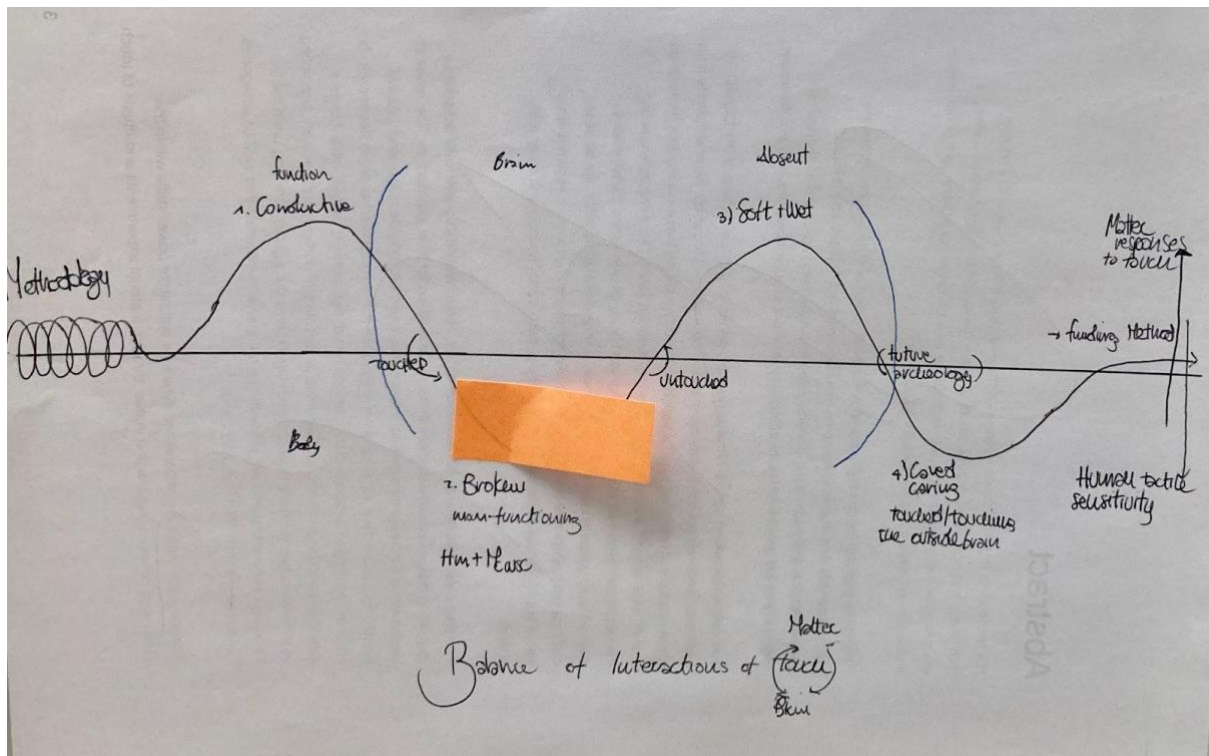


Figure 7. Page of Cloth screen development from the printed documentation from iPhoto.



Intra-action balances matter-touch-person

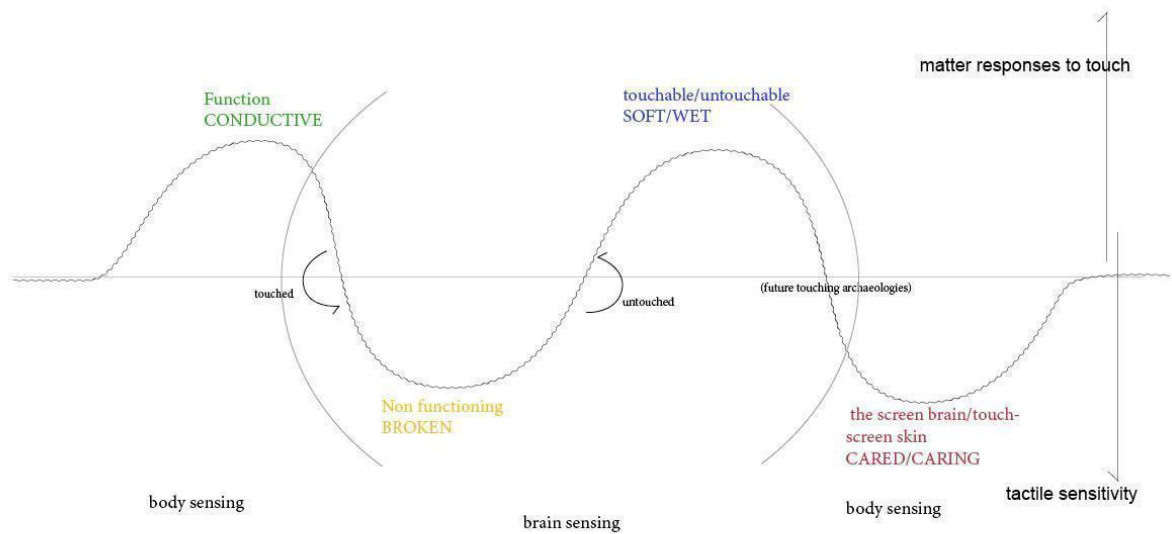


Figure 8. Drawing of qualities from gathering visual, material, and written documentation.

Figure 8 is a linear representation of the different qualities and their coming together in a clear narration. As a development from the iterative exploratory practice, the curve is the quality of Matter about the

brain and body during the practice and dissemination. The top part refers to the capacity of Matter to respond or appear sensitive to touch (such as electrical potential, which is conductive, texture, and pressure, which is soft/wet). The bottom part includes the non-functioning and the agency of touch as breaking and caring; the agency and intentionality of touch impact the touchscreen by touching (Broken) or filling distances (Caring). The scheme presents a balance of touch interactions, and the curve presents the idea of intra-action and exchange of energies between the body, the brain, and Matter. From the figure, the brain is more present in the Broken and Caring/Cared, in terms of observing and looking at the Matter, while the body works about and responds to the material and its engagement with it. In Soft/Wet, there is much realisation about the agency of the making and the building from mistakes. Each curve element is narrated and explained in the Practice chapters (p.84).

4.9 Conclusion

The methodology chapter outlines how I conducted the research, focusing on the influence of employing New Materialist notions in exploring materiality and engaging with participants to address the research questions. The variety of methods and analytical approaches helped reveal the material qualities presented in the following chapters as findings. The Modes of tactile engagement and iterative process aimed to highlight the importance of reflective and embodied practices. This chapter serves as grounding and justification to explain the findings and reflections I discuss to follow, allowing them to infiltrate into materiality. I explained the diverse methods and analysis modes to enable the subsequent chapters to define the material qualities as Conductive, Broken, Soft/Wet and Caring/Cared and their relationship with the literature on developing critical thinking through hands-on making, thereby enriching the layers of discussion.

5. Practice Introduction

The following subchapters discuss and detail the findings of this study, including the processes and methods used to define tactile qualities through practice and techniques. To address the research questions, I reflect upon material qualities as findings about the methods employed (Woodward, 2020). The discussion delves at the meeting of the nervous body and technological matters encountered in my practice, expanding on critical concepts such as Touch, Touchers, Intra-action, New Materialism, Somatic Interaction with Technology, and Neurophilosophy. I explore various facets of the concepts of entanglement (Barad, 2007), soft thinking (Igoe, 2021), and material inventiveness (Carter, 2004), revisiting them throughout the subchapters. The four subchapters —Conductive, Broken, Soft/Wet, and Caring/Cared —expand on the emergent qualities in the Analysis. The material exploration narratively unfolds to define the tactile material qualities through practice-led research-based tactile relationship. Projects, exhibitions, and gesture collections are attributed to specific qualities based on touchers and material responses, supported by my interpretative Analysis (e.g., Inert Matter in Conductive).

The subchapters follow this order: an initial introduction to key literature review terms and concepts I draw from (e.g., Electrical potential), then a list of the practice projects that formed the basis of the analysis for the findings of the subchapter's themes. In each section, I describe the findings of tactile qualities (e.g., Unmaking Touch) that are embedded and fragmented within the projects, and, to conclude, define the quality (e.g., finding and defining Care). The subchapters and practice are divided to present the analysis and findings into the material quality themes:

- Conductive: I created conductive thread circuits to narrate new transmissive touch and electrical potential, drawing on authors such as Churchland (1989) and Damasio (2005, 2020). I discuss the processes of material explorations, such as Inert Matter (2022), to define conductivity.
- Broken: I investigated the breakages and cracks of the touchscreen as a surface, as well as the tactile explorations of non-functioning smartphones, drawing on Heidegger (1962) and artists Rental Cohen and Tuur Van Bale (2015). I defined the quality of broken through the unmaking touch, Gesture Postal Collection, and other material interventions.
- Soft/Wet: I discuss the search for softness behind the touchscreen by applying textile thinking and stitching techniques. I present the disruption of casting errors to consider a wet, untouchable touchscreen through Oorbit residency material explorations, drawing on authors such as Barad (2007) and Fisher (2004).
- Caring/Cared: I embroider the Care taken in making and altering the screens to preserve them while considering how the touchscreen can improve tactile relations. I draw on de la Bellacasa (2017) to consider tactile relationships and their making by shaping distance, to consider what the touchscreen touches beyond the skin (e.g., Cloth screens, 2022).

The subchapters describe the research processes by defining the tactile qualities through practice and techniques (stitching, unmaking, building circuits, casting, embroideries, covering, and wrapping). I expand on the impact of the COVID-19 pandemic, discussing the lessons learned from making, sensing, observing, disseminating, and translating the embodied intuitions of making processes and dissemination into words. The subheadings support the narrative and capture the uniqueness of quality, which differs for each sub-chapter.

5.a Conductive

In the following subchapter, I discuss the findings related to the theme of Conductive material quality that emerged from the initial aim of the research: to explore the conduction between the toucher and the conductive thread through material explorations, as presented for the Weight of Light exhibition (p. 16). I draw on the literature review on Touch (Maurette, 2018) and Neurophilosophy (Churchland, 1989), referencing Pierre Hyuge (2018) and Schwartzman's (2011) work, which contextualises tactile interaction in the domestic "electro sphere" (Dunne, 2005) during the pandemic. I introduce the material explorations narratively, including failures, reflections, and critiques; each exploration highlights sub-themes that expand on the defining qualities.

I discuss the following projects:

- Touch-no see, no touch-see (2020)-material exploration (Annotated Portfolio p.8)
- Mind Object series (2020)-material exploration (Annotated Portfolio p.15)
- Circuits to Handle 1 and 2 (2020)-material exploration
- Inert Matter (2022)-exhibition
- Volitional Touch (2022)-experiment

I discuss these projects chronologically to highlight the key learnings from both the practice and the literature. I conclude the chapter by defining conductivity in practice, embodiment, and interaction. I reproduced the circuits to re-enact skin conductive expression through Touch and searched for different electrical signals by varying the intensity of Touch. Touch becomes key to explore one's sensorial existence and awareness (Roazen, 2007) by transmitting intentions within the material practice. The smartphone is part of the "electrosphere" (Dunne, 2005) when it stops functioning and is disposed in a desk drawer. It becomes something else, an untouched, frail object, no longer part of a responsive, interactive group of objects. It becomes an assemblage of material layers gathering dust, skin leftovers: traces of their touchers.

5.a.1 Perception as embodiment

Prior to discussing the practice, I highlight the embodiment of touch and its expression of electrical potential to explain the internal processes involved in material explorations and their dissemination. According to Maurette (2018), touch is often neglected in its complexity; the awareness of feeling touch involves the collaboration of multiple layers of sensation, which are highly individual in their perceptual elaboration. To address the tension between touch and vision, I explore this sensorial gap in various projects, considering my perception of touch in making and feeling and exposing my material explorations to the audience's touch. I aim to explore the collaborative tension between touch and vision

in *Touch-no see* (2020). I delve into my inner nervous system through the *Mind Object* series (2020) and then test audience touch and conductivity in *Circuits to Handle 1,2* (2020). To conclude, I re-enact touchscreen conductivity to be tested in the gallery space, *Inert Matter* (2022).

When exercising attentive practice, touch becomes an inner sense (Roazen, 2007) proprioception of the transmigration of particles (magnesium and calcium) between the synapses. In describing the following material explorations, I refer to the body as nervous Matter, capable of electrical conduction and conductor to transmit energies with the manipulated materials (touchscreen, silicones, conductive threads). I explored the body's capacity to connect the expression of sense to the awareness of touch (Roazen, 2007). The body becomes a layered energy transmitter, based on the Neurobiology training with Peggy Mason (2016) (A.P. p.152). The neurological frame allowed me to dive into an embodied perspective in sensing conductivity and embodying electrical potential (see Glossary). The skin's electrical current is expressed daily when touching screens, tablets or smartphones, and other materials responding to moisture, heat, pressure, and closeness. In-depth studies of the embodied capacities enhance the understanding of my own body and, consequently, reflect critically on the making and layering of conductive materials. The questioning over the body's physiology and conduction opens an interrogation of embodiment and a more philosophical perception of self-making, sensing, and responding.

The tactile sense plays a role in the inner sensing and perceiving of the outside world; it enables connection with the other. Touch has extended continuous interlacing between the touched Matter and myself, which informs my elaboration of tactile embodiment. Building from Intra-action (Barad, 2007), tactile awareness rises with energy transmission, intentionality searches through my skin. I consider conduction an energy expression in my making: two different corps meet through conductivity. There is an exchange of tactile action and response dynamics between the two, and within the evolution of the following projects, I aim to explain how the tensions worked in favour of the Matter.

An example of embodied experimentation is the work of Madeline Schwartzman²⁹. Her use of the whole body and inquisitive methods regarding touch, vision, taste, smell, and hearing are explorative and unexpected. Her daily modes of questioning the body (posted on Instagram @madelineschwartzman) and the perceptive bodily modes have been informing my sensing body through gestures of feeling and making. Her work is based on materially expressing the senses and understanding nature's perception in unthought and creative ways. Her creation of stimuli and use of diverse materials on the body's parts informed the idea of using thermochromic threads, flowers, and gold leaf on the screen's surface. The body, as in her experimentations (Figure 13), becomes a whole sensing tool, which I documented through the wearing and placing of smartphones. She is the primary reference for the sense of touch on *Inert Matter* (2022) as an artist inquiring about her own embodiment. Her assemblage of Matter relates to distinct body parts and inspired the idea of thinking of clothes as a layer between the legs, heart, chest, hips, and the smartphone, connecting embodiment to the *Cloth screens* (2022) material exploration. I

²⁹ Madeline Schwartzman is a New York visual artist and author of *Seeing Yourself Sensing* (2011). She interrogates perception through the whole body. She is a Professor at Barnard College and an Associate Teaching Professor at Parsons: The New School for Design. She teaches architectural design, drawing, video production and time-based media.

linked her use of materials on the body and exploring sensations (Schwartzman, 2011) to the investigation of touch as a self-awareness tool to explore conductive touch.

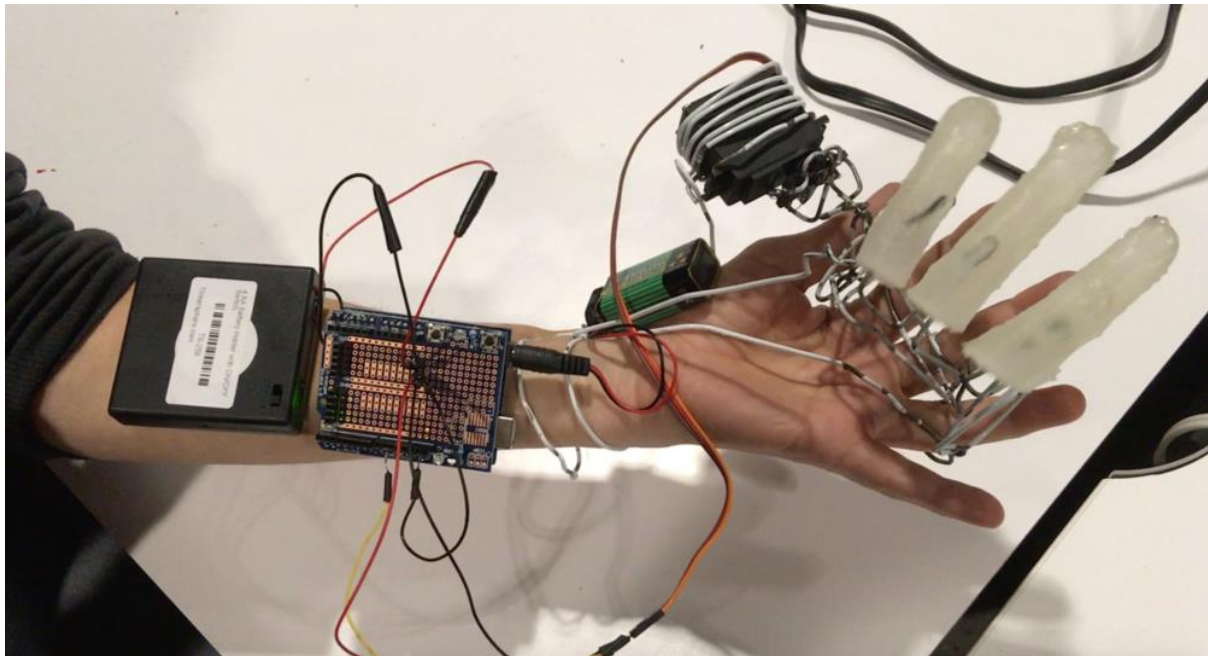


Figure 9. Madeline Schwartzman, see yourself sensing (2011) (Copyright 2025, Madeline Madeline Schwartzman)

5.a.1.1 Electrical potential

Following, I introduce the concept of conductivity in terms of electrical potential to explain it is employed for the material explorations. The nervous system transmits information within the body through electrical conduction, facilitated by electrical potential. The electrical potential of the body refers to the capacity of neurons to passively transmit electrical signals by axons (which can extend for more than one metre). The neurons are not as efficient as wires and conductive threads, but they employ an “action potential” (Purves, 2001). The “action potential” works concerning a “membrane-resting potential,” which, by fluctuations of electrical charges, elicits a better transmission of the signal across the body, with the support of an axon coating called myelination (Purves, 2001). Importantly, this information is captured by mechanoreceptors (Purves, 2001); for this study, I focus on the specialisation of tactile receptors. The hand, for example, is highly innervated and presents a high sensitivity to tactile stimuli, thanks to corpuscles present in the dermis, which are highly myelinated to quickly fire information to the rest of the body with a minimal amount of pressure. The collaboration of different mechanoreceptors within the epidermis and dermis, along with their innervations, allows for the

differentiation of various pressures, temperatures, and the finest textural changes, as well as elaborate internal states (Purves, 2001).

5.a.2 Circuits to Handle 1 and 2 (2020)



Figure 10. Circuit 2 (October 2020), Glass box, with tulle, thermochromic, conductive thread, battery

Circuits to handle 1,2 (2020) is a material exploration that expresses the skin's electrical potential, targeting the collaboration between vision and touch. Here, I investigate the definition of conductivity through the material experimental journey and the creation of responsive materialities in the domestic environment. Before the second lockdown (October 2020), I designed the circuits (Figure 16) to communicate the idea of conductive tactile, responsive materials with the assessors by employing diodes and battery circuits. Circuit 1 is made of water-dissolvable plastic and gold leaf (Figure 15). Circuit 2 is gathered tulle painted with thermochromic ink (Figure 14). Both presented batteries, diodes, and conductive threads and were delivered³⁰ in glass jewellery boxes with one white glove each to handle them. They are open circuits closed by finger pressure to light up the diodes. Circuit 1 becomes more

³⁰ The circuits were boxed and safely delivered to my assessors in jewellery boxes. Both were functioning, and the diodes lit up before sending. The boxes were left outside the house for three days as quarantine prevention to the spread of the COVID-19 virus.

malleable and softer by prolonged contact, increasing the risk of rupture. Circuit 2 gains colour with the crystal thermochromic ink and shows the gathered folds, layers, and lightness. I aimed to expose their frailty with the risk of touchers' tactile agency breaking or warming up the material to light up the diode. Hand and thread responded to one another (because of battery polarisation), and both pieces aimed to express this conductive transmissive relationship. The glass boxes and the gloves created a sense of Care and gesture. I aimed to create frail and transmissive surfaces that expressed the sensuality of the fear of touch. While developing the circuits, I became aware of non-functionality being functional in exposing tangible Matter qualities as frailty. Circuit 1 and Circuit 2 (Figure 11 and Figure 12) were the first opportunities to share my work and to support the presentation of the experience of touch as transmission. The material method (Woodward, 2020) employed in this project considers a phenomenological approach in terms of generating tactile awareness for the touchers through using a reflective practice (Woodward, 2020) to develop provocative materials.



Figure 11. Circuit 1 (October 2020) Glass box, with dissolvable copper conductive thread, battery



Figure 12. Circuit drawing and testing (Oct 2020)

5.a.2.1 Frail transmission

During the second lockdown (October 2020), when touch was widely avoided in public life, I enacted tactile engagement through my hands by crafting inviting, textural surfaces for others to encounter. This practice fostered a heightened sense of intentionality in the act of making, wherein circuit-based canvases—composed of tulle and water-soluble fabric—responded to assertive stitching with conductive thread (Dormor, 2021). The act of surface-making became a form of violent intra-action (Dormor, 2021; Barad, 2007), shaped by my anxiety about transmitting the COVID-19 virus through contact. Anticipating future interactions with the work, I carefully considered how others might touch and activate the circuits, and how contamination might be prevented. The societal fear of touch and physical contact during the pandemic became a site of reflection for me, prompting questions about the necessity of tactile intervention and the implications of leaving an imprint—literally and metaphorically—on matter. This collective fear was materialised in my use of fragile, deteriorating textiles, which embodied the vulnerability of the hand's encounter with the surface.

When interrogating surfaces, the related Tactilism Manifesto by Marinetti (1920) became a tool for thinking about categorising the relationship with material touch. The Embroidered Computer (2016) by Irene Posh is a crucial outcome for soft computers and circuits to harness the properties of wire and conductive threads. Leah Heiss practices and reflects on the polarisation of materials and the distance between the person and the reactive liquid metal in an exhibition display, such as *Polarise* (2012). Her work was essential in considering the distance between a person and an object, as well as the reaction that occurs without contact. I began considering the emotional labour of creating conducive and transmissive work, drawing on Jan Hopkins's practice, which I further developed in *Inter Matter* (2022). Jan Hopkins's relationship with technological Matter reflects on the participatory work that links with the artefact/object, which relates to the history of her interactions with vintage radios, televisions, and computers, with personal narrative and a sense of nostalgia. Her work (Figure 13) involves the creation of circuits and coding to generate new modes of presenting objects, considering their new forms and the cultural significance of their presence in our daily lives.



Figure 13. Jan Hopkins, *Black Box* (2018) (©2025, Jan Hopkins)



Figure 14. Detail of diode lighting up by my finger closing the circuit

5.a.2.2 Soft circuits, and nervous touch

When collaborating with materials (Bardt, 2019), it became essential to appreciate and embrace the unique characteristics of the circuits, which are fragile yet functioning. In the domestic tactile library (Classen, 2012), skin conductivity refers to the capacity to transmit heat and electricity through the skin, representing an embodied ability of the nervous system (Hsiao, S., and Gomez-Ramirez, 2011). I made the circuit for touchers (see Figure 19 for diodes lighting up) with an emotional expression of the inner biological chemical transmissions and interoception. Outwards, Conductivity can be expressed through contact and sweat, which are the outcomes of internal experiences and the transmission of information. I attentively addressed Conductivity as aliveness and awareness of the functioning Inner senses (Roazen, 2007). I attempted to express my embodied tactile sensing reflectively through my making, utilising material explorations to reflect on my sensing and relate it to others. I elaborated on this through responsive frail surface sensing, which connects with Inner Sensing (Roazen, 2007). Which I challenged by exploring the action of touch in sensing itself through an outer responsive circuit, resulting in the stretching of inner and outer touch, and helping me comprehend my sense of touch in making, understanding, and breaking materiality.

Significantly, by sharing the Circuits via post, my maker role shifted to that of a researcher, disseminating delicate material explorations, in contrast to the Screen Mind (2020), where the work focused on self-awareness. Afterwards, I considered touch from a neurobiological perspective to investigate the expression of conductivity thoroughly. Similarly, in the Touch-No-See (2020) investigation (Annotated

Portfolio, p. 8), I had to explore the skin as a layered materiality to navigate the decision over movements and sensations to grasp touch. Throughout Circuits 1 and 2 (see Figures 11 and 15), my perspectives on interaction, agency, and power shifted as I encountered Matter's autonomy—living, decaying, and transforming independently of my control. This interaction became an intra-action, allowing my practice and understanding to "become" (Barad, 2003) entangled with the material's altered states.



Figure 15. Detail of tulle stitching with conductive thread and diode and battery

5.a.3 Volitional Touch (2022)

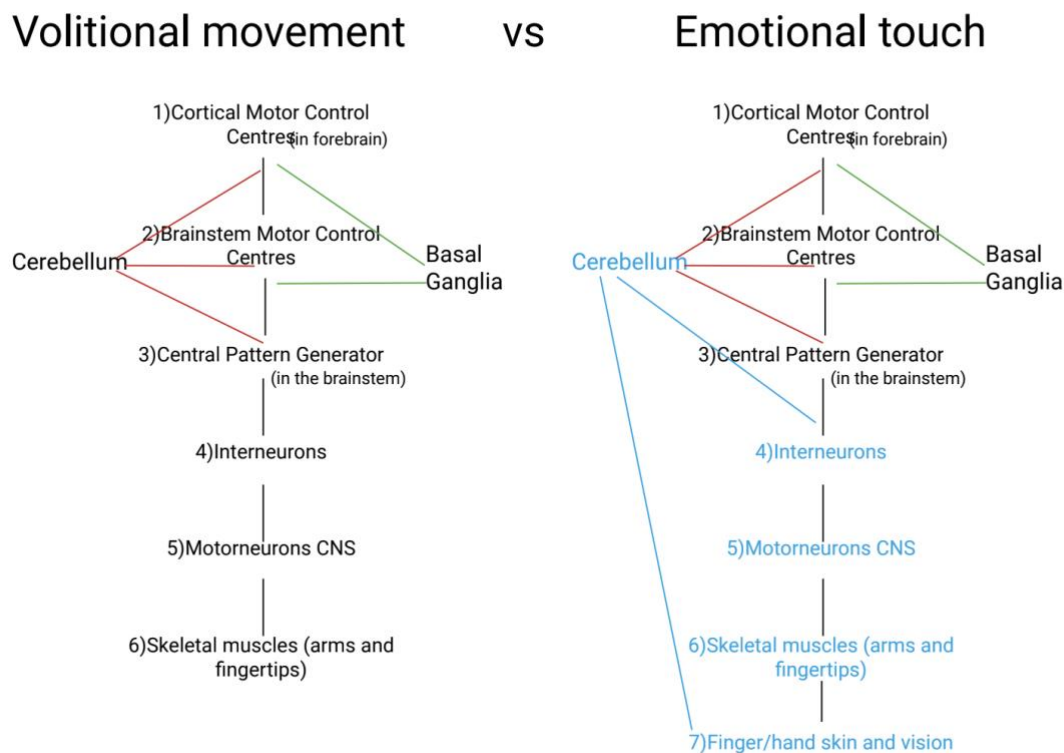


Table 6. Comparative theoretical proposal on motor-hierarchies of various kinds of touch between volitional and emotional

This section aims to explain how the nervous body works, and how it stretches beyond the cerebellum. After completing the Neurobiology course in 2022, I investigated the automatic hand movement when touching a touchscreen as a reinforcing sequential movement. The daily movement analysis served to understand myself and the research in a bodily sense, which informs my capacity to sense the rising qualities of tactile relationships with Matter. I distinguish between volitional and emotional touch (see Table 6) by reflecting on the motor hierarchies involved in touching a touchscreen. Volitional touch is initiated by a specific decision made by the prefrontal cortex. In contrast, for the Emotional touch (or mundane touch), I consider the cerebellum intervention, which bypasses the decision-making process of touch movements by the prefrontal cortex and communicates directly with the interneurons, resulting in a faster, more emotional, and repetitive movement. Drawing from Herrnstein (1982), textural and perceptual organisation evolve from: “Principles of similarity that have evolved to favour the perception of recurrent events and extended objects.” Those similarities (e.g. touching the touchscreen) develop from physical similarity to become equal to “innate knowledge” (Herrnstein, 1982). In the relationship between Neurophilosophy and Technology, the work of Gallagher (2023) considers modes of relating brain and technology under the terms of the “extended mind” (Clark & Chalmers, 1998). This is an elaboration on how cognitive processes work beyond the brain, including

bodily behaviours, extending the mind's presence beyond the cranium. I achieve this by introducing Gallagher's (2023) perspective on neurology and its impact on mundane interactions. Gallagher (2023) states that considering the nervous system can enrich the understanding of embodied phenomena, in this case, the phenomena of touching technology, such as touchscreens and conductive threads. Technologies can operate as vehicles of cognition in ways that supplement or replace neural mechanisms as we attempt to remember, imagine, or think through solutions to problems. Accordingly, our cognitive abilities (and the cognitive processes themselves) are extended and constituted through various aspects of the environment, and with the integration of technology, they become integrated (Gallagher, 2023). The authors focus on the cognitive and ethical aspects of technology. Following Clark and Chalmers' (1998) embodied consideration of the extended mind, I aim to examine the dual embodied neural engagement with technology through the somatic sense, which involves considering the reciprocal impact they have on one another.

This elaborated literature of key terms and authors serves to consider the material aspect of the body as flesh. While acknowledging the incredible capacities of the brain to respond, modulate, and adapt, I consider the entire body a system of elaborating relationships with technological materiality. To consider the complexity of the relationships with technology, this neural embodiment is presented in a Neurophilosophy landscape. This section is necessary to explain how the nervous system works and how it stretches beyond the cerebellum.

5.a.4 Inert Matter (2022)

During the COVID-19 pandemic, I searched for responsive materialities between textiles, glass, and wooden interiors, considering the electrical sphere of technological relations between objects (Dunne, 2005). Consequently, I focused on the tactile, monogamous, and obsessive relationship with the smartphone, an overused yet familiar object that responds to touch through hidden and mysterious layers (White, 2022). In this section, I relate the touchscreen to the nervous body and then to the grey viscous Matter of the brain. Inert Matter (Figure 16) was the first in-person, one-day tactile event on 24 July 2022, in S1 gallery space. This experiment, presented as a tactile exhibition, explored energy transmission using conductive thread, wires, and the layers of a touchscreen. Although the Matter looks inert, it still holds electrical potential; I invited the visitors to touch and re-enact the touchscreen layer transmission (see Glossary for details on capacitive touchscreens) while walking around wasted technology. I employed knotting, stitching, and re-layering as part of the textile-making process to connect the layers of the touchscreen and the touchers. I displayed touchscreens to explore their materiality as a wasted responsive body to dissect. Their materiality is “zombified,” reutilised to express both the flesh and the metal layers of the touchscreen’s capacity to transmit electrical signals. The question was why and how to alter the materiality between conductive materials and recompose the layers with stitching. I am employing

Material Methods (Woodward, 2020) to utilise material explorations and initiate embodied responses through provocative and responsive materials.



Figure 16. Inert Matter (2022), Touchscreen, diodes, and conductive thread

Technological devices, such as smartphones, are created for interaction by systematically assembling various materials (Dunne, 2005) that respond to touch, heat, and pressure. Then, gestures, movements, and tactile behaviours adjust to those materialities (Malafouris, 2022). With *Inert Matter (2022)*, I explored touchscreen tactile conductivity in S1, where neither intra-action nor interaction has a settled mode of expression. Through making and reflective notes,³¹ I developed an emotional fear of labouring

³¹ Practice notes: The idea of *Inert Matter* emerged from my intention to discover a resurrection of the touchscreen, aiming for the concept of reactivation that is peculiar to humans. In New Materialist terms, Matter is its ontological expression, independent from human interaction. The touchscreen is produced and altered through industrial processes and mining and then utilised to express the smartphone hardware functionality. However, once wasted, its materiality becomes independent from human agency, becoming a new thing in its being. Deteriorating in its terms, I infiltrated the deterioration process to entangle and relate conductively with the touchscreen, and the touchers.

on the resurrection of the screens, by making the material responsive again to skin and battery. Ultimately, this was a human imposition on the idea of aliveness and the death of Matter, which is tied to transformation and deterioration.

5.a.4.1 Emotional touch with vision-based responses

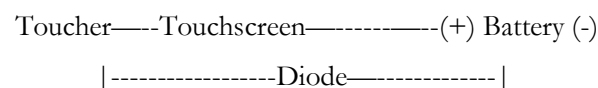


Figure 17. UUmwelt, Pierre Huyghe (2019) (Copyright, 2025 Ola Rindal. Courtesy of Serpentine and the artist)

While working on electrical potential tactile expression, I acknowledged the visual-based approach to the neuroscience of P. Huyghe's "Umwelt" ³² work (MRI is visualised as Figure 17), with a fascinating change of screened scenario due to brain activity changes. His use of fMRI to "exhibit someone to something"³³ exhibits the audience to the artwork, by using the profound neural capacities of the audience to produce assembled memorised figures through previous MRI scanning. Huyghe's work is critical for my research because it incorporates neuroscience into daily relational perceptual means, which the artist and the audience can embody. The screened materiality forms the new speculative realities at the centre of relational inquiry. Similarly, displaying the touchscreen's inert materiality involves placing the artwork, considering the audience as nervous, and presenting the person to the resting, inert thing by interlacing tactile engagement. The tactile agency was transformed into light within the Inert Matter circuits (2022), changing in intensity according to finger pressure and heat. The touchscreens were altered to waste matter, lacing stories and relationships with moving, touching, and interacting modes through the terms of the skin and the motor hierarchies known in neuroscience.

5.a.4.2 Conductive systems between the nervous body and the gallery space

The tactile experimentation involved tactile encounters between the nervous body and the touchscreen, treating it as a broken thing, in conjunction with conductive threads and diodes. The tactile engagement included planning circuit placements (on the wall, floor, or hanging). To create the circuits, I employed the following structure, considering the main parameters were the gallery space proportions and lighting conditions.



The circuit components include the body, the layers of the touchscreen, conductive thread, diodes (with positive and negative legs, known as anode and cathode), and small 9-volt batteries. I designed the circuit around the polarities of the diode and the battery; meanwhile, the touchers and touchscreens varied in number, while the conductive thread changed in length. The circuits were placed according to their modes of activation: by one or two touchers holding the thread or by the thread closing the circuit with

³² Umwelt is translated from German as Umwelt: perceptual environment ([Britannica dictionary](#)). Huyghe's work aims to exhibit the person on screen, presenting mutating humanoid creatures elaborated through a visual language derived from previous MRIs, which serve as a mirror to reveal insights into brain elaborations.

³³ Pierre Huyghe's speculative work includes inanimate, technological, and natural forms. The peculiarity of his work in creating future rituals and experiences between humans, the human body, and technology (e.g., fMRI) inspired the creation of my work as a means not only of creating an object as artwork but also of considering the shaping of a tactile experience and a new relationship with waste.

the toucher help. The circuits were placed to be accessible to touchers to experience them, letting touch activate the circuit.

Around the space and the touchers, I organised five circuits in the following system according to the placement of the touchscreen and room brightness:

1. White wall: two circuits with diode, battery and conductive thread activated by one or two touchers (Figure 18); in the mid-light intensity rooms, I placed the circuit activated by touchers by touching safety pins and needles.
2. Floor: In the central bright room, two touchscreen circuits in which the smartphone metal waste is the conductor (Figure 19) expose the blue light, present the force, and sleek beauty of the exposed layers.
3. Window hanging: The touchscreen and the person activate the diodes (Figure 20). The hanging window displays aimed to preview the elements in the room, acting as a simple circuit that could be closed by touching the threads.

The scope of the gallery experiment was to explore the expression of touch and the skin's electrical potential, while simultaneously questioning tactile engagement with a non-functional object. In embodied terms, I positioned the circuits on the wall at the same height as when I typically use my iPhone while standing. The placement of circuits on the floor reflected ideas of zombification and collapse—the fallen or crashed touchscreen transmitting electricity and emitting light independently of the toucher's agency. I arranged the circuits in response to the natural light conditions of the space. The main room was illuminated by overhead and window light; the adjoining space was dimmer, culminating in a smaller, darker room with only a small door admitting light. These gradients of natural light were used to demonstrate diode activation, as the human body is not a particularly efficient conductor. I placed the circuits intended for toucher interaction in the darkest part of the space.

The stitched touchscreen layers, integrated with conductive thread, enabled the diodes to light up more vividly, showing how the collaboration between vision and touch was essential: light and visual feedback were employed to support and extend the exploration of touch.



Figure 18. Two people activate the diodes leaning on the wall. Figure 19. Touchscreen waste is on the floor with diodes. Figure 20. Conductive thread and screensaver are hanging.

5.a.4.3 The expected interactions

Only five attended the one-day tactile experimental exhibition. After briefly introducing the exhibition and explaining how the circuits worked, I let the participants explore; then, I explained the types of touch involved during the material exploration. The brief time restricted the number of participants, but it allowed me to observe the few people moving and walking around the circuits before touching and texting dissimilar materials. The small attendance was reassuring and intimate, maintaining a sense of privacy that I had fostered during the COVID-19 lockdowns. This exhibition was intended to disseminate the outcomes from my Neurobiology course (A.P., p. 152) while testing how people might engage with the circuits. Not knowing if the interaction between the audience and broken touch screens would work, I displayed the artefacts with an invitation to be touched. I expected to play with the uncertainty of touch being expressed or not. The design of the sequence of installations aimed to combine the materiality of the touchscreen with that of the space and its visitors, as nervous matter. The touchers engaged with the circuits with a sense of surprise as the diodes were placed in unexpected positions; after trying the first circuit, they were eager to try the others. Notably, the touching was slower and more delicate once I explained the concept of Volitional touch to them (p. 84). The challenge of the intra-active work was to have the three elements —matter, space, and touchers—collaborating in expressing conductivity. Notes and reflections for that tactile experiment included consideration of being a participant myself and considering the circuits, the toucher, and my role³⁴. In conclusion, I sought to resurrect matter—excavating it, un-layering it, and revealing what lies beneath. It was a deeply exhausting phase: a dry moment marked by care, attentiveness, and delicacy. Despite this, there were still encounters with others and intervals of writing. At this point in the research process, I focused only on what felt essential—each action becoming a thread of thought imbued with meaning. In these suspended moments, everything seemed to still itself and fold inward. The fatigue of attempting to bring something back to life left me paralysed, yet the illusion of a life force remained—the driving energy behind the metaphor of metamorphosis.

5.a.4.4 Conductive threads and Volitional touch

I inquired about volitional touch (p.95) through observing my making, questioning if there is a different agency and way of being when it comes to understand how nervous systems responds to matter.

³⁴Practice notes: However, I look at the touchscreen's nervous beings and material behaviours when its functionality vanishes. So, in the gallery, there is one nervous being, myself, and the touchscreen layers; I am reverting the touch movement from emotional to volitional, from an emotional response behaviour to reactive rational movement, and an intended and decisive making. Therefore, I am between the thinking of Care, display, alteration, and presentation of the bare Matter; for the first time, I stepped away from thinking about the participants, the audience, and the rituals. What is it when the Matter comes out? I am the maker and the researcher, but I am a participant in the research and the one who builds a consciously nervous relationship with a wanted Matter of human interaction. Why not shape the work around my experience of the touchscreen and its materiality? Why not present a presence when there is none around, and you are left with the leftovers of a handy interaction?

Conductive threads and touchscreens have different conformations and ways of being, while, indistinctly, the system of connections in the ANS³⁵ is fired in terms of the motor cortex while skipping the decision-making. The thumb on the iPhone is moving while the mind is elaborating of something else. I wondered about these automatic movements while in the brain other functions are at work. The structuralist school (Bickle, John, et.al, 2019) considers the mind to be thinking in a levelled and consequential way (the touching and automatic making). At the same time, the nervous system is continuously adapting to and because of the environment. Therefore, I tried to observe how the touched Matter responds to the distinct kinds of touch. One concentrates more on movements and impact, and the other is automatic. This project evolved into rethinking the touch towards a technological material and the modes by which materiality is conductively touched. I employed a device that allowed communication while highlighting the missing touch in the context of the COVID-19 pandemic. It is the one object that I am using to bring people together, not digitally but physically. This Inert Matter (2022) event was a possibility to open a very personal relationship with the Matter of the touchscreen. While the nervous system decays, the materiality of the touchscreen can still be reactivated by creating scenarios of long-lasting materialities of machines. The unveiled nervous relationships between Matter and touchers allowed a sense of Care and compassion to present an Inert Matter (2022) that still holds the potential to transmit energy. Importantly this material exploration considers the somatic sense in an embodied manner to develop a material reflective practice (Woodward, 2020). The reflections note³⁶ on the diversity of touch as volitional or emotional are inspired by the theories of perception and elaboration of Damasio (2005). In an embodied manner I elaborate on present states of movement and decision-making that both apply to the mundanity of touching touchscreens and create material explorations.

5.a.5 Defining conductivity

In these sections the somatic sense emerges as a crucial investigative tool to feel, and conductivity emerges as analytical theme in merging the reciprocal dynamic agency of skin electrical potential and touchscreen transmission. Furthermore, through touching, I comprehend breakage and traces, confirming the connection between the mind, the hand, and the subject of exploration in an inner and outer circuit.

³⁵ The autonomic nervous system (ANS) is a division of the peripheral nervous system that regulates involuntary physiological functions, helping maintain homeostasis within the body (from Mason's lectures -2016).

³⁶ "This course allowed me to explore and understand myself more deeply regarding responsiveness, reactions, and decision-making. It enabled me to observe and understand the impairment and reactions of the people and animals around me and self-reflect on specific ways of being and moving. I learned to recognise my way of perceiving and responding to stimuli. For example, I can now observe and unlearn the automatic behaviour of my smartphone. In the analysis for this project, there is not a particular impairment but a kind of interaction addiction. The repeated, emotional, and learnt movements of the hands are reinforced daily. The movements and interactions happen within a concise amount of time, in which decisions are taken quickly. It was essential to observe both myself and other people when the addictive touching of smartphones happened. I used to dance, and the behaviour described here almost compares to the learned and memorised movements of dance and learning choreographies, for which I had to quickly initiate a sequence of movements without thinking of the exact and precise movements."

Continuous tactile engagement with the Matter means comprehending through my practice, and the participant's engagement shows the sense of transmission in a carnal manner drawing from intra-action (Barad, 2007). In contrast, technology like the iPhone remains physically static but evolves through behavioural changes, concerning the shifts between Volitional and emotional touch. As in *Inert Matter* (2022), the thread becomes the nervous system holding the potential to transmit a neuron from/within the body and the Matter. Touch, in its neural infinitesimal elaboration (Damasio, 2020), corresponds in conduction to the discourse of Barad (2012) on the agency of touching the self, making decisions and the lesser amounts of time considering the self as otherness. Finally, after considering materiality and its conductive capacities, it is essential to consider the forming elements of the touchscreen and its meeting with the conductive thread in the manner of transmission by a broken object. In the following chapter, I aim to present the touchscreen as a broken object, displaying its material variety. The broken object becomes a new object and presents frozen moments in time and qualities that enable one to think of how to work and alter the materiality. In synthesis, touch emerges in the interchange between volitional and emotional capacity according to the task; meanwhile the touchscreen materiality remains transmissive even in its deteriorating form.

5.a.5.1 The "in-between" of the practice, embodiment, and interaction

Before presenting the broken touchscreen explorations in the following subchapter, *Broken*, I introduce Maurette's (2018) acknowledgement of touch as an entangled action with the capacity of the Matter to respond to it; it is reciprocally active and passive in it happening. Accordingly, through the practice, my search for conductive materials evolved between various tensions, one being the touch-vision work and the second being the exploration of softness and hard surfaces. The tensions I explored between these qualities of Matter are expressed in my consideration of touch as a tool to create awareness of material qualities and work over, inside, underneath, and with the leftovers. This material exploration from the *Touchscreen Matter* represents my hand agency (Figure 21), symbolised by the gold leaf, a material I previously explored for conduction. It represents an in-between state of metal as soft and malleable gold leaf and the stickiness of the screen protectors catching fingerprints. It interacts so much with the screen protector that it merges and moves under the skin of the touchscreen to leave only traces of breakage and some leftovers. The hand and the skin were like the fragile gold leaf and the screensaver as a touchscreen; both materials, metal, and glued transparent polymers, are actual elements present in the layers of the touchscreen. Importantly, the touchscreen Matter sequence (Figure 21) of gold leaf and screensaver reflected the layers of skin and technology merging and moving close to each other. Fast prototyping materialised the thinking about different terms from the concept of conductivity. I moved away from conductivity to explore the sense of transition that accompanied touching Matters with intention and purpose. Conductivity was investigated as the transmission of energy and the intention of imprinting a mark on Matter and then feeling and sensing the surface. To conclude, conductivity is defined by

employing transmission through circuits as in *Circuits to Handle* (2020) which considers an intra-active sense of mutual sensing. In my practice, conductivity becomes comprehending through feeling the otherness.

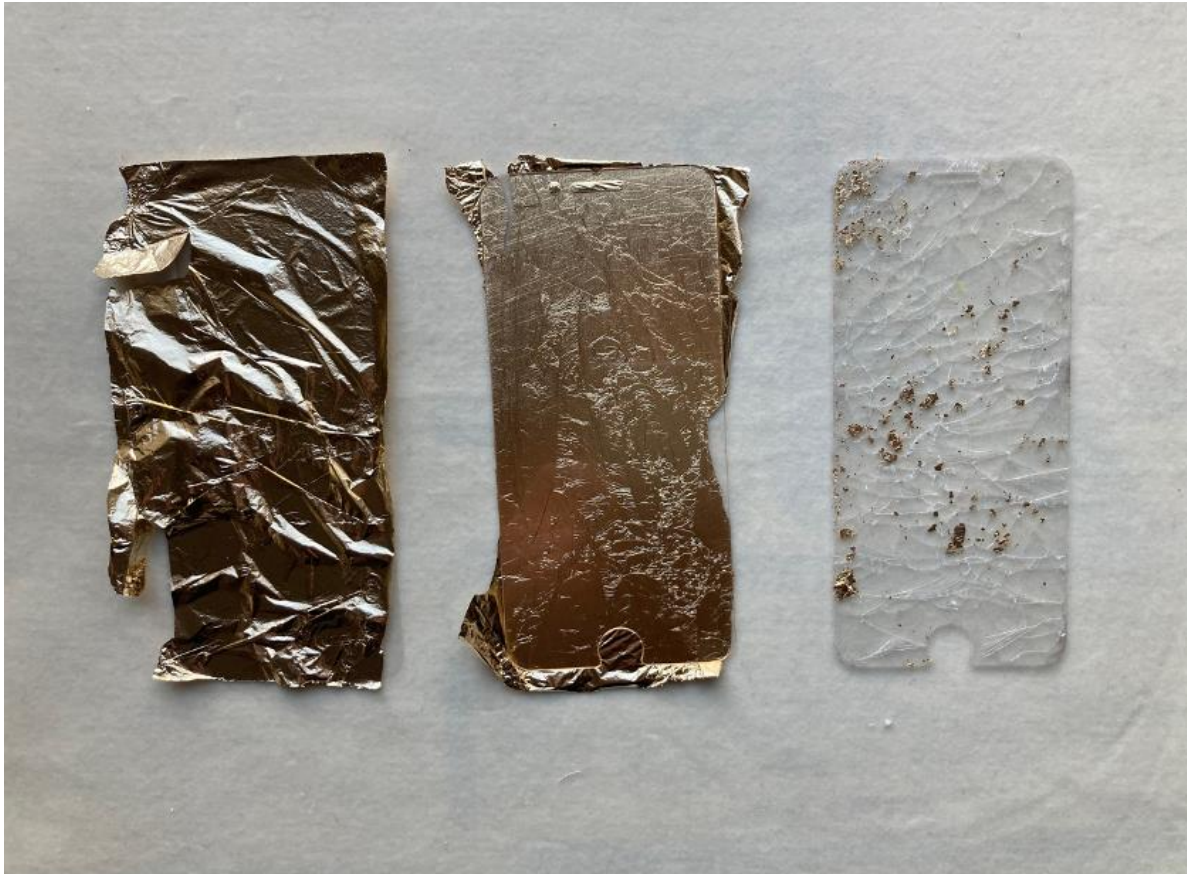


Figure 21. Touchscreen Matter (March 2021), Screen protector, and gold leaf

5.b Broken

5.b.1 The broken object becomes a surface

This subchapter discusses my material explorations of broken touchscreens, their symbolic meaning, and their physical properties. I explore how un-making and explorative touch dynamics work when an object no longer functions. The aim is to define the touchscreen as a surface through its brokenness. I address how employing practice-led methods (Methods 3) addresses the tactile comprehension of touchscreen composition and how it documents touch. To explore the broken touchscreen, I build on the idea of Entanglement (Barad, 2007) to observe and manipulate the materials considering their past encounters with the skin and future deterioration.

“Matter and meaning are not separate elements. They are inextricably fused, and no event, no Matter how energetic, can tear them asunder” (Barad, 2007, p.7)

According to Barad, Mattering is a dual combination of substance and significance; it entangles and merges them, and acknowledging one aspect of Matter means acknowledging the other. Through the material explorations in the art practice, I aim to reveal the tight entanglement between physicality and meaning, nuanced by the previous use, to look for unexpected responses. Material touchscreen qualities, compositions, and behaviour are mixed with cultural layers of use, production, waste, and mundanity. My understanding of Entanglement (Barad, 2007) through practice evolved from observing Matter behaviours in repetitive actions such as unmaking and documenting; it informed my practice's critical eye and hand. The in-depth study of the materials is even further interlaced with the cultural meaning of those elements, creating a loop and connection of material practice in between meaning and physical features. I approached this development of practice in consideration of entanglement through Care and touch. In its brokenness, the touchscreen has a novel identity; the broken thing (Heidegger, 1962) is no longer a technological device but a material holding traces of the past, which I scrutinise by employing material methods (Woodward, 2020).



Figure 22. Open Broken touchscreen (2021) work in progress from tr.ansienttt residency

In the following material explorations, I aim to materially explore 'aliveness' (Bennett, 2010) through my agency and the touchscreen material behaviours by considering it as a vibrant composite of layers that work beyond being an extension of the human body. The touchscreen as the broken thing (Heidegger, 1962) has multiple layers due to its aliveness and vibrancy (Bennett, 2010). An unlayered touchscreen is a novel object made of soft plastic and metal layers that once were conducive to touch and now hold possibilities of material manipulation unrelated to its functioning. Particularly during the lockdowns, the smartphone often encapsulated the means of contact with the rest of the world. The hand-size rectangular touchscreen scale and its continuous presence in human life interlace thinking and engagement in a particular manner (White, 2022). The engagement with the touchscreen is superficial; the glass layer is marked by fingertips until the touchscreen is broken by human activity. The touchscreen is used to symbolise the changes in the tactile experience that evolved during the @tr.ansientttt residency while looking for materials that are present daily and encompass domestic and intimate interaction and social and working communication.

The broken touchscreens become a vibrant layered surface: screen protector, sleek Gorilla Glass³⁷, with cracks and lines, showing a metal booklet at the back (Figure 22). I collected the touchscreens as bodies to dissect from the Irepair shop in Sheffield (Figure 23), then unlayered them to observe qualities and elaborate on material alterations (4. Methods). The touchscreen is a material of Future Archaeology (Glossary), an object holding the producers, users, repairers, and researchers' fingerprints and skin dust (Figure 23). Drawing from Paola Zuccotti's work Future Archaeology: Everything We Touch³⁸ (2019), I framed the broken touchscreen in a forensic sensorial reading, to formulate tactile speculations on its surface. I refer to the work of Revital Cohen and Tuur Van Balen B/NdAITaAu (2015) and Dear Steve by Herman Asselbergh (2018). The search for traces employs observation and un-making to analyse the touchscreen layers' composition. In my practice, the research acknowledges the effect of tactile agency in the investigation process through the following projects:

- UnMaking TOUCHscreens (2021)
- Broken Touchscreens (2021)- tr.ansientttt online residency
- Beyond the Touchscreen (2021)- CHI (Computer Human Interaction) Exhibition- (in Annotated Portfolio p.80)
- Postal Gesture Collection (2021)- Gesture collection material analysis
- Touching Screens (2022)-Exhibition

³⁷ GORILLA GLASS: A type of durable, scratch-resistant glass used in touchscreens, engineered by Corning Inc. Its significance in this research is in mediating tactile interactions between users and digital content, shaping both the aesthetic and practical dimensions of touchscreen usage.

³⁸ Paula Zuccotti is a filmmaker and photographer who, right before the COVID-19, started filming the mundanity of what we touch in our daily lives worldwide. The video is a documentation and gathering of people, fabrics, technology, tools, keys, bags, and handles that are touched daily; the temporary frame and idea of it being future documentation in media forms relate to the phenomenological aspect of touch of my research. It especially connects to the idea of the postal exhibition and the recording of how people touch and interact with objects, in this case, in the domestic environment.



Figure 23. Box containing touchscreens from Irepair, Sheffield (February 2021)

5.b.1.1 Broken Thing fascination, the object fascination (Heidegger)



Figure 24. Silicone fingerprint on screen while making, to exaggerate vision (February 2021)



Figure 25. Unmaking (2021), @tr.ansienttt residency

"In our dealings with the world of our concern, the un-ready-to-hand can be encountered not only in the sense of that which is unusable or simply missing, but as something un-ready-to-hand, which is not missing at all and not unusable, but which 'stands in the way' of our concern."
(Heidegger, 1962, 103-104)

The quote from *Time and Being* (Heidegger, 1962) (2. Contextual Frame) states that the Thing's capacity stands in its being unusable. When it loses its expected form, it becomes an unfinished object living in our thoughts, as its original shape is lost. The literature review based on Heidegger's work (1962) informed my change of perspective regarding the touchscreen elements emerging due to deterioration or breakage and consequently shaped this subchapter material explorative practice (Figure 25). The touchscreen, through the lens of the Thing Theory (Heidegger, 1962), becomes a functionless screen that shows its material nature by neglecting the expected visual output for interaction. The Thing is broken, disrupted, and fragmented for the eye, hand, and sense of function; however, the touchscreen is simply mutating and responding to an external agency, changing its responsiveness, shape, and texture. In establishing a new tactile relationship with the touchscreen, I draw from Barad (2007) in considering how Matter has its own Mattering, independently from human agency, which I try to glimpse through the material explorations. Interestingly, the Thing is unready-to-hand (Heidegger, 1962) in its entirety. Its broken qualities are first revealed by the eye and then by the hand; the breakage inspires the hand to investigate

its hidden, untouched layers. The broken touchscreen creates a different connection with the somatosensory sense; the relationship no longer follows a system of use and being used but on considering alien and unexpected features. The touchscreen's unreadiness for use (Heidegger, 1962) is an opportunity to perceive and conceive its internal Matter through dissecting, re-layering, stitching, painting, and appreciating its qualities.

My material exploration (in the following paragraphs) of the broken touchscreen evolved in the awareness of Revital Cohen and Tuur Van Balen 'work. Revital Cohen and Tuur Van Balen are an artist duo based in London, preoccupied with the material processes behind the everyday object in use. Their investigations in terms of artificial production uncover political, cultural, and ethical issues. Their work relates to technological processes concerning the unmaking of touchscreen layers with the production data of the smartphones. Their outcome is to return the tech object to the rough Matter as it happened in B/NdAITaAu (2015) (Figure 26); the metals return to their stone form. I contemplate the material exploration behind the objects, which I have experimented with, although without pressuring the Matter back to a primitive state. Their material questioning relates to the manufactured compounds' time transition and making and ageing processes. Their experimental approach, first fast prototyping, and trial are the elements that connect my practice to them.



Figure 26. Revital Cohen and Tuur Van Balen', B/NdAITaAu (2015) (Copyright 2025, evital Cohen and Tuur Van Balen')



Figure 27. Unmaking and un-layering with a spatula (2021) @tr.ansienttt residency

5.b.2 Unmaking TOUCHscreen (2021)

Unmaking TOUCHscreen is a collection of work composed of a video and un-layered touchscreens produced during the online tr.ansienttt residency. I recorded myself unmaking a touchscreen, a symbol of a hyper-visual contemporary society living according to digital engagement and economies of attention (Berardi, 2007). Those surfaces (Figure 27,33,34 layers) make up the inside layers of the smartphone's touchscreen, enabling an interaction with the world through digital meanings. The video and the material explorations try to investigate what is touched beyond the Gorilla glass (the pixels, codes, algorithms, microphones, and the glass layer documents).



Figure 28. Figure of the work in progress of delayering and discovering the touchscreen layers.

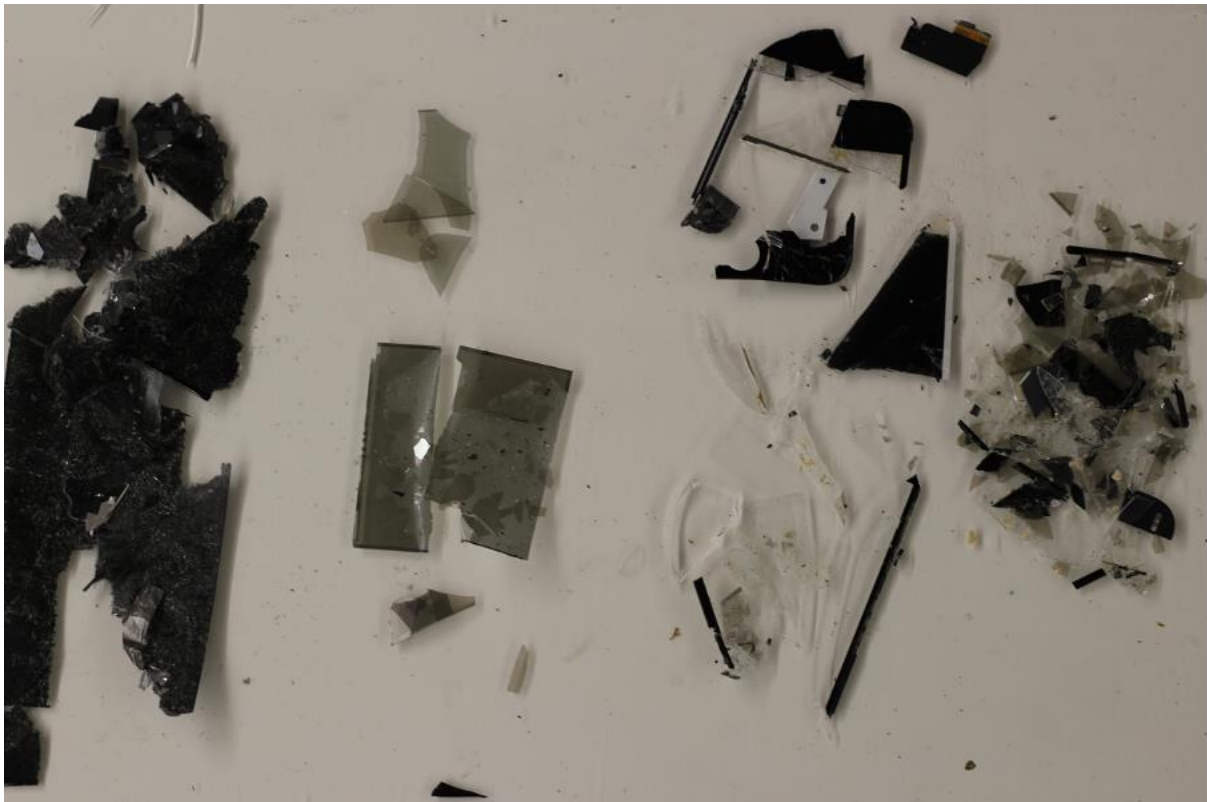


Figure 29. Broken touchscreen fragments, glass, metal, polyesters, tr.ansienttt residency (March 2021)

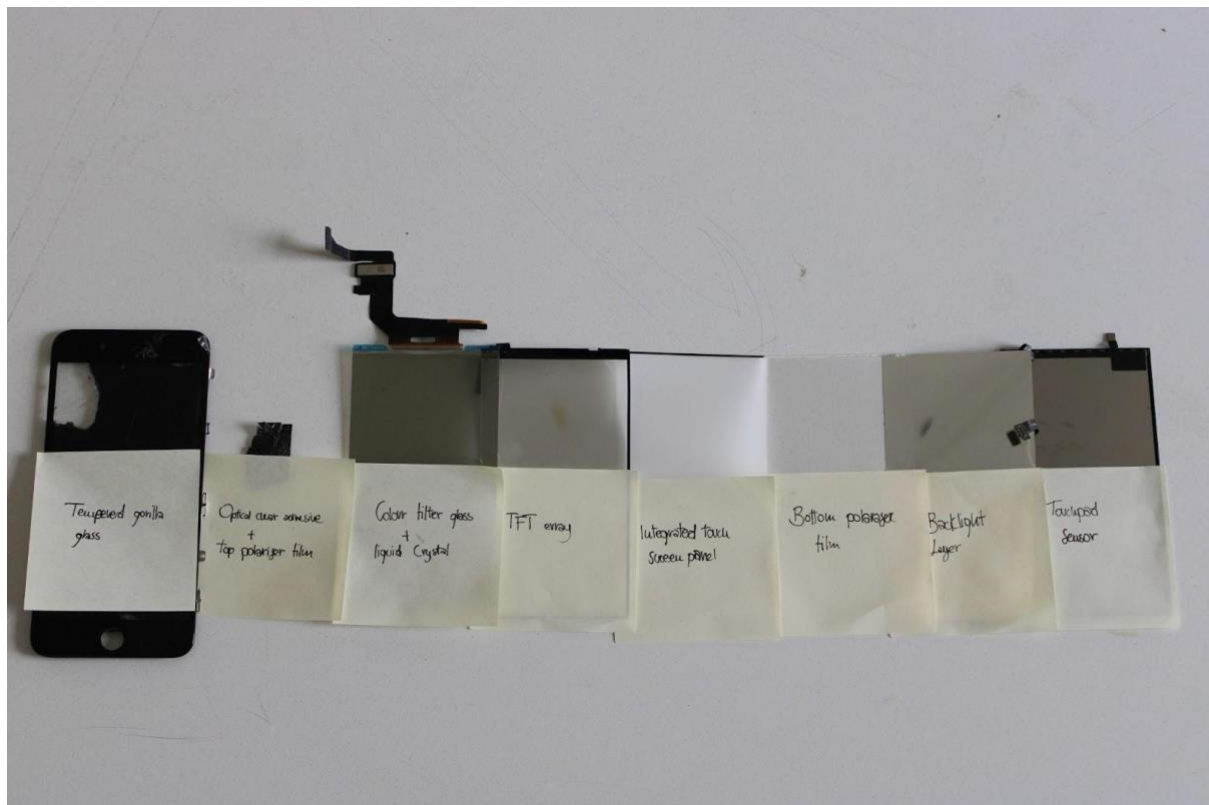


Figure 30. Layers: Tempered Gorilla glass, Optical clear adhesive, Top polarised film, Colour filter glass, liquid crystal, TFT array, Integrated Touch screen panel, Bottom polarised film, Backlight Layer, Touchpad sensor³⁹

This paragraph concerns my undoing of touchscreens in *Unmaking Touchscreens* (2021) by evaluating the work of Herman Asselberghs's⁴⁰ "Dear Steve" (2010). The displayed Mac components (Figure 30) are an example of understanding technological Matter by deconstruction. He shows the insides of a device that is an invisible part of the present-day culture industry as an instrument for content creation and a political and sociocultural instrument of today's labour.

The laptop unmaking provokes a discourse about the unknown, untouched technological material employed daily for working or leisure activity, and I see it as a decomposition of daily interaction gestures. I build on Asselberghs's unmaking process in the video *Unmaking Touchscreens* (2021) (Figure 31, and A.P p.70) and the material exploration in *Touchscreen Matter* (2021), which is about understanding and observing the touchscreen layers and their material and aesthetic relationship to one another.

³⁹ For details Editorial by Industrial Quick Search (last viewed: 10th January 2025)

⁴⁰ Herman Asselberghs is an artist, philosopher and media critic, based in Germany. His inquiry refers to the boundaries in video production when considering the friction between media and poetry.

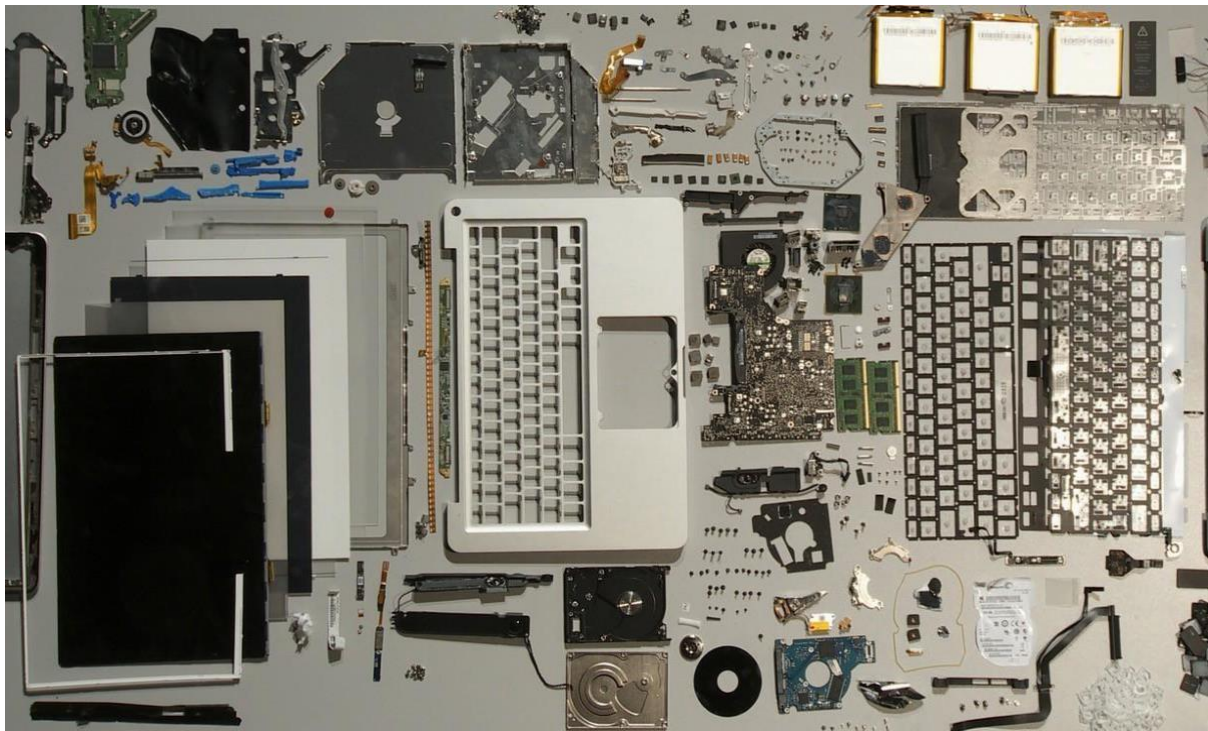


Figure 31. Herman Asselberghs, *Dear Steve* (2018) (Copyright 2025, Herman Asselberghs)

According to Roelstraete⁴¹ (2018) the work refers to the brutality of the dismantling and laying bare of the immaterial labour of the creative industry. I believe the coldness of the work of Asselberghs goes beyond its context; it refers to the newness of a perfectly working device; the object and its Matter are virgin from any labour. As the touchscreen, *The MacBook Pro* (Figure 31) refers to a wide audience of users for education, leisure, and so on. Elaborating on Berardi (2007), this attention-holding object becomes engaging on a different material scale. There is a capitalist ruthlessness in clinically dissecting a perfectly functioning laptop. For both works, the Matter of technology is the medium and the tool for immaterial labour. In my research, the touchscreen is a Matter of investigation and the material functioning tool to investigate itself (recording and documenting with the smartphone the unmaking of the touchscreen). This results in the touchscreen being a medium, but also the body of the study as discussed in Chapter 3.

⁴¹ What we are witnessing in this work is the ruthless, smooth dismantling of a brand-new MacBook Pro, and the act of literally turning inside-out the digital workstation cannot help but reveal the irreducible materiality of the one “tool” that plays such a pivotal role in the triumphalist rhetoric of so-called immaterial labour. (Dieter Roelstraete, 2018)



Figure 32. Screenshot from the video *Unmaking Touchscreens* (2021)

5.b.3 Broken touchscreens (2021)

In the following paragraph, I unfold the material exploration of the touchscreen during an online residency hosted by the account @tr.ansienttt, curated by Lydia Griffith in March 2021. During the residency, I aimed to share and provoke discussions about our tactile relationship with the touchscreen, while considering Barad (2007) and Heidegger (1962) as contextual frameworks for my material practice. The residency took place in the safety of the White Building (Sheffield) despite COVID-19 restrictions, as I was concerned about the danger of inhaling touchscreen resins at home. This shows how technological Matter can be unsafe and alien in its deterioration. In the workshop space, I created a distance from the domestic, intimate environment; I was more analytical in the clinical setting and aware of the entanglement of physical Matter and its significance and cultural meanings (Barad, 2007) in the white space with cold lighting. I discuss the work with participants in the sections about the Gesture collection and the Postal exhibition by employing a broken touchscreen to suggest changes in how technological Matter is interacted with. To follow, I present the tr.ansienttt residency work and the dissemination modes through the exhibition during the CHI conference in Bolzano. I present reflections and critiques on my research methods and the selected theories that form the framework for both events.

5.b.3.1 Meaning and physicality entanglement

I wove a denser entanglement between touchscreen Matter and new meaning unveiled by my tactile engagement. To create distance from its performativity, the touchscreen Matter and its meaning are undressed, and unmade by employing material such as textile, gold leaf, threads, and safety pins to create new material relationships and explore a novel identity for the broken thing (Heidegger, 1964).

Individually the inner layers carry their meanings, expressed in various textures, thicknesses and colours, which are recognised as part of the technological Matter. I then investigated the significance of the individual components of the explored Matter (e.g., the layers of the touchscreen, components of resins, conductive thread) in a tension between metals and manufactured synthetic materials.

5.b.3.2 Touched broken Matter

The following material investigative practice looks at touch marks on devices, focusing on touchscreen behaviours that hold signs of past interaction, becoming present documentation and Future Archaeology. The COVID-19 pandemic and lockdowns only allowed sharing my work online, leading to a sense of solitude. The touchscreen symbolised this isolation, receiving much attention and then being reused for my practice. My sense of touch restricted itself to specific spaces for prolonged intervals, forming a peculiar relationship with the little sleek rectangle: the touchscreen, collectors of traces and marks, sometimes hidden inside its layers. The @tr.ansienttt residency explores the body-mind-screen circuit spinning faster and faster during the lockdowns, bringing the three elements of the relationship closer together. The @tr.ansienttt residency had a clear purpose for the five days⁴²: to investigate the touchscreen using different techniques. The explorative relationship with the touchscreen was framed by Meeting the Universe Halfway and On Touching (2012) by Karen Barad (2007), in terms of intra-action and mattering. For the residency I planned (Figure 33) a reflection on the work of the day before, daily reading and note making, which are translated into explorative techniques (breaking, threading the layers, looking at the decomposed layers, using dust to trace fingerprints, gilding, casting, and silicone and plaster negatives). I had a couple of dissected touchscreens on my desk every morning, according to the textile techniques and qualities I intended to research.

⁴² The self-residency was an initial residency focused on the moment of touch, which was a free explorative time to explore touch (A.P. p.30).

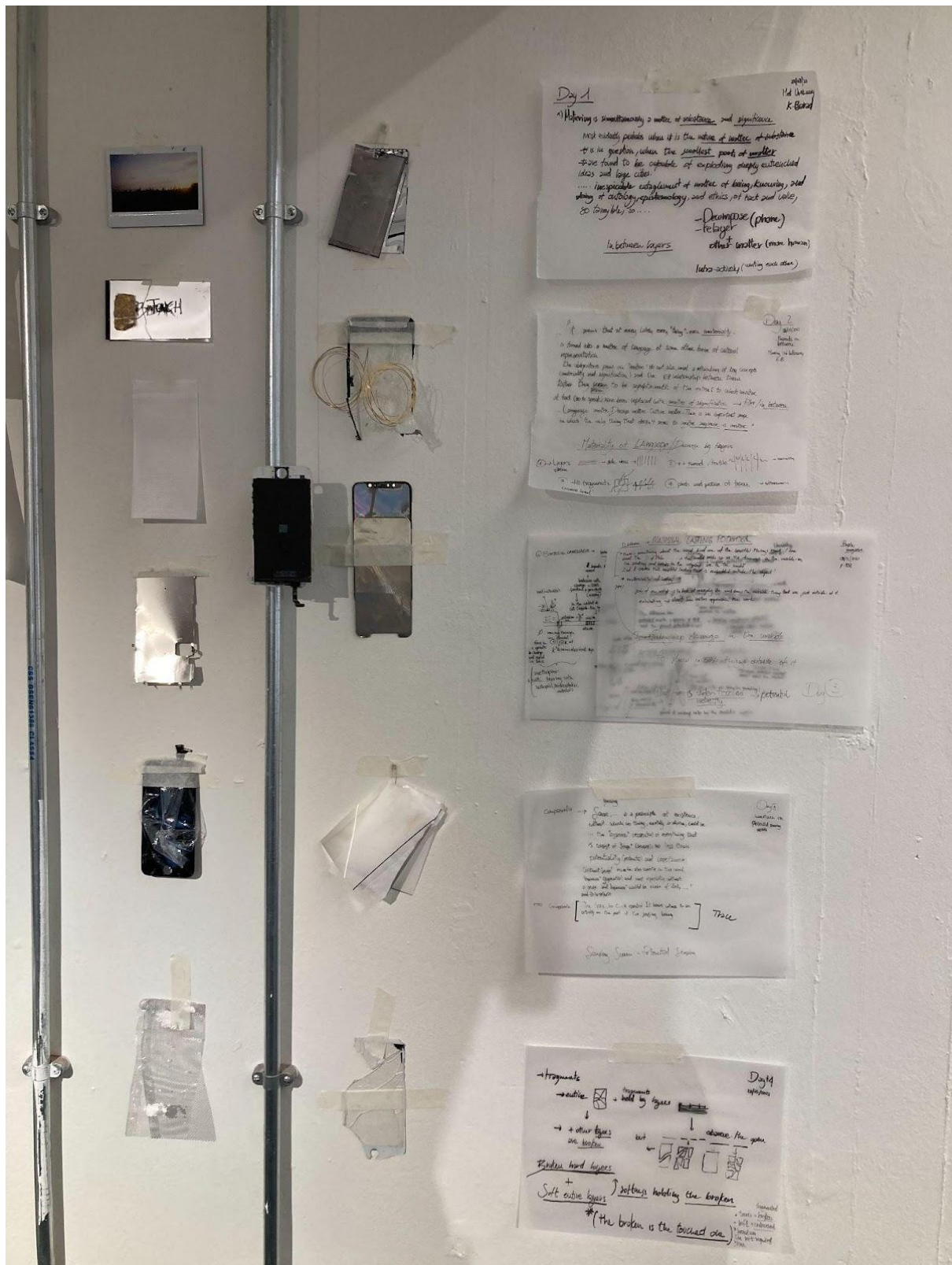


Figure 33. @tr.ansienttt residency: process figure of work, materials, and hand notes for the six days of residency

During the residency, I extensively employed my iPhone SE (2020), a rectangular solid device measuring 3.5 x 7.8cm, and Instagram to share processes and work about materially exploring wasted touchscreens. First, I embraced its physicality by measuring it with a ruler to consider its proportions as a documentative tool and daily handled object. This inquiry highlighted the touchscreen's detachment from the physical world, overlooking its presence in weight and dimensions for everyday use. Measuring helped me evaluate how my iPhone was indirectly involved in material research and its medium for sharing with @tr.ansienttt, and my Instagram audience.



Figure 34. Broken touchscreen with textured Top polarised film and cotton thread (March 2021)

To carry out the material investigation, I tried to document the embodied frustration of trying to leave a mark on the functioning smartphone to access a non-existent flesh. The most invasive intervention was stitching (Figure 34); I used a thread and a needle to infiltrate the cracked substrates of the touchscreen. The contrast between cotton, glass, optically clear adhesives, and the top polarised film resisted when I worked my way through with the needle. My struggle to form the Matter to my satisfaction resulted in the glass breakage, showing underneath softness, lightness and reflectiveness. In the material explorations, I re-evaluated my tactile relationship by bending and folding the broken touchscreen; I had to become more assertive and caring than mindless tapping on my functioning smartphone. The tactile expectations

from the broken touchscreen were not entirely under my control; intervening in its physicality required a physical forceful imposition I had never experienced with functioning smartphones. Through the manipulations of broken materiality, I experienced resistance from the touchscreens, shaping flaws and mistakes during the residency. The touchscreen resistances translated into embodied physical pain and wrist and muscular contusion when unmaking, cutting, inserting, and dismantling. Importantly I organised my agency and sensing: the left hand was the toucher and destroyer, and the right hand was the organiser and the feeler.

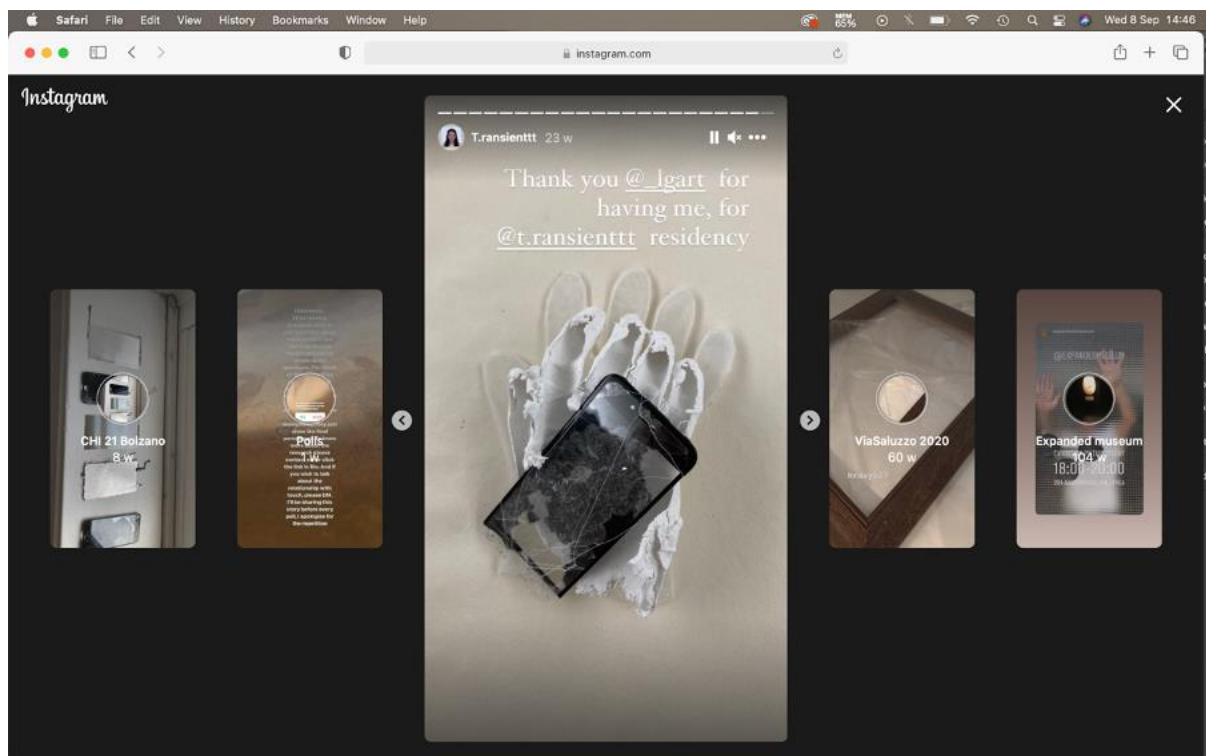


Figure 35. IG story from @tr.ansienttt residency (2021)

During the COVID-19 pandemic, the uncertain future unfolded in experiencing tactile solitude through the @tr.ansienttt residency. In the isolation, I developed an empathy for the broken touchscreens; after so much touching, they were wasted and only retouched by myself, accompanied by the disappointment that I could not convey in person the excitement of discovering, dissecting, and examining the materials hiding underneath the Gorilla Glass. I embraced the immediacy of Instagram stories to share the practice's progress and communicate better through wording, figures, and screens (Figure 35). Importantly, Instagram was not the right tool to engage physically with the participants (touchers); it only communicated my embodied skin-brain perception of the broken touchscreens. As the audience couldn't experience my material explorations, I weaved a tactile sense of being in relation to technology (Roazen, 2007). I exercised my sense of touch to dissect and discover the touchscreen layers, finding unexpected textures and consistencies expanded and extended my comprehension of my relating to technology and myself.

To document the unmaking, I employed my iPhone to take photos and videos of every process and trial. During the documentation, there was tension between photographing to share on social media or capturing the touchscreen's nuances, edges, and colours (see figures 41,42); I reflected on sharing, privacy, and the protection of the work in progress before every Instagram posting. The tension between making, exposing, and sharing right away was a tool for understanding the sense of protection, overexposing a deteriorating body (broken touchscreens) to functioning bodies (mine and the audience's smartphones). I documented only parts of the process, as capturing everything while actively creating was impossible, but I exposed the broken touchscreen entirely. The libidinal attention-sucking object (Fisher, 2011) became a black hole of interactions, allowing it to be discarded as an intra-action mode of relating.

The lights in the White Building, the Canon camera, and the iPhone camera played a crucial role in examining the object from different perspectives. Capturing the right angles for Instagram while highlighting the material qualities required a Careful balance of positioning and movement around the object with multiple intentions (Figure 36,42). I needed clear and communicative images for the residency to explain the process without too many words while allowing myself to get lost in experimentation without judgment. This material exploration helped me establish and acknowledge my relationship with the fragilities of the touchscreen, smoothing the sense of isolation. Capturing images that effectively highlighted the material explorations of physicality on Instagram aimed to make viewers reflect on how they touch their smartphones. These ideas I develop and further explore in the Instagram poll Gesture collection (p.159).



Figure 36. Touchscreen inside layer documentation (March 2021)

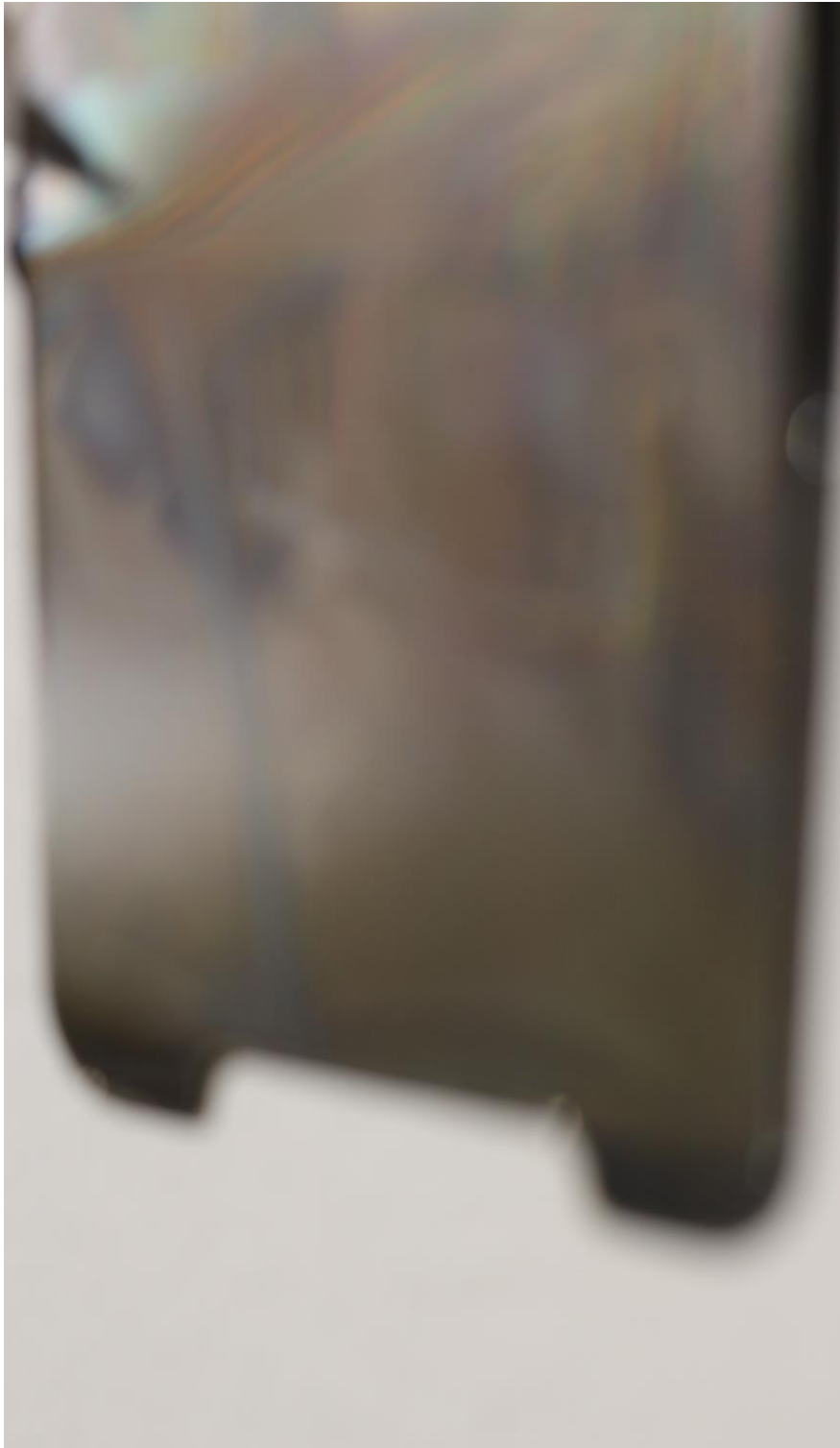


Figure 37. Touchscreen inside layer documentation.

5.b.4 Gesture Collection postal exhibition

In this section, I discuss the collection of tactile responses, gestures, and marks, considering an ethical approach to touch during the COVID-19 pandemic, and my linked reflections. I employed the Gesture Collection (details in A.P p.113) as systematic material dissemination to gather skin marks by altering touchscreens and collecting user marks. The Postal Gesture Collection allowed remote engagement with the touchscreen material and to navigate my roles as a researcher and artist. The aim was to find alternative modes to document tactile engagement with touchscreen waste. I use broken touchscreens as probes according to the method discussed in "Material Methods" by Woodward (2020). The Gesture Collection focuses on the interaction between the materiality of broken manipulated touchscreens and touchers, exploring how the Matter responds and behaves. The Gesture Collection involved gathering data for Gesture Observation and Analysis by examining the returned touchscreens and videos. In June 2021, I sent altered touchscreens by mail with instructions for touch and recording, feeling invasive of domestic spaces, with methods usually reserved for galleries or workshops. In the following paragraphs, I explain how I shared the touchscreens, collected feedback, and the significance of the collected data. This information was used to create new touchscreens and speculate on Future Archaeology by examining the material traces on the touchscreen. Drawing from Maurette (2018), and Classen (2012) I tried to place touch in a site of primary importance to know Matter. I employed two modes of documenting Touch from touchers during COVID-19:

- Postal exhibition with altered artefacts with video recordings of the hand movements of participants and drawings of the returned artefacts.
- Instagram questions about touch and interaction with polls (5.C Soft/Wet)

5.b.4.1 Gesture: collecting marks and movements

Through my touchscreen material explorations, I collected gestures as traces and marks to capture responses from the public. Gestures became my data as tactile narratives to gather and elaborate upon, considering the mode of tactile engagement and formulation of further tactile material exploration, such as embroideries. The Gesture collection⁴³ is concerned with experimenting with various observation modes to identify the marks on the touchscreen by using drawings, video, and material analysis. I considered the relationship between a person and a touchscreen to be examined for research and artistic purposes, to learn through others about the Matter, and to explore further modes of making and

⁴³ I planned one initial test with a participant I observed, then I sent 19 touchscreens to 19 participants, only 11 returned in time for the analysis. Three were sent to a person to experience alone, and eight were sent to couples to record each other touching the touchscreen.

variations on touching a broken object. The micro-fracturing of the touchscreen touch experience supported the meaning and sense behind the word gesture, which includes swiping, packing, tapping, stroking, turning, handling, scratching, etc. Initially, the touch collection was intended to search for diverse ways of looking at the touchscreen materials while engaging with people. The collected gestures were a library of primary research on the touchscreens while considering responses; the collection became a tactile participatory intervention on the Matter that I observed and interacted with during the residencies. The unmaking of forty touchscreens for the Gesture collection revealed marks, symbols, and stamps inside the touchscreen, particularly on the back of the metal booklet (Figure 38).



Figure 38. Documentation of traces of fingerprints inside the touchscreen on the polarised film (2021)

5.b.4.2 Gesture collection findings

This section includes the process of sharing through the Postal exhibition, considering the traces of touch to collect. The Postal exhibition was designed to share a material exploration created during the COVID-19 restrictions and sent to participants' houses to experience. By considering COVID-19 restrictions, I decided to combine the sharing of touchscreen with a safe video recording. Therefore, the Gesture collection is a collection of movements, marks, and videos, which together unveiled aspects of touch, such as Caressing, curiosity, and delicacy towards waste and altered touchscreens. To follow I present documentation of the altered touchscreens with gold dust, threads, thermochromic ink, and paint, to explain how I infiltrated touch, and which reflections emerged and gathered through the process of sharing and the analysis of the returned touchscreens (process details are in appendix p.204) To gather this information, I organised and suggested modes of touching, with eyes closed or open and with or without gloves. The touching was documented by another person or by having the person self-managing the documentation. I sent the altered touchscreen as copy to the coupled participants and one to the self-touch-recording ones. Figure 39 is the packing with the touchscreens before sending, while Figure 40 shows the touchscreen when returned. Figure 40, with the dirty glove and touchscreen, documents how the touchscreen was once returned. It documents the touchscreen's state before I translate it into drawings. Figure 41 is one part of the eleven-gesture observations I drew when observing the returned manipulated touchscreens from the postal collection. When drawing, I used gloves and proper lighting to capture the marks, dust, and alterations from the front, back, side, and perspective views. Through the observation I aimed to unveil the movements of the hands and stories of the participants. They mostly showed aesthetic and textural qualities of the surfaces, such as glass and dust patterns, resins creating patterns and solidifying, hidden corners, and proportions. From the received touchscreens, and the analysis through drawings and video, I developed a series of embroidery, and on reflection a sort of voyeurism developed in observing both with a sense of privacy invasion on how a toucher touches its touchscreen. Importantly, the process and the rituals of sharing and retrieving the touchscreens in times of social isolation allowed me to recognise diverse ways in which this tool for communication became a messenger of tactile traces. The traces became a documentation of time; intra-action with an object already present in the domestic environment which in its unfunctional form became a mode to reflect on technology and its perpetual mundane presence.



Figure 39. Glove, touchscreen packed, and guidance for the Postal exhibition, before sending



Figure 40. Touch Screen layers with gold coloured powder, guidance, envelope

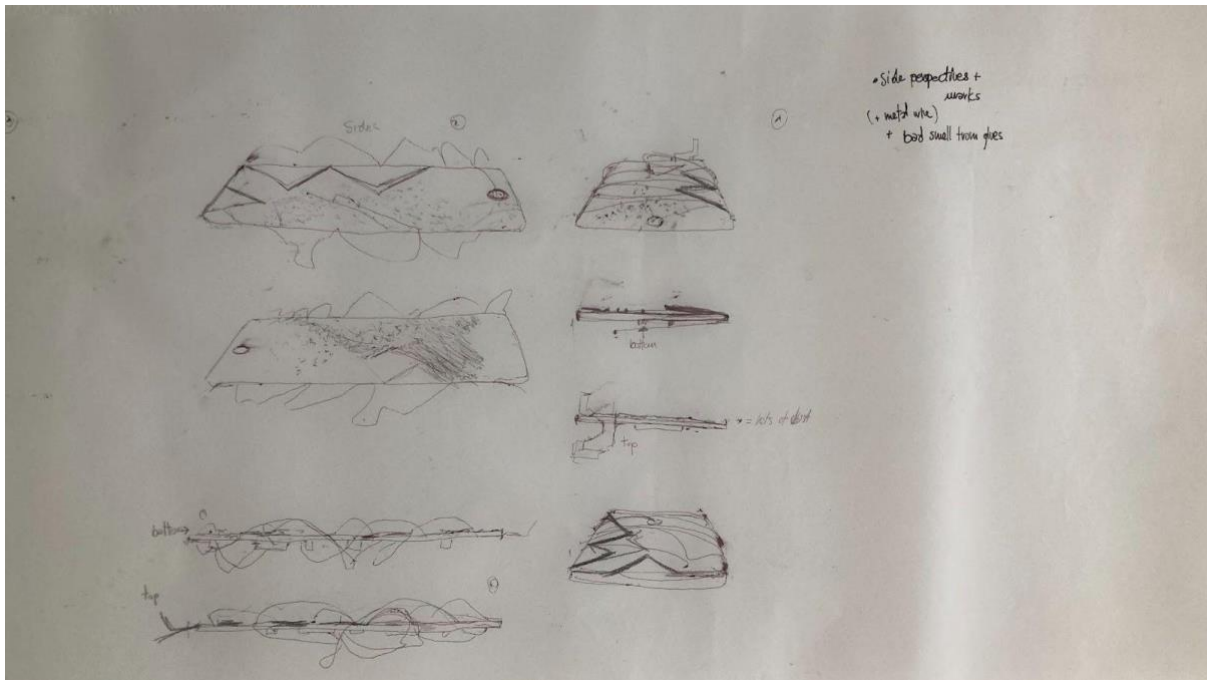


Figure 41. Tracing roll paper with the drawings following with side and perspective views of touchscreen 25, showing the metal threads around.

5.b.5. Screening Matter (2022)

In this section I present my material explorations Screening Matter (2022) in relation to Ontophany; how the being (ontos) of the broken touchscreen appears (phaino) to us (Grossman and Kimball, 2021). My work was part of a group exhibition 'When Space Becomes the Screen,' 2022, in S1, a communal exploration of projection'. Screening Matter (2022) looks at the materiality of the touchscreen through projection mapping of Gesture Collection videos, and the displacement of projections. The inside layers of the touchscreen are placed on the wall to allow different reflections and textures to appear. The intimate space of the installation aims to provoke thinking regarding Matter touched daily, creating a small environment to observe other people touching and performing movements on the touchscreen. I responded to the bareness and lighting of S1 by using the reflectivity and cracks of the screens (Figure 42,54).



Figure 42. Touching screens installation (2022), with projector and chair.

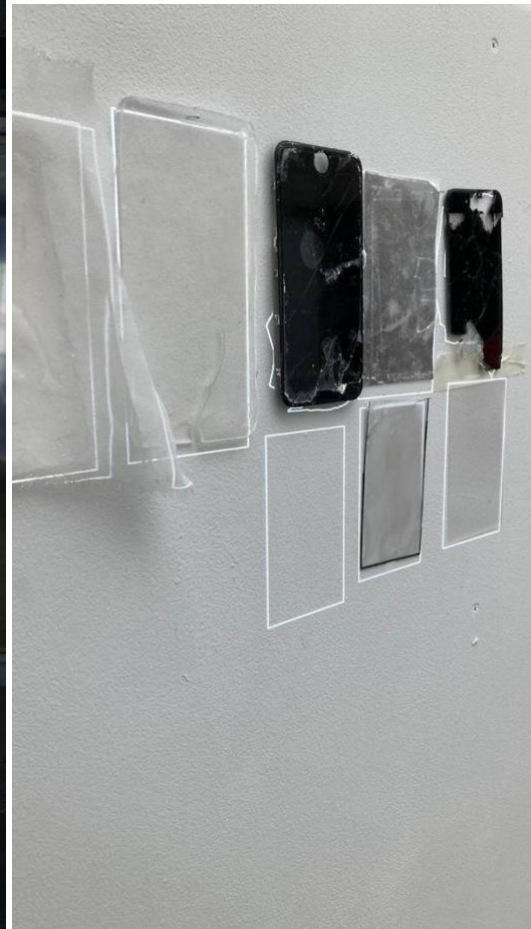


Figure 43. Detail of scanning and framing touchscreen mapping.

On the left: I used the program Lightform to scan the touchscreen on the wall, using a Lightform projector to recreate the video in small rectangles so I could show different videos simultaneously and the materiality of the touchscreens. As part of my iterative method (3. Method) this exhibition was an exercise to step away from the gestural collection by inviting the audience to look at others touching and leaving marks, shaping a waste/archaeological tactile attention to mundane gestures regarding the smartphone.

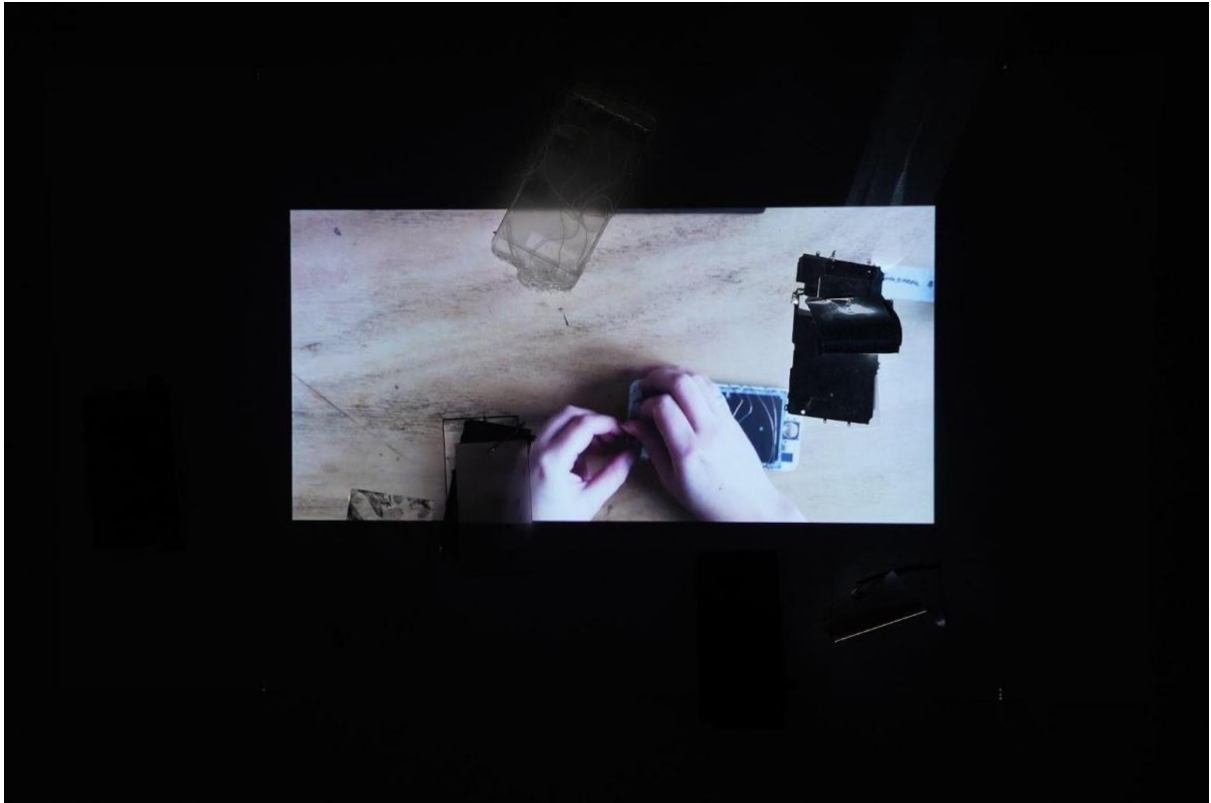


Figure 44. Touching screens installation (2022) Touching screen video from Gesture collection with touchscreens.

In *Screening Matter* (2022) I tried to stimulate home settings, to highlight the sense of observing someone else touching the altered touchscreen (Figure 44); to tease the voyeurism of the viewer, I presented fragmented videos in a touchscreen format, on real touchscreens. The inside layers of the touchscreen are placed on the wall to allow different reflections and textures to appear, challenging the idea of what the touchscreen is, and how it appears. I aimed to bring a voyeuristic feel too simple, mundane tactile interactions with technology, present as a broken thing (Heidegger, 1964), and able to show diverse tactile entanglements with the meaning and physicality of the touchscreen, as a sleek, broken, glassy, squared surface (Figure 45).



Figure 45. Touching screen video from gesture collection with touchscreens, touchscreen shaped video.

5.b.6 Defining Broken as naked, undressed material

In this subchapter I explore brokenness as defined by my material practice through the different projects. Firstly, it is the quality of Matter that allowed me to undertake the research, investigating tactile relationships of a no-longer usable object. The broken and un-ready touchscreen allowed me to un-layer and un-dress it to unveil hidden layers, to introduce textile-making techniques, and then communicate with the audience. I embraced the brokenness of the touchscreen to touch its surfaces and transform it into other materials, beyond the conception of the “broken thing” (Heidegger, 1964). As a maker I embraced this quality to express my reflections on touching technology, still entangled with the responsive power of the functioning smartphone.

Through the Gesture Postal Collection, I became aware of how the visibility of marks impacted the touchers and my awareness of tactile agency. Essentially, Brokenness is defined in its relation to the body, the non-functioning touchscreen relates to the dead neurotransmitter, unrepairable in its form; it can still partially conduct, without firing a closed circuit. Importantly this reflection is linked to the previous exploration of conductivity of the touchscreen, that in its broken form arises a consideration on the deterioration of flesh or technology. Furthermore, this tension between the broken object and the

durability of the Matter is framed by Neuroscientific research on the decay of Neurotransmitters (Damasio, 2021) and the poem "Cascade Experiment" by Alice Fulton (Fulton, 2020) (2. Contextual Frame). The tension between the two references explains the vision of touchscreen as non-functioning and dead: broken, comprehended as an independent being with a slower deterioration than the body. Through the material explorations I encapsulated this deterioration as opportunity to touch and observe the touchscreen as a material of Future Archaeology. Considering the New Materialist frame on the broken touchscreen, I employed modes of intra-action (Barad, 2007), to expand on how touch impacted the Matter and myself as transmission of energy. I opened this tactile relationship to the toucher to consider how participants touch differently. Finally, the relationship between the touchscreen and materiality goes beyond the researcher and the maker. I considered intra-action (Barad, 2007) between the broken touchscreen and the touchers within the widespread use of the smartphone in reflecting on the collective tactile entanglement with technology, which I explore further in Chapter 5, as Soft/Wet and the dressing and caring for the Matter for its death.

5.b.6.1. Unmaking touch, searching for soft traces

In this subchapter I explain how I employed unmaking as an explorative tool to prioritise touch over vision to re-establish a fleshy relationship with the touchscreen in opposition to its “ocularcentric”⁴⁴ functioning (Maurette, 2018). Unexpectedly, through the work of the unmaking touch, I found softness, and textile-like materiality which I will introduce in the following subchapter Soft/Wet. Through the work of the hand, I investigated the touchscreen Matter beyond the outer Gorilla Glass surface to understand its capacitive qualities: touchscreens are composed of transmissive and responsive layers that enable visual output from heat, pressure, and voice. When deconstructing the screen, I employed tools such as spatulas (or paint knives) (Figure 31), pliers, tweezers, and wire threads to infiltrate the layers (4. Methods). I perceived the layers by hand as resins, metals, and polymers. Importantly, my touch was initially conveyed using tools and gloves for safety and practical reasons before directly contacting the layer’s materiality. Through the un-making touch, I enact a textile mode (4. Methods) to produce insights through dissection, to know and explore and explore sensual diversities (Maurette, 2018). Consequently, infiltrating materiality meant encountering unexpected Matter; I looked inside the layers to find symbols, or any trace of production, usage, and disposal to find tactile leftovers beyond the vision-led technological interaction (Maurette, 2018). When elaborating on the Conductive quality my experience of touching the touchscreen shifted. When touching a conductive material, like the conductive thread, heat transmission involves energies and forces which grasp and take from the hand, forming and

⁴⁴ “... the material world has coexisted with that which some have liked to call ocularcentrism, a pervasive tendency to place sight over all the other sense as the most noble and trustworthy....In recent years, staggering advances in technology have led to more voices that warn about the dawn of an age of detachment in which human will lose touch with one another and will be stripped of the ability to feel empathy, to achieve real intimacy, and to experience compassion.” (Forgotten Sense, Pablo Maurette) (p.ix)(2018)

exchanging. The tactile agency shifts between one and the other, forming a bridge and discrepancies. While within the broken thing, the object receives the touch of the hand; it still touches back but is not visibly responsive. The broken, dissected touchscreen results in a shift in tactile dynamics. This time, the holder, maker, and non-user hold a manipulative agency against the non-functional object, and the libidinal object loses its attention-seeking behaviour (Fisher, 2011). To follow, I aim to unveil the capacity of touch and vision to form a new identity for an object with a symbolic function; the touchscreen becomes a material to be tacitly discovered and examined. I discuss further the details of unmaking in *UnMaking TOUCHscreens* (2021) and *Broken Touchscreens* (2021).

5.c Soft/Wet

5.c.1 Soft and Wet touchscreens

In the subchapter Soft/Wet, I discuss the tactile relationship with the touchscreen, highlighting my perspective as a maker when employing textile and casting materials to explain tactility during the making process. I applied Material Methods (Woodward, 2020) to produce material explorations that search for skin softness and wetness in opposition to the rigid and dry broken touchscreen. I searched for what was missing in the experience of touching a touchscreen: texture and squishiness (fig.57) Softness and wetness allowed me to inquire about the touchscreen's capacity to document touch by exploring unexpected material behaviours. I draw from the concept of knowing through making (Mäkelä, 2007) to explore how these techniques can help a material-centric perspective on gestures on a dry, sleek, and rigid touchscreen. I employed material explorative approaches to comprehend tactile relationships with the touchscreen, provoking reflections on the entanglement between the sensorial qualities and touchscreen significance (Barad, 2007). In this subchapter, the research questions whether perception occurs when touch is impossible. How do touchscreens' soft, sticky translations narrate stories of past touch?



Figure 46. Gorilla Glass screen delayering process, @tr.ansientt online residency, White Building (2021)

While working with the malleability of textiles and casting, I draw from textile thinking (Igoe, 2021) and Textile Philosophy (Dormor, 2020) to interrogate my tactile and material agency in creating a sense of soft emptiness through my material exploration. This subchapter aims to disclose how the touchscreen, as digital Matter, inhabits a tactile relation with the body by critically narrating my material explorations (e.g., Oorbit residency) and Gesture Collection (e.g., Instagram Polls).

I discuss the following projects to define wet and soft in relation to touched technology:

- Touchscreen as Surface (2021) -material exploration
- Tr.ansientttt residency (2021)- residency and material exploration
- Embroidered screens (2022)- material exploration
- Wet screens Oorbit residency (2022)-residency and material exploration
- Gesture Collection: Instagram polls (2021)-Online Gesture collection
- Touched screens (2022)-exhibition

5.c.1.1 Intra-acting with wasted Matter

In the experiential sensorial work of touching technology, I introduce the elements comprising conductive thread (bronze, silver) and the touchscreen back layers situated in a booklet. I focus on metal as one of the hidden elements of the touchscreen, I draw from Nikolić (2018) in considering metal a geological component of the earth, but also defines a continuous Metal Age of craft, production, extraction, embedded in the social, cultural, and political spheres of human life. In defining Metal, the New Materialist Almanac considers its presence in devices, earth, and its encounters with the skin. However, it interestingly conceives its qualities of conduction, ductility and flexibility as not entirely comprehended by the person (Nikolić, 2018). In 2023, the UN report stated that one-fifth of the e-waste is recycled from the total collection of 50 million tonnes:

“According to the United Nations Environment Programme, Waste Electric or Electronic Equipment (WEEE) or simply 'e-waste' is the fastest-growing material stream of waste on the planet. A 2015 report from the UN University estimates that about 90% of global e-waste is illegally traded or dumped worldwide (Nichols, 2015). In 2014, 42 million tonnes of e-waste were produced (Nikolić, 2018).

The amount of metal waste raises questions about future unrecycled leftovers, their decay, and their testimony of people's lifestyles at the beginning of the 21st century. Furthermore, I extrapolate the definition of metal and e-waste to consider the qualities of the touchscreen components and how the body and the mind comprehend those through tactile practice. The consequence of consistent interaction with the digital world is the constant increase of technological devices that intersect with physical reality. The novelty of technological and digital Matter leaves space to create a material and ethical culture, relating to it through artistic practices. From an ethical perspective, it becomes critical to consider the

aftermath of the digital world's material presence on earth, as touched waste, as well as artefacts in our pockets.

I discuss my tactile comprehension of touchscreens as wasted layered Matter in considering the exchange of tactile agency as intra-action (Barad, 2007) to delineate my material exploration discussion in the post-COVID-19 era (see Timeline Practice), drawing from the New Materialist contextual frame, considering electronic waste rapidly raising, and with it, metal waste. For 14 years, I have engaged with smartphones, influencing my lifestyle, politics, food, music, health, social life, and tactile interactions. After the COVID-19 pandemic, I evaluated the need for attentiveness toward personal digital belongings. Over time, technological devices have emerged as documentation and testimonies of past human agency. In studying mundane tactile agency, I build on Paola Zuccotti's "Everything We Touch" (2015) when considering daily touch as Future Archaeology. Her voyeuristic mode of inquiring about touch is close to mine when considering the daily diversity of touched materials in a future timescale. The technological Matter might become in a speculative future an archaeological artefact, a flat glass touched surface with marks of fingers and skin; the touchscreen is leftover documentation of nervous decisions and quick movements. The nerves have been lacing the body with the responsive layers of Matter, but now only fragments are left. The understanding of today's technology as Future Archaeology (Zuccotti, 2015) and objects that represent past interactions, movements, and gestures to access the cloud. I explore this through making and tactile engagement with Matter.

In Future Archaeology (Zuccotti, 2015) terms, my exploration of objects as materials is particularly influenced by the work of Danny Arsham and Thomas Thwaites (The Toaster and the Future Energy project). The two artists speculate on mundane objects as Matters of archaeology, creating a distance with touch and considering mundane objects' functioning/non-functioning duality.

Questioning emerges as: What/who is touched when the touchscreen is touched? There is a raising of liability and consideration of its Matter. Touching something for its function so regularly, I built a sense of responsibility towards it, which I addressed throughout the making. I narrate how the reproduction of the touchscreen in varied materials challenges perception and mundane gestures using the smartphone.

5.c.1.2 Searching for softness behind the screen

Hidden from touchscreen tactile interactions, softness appeared inside the touchscreen when I dissected the screen and unlayered the Gorilla glass, discovering film panels and polymer-based transparent paper-like materialities (see Broken 5b.3). Drawing from the Soft Tissue workshops organised by Becky Lyon, I attended touch as an extended sensible outer skin organ to unveil technological textural similarities with the skin. The online workshops (Lyon, 2021) focused on perceiving the diverse fleshy living Matter in the domestic environment through creative sensorial exercises during the second lockdown. When I initiated the research on softness with the project Touchscreen Matter (A.P. p.40), the project set the techniques and material choices for the following soft interventions. For the following paragraphs, I refer to touch as

‘skin thinking’ (Lisa Dowdall, 2018), a deeply embodied capacity to comprehend material otherness (Barad, 2012) under the skin in a carnal manner.

“By extension, then we can infer that skin thinking places us within worlds and suggests that we cannot meet those worlds through reason and logic alone.”
(Lyon, 2021, p.7)

This extension inspired my translation and juxtaposition of materials, such as textiles and paint (A.P. p.43), on the touchscreen to materialise the skin thinking into touching. While the exercises and the literature expanded the critical thinking behind the soft, textured materials, I adapted my ‘skin thinking’ (Dowdall, 2018) to the sleek, fragmented, and cold materiality of the screen's silicones, glass, and polymers. I worked across borders to encounter touchscreen surfaces as mutating materiality. Through the practice of thinking-feeling with the skin (Dowdall, 2018), I tried to comprehend the resonance between the marks on the wasted touchscreen, my agency, and the material itself.

5.c.2.1 Tr.ansienttt the unmaking hand (2020)

I reflect on stitching interventions, the holding hand, and the softness explored during the online residency hosted by @tr.ansienttt's Instagram account in the White Building workshop. Outside the house, following provocative material methods (Woodward, 2020), I navigated the intricate interplay between touchscreen physical Matter and its cultural significance. Stitching and soft layering were added in a second round of touchscreen unmaking.

Drawing from the concept of Entanglement and representation⁴⁵, I searched for softness and tactile traces through the “Mattering” (Barad, 2007) of the touchscreen without dividing its material components from its significance by adding safety pins to try to reconnect to tactile engagement. The touchscreen soft material board (Figure 47) considers colour, materials, and finishings, in which materials are juxtaposed and layered to show folding, bending, transparencies and reflecting. The touchscreen layers are used as texture, with fragments and a reflective background. To follow, I present two key qualities that emerged as analytical themes of the soft interventions conveyed through soft Matter in the following section.

⁴⁵ “...every “thing” is turned into a Matter of language or some other form of cultural representation. The ubiquitous plus on “Matter” does not, alas, mark a rethinking of key concepts (materiality and signification) and the relationship between them. Rather they seem to be symptomatic of the extent to which Matter of fact (so to speak) has been replaced with Matter of significance. Language Matter, Discourse Matter, Culture Matter. There is an important sense in which the only thing that doesn't seem to Matter anymore is Matter.” (Barad, 2007, p132)



Figure 47. Touchscreen layers, tr.ansienttt residency, White Building, (2021)

5.c.2.1 Threads in Between

When working on the soft alterations processes with the touchscreen, I questioned my brain's sensory input abilities. This resulted in exploring the touchscreen's tridimensionality, edges, and insights beyond my user surface touching. For the first time, my body's sensory/motor nervous system sensed the concealed inside layers of the touchscreen.

Drawing from Damasio's (2013) reflections on embodied carnal knowledge, I acknowledged the complex interlacing of my neural inputs, output, and embodied touch in the creation and alteration process. The material waste is cracked, stitched, and laced to represent past neural and tactile long engagement (Figure 48). The ISO layers' (Broken, Figure 30) layering symbolises the speculation of synapses' softness and nerves plasticity. I translated this by using cotton thread knots and looseness to merge with the tempered glass and top polarised film resins, similarly to the Mind Object (2020). I employed the soft material interventions from Touchscreen Matter (Figure 49) to stitch between the Gorilla Glass fragments, and the polarised layer (Figure 48).



Figure 48. Tempered Gorilla glass, Optical clear adhesive, Top polarised film stitched with cotton.



Figure 49. Touchscreen Matter, Screensavers hydrophobic white paint, metal net acrylic paint, and cracked touchscreen (March 2021)

This inner and soft material exploration allowed me to see the user's imprints (Broken, p16) as material traces; they inscribed a narrative of gestures onto the touchscreen, which I read with an embodied symbolic value.

5.c.2.2 Holding Hand

The touchscreen is not only swiped by the fingertips but held. On day 4 of the @tr.ansienttt residency, I manipulated the touchscreen materials to freeze the handling through plaster moulding fabric. The skin

inside folds and softness transposed to the touchscreen are captured by the hardness of the hand casting (Figure 51). I tried to merge the hand insights by locating the touchscreen in the emptiness of the cast. The castings resonate with Josh Kline's work *Creative Hands* (2013) (Figure 50), bodily extension of the smartphone, becoming made of skin-like silicone. I tried to merge the hardness and stiffness of the holding gesture to provoke a sense of missing squishiness and malleability.

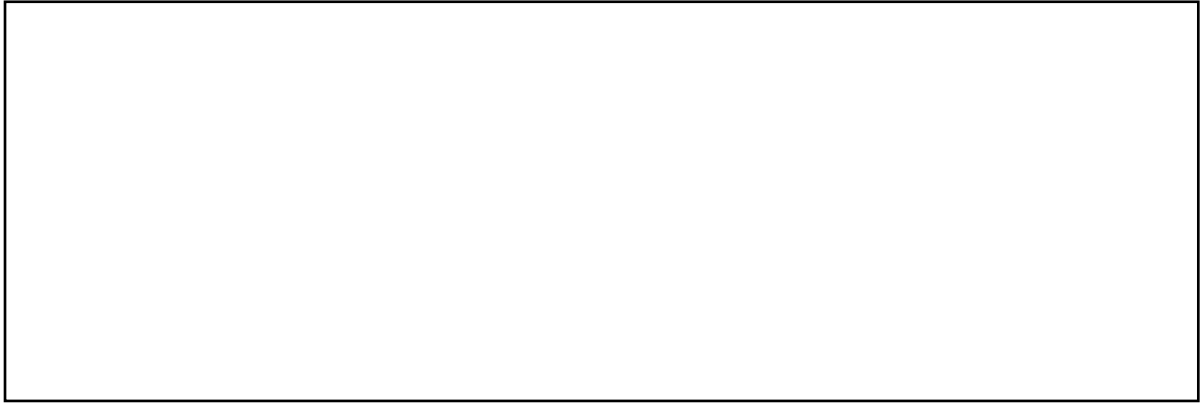


Figure 50. Josh Kline, *Creative Hands* (detail), 2013, silicone, commercial shelving, LED lights, 36 1/2 x 26 x 15 1/2". From "Speculations on Anonymous Materials," 2013–14. (Copyright, 2025 Josh Kline)

The hand-casting process was a material exploration of the touchscreen as an extended body portion (Figure 52,64); the colours and the background allowed a homogenous feel of Matter that accompanies the body perpetually (Haraway, 2003, in Ihde). My smartphone's wet plaster tissue cast was a bodily reflection, representing the hand's muscular tension from holding the smartphone for a long time⁴⁶ and the difficulty of controlling my bodily responses with my iPhone and recognising the raising awareness of my interactions with it in an intra-active manner of touching technological otherness (Barad, 2007, 2012).

⁴⁶ Also, it conveyed my left wrist injury when un-making 30 touchscreens, for the unmaking process, with the spatula during the @tr.ansientttt residency.



Figure 51. Casting negative of the hand with clay wrapping (March 2021)



Figure 52. Casted hand and stitched touchscreen in composition with the cast (March 2021)



Figure 53. Casting of the hand and painted touch (March 2021)

5.c.3 Embroidered screens (2022)

The Embroidered Screens are a soft elaboration of the Postal Gestural collections drawing analysis (see Broken B.3). I translated the drawings of fingerprints, dust deposits, and breakage lines into six touchscreen-sized digital embroideries (Figure 55). The embroideries made with a Brother machine (drawing detail Figure 56), incorporated touchscreen inside layers as part of the textile work. I aimed to draw a relationship between the touchscreen polymers and the natural fibres, such as cotton and silk. They all merge into an interpretative documentation of someone's past touch (Figure 54). Each embroidery panel comprises six drawings assembling the different perspectives from the drawing analysis, designed with a vectorial program for embroidery, Wilcom software.



Figure 54. Abstract Gesture collection drawings on tracing paper from the Postal Gesture collection

For this material exploration, I draw from the work of Classen (2012) and the vanishing of touch in contemporary society, considering the transition into a vision-led technological era. I used technology (Brother machine) to develop touchable embroideries to infiltrate these vision-touch tensions, aiming to represent the broken touchscreens with tactile attentiveness and availability for the touchers' hands. The Brother machine allowed me to translate the pen lines, pressure, intensity, and movement into running, satin or fill stitches. In translating tactile touchscreen engagement (from the Gestural collection) into embroidery, I embraced the frailty of technological deterioration through the intensity of the stitches, which contraposes with the broken thing's definitive cracks. The embroideries rise in dense softness; the Brother machine skips stitching due to the marks' over-density, like resistance in portraying touch's messiness (Dormor, 2020). The embroidery material exploration documents material behaviours (canvas⁴⁷ breaking for overstretching or the dissolvable resisting and merging with the touchscreen stitched). I reflect upon learning, reassess the practice, and research questions (Mäkelä, 2007) to consider softness, including softness in the discourse of touching the touchscreen. Material and machine behaviours include the following:

- 1) Brother machine skipping stitches.
- 2) Holes in the canvas/backing from over stitching (Figure 55)
- 3) Embroidery needle breaking the touchscreen layers.

⁴⁷ The canvas is the back layers for the digital embroidery, either cotton or poly-chiffon, while the dissolvable is a transparent polymer layer employed instead of the canvas to produce laces, it can dissolve with water or heat.

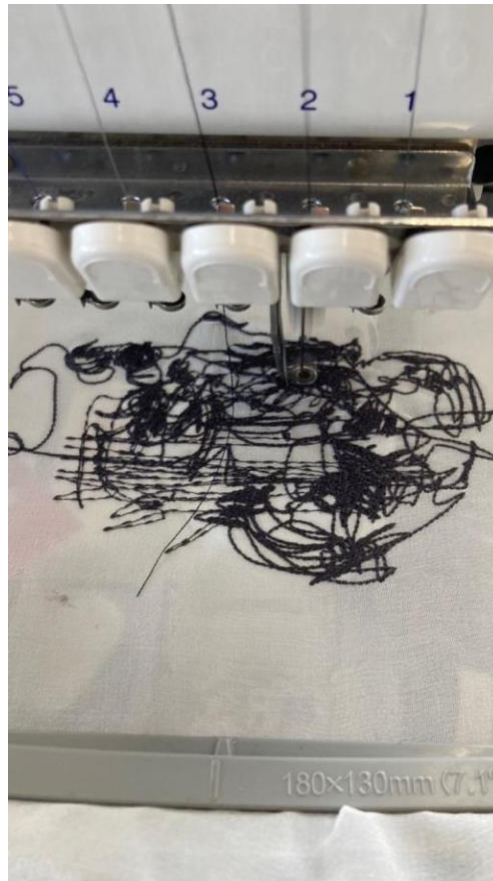


Figure 55. Work in progress of Digital embroidery with Brother Machine, polyester thread on silk, and digital drawing on Wilcom software: green lines are running stitches.

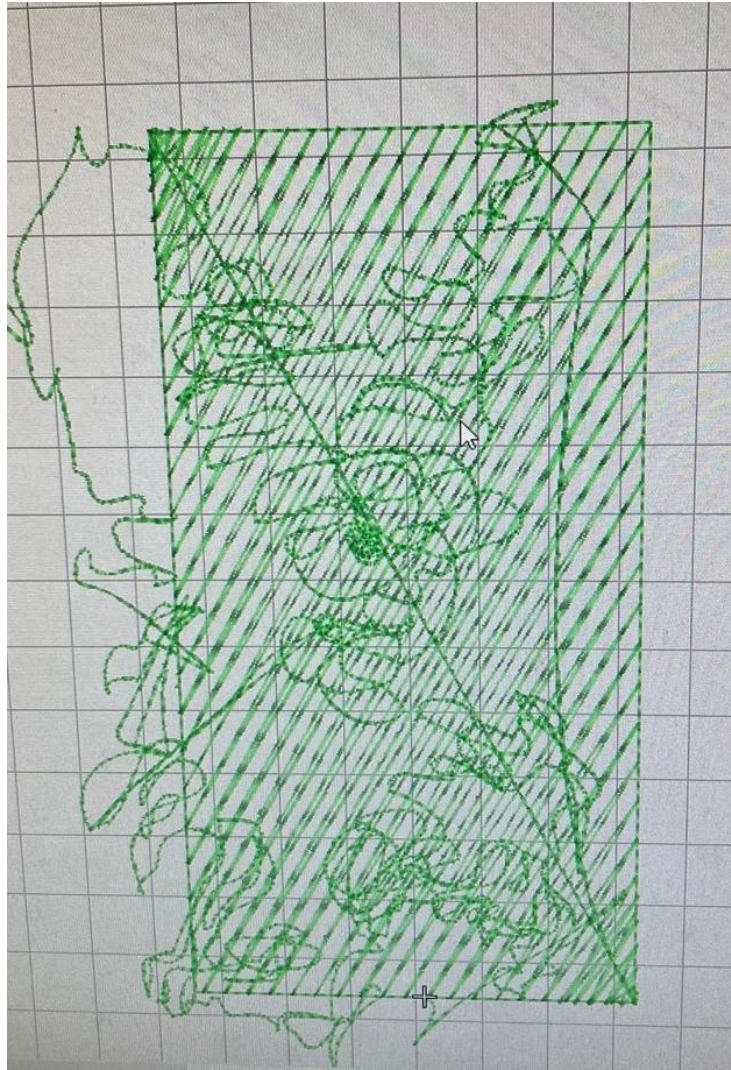


Figure 56. Work in progress of Digital embroidery with Brother Machine, polyester thread on silk, and digital drawing on Wilcom software: green lines are running stitches.

The encounter between touchscreen-textile tools (initially developed with the Touchscreen Matter A.P p.40), such as needles, cotton threads, and safety pins, was reflected in a further translation into softness through textile machinery. While making embroidery, I stepped away from the touchscreen, which permitted me to distance myself from the research subject and reflect on its touching back (Maurette, 2018) in the skin softness and touchscreen rigidity. The embroidery canvas is a new ground in which material inventiveness (Carter, 2004) and my tactile agency merge into a collaborative discourse with the machine to allow the insertions and folds of the inner screen to layer through the stitching. Reflections from my practice arose in the embroidery material's exploration of meaning and its interlacing with the touchscreen's fundamental Matter. These embroideries speculate on a tactile speculative past of softness and textural sensibilities. At the same time, the wasted, malleable inner touchscreen layers caused me a sense of consumption guilt and nostalgia toward past interactions, which I tried to convey through the following exhibitions: *Gorilla Glass* (2023) (Figure 57,69) and *TS#25* (2023 (Figure 61). More details about the exhibition are available in the Annotated Portfolio (p.182).



Figure 57. Gorilla Glass Skin (2023) Tracing paper drawings with digital embroidery and touchscreen on the wall with dirty square mirror acrylic and embroidered touchscreen at Dipolo Gallery (Aalto) for AOR conference (2023)



Figure 58. Gorilla Glass Skin (2023) in S1



Figure 61. TS#25, Conversation in Practic(s)e, 2023, Yorkshire Art Space

5.c.4 Wet Screens (2022)

In my project "Wet Screens" (2022), I explored the material limitations and sensorial extensions of touch using silicone and resin to create transparent, empty touchscreens. I discuss the production of the West Screen during the Instagram Orbit residency (March 2022), then presented as Touched Screen during the exhibition Digital Sustainability: From Resilience to Transformation at Stanley Picker Gallery⁴⁸. Drawing from Bardt's (2019) and Heller-Roazen's (2007) works, I focused on extending touch as an

⁴⁸ The exhibition, curated by Dr. Bill Balaska, was part of the DHRA 2022 Conference at Kingston University.

archaeological explorative tool to consider tactile self-awareness and material responses. Reciprocally, my practice involved an awareness of my skin's responses to touching the wet material explorations. These laced a learning relationship from materials in which failures to manipulate the resins, silicones and touchscreens informed the creative process (Heinzel, 2019). These material explorations evolved from "Touch-no-see/See-no-touch" (2020), in which a casting catalyst miscalculation resulted in undried harmful resins. Drawing from squishiness sensory explorations (I discovered material liquid capacities in Soft Screen (2020), which aligns with the brain liquidness material exploration (Mind Object Series, 2020).



Figure 61. Transparent touch screencast in glass resin taking fingerprints.

The Wet Screens material exploration focused on transparent materials, contrasting with a functioning smartphone's bright, responsive colours. I developed a sense of attachment and awareness when feeling and seeing the hand behind the resin transparent touchscreen (Figure 61).

The Wet Screens (2022) highlighted the dichotomy of vision and touch through their stickiness and responsiveness, embodying the following statement: "whilst the eye may give things names, only the hand truly knows them." (Bachelard, 1942, in Lyon, 2021). The touchscreen reproductions and encapsulation

represent the sweaty state of hands, and residual oily traces are left on Gorilla Glass to preserve the touchscreen's state, as Fisher (2004) observes in keyboard-finger interactions. Inspired by Daniel Arsham's work⁴⁹ (Figure 62) on future archaeologies, I considered the enduring nature of technological artefacts and their documentation of bodily agency.

I explored the reproduction of the touchscreen in different media and techniques, like his use of silicone glass, to suggest a future perspective on today's devices. In the following paragraphs, I disclose the project's key elements: reflection on the material exploration processes and my sensory engagement as a maker.



Figure 62. Danny Arsham, *Crystal Relic*, Nintendo Gameboy (2020) (Copyright 2025, Danny Arsham)

5.c.4.1 Oorbit, Silicone and Resins

During the Oorbit residency, I embraced touchscreen frailty and durability, informing modes of behaviour towards the smartphone. I aimed to expose the mutating person-epidermal relationship using silicon, resin casting, and textiles. The main inspiration and understanding of material frailty are explored using fragile materials to elaborate on touchscreens as textiles in making and displaying. The process of un-making (as described in the methods) involved un-layering, carefully removing intricate, sturdy layers by slowly fragmenting them and using a spatula to remove the softer ones, resulting in a structure resembling a little booklet. I worked with an incomplete state of undried untouchable Matter, in which the toxicity of resins and silicone posed a barrier to touching (Figure 63). The residency aimed to explore modes that would inspire the idea of the intimate technological device by using wet, transparent casting

⁴⁹ Daniel Harsham is an American interdisciplinary artist and sculptor based in New York. His work combines classic artistic tools such as clay and gesso to create future history using objects such as clocks, basketballs, and Gameboys. His work on fossilised objects cast in glass resins or silicon has influenced my vision of future technological archaeology. His light and pastel colour palette influenced my material choices to alter and reproduce the touchscreens. His use of a mundane object relates to an idea of a nostalgic future, which I combined with a feeling of lost interactions when new technology replaces touchscreens. His work provokes reflection that technology Matter would last longer than our flesh and become part of the decomposition history of human interactions.

materials—the opposite of what a touchscreen is. I employed casting to encapsulate and reproduce the touchscreen in several ways, immersing myself deeply into its materiality to explore its possibilities.



Figure 63. Wet explorations, resin casting hand with glove, and soft textiles

To start, I explored the creation of a void touchscreen, a material holding and showing nothing but fingerprints and signs of existence. As Figure 64 shows, I first envisioned the contours and borders of the screen using humid tracing paper and drawings from the Gesture collection (Figure 65). The drawing presents signs of wetness and bumps, which led me to reflect on the skin's wetness during the touchscreen interaction. Gesture collection detailed analysis influenced the reproductions through casting to preserve marks, cracks, and edges.

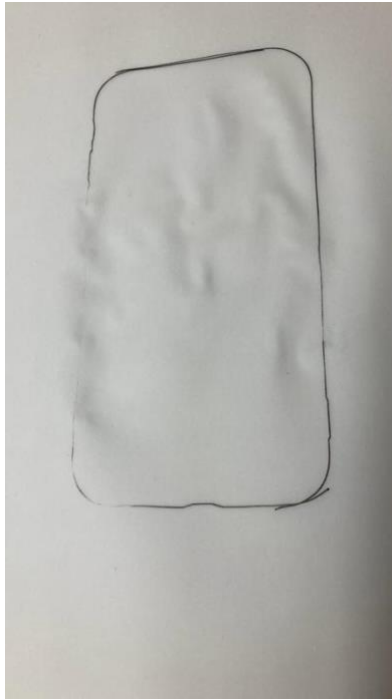


Figure 64: Empty screens, drawing on humid tracing paper

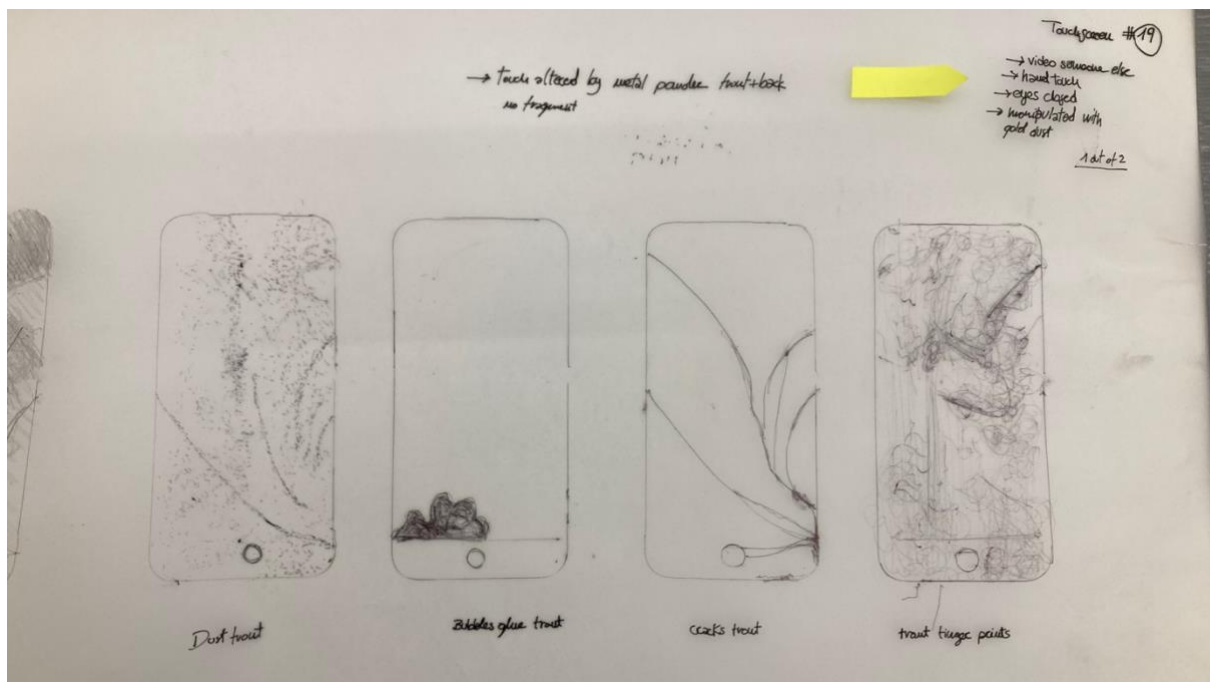


Figure 65. Tracing paper drawing from the Gesture collection

The following Figures (66, 67) depict the processes of glass resin casting, with leftovers of a touchscreen on a transparent silicone mould and the fitting of brass slate; I tried to freeze fingertip oily traces. The visually empty touchscreen highlights the absence of function in my practice of technological Matter. As an empty form, the moulds and the transparent reproduction directed attention to the malleability and stickiness of the touchscreen (Figure 68).

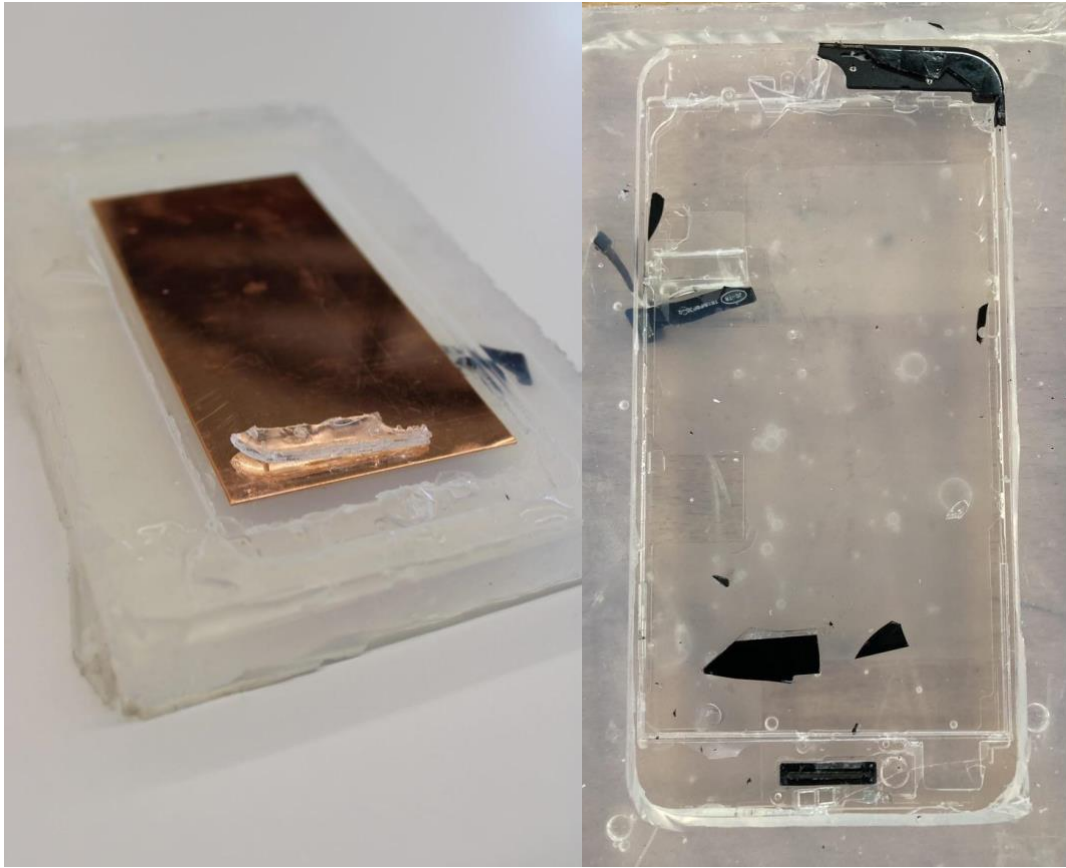


Figure 66. A rectangular metal plate on silicone/ Figure 67. Fragments of touchscreen left on the silicone casting



Figure 68. Alginate⁵⁰ and touchscreens

Before the transparent casting, I tried to document touch with alginate, a material employed in dentistry to capture teeth positioning (Figure 68). The wetness and oils of the skin are trapped and mirrored by the alginate, adding another material between the skin and the screen to capture the touch—the sense of wet interaction with the touchscreen, which I had never considered before regarding technology. The static moments of the thumb felt liquid, and the sensation of consistency and fullness arose. Touch extended beyond that present tactile moment to consider the alginate's drying time. As Fisher (2004) notes, "What we touch is touching us." In this reciprocal agency, the alginate shapes and captures the fleshy fingers and palms' consistency, touching back and capturing my stickiness. The alginate dried slowly, capturing all the lines, valleys, and details of the hand, going in between fingers. I explored the transparency and consistencies by confronting the casting materials using silicone and resin (Figures 76,77). I compared the outcomes in terms of feel, texture, and how they retained dust, cracks, and marks while keeping in mind touchscreen behaviours.

Differences Between Silicone and Resins:

- The silicone folds and bends, feeling mouldable and capturing details, while the cracked edges hold a sense of malleability. Accompanied by opacity and absorption, the cuts can twist and give a soft, distorted sense of small, touchable material exploration. While making a silicone mould, I elaborated on a material sense of disgust linked to the dependency on touching my smartphone in a frustrating relationship. The silicone mould was the base for 3D transparent resins and silicone touchscreens. Seeing the hand moving because of the transparency of the touchscreen allowed me to reflect on the “handability” of the smartphone. I became aware of my tactile agency not only as a maker but as a toucher: pressing, swiping, holding, and moving. I could see traces of heat, leftover skin, dirt, and skin lines on the silicone (Figure 69). The transparent opacity shows and captures every gesture. This material experiment explored the collaborations between vision and touch, giving a tactile, fragile, transparent surface interaction with the hand.

⁵⁰ Alginate is a stretchy, gel-like material often used to make dental moulds. Once it sets, it can't be reversed back to its original form. It is one of the most used materials in dental procedures (Nandini, 2008).



Figure 69. Material explorations with transparent silicone (left) and resin (right) touchscreens.



Figure 70. Material explorations with transparent resin (right) on screen protector.

- The resin touchscreen (Figure 70) is a brush layered on a screen protector, and both are fragmented after being pulled away from the touchscreen. I found beauty in the diversity of breakage as the materials reacted differently. The glass resin liquidity allowed me to paint over the screen protector; the layering created a sum of reflection and limpidness. The dried resin surface felt frail and textured, while cracks slightly moved away from the underlayer. On the other side, the screen protector glue captured fingerprints.

To conclude, the blurred casting of silicone evoked emotional attachment sensations, while I focused on the time of the interaction of glass resin details. The two combined in the mould encapsulate the time and feelings of my tactile engagement. The resin inside the silicone conserved the moments of the broken touchscreens. A broken touchscreen was employed to make the mould in silicone and then the positive in glass resin. In opposition, resin fixes and rigidly holds a shape, while silicone is ductile and elastic. After

reproducing the touchscreens, I tried encapsulating them, resulting in a malleable overlayer while the resin froze them, creating protection against material ageing.



Figure 71. Resin encapsulation (left)/ Figure 72. Silicone encapsulation (right)

The following material exploration (Figure 71,72) depicts the addition of textiles through the transparent glass resin material, aiming to evoke a sense of touch and movement. I aimed to create a touchscreen with contrasting qualities, soft and rigid, to document tactile agency and merge casting and draping. This material exploration (Figure 73) materialises my tactile sensibility towards the touchscreen Matter during the Oorbit residency.



Figure 73. Brush and pour resin with draped silk on a touchscreen.

I created transparent touchscreens to explore materiality through my agency toward an absent, immaterial touchscreen. I discovered traces of touch, dust, and light from the environment when observing the material exploration. When casting, I considered using small quantities of silicone and resins, without wasting any of it - even when the process failed - to be environmentally conscious. This drew a parallel consideration on the sustainability of smartphone production and waste. During the residency, the touchscreen underwent a process of reproduction and preservation, symbolising the realisation that its Matter belongs to none. It will deteriorate, even if encapsulated; it will take much longer than flesh to decay, holding the trace of human touch. The Oorbit residency became a reflective time to interpret intimate modes of being with technology at the end of the COVID-19 restrictions. It allowed me to reflect on the possibility of engaging in tactile relationships on and on while freezing tactile

documentation of interaction with the touchscreen. The transparent Matter reminded me of the importance of touch, creation, observation and being. I have shaped a carnal, embodied relationship with the touchscreen by altering it, examining it, and rethinking and returning to it. As a material person (understanding the world through the composition, structure, and behaviours of elements), I have slowly and delicately moulded a relationship with these varied materials, which I tried to convey and explore digitally through Instagram Poll.

5.c.5 Through the screen, Instagram polls

With the Instagram poll I aimed to gather responses based on visual provocation and sensorial questions; for example, Figure 74 derived from the empty, soft, wet screen exploration as fast testing. The Instagram polls (see A.P p.86 for all polls) design was rooted in the literature review of "The Inner Sense: Archaeologies of Touch" (Roazen, 2007), and they were inspired by the Touchscreen Matter (2020) explorations (A.P p.40). I employed the literature review to question touchers' tactile awareness, focusing on interrogating their perception of touchscreen-like surfaces, or broken touchscreens (Figure 75). To design the polls was challenging due to the instantaneous nature of Instagram; I employed a visual-driven approach that portrayed body parts and touchscreens. I posted the picture of my hand to represent the gesture the viewers did when holding the smartphone before tapping with their thumb on this Instagram story.



Figure 74. Instagram poll screenshot with the result; Instagram Polls

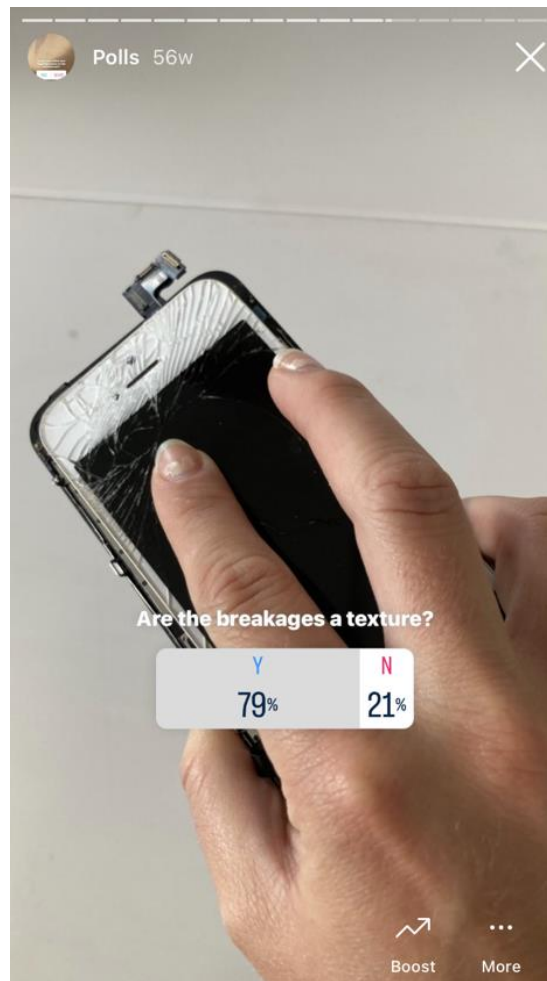


Figure 75. Instagram poll screenshot with the result; Instagram Polls

The Gesture Collection aimed to transform observers into responsive participants, the sample included my followers familiar with my research from conference and exhibition dissemination. The polls of followers increased during the COVID-19 pandemic, and it broadened online audience access, exposing diverse knowledge through screens. Through Instagram, I could openly share content, transcend traditional researcher-participant roles, and foster genuine interactions. This convergence of online content with reality highlighted the active participation in the research process.

During the COVID-19 pandemic, I used Instagram to reflect on and share the features of broken touchscreens and the mundanity of touch developed through the making and the literature review. I formulated the Poll by considering how others might perceive their touchscreen tactile engagement. This approach drew from Madeline Schwartzman's Instagram account @seeyourselfsensing (Methods 3.5). Her work explored full-body sensory perception, and I formulated tactile experience questions like hers

to align with inner and outer sensing (Roazen, 2007). I was inspired by philosophical campaigns like Prada's 2021 advert by Ferdinando Verderi (Dialogues: Prada S/S 2021 campaign). I refined visually driven Instagram questions from my tactile experiences and the literature review. I created the polls after reflecting on my Instagram residency, which was solitary, centred on display and curation across two accounts—mine and the curators, without seeking engagement. The Instagram polls aimed to find an effective tactile way to share my research and provoke a few responses. The touchers responded the most (100 responses) on touchscreen texture questions (Figure 75), during the lockdown, and engagement decreased to 20/30 responses after (Figure 76).

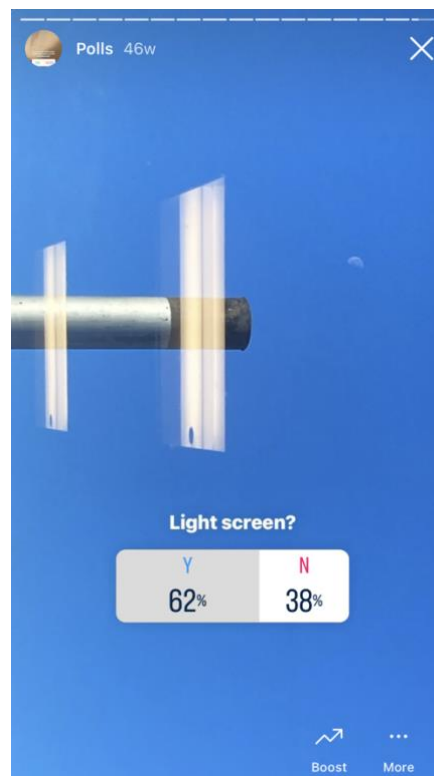


Figure 76. Instagram poll screenshot with the result; Instagram Polls

The Gesture collection through Instagram resulted in a reflection employing my functioning touchscreen to provoke reflections for the participant on touching their touchscreen through my material explorations. Notably, the participants I met in person after the polls asked questions about the research and the touchscreen materiality. A reflection on the materiality of digital interaction sparked and is discussed in the following paragraph.

5.c.6 Touched screens (2022)



Figure 77 Touched screens (2022) for DRHA22 at the Stanley Picker Gallery, Kingston University.

The "Touched Screens" installation at the Stanley Picker Gallery (Figure 77) features wet and soft material explorations resembling touchscreens, positioned strategically within the gallery corners to interrogate sensorial extensions. The work is a part of the Digital Research in the Humanities and Arts (DRHA22) conference, themed "Digital Sustainability: From Resilience to Transformation."

This spatial distancing encourages contemplation by engaging the senses with the fragmentation and fragility of the device remnants. I aimed to create a spatial separation between the viewer and the screens' disrupted, untouched soft and wet surfaces.

Skin agency, lights and sensors activate touchscreen response, triggering an operating system that interacts with our hands; it is constantly capable of adapting and performing according to requests. I present the touchscreen as an intimate responsive symbol of contemporary digital interaction (White, 2022). Through the viewer-Matter distance, I aimed to suggest the human performance of the smartphone, which has become a content-creation instrument through our voice, finger movements, and gaze. In the "Touched Screens" exhibition (2022), I adopted a material-centric perspective to exhibit the narratives conveyed by my material-manipulated remnants and touchscreen reproductions. I displayed the fragmented Matter and its tactile interactions to redefine the subject-object relationship, with smartphone materiality as the

subject. Drawing from Doueihi (2013), digital technology is culture, which I interpret as a material culture encompassing the components' sourcing, production, use, and eventual deterioration. Daily engagement transforms digital technology into part of our sensorial culture (Classen, 2012), lacing personal attachments, customisation, and the preservation of the touchscreen waste in a home drawer. Digital Material Culture intertwines digital content and data with the material history of devices, such as smartphones, prompting new avenues of inquiry as human lives become increasingly intertwined with technology.

5.c.7 Making and defining softness and wetness

This subchapter has explored how material-centric perspectives convey qualities of the body—softness and wetness—through interactions with technological objects. I have introduced selected projects that evolved from rapid prototyping to in-depth material explorations and iterations, encompassing display modes and audience engagement. These projects investigate the nature of touch by stitching together layers and wrapping broken screens. While searching for technological softness, I encountered sticky wetness in the touchscreens and malleability in textile materials. By creating material explorations of touchscreens' soft and wet attributes, I considered the touchscreen as digital Matter, a material symbol of interactions, and a portal to online space. I questioned the material exploration of the tactile qualities of technologically touched objects within the gallery context and on Instagram. This research offers an alternative perspective on technology, evaluating human tactile adaptation to the touchscreen. Working with technological Matter developed parallel with the rising sensation of being stuck with a libidinal attention-sucking object (Fisher, 2011) transformed into encountering and thinking of the material amalgamation. Contrasting the creation of embroideries with crafting resins, I developed a sense of attentiveness and Care when working with the Brother machine. This process differed from working with resin and silicon, where my intention and knowledge aimed to make these materials accessible to the public despite their failure to dry appropriately. This contrast highlighted the role of the object-artefact in research (Mäkelä, 2007). Experiencing the soft qualities of the produced and analysed Matter through my eyes and hands provided insights into material behaviour. Understanding and reimagining technologically wasted Matter as a textile was a learning experience that required a sense of interactivity and the agency of touch. I was looking at an empty transparent touchscreen for a tactile narrative with significant emotional value.

5.c.7.1 The making relationship with the soft touchscreen

This subchapter deals with touching and being touched by the touchscreen. Through wetness and softness, I had to consider modes of making that work on softness through an attentive and caring touch.

The Caring/Cared subchapter discusses the manners of touch, which consider dealing with closeness and the need for distance from technology. The wet screen embodies the wetness of skin and its underlayers, while the softness of embroidered folds reflects the subtle and intimate interplay between touch and resistance. Through practices of force transmission and emotional touch, I witness and participate in the mutating encounters between myself and the materials, where agency is shared and co-constructed. Furthermore, my interpretation (Mäkelä, 2007) creates a reciprocal material mutation between the somatic sense and technology. In tactile investigations, Matter and mind are significantly entangled in the continuous process of defining one another (Malafouris, 2013). The practice of force transmission reflects Barad's (2007) work, capturing the mutating encounters and discourses between myself and the Matter. Consequently, I became a witness and actuator in a relationship where materials facilitate or resist specific manipulations considering activity and passivity. In conclusion, this subchapter has emphasised the necessity of material exploration to investigate technology and touch through making. This approach builds on the diverse possibilities of making, offering a productive means of understanding material qualities. By categorising projects based on material qualities, I have narrated a journey encompassing feeling, destroying, making, and observing. These four actions, presented in a non-chronological manner, represent various stages of attempting to comprehend Matter through tactile material interventions. Considering the touchers and my tactile agency, I employ emotional touch (see Inert Matter A.3.2) to address the imaginative tensions in the impossibility of touch for the squishy, resinous touchscreens. It raised the evaluation of making touch in a caring manner, considering longer periods of tactile engagement that provoked a reflection over being touched and cared for by technology.

5.d Caring/Cared

5.d.1 Making with Care

In this subchapter, I explore the tactility of touchscreens, building on the Conductive, Broken, and Wet/Soft chapters. The Caring/Cared subchapter presents findings of qualities in considering the relationship between skin and technology, a Matter of more than daily encounters. Through my material explorations, I discuss Care as attentive practice and sensorial touch (de la Bellacasa, 2017). I question how touchscreen documents touch from various parts of the body and how material explorative approaches can comprehend tactile relationships with wasted touchscreens. I investigate the somatic sense through the entire body and its relation to the proportions of wasted materiality by drawing from Neuroaesthetics and New Materialism. I observe bodies as nervous Matter and touchscreen as deteriorating surfaces. I employ material explorative approaches, such as displaying modes to juxtapose touchscreen layers with textiles, clothes, embroidery, concrete, walls, gallery interiors, plaster, and exterior places. The study of bodily relating to touchscreens includes reflection over touch as an extension of the brain in domestic space during the COVID-19 pandemic. Caring/Cared is a sub-chapter of qualities as findings; this quality emerged from observing my practice and considering the touchscreen under the lenses of Digital Humanism, which I critique by relating touchscreen layers to flesh, skin and other materials.

I delve into the Neuroaesthetics programme by SFSIA21 (Neidich, 2021) and how it informed perspective and material explorations on brain-body relationships to influence the bodily perspective. I employed provocative Art Based Methods (Woodward, 2020) to consider display material explorations and discover Caring/Cared as embodied qualities of the touchscreen tactile relationship. The discussion includes material explorations created during the COVID-19 pandemic and subsequent years, where I consider Care as an attentive touch practice (de la Bellacasa, 2017). Care is the lens that displays modes and compares touchscreen layers to textiles, clothes, embroidery, concrete, walls, gallery interiors, plaster, and exterior places. The study of bodily relating to touchscreens includes reflection on touch as an extension of the mind in domestic space, especially during the COVID-19 pandemic. The projects unfold chronologically; I present and discuss them in a narrative that shifts from focusing on Care by considering the body to moving towards the displayed touchscreen, unveiling the tensions between flesh and technology.

- Theory of Screen Mind (2020)- material exploration
- Cloth screens (2022)-material exploration and exhibition
- Caring screens (2022)- material exploration in S1 (gallery)
- Cared Screens (2023)- exhibition

5.d.1.1 Caring for the touchscreen

From the analysis of the practice, the theme of Care emerged when I observed alteration and displayed steps described in iterative cycle methods (Chapter 3, p.4), considering the meanings layered on the Matter of the screen. To explain Caring/Cared, I draw from notions of display and materiality by Edythe Dekyndt (2022) and the relations with technology discussed in *Matters of Care* by de la Bellacasa (2017). Drawing from the work of de la Bellacasa (2017), practice and material-based research enable an understanding of material exploration as an attentive, caring agency. Caring is an implicit choice in crafting and exposing the touchscreen when considering my continuous closeness to technological surfaces touched by others.

I observed and engaged with material experimentations attentively to provoke discussion with the touchers; in *Cared Matter* (2022), I represented a caring relationship with technology by manipulating distance and closeness to illustrate how the evocative power of touch and past intra-actions create infinite possibilities for caring and formulating embodied and affective sensing. In *Cloth Screen* (2023), I intertwined the relationship of touchscreen and skin through textiles and garments. I discuss Care as a material-quality touchscreen relationship by giving insights on material, clothes, and space that inform a sense of relating beyond user-driven interaction. To disclose insights into findings through the complexity of iterative systems of material methods, I explain personal choices by employing textile thinking (Igoe, 2021) about screen materiality. The discussion of artistic practice considers the Matter of the body and brain/mind system to explain the raising of embodied tacit knowledge.

5.d.1.2 Touching visions and Care

Caring comes with the allure of the future, and caring for the Matter in the present transforms the possibility of what remains, with the prospect of technology in the speculative future. As stated by Bill Gates at the beginning of the new millennium, we are in the "age of digital senses" (de la Bellacasa, 2017), regarding our use of biometrics, and vision, haptic and audio activated technologies. But I interpret it as the continuous sensing of technology, in particular the touching of glass, metals, and polymers, which are now examined for their provenance and making, as in the artwork *B/NdAlTaAu* by Revital Cohen and Tuur Van Balen, in which software composites are dismantled and pressured into a geological looking artefact. Technology as digital Matter and its senses are transformed into compressed material by speeding up a geological process. The alterations come with the knowledge of the material compositions and with the consideration of the wasted Matter as holders of traces. I developed a body of work inspired by *Matters of Care* by Maria Puig de la Bellacasa (2017), which established Care by focusing on awareness of how Matter influences touching. I draw from the chapter *Touching Visions* (de la Bellacasa, 2017) to present the bareness of tech materials, especially when it comes to the experience of people's touch and

distance during the display. Closeness with touchscreens invokes the discomfort of caring while touching technology remnants. The skin-responsive relationship to materiality is unlayered through Care when the Matter shows its dismantled state. Moving away from the idea of the audience as technology user, I highlight the embedded Care in touch and interaction with wasted material through Careful placements and protections for the touchscreen. I delve into de la Bellacasa's (2017) work to frame touch in the gallery works in collaboration with vision, inviting contact after observation. The ethical enquiry underlying the use of touch and technology is a crucial aspect of our research, as underscored in the following statement:

"Standing here as a metonymic way to access the lived and the fleshy character of involved Care relations, the haptic holds promise against the primacy of detached vision, a promise of thinking and knowing that is "in touch" with materiality; touched and touching. However, the promises of this onto-epistemic turn to touch are problematic. If anything, they increase the intense corporeality of ethical questioning." (p.95, de la Bellacasa ,2017)

In being involved in somatic care relations as an artist I am interested in this material relationship with technology, in the role of skin in reciprocal touch, questioning first materiality and then ethical stances (de la Bellacasa, 2017). This materiality often seems alien, acting as a curtain or portal to the online world (White, 2022). Introducing embodiment involves making as stretching skin extension, considering interlacing materialities as encounters with otherness within somatic, nervous, and layered extensions.

5.d.2 Cloth Screens (2022)



Figure 78. Cloth Screen (2022) work in progress

The Cloth Screen (2022) was developed to shift the research question into how the touchscreen touches soft materials other than the skin. It is a series of material explorations juxtaposed to reflect the de-layered soft and plastic-like layers from the touchscreen inside. The cloth was employed as textiles, fibres, and garments to provoke a comparison with the touchscreen layering.

I draw from New Materialist theorist Karen Barad (2012) to understand touching otherness (Barad, 2012) as the mundane encounter of reciprocal mutation. Touching otherness, as material, is considered in a caring agential manner and behavioural observation of the other. In the COVID-19 pandemic context, I contemplate the presence of clothes as appearance and ontophany, drawing from the work of Grossman and Kimball (2020) as a connection to the mundanity of touch beyond touchscreen edges. I present the touchscreen layers and their relationship with worn materials like jeans, coats, and sweaters. I assembled soft materials gently, using layering to reveal delicate narratives of their interactions (Figure 80) to leave space for the Matter to present a new relationship with the toucher through clothes. Figure 80 is a close-up of a puffer coat on a chair, with many touchscreens in pockets and a few layers on top of the lining. I sourced the touchscreens from Irepair in Ecclesall Road and clothes from charity shop Age UK. Both materials hold signs of their users and stories. The touchscreens are similar

(changing in size), but the garments were all different in colours, textiles, size, and signs of usage. I applied my professional understanding of vintage, fashion, and textile second life to assemble cloth materialities with touchscreens while transmigrating Care from clothes to technology.

5.d.2.1 Being touched by Matter

Touch, as contact, is an action of two independent substances; it goes beyond the pressed, swiped, and Caressed materialities; it is an intimate action that requires the intention of encounter. When they meet, I employ touch in caring forms to consider the Matter's willingness and material behaviours. As Maurette (2007, p.7) suggests, “to touch means to be touched.” The tactile caring agency has two sides: the touching element (myself) is touched, and by closeness, it can create a response; the bridging feature of touch forms a sense of reciprocity. I draw from *Forgotten Sense* (Maurette, 2007) to delineate material practice's reciprocal sensing and sensuality. The literature review inspires modalities of touch for making; reflections emerge from juxtaposing varied materials. In material exploration, *Cloth Screens* (Figure 79,80,81), touchscreens and clothes were investigated by placing them in pockets close to collars. I wore the found garments to embody movements and usage of the phone to consider modes of placing; I considered the inside of the touchscreen layers and their stickiness in being glued to one another. I wanted to place soft materials on garments to revitalise the relationship between softness and hardness. The project reflects on making and thinking of intimacies and behaviours, as bodies and reflections on letting touchscreens decay with coats and child socks. The touchscreen touches many aspects of our lives by touching clothes in their diverse functions and shapes.



Figure 79. Hand holding rectangular textile folded as touchscreen/ Figure 80. Cloth Screens (2022) in S1 presented with wasted sock at Fashion Fare in Doncaster/ Figure 81. Wasted cloths and wasted touchscreens in suitcase (S1).



Figure 82. Detail of touchscreen on grey coat in S1/ Figure 83. Dress and touchscreens on chair in S1/
 Figure 84. Cloth screens (2022) oat and resin touchscreen presented in Fashion Fare in Doncaster

The intervention shows the materialities of holding, touching, and grasping the touchscreen, moving beyond touch as a skin-device relationship. From material explorative approaches, the touchscreen relates to other materialities, such as spatial ones and those relating to the body. I explored these relations by including narrations on touching surfaces such as pocket lining, tables, cables, floors, bed linen, and chairs. Leftovers of the touchscreen are carried around in my backpack and suitcases (Figure 82), often wrapped and packed but scattered everywhere. Figure 82,83,84 document the work progress: leftovers on the chairs as forgotten interactions and assembling smartphones on coats or trousers. While the touchscreen carries human traces on the glass and sides of the smartphone by breakage, touch, and use, cloth holds testimony of the wearer by stretching, wearing out, washing and often by following body shape. Both materials respond to body shape, heat, and movements, and clothes wrap and cover the body in diverse ways, reminding and suggesting that touch with a touchscreen does not imply only the use of the hand. It works with the entire body: face when calling, lips and ears when recording audio, and teeth and mouth when holding too many things. Even the belly is touched by a touch screen when lying down and talking with someone.

The observation of a touchscreen is framed by considering its presence, not being touched by skin, and yet being carried around inside pockets or bags. Throughout the making of Cloth Screens (2020), I reflected that the body and cloth are both touched by the touchscreen, while the touchscreen is touched by the softness of the skin and the lining of the pocket. In the following paragraph, I present touchscreens as objects touching different portions of clothes, skin, and domestic objects. Cloth Screens (2022) is a fusion of touchscreens, embroideries, and remnants of touchscreen insights integrated into various garments like outerwear, loungewear, and denim.

5.d.2.2 The touchscreen and the body

Cloth Screen (2020) refers to Ontophany as the appearance and 'manifestation of being' (Vial, 2018). Drawing from Grossman and Kimball (2020), I explore an embodied, intimate relationship with technology. Juxtaposing soft and hard materials (Dormor, 2020), I use clothes 'weariness' to show how technology and textiles recall skin sensing. During COVID-19 lockdowns, I materialised domestic spaces at the edge of the Zoom screen by confronting touchscreen materiality in public spaces like the S1 Gallery in Sheffield. Cloth Screen (2020) envisioned a future where touchscreens and clothes are acknowledged in their mundane presence beyond Zoom screens. Empty, disregarded clothes confront the body, translating the same sense to the touchscreen. Small embroideries (Figure 83, grey coat) link to past touchscreen interactions. As Esrock (2001) states art infiltrates the body through somatosensory

organs, reaching and touching a person. I use fashion and textiles to suggest encounters with skin, engaging all somatosensory senses. Technology, like clothes, is lived by humans in a dynamic relationship of meaning and metaphor (Sobchack, 2016). This skin relationship formation involves encounters and forces transmissions within the Intra-action frame (Barad, 2007). Cloth Screens (2022) communicates unexpected ways touchscreens interact with skin and clothes, using remnants of both.

5.d.3 Cared Screens (2022)

Cared Screens (2022) is a material exploration displayed at S1 Gallery in Sheffield. I experimented with touchscreen elements (metal, glass, paper) in objects that, while no longer functional, invited new interactions with the gallery's materialities (walls, glass, concrete). Framed by Barad's concepts of Intra-action and Entanglement (2007), Cared Screens (2022) draws on Maria Puig de la Bellacasa's Touching Visions in Matters of Care (2017), redefining technological relations and establishing boundaries between Matter and touch. Touchscreens act as a bridge between space and the visitors' bodies, activating technological Matter through the flesh. My interaction with these screens transformed them: broken and altered by touch, then observed and touched anew, often protected with textiles or repositioned. The S1 space became a 'zombified' zone for deactivated touchscreens—archaeological relics of tactile interactions. Cared Screens (2022) reflects on forgotten, discarded smartphones as tactile memoirs, evoking a sense of attachment and Care for these everyday objects.

5.d.3.1 Matter, Edith Dekyndt

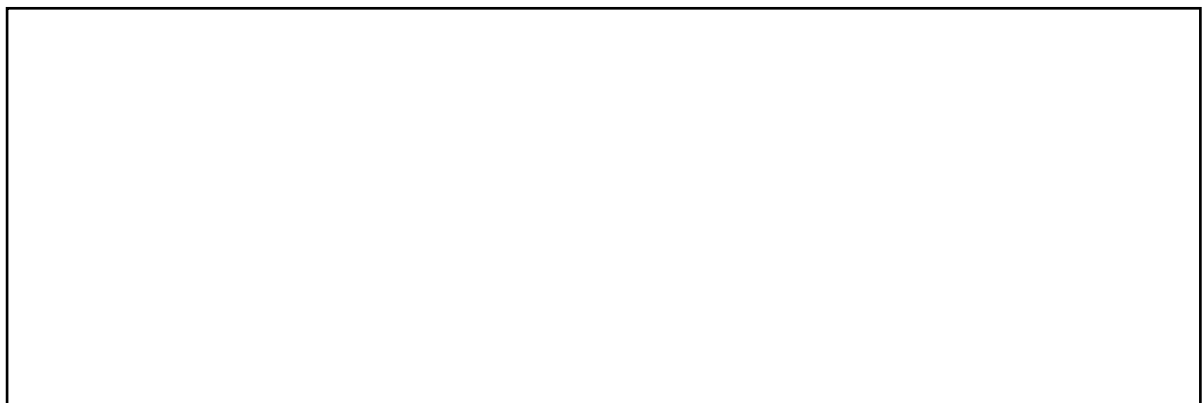


Figure 85. Edith Dekyndt, Paradise syndrome (2014) (Copyright 2025, Edith Dekyndt)

I frame the idea of material Care in my practice by drawing from Edith Dekyndt's work, particularly her use of material placements and juxtaposition to inhabit space and refer to the body. Reflecting on her work and interviews, I thought of touchscreens as living and still objects made from textiles, resin,

silicone, and other materials. This revealed how ageing impacts metals, polymers, and cotton. Dekyndt's practice, inhabited by wasted and reusable materials, considers material relationships within and beyond her work. I draw from her modes of presenting mundane Matter in various spaces. Her time-related approach to materiality has been influential, focusing on light, ageing, and viewer-object experience. Her work made me consider the visible unmaking of textile materials and the contrasts between softness and stiffness. Her work's rectangular and square forms (e.g., Figure 85) are disrupted by non-geometrical and non-linear time processes. Material disruptions and breakages transform objects into something new, resonating with their initial form while including new material qualities. Time's ongoing impact on my work aims to form encounters and translations of daily materials into unexpected forms akin to material transformation and translation.

5.d.3.2 Cared Screens in S1

In March 2021, I experimented with provocative display methods to centre technology for five days at S1 Art Space. The bare concrete walls and natural light provided a backdrop for exploring the material essence of the touchscreen. Continuing with the iterative practice described in the methods (Chapter 4), I explored materiality by considering its compositional relations and how the digital Matter of the touchscreen can Care for me, revealing our tactile relationship:

- Exhibiting touchscreen layers challenged perceptions and invited contemplation of its essence.
- Placing touchscreens on floors and walls created transformative intimacy, encouraging viewers to reconsider their relationship with technology.
- Highlighting the visitor as material showed the interconnectedness between bodies and technological materialities, shaping perceptions and interactions within the exhibition space.
- Broken screens symbolised shared experiences and personal narratives, challenging notions of waste and obsolescence.
- Resuscitating material to respond to touch without utility sparked the latest ideas for future interactions, suggesting possibilities beyond functionality.

I describe the journey of Care between Matter, myself, and touchers on a day-by-day basis, presenting the current iterations and contaminations with the literature review. This exploration addresses the question: How do I practise Care when displaying wasted touchscreens in the gallery space?

As materiality becomes central to the investigation, using artistic practices and material exploratory approaches, such as art-based methods (Woodward, 2020), for display. My method draws from material methods (Woodward) and was inspired by Zuccotti's work (2015); in S1, I, I explored making, thinking, and changing through and with materiality while considering mutual plasticity. I structured the discussion around material explorations (touchscreens) and spatial materials: concrete (Day 1), Walls, Glass/Window (Day 2), and Visitors (Day 3), to then consider Care (Day 4) as a Research mode. As my first experience

in an experimental gallery space, I explored distinct roles and modes of engagement with the space, visitors, touchscreens, and their materiality. While maintaining the research role, I transitioned from maker and curator to photographer, enjoying the intimacy of the work through the camera. I used Polaroids (A.P. p. 133) to exercise material observation in the gallery space, searching for new ground and light, which was an analogue approach that did not include any technological documentation. The use of the Polaroid was instantaneous and layered a sense of time in the observation of touchscreens.



Figure 86. S1 Space work in progress with material placements, S1 Art Space Day 1 (2022)

I divided the experimentation time to focus on positioning the object on different spots and considering how the work interacts with the space and the body of the visitor. This is presented in detail in the Annotated Portfolio p.126.

5.d.3.2.1 Day 1: Concrete

In S1 Space, mass-produced touchscreens became unique records of touch, marked by cracks, lines, and traces of skin. I explored Care as attentiveness, considering the materiality of HCI⁵¹ (Human-Computer Interaction) in artistic forms. This perspective focuses on the ethics of touch and non-interaction with discarded touchscreens, which now co-exist in a more-than-human world. As de la Bellacasa (2017) notes, Care can expand to treat technology as a Matter to be Cared for. The placement of materials began with the concept of wet (Figure 87) untouchable touchscreens. Coated in resin or satin, these screens were positioned just out of reach, inviting contemplation on touch and the boundaries of interaction. Through "caring" for the material, I engaged with the tactile relationship between the screens and the space, inviting a reflective experience of these objects beyond their original function.



Figure 87. Wrapped screen with satin and glass resin finger (2022) on concrete in S1

5.d.3.2.2 Day 2: Layered Touchscreens on Wall

⁵¹ HCI (Human-Computer Interaction): An interdisciplinary field focused on designing, evaluating, and implementing interactive computing systems. In this research, it examines touch-based interfaces like touchscreens and their influence on user behaviour and sensory engagement on.

Reflecting on past exhibitions, I reimagined the display strategy for touchscreens. These were placed close to the wall (Figure 88), encouraging tactile interaction, while soft materials flowed around them. The placement mirrored body interactions with technology, activating touchscreens as active, embodied participants in the space. Through this arrangement, the screens became symbols of material decay, linking past experiences with current use.



Figure 88. Broken screen with glass resin on plaster white wall, S1 (2022)

5.d.3.2.3 Day 3: The Visitor as Nervous Matter

The relationship between touchscreen materiality and the human body deepened on the third day. I explored how the body's interaction with the screen—both through proximity and touch—shaped its materiality. By positioning the screens in varying ways, I highlighted the tactile relationship between the viewer and the screen, encouraging a more embodied engagement with the objects (Figure 89). Now broken and unresponsive, the altered screens embodied a sense of decay, inviting reflections on the technology lifecycle.



Figure 89. Visitor in S1 space with touchscreens on concrete (2022)

5.d.3.2.4 Day 4: Care as Research

In S1, I observed how the positioning of broken touchscreens transformed them into symbols of shared experiences. The screens, once functional, were then hanging (Figure 90), placed on the floor to embrace new ways to inhabit the space and build a new relationship. Curating and displaying these objects allowed me to reflect on the materiality of technology as it moves from a tool of interaction to a Matter of memory and Care.

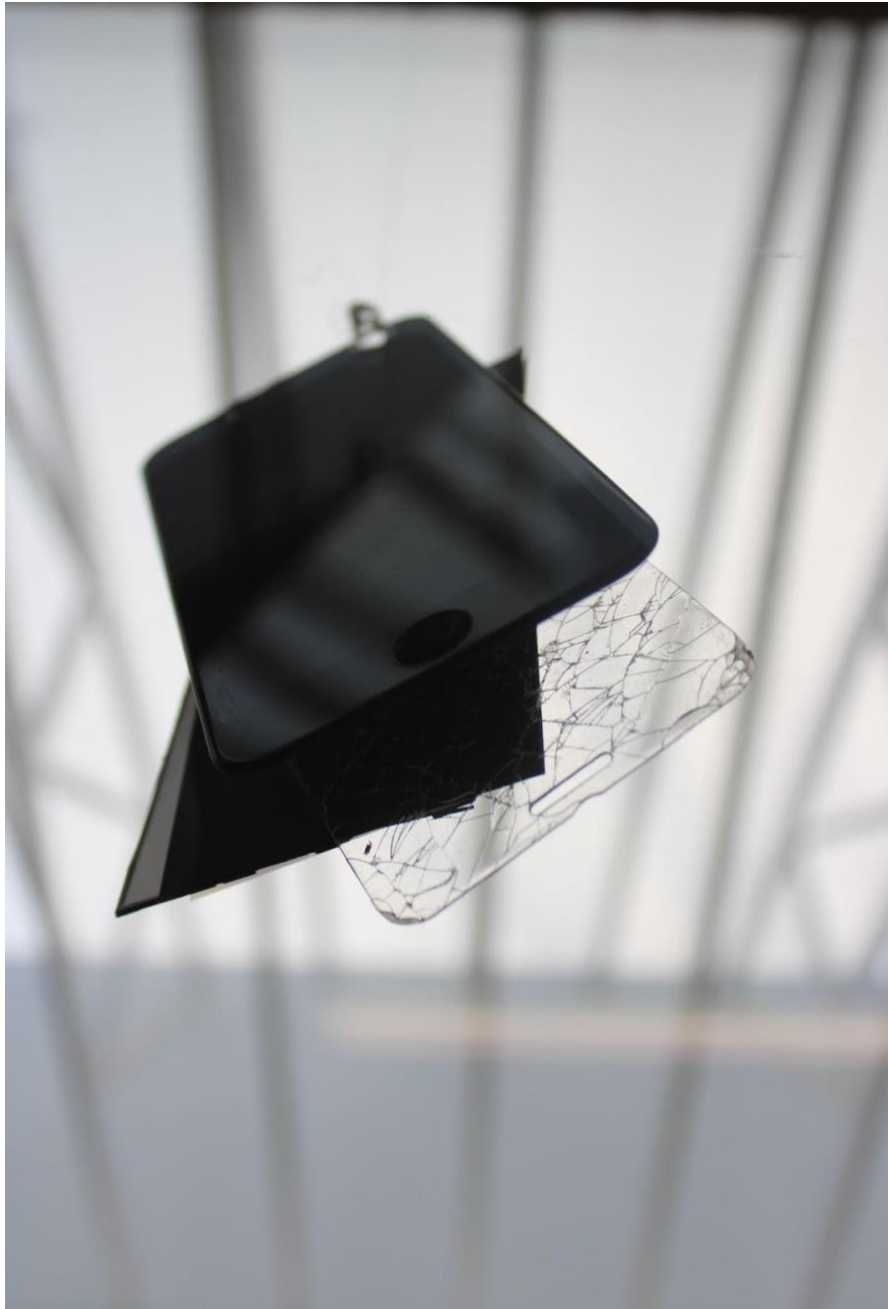


Figure 90. Hanging touchscreen with the ceiling in the background (S1)

5.d.3.2.5 Day 5: Touched and Cared Matter

On the final day, after observing the evolution of the screens, I focused on sensory engagement without direct contact. The broken screens, now stripped of functionality, became material bodies, transmitting meaning and energy even without active interaction. By positioning them as inert objects, I explored the idea of "touch" as both a physical and sensory engagement that occurs reciprocally—between the screen, the viewer, and the space.

From the idea of Ontophany (the appearance of being) (Grossman, Kimball, 2020), I worked on the appearance of the touchscreen and its presence in the gallery like a layered agglomerate of glass, stones, and paper. I reflected upon the touchscreen re-touching in my practice notes as: The appearance of being after being used. The abundance and perpetual repetition of interaction with the touchscreen make the selection and dissection of the touchscreen an exercise of essential interactions and moments. Today is about embracing the changes of technological materiality, lasting longer than human flesh and the changes, both as decay and changes of behaviour and interaction. What is it when the Matter comes out? I am the maker and the researcher, but I am a participant in the research and the one who builds a consciously nervous relationship with a wanted Matter of human interaction. Why not shape the work around my experience of the touchscreen and its materiality? Why not present a presence when there is none around, and you are left with the leftovers of a handy interaction? Importantly, this appearance of being is studied by considering Esrock's (2001) statements on how vision can study an inner sense of touch. The following reflections deal with the experience of situating the practice and finding modes of disseminating while experimenting with materiality. The relationship between technology, art, and the body is presented in two points. First, art is a bodily and material experience that functions throughout the whole body. The second is the function of technology, its utilisation, and the relationship with meaning in the dynamic relationship with it. This is something I tried to convey in my display methods and relating to the mundanity of the audience's touch. When the touchscreen was functional, it was like resurrecting the screen to respond to touch without flashing lights. The presence of multiple people in the space heightened the sense of interaction. In S1, touchscreens were present and shared, while the discourse on re-touching, as in the Postal Exhibition, paralleled the idea of re-engaging and having an entangled presence. Device materials still have desirability, as metals and wires will last longer. It may not be a discourse of being dead or alive for humans but their being potentiality. Through Care, observation, and distance, I embodied the New Materialist (Barad, 2007) perspective to consider the Matter for what it is. However, I cannot grasp its meaning beyond entanglement with my experience of touching it. Nevertheless, I found space throughout my roles in which its beauty narrates and provokes thinking far from its usability. As mentioned earlier (in the Soft/Wet subchapter), the relationship with technological Matters concerns the entire body, including arms, posture, skin, eyes, lips, cheeks, and ears. The inner layers of the touchscreen relate well to the softness of jerseys and wool, creating a story between touched and untouched objects. The investigation of touch in a mundane environment and workshop moved to the gallery space, where shifting materialities evolved into thinking of Care softly, as traces of touch were marked like embroidery. To conclude, I must acknowledge multiple tensions in our relationship with technology. Tensions include the concepts of touching/being touched and Care/caring, where materiality becomes an active part of daily life. My material explorations are the outcome of the idea of Care about voyeurism, observation, and an intimate relationship with technology, which is built and consumed daily. From Cared Screens (2022), two perspectives shaped my relationship with touchscreens about Care. First, I employed intentional attentiveness as both maker and user and second, I acknowledged the use of

wasted materials. I touched non-functioning touchscreens with embodied awareness to re-sense past interactions and investigate Care as preserving Matter. Outcomes from Cared Screens's display experimentation inspire criticism of Digital Humanism by framing technology through its materiality and daily tactile engagement.

5.d.4 Caring screens (2023)

In 2023, I was awarded a Digital Humanism Fellowship at the Institute of Human Sciences in Vienna to further investigate my critique of the Manifesto. This research draws from New Materialism, investigating Intra-action and Entanglement, and highlights tensions with the Digital Humanism Manifesto. While Digital Humanism aims for human and technological co-development by shaping technologies to ethical human values, it overlooks material concerns about technological waste and bodily use.



Figure 90. Caring Screens (2023) Temporary installation, Mirror glass, mini-camera, silk, e-waste touchscreen, IWM

I investigated further studies on Care while I developed a temporary installation, Caring Screen (2023) (figure 93), in the library of IWM Vienna to respond to the Junior Visiting Fellow Conference 2023 and discourses and encounters that happened at IWM during the Fellowship. The installation consisted of touching the decomposed touchscreen after unwrapping it. Hand movements and gestures were recorded by a mini motion-sensitive camera facing tray and paper mirror (Figure 90). The video recording (Figure 93) modality was inspired by the Postal exhibition for the Gestural Collection; I was curious to set a similar filming mode in a public space. Over four days, four people engaged with the

touchscreen without proper rules, and there was no set mode of touching or sensing. Mostly, touchers were intrigued by the consistency of silk wrapping the touchscreen more than the screen itself. Interaction with touchscreens becomes seamless and repetitive daily, yet shared experiences and experiments around the table in the IWM library inspire a sense of meditation on sensing. Mirrors and recording cameras aim to highlight and provoke a sense of awareness toward the shared agency of touch. The library room (Figure 90) invites moments of intimacy, Care, and attentiveness toward technological materiality, enabling us to continue with our fast-paced lives.

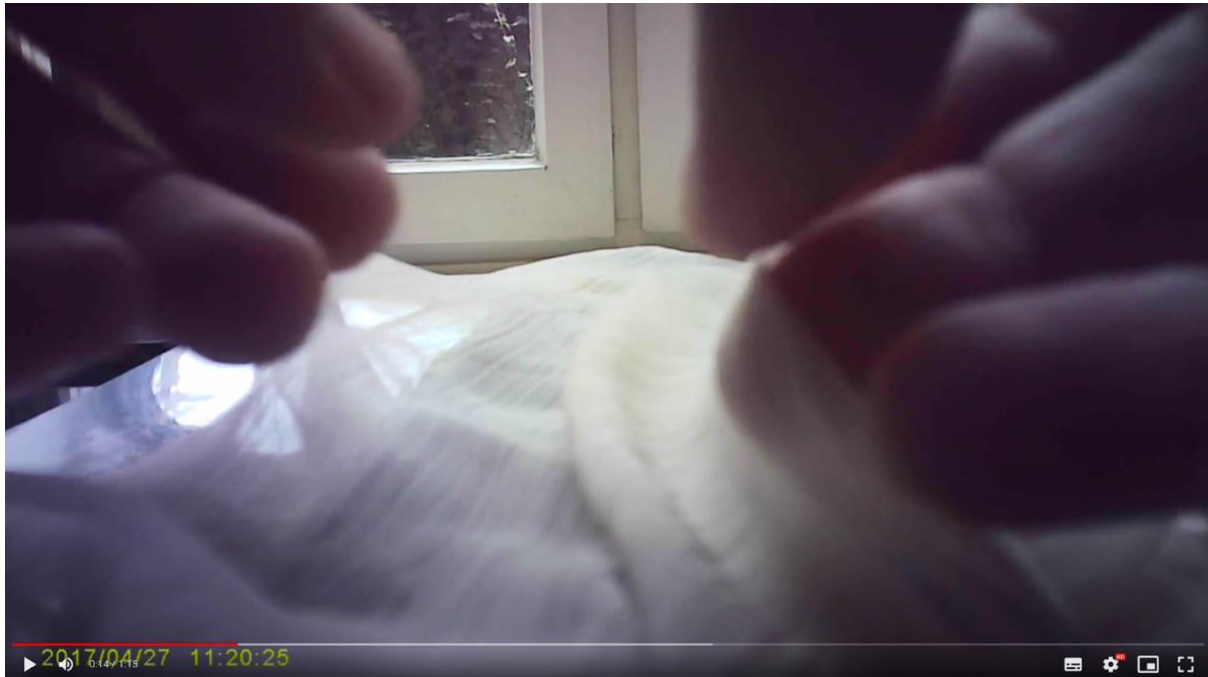


Figure 90. Screenshot of the movement responsive camera in IWM library (2023)

In terms of Ethics of Care for the toucher, the installation delineated an evaluation through the fingertips. The ethical requirements to collect the videos of the hands touching touchscreens focus on non-identifying the person touching (no voices or faces). The hands and their movements are not considered when creating an identification. However, it is the hands and fingerprints that allow a user to access their touchscreen.

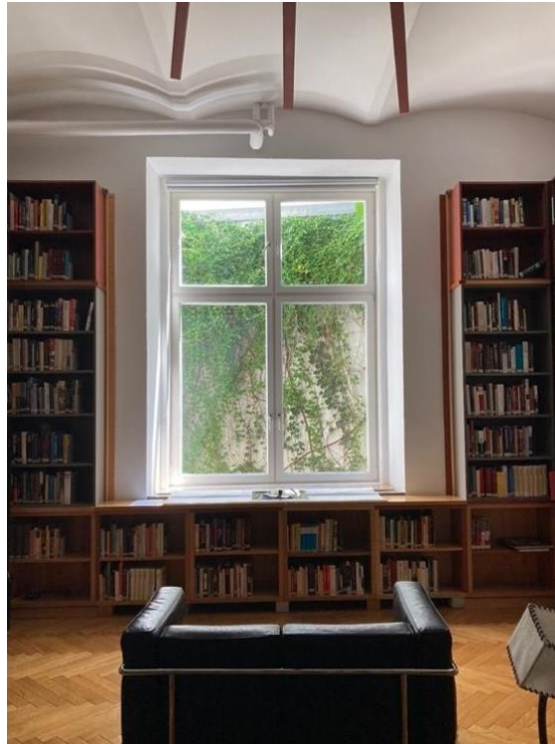


Figure 93. Caring Screens (2023) IWM Library Vienna

5.d.5 Finding and defining Care

In defining Care, I draw from the frame of the “situatedness inherent in touch” (de la Bellacasa, 2017) to consider Care not only in the moments of attentive making, but when it comes to the place and laying the circuits (formed by conductive threads) and the touchscreens in project/gallery spaces, and archiving mode. In this process, I am unveiling the relationship between the making, what the object was, what I made of it, what it might become, and how people might perceive it. Care has become a way of being and transforming for me as a researcher, but it is also a space for others to expand the boundary of relationships. The sense of Care was placed through the acknowledgement of the broken touchscreens being gathered by Irepair before and during the COVID-19 pandemic; in an act of self-care, I cleaned and sanitised them. I was intentionally Careful in considering that this object was touched and utilised in challenging times. I enacted Care as a growing, warm spatiality, expanding over time through intra-acting with Matter. However, tactile technologies and other objects have a rich history of development, fascination, and production that warrants careful consideration. From a Posthuman perspective, Care is an agent for the conservation of Matter or at least the understanding of its material waste when it stops expressing itself in the digital realm of our agency.

Importantly, I considered Care part of the relationship between skin, touchscreen waste, and conductive thread by applying the idea of touching and being touched back (Maurette, 2018). I translated this reciprocity of agency into caring and being cared for with my practice by considering touch a mundane gesture of contact with technology. Drawing on my material explorations of wasted touchscreen displays,

I aim to examine the sense of caring for a non-functional object as an evocative remnant of past intra-actions (Barad, 2007). Care is a reciprocal and evolving relationship between skin and technology, where tactile investigations reveal the deep entanglement of Matter and mind in continuously defining and shaping one another. I identify Care as an act of attention, a way of noticing and responding to the imaginative tensions that arise in the impossibility of direct touch with squishy, resinous surfaces. It involves an ethical commitment to acknowledging the material's agency, not as a passive medium, but as an active participant in shaping tactile relationships and sensory experiences. By engaging with these tensions, Care becomes a form of tactile negotiation, honouring the fragility, softness, and vitality of both human and technological interactions. It reflects a practice of being with materials that transcends utility, emphasising mutual responsiveness, and fostering a deeper awareness of the interconnected, embodied nature of these relationships.

5.d.5.1 Touch through material explorations

The material explorations and interventions conducted throughout my practice have profoundly contributed to understanding touch's temporal and qualitative dimensions. These themes are navigated in touch, sensing, making and facilitating discussions, where touch is understood not as a static action but as a dynamic interaction with Matter. Touch varies across contexts, imprinting differently on various materials depending on the surface properties and interaction durations. For instance, circuits activate with a brief touch, while other materials require sustained contact to record traces, revealing the nuanced temporalities of touch. Writing has been instrumental in reflecting on these processes, enabling me to refine ideas for the literature review and inform future explorations.

In comprehending and collaborating with materiality, I embraced circuits' delicate and functional qualities—fragile yet conductive—and the nuanced affordances of different textures and surfaces. My search for conductivity emerged from an isolated, domestic context, leveraging a tactile library of mundane household materials (Classen, 2012). In this sense, conductivity extended beyond technological functionality to encompass an embodied phenomenon tied to the nervous system, where heat, electricity, and chemical transmissions reflect interoceptive and emotional states (Hsiao and Gomez-Ramirez, 2011). In making circuits for touchers, I sought to express this interplay between internal biological processes and outward tactile expressions, exploring the dynamic reciprocity between inner sensing (Roazen, 2007) and external material interactions.

Through reflective material practices, such as the Touch-No-See investigation and the creation of Circuit 1 and Circuit 2, I engaged in tactile explorations that shifted perspectives on agency and interaction. These experiments revealed Matter's autonomy, showing how materials could decay, transform, and resist control. This engagement aligns with Karen Barad's (2003) concept of "intra-action," where the relationship between maker and Matter is not unidirectional but entangled, co-constructing new understandings of touch and materiality. Documenting these processes through writing, sketches, and

photography highlighted the evolving interaction between tactile and cognitive dimensions, emphasizing how touch is mediated and transformed by the materials it encounters.

The concept of conductivity influenced my exploration of neurobiological frameworks for understanding touch. Drawing from Mason (2016), I distinguished between volitional and emotional touch, reflecting on motor hierarchies and the brain's role in tactile perception. Volitional touch involves deliberate actions mediated by the prefrontal cortex, whereas emotional or mundane touch bypasses decision-making processes, engaging faster, more intuitive movements shaped by the cerebellum. Consequently, these distinctions became evident in my daily interactions with touchscreens, where repetitive and automatic gestures underscored the interplay of cognition and habit. Extending this analysis, I engaged with Gallagher's (2023) work on the "extended mind," considering how technological tools like touchscreens and conductive threads function as cognitive extensions that reshape our sensory and neural engagements.

The practice of unmaking touchscreens further elaborated on these ideas. I uncovered their tactile and material dimensions by dissecting and un-layering screens, moving beyond their acrocentric functionality (Maurette, 2018). This process revealed the capacitive layers—metals, polymers, and resins—that underpin their responsiveness to touch. Employing tools such as spatulas and tweezers allowed me to interact with these materials safely, transitioning from mediated to direct tactile engagements. This unmaking practice revealed tactile residues and traces of prior interactions, transforming the screen into a site of archaeological and sensory investigation.

In works like *Unmaking Touchscreens and Broken Touchscreens* (2021), I investigated the tactile dynamics of broken devices, where the tactile agency shifts. A broken screen no longer invites habitual gestures but instead requires manipulative engagement, disrupting its role as a libidinal object (Fisher, 2011). This transformation allowed me to reimagine the screen as a material to be explored rather than a functional interface, emphasizing its layered materiality and the relational dynamics of touch.

The reciprocal relationship between touch and materiality is further explored in *Volitional Touch* (2022), where I considered the agency shared between myself and the materials I worked with. Drawing from Barad's (2007) notion of material-discursive practices, I witnessed and participated in the mutating encounters between skin and technology, where touch becomes a site of Care and transformation. The softness and wetness of touchscreens, mirrored in the folds of embroidered works, reflect the subtle interplay between resistance and intimacy. These tactile engagements foreground the ethical dimensions of making, considering the shared vulnerabilities of flesh and technology in their intertwined states.

Inspired by Maria Puig de la Bellacasa's (2017) *Matters of Care*, I frame my tactile investigations within a speculative and ethical inquiry. As a mode of engagement, Care invites attentiveness to the material and its histories, urging a shift from detached vision to embodied interaction. This approach resonates with the layered complexities of touch, where technologies are not merely tools but active participants in relational networks. Finally, by considering the screen as a material site rather than a mere interface, I place its role in shaping our sensory and cognitive landscapes, advocating for a tactile ethics that extends

Care to the overlooked and discarded. Through this practice, I aimed to bridge the sensory and material, engaging with touch as a transformative encounter that redefines relationships with Matter, technology, and the self.

5. Practice conclusion

Over the four practice chapters, I have presented the findings and discussed the four thematic analytical themes of this study. The practice unfolded through caring, dissecting, feeling, and displaying, creating a layered reflection on how embodied and material agencies coalesce within the artistic inquiry. In subchapter 5a, I expanded on the definition of Conductivity; in the following subchapter (5b), I investigated layers of brokenness; in subchapter 5c, I discussed Soft/Wet and unexpected qualities of the material explorations; in the final subchapter (5d) I defined the active and passive agency through Caring/Cared when exploring the relationship with the touchscreen.

Synthesising the practice material explorations, the research questions and literature review were developed, generating new inquiries in an iterative process. Each project and material choice contributed to understanding the temporal and qualitative aspects of touch, which I explore in paragraphs concerning touch and making, particularly how intervals of touch imprint differently on various materials. For example, circuits activate with a brief touch, while other materials require sustained contact to show marks. Meanwhile, writing has been crucial for reflecting on these processes and refining ideas for the literature review and future explorations. This research examines the tactile quality of touchscreens, whose responsiveness persists even when discarded, prompting a revaluation of digital materiality. Jewitt and Price (2024) suggest that such responsive Matter reshapes people's engagement with the world. The Covid-19 pandemic allowed me to pause the tactile interaction with the touchscreen and examine how stroking and touching my smartphone altered my interconnection with the world through material explorations, which I then employed to explore how others engage with and are affected by states of broken materiality. New Materialism provides a framework for examining intra-action and material existence beyond anthropocentric views in this continuously active relationship. It allowed me to consider technology's attentive and responsive materiality in reciprocal becoming (Barad, 2012) and mutating. My practice acknowledges that even seemingly alien technologies are embedded in daily activities and are grounded in geological time (Nikolić, 2018), and mundane yet strange (White, 2022). I employed Art Methods to explore the intimacy and personal ways of being with technology, provoking and engaging audiences in their relationship with technology. This evolving relationship with a responsive material, such as the touchscreen, became an intimate, almost monogamous obsession, intensified during the COVID-19 pandemic. This period allowed me to realise my intra-active relationship (Barad, 2007) with the world through this material, sparking new insights. To conclude, the diversity of qualities that emerged as analytical themes was made possible by the employment of New Materialism in comprehending embodiment in art practice, and by attentive entanglement with matter.

6. Conclusion

6.1 Introduction

In this final Chapter, I weave together the key findings, synthesising connections between the material analytical themes and the conceptual frameworks, with respect to how I explored materiality and what I discovered. Through the practice, the emergent material responsiveness opened a questioning of the boundaries between inert and alive, which became a critical concern I explored through touch, material relationships, and reciprocity. I employed touch as a dynamic, *“intra-active”* tool for tactile awareness, taking a practice-led methodology to contribute to knowledge about how bodies relate to technological materiality. Touch emerges as an embodied sense of becoming, challenging views on passive/active behaviours that mutate daily on touchscreen devices. My conclusion reflects on the original contribution of artistic inquiries integrated with New Materialism with Neurophilosophy in conjunction with the context of the COVID-19 pandemic. The process unfolded into discovering the monogamous relationship with the touchscreen, explored as an experimental space for responsive encounters.

6.2 Key-practice

In my exploration of the tactile relationship with the touchscreen, the practice-led methodology drew on different methods (Art practice, Material Methods, Textile, Sensory Methods, Embodiment, Neuroscience and Reflexivity) and key findings were drawn from this practice. Starting from the key concept of intra-action, I explored the entangled meanings and physicality of mundane technology by approaching skin and touchscreens as surfaces and textiles. From the entanglement of theories and methods, four qualities—Conductive, Broken, Soft/Wet, and Caring/Cared—emerged as signposting material and human agency in the intra-active phenomena of touch.

I employed novel approaches as Modes of Tactile Investigation, which consisted of an iterative system of material explorations, sharing, dissemination, and reflection, which places the skin-gorilla glass encounter at the centre of the investigation. Due to COVID-19 pandemic restrictions, my decisions were guided by testing (in-person and online) how the audience as touchers would tacitly engage with the material explorations. To guide the practice in exploring the expression of touch as an electrical potential, I drew on key literature concepts such as intra-action, care, awareness, emotional, and volitional touch. In this stance, Neurophilosophy emerged as a lens to examine the flesh in dissecting tactile moments of self-awareness when encountering responsive materiality, which was considered under the New Materialism framework as an elemental, entangled composite.

I moved beyond the idea of tactile activity and passivity by underpinning the reciprocal impact between the touchscreen and the skin through thorough questioning of my somatic sense and the agency of matter. The material explorations aimed to respond to the documentation and assessment of methods; meanwhile, textures, structures, and behaviours emerged as qualities through exhibitions, workshops, and studio practice time. To explore the liminal spaces of intra-action, I touched, felt, stitched, made, embroidered, cast, displaced, broke, fixed, laced, and embodied sensations with care, sensibility, temporality, intentions (emotional or volitional), and responses (irritation, violence, surprise, and pleasure), which I documented and reflected upon through iterations. This explorative path was only available through the exploration of how participants (touchers) could engage with my work, while questioning my own practice.

The inertness of the touchscreen provides a basis for exploring skin residue and traces, which, through material investigations, becomes a provocative archaeological artefact of the future, in juxtaposition with the mundane relationship with functioning smartphones. To conclude, this research expands on the liminal times of tactile encounters to assess technology-responsive materiality and the somatosensory sense through their material conductive capacities. These material explorations entangle a personal monogamous obsessive relationship, which ended in questioning responsiveness and inertness, in relation to others.

6.2 Tactile findings

My research reconceptualises touching technology in the post-pandemic context, my awareness of touch evolved inside the practice, with findings emerging as qualities of Matter. These are Conductive, Broken, Soft/Wet and Caring/Cared. The exploration of sensorial and reflective grounds allowed the practice-led research to sit within a diverse literature review, addressing the touchscreen's complex tactile relationship with physicality and suggestive power. Throughout the practice I found a messy entanglement in both physical form and meaning (Barad, 2007), which intertwines with how body senses materials and develops carnal intelligence (Barrett, Bolt, 2013), extending the brain's role in perception through an "Inner Touch" (Roazen, 2007), as a tool of awareness between the self and the other, working simultaneously in various directions.

Importantly, the explorative material approach allowed a deep inquiry into the layers of the skin, emphasising the entire body's role, not just the hands- here, I discovered how the touchscreen becomes an extension of the nervous system, physiologically as a stretch of conduction and heat transmission, and poetically as an extension of agency and intentionality. The detection of these extensions materialised into my material intervention which captured my unconscious mundane behaviours associated with touchscreen surfaces. From the daily moments I uncovered the hidden material traces—fingerprints, oils, dust, and sweat—that these objects capture, transforming them into future archaeological Matter and artefacts of unused touchscreens. These traces revealed stories of transmission, intimacy, and Care

unveiled through exploratory and observational touch. As demonstrated in the practice chapters (see chapters 5, p.73), the broken touchscreen gathers and touches back, participating in a suggestive reciprocal intra-action that reinforces the finding of novel grounds of interaction as monogamous, obsessive, and continuous. These were only available once the smartphone's functionality was absent, and I could penetrate spaces of diverse responsiveness and inertness linked to bare materiality more than technological expectations.

Two key findings emerge from the evolution of my practice in penetrating the relationship with responsive matter:

1) Technology as surface: My research is shaped around my understanding of things as layered surfaces, which is expressed in my art practice. Those technological surfaces intertwine in understanding the world through flesh, contact, and touch. In comprehending technology as surfaces through the skin, I employed mundane Matter such as clothes and casting materials such as resins to extend and place technological materiality near them. Intimately, this research was only possible in delving and immersing myself into the touchscreen surface, meanwhile creating moments of distance and closeness with my functioning iPhone with a sense of exclusivity that shaped the research.

2) Touch and engagement temporalities: Through mundane activities and studio/workshop elaboration, I dwell between the personal and research temporalities of entanglement with Matter. Which then extended beyond the non-functioning e-waste employed for the practice to the intertwining of repetitive daily touch towards my iPhone. This allowed different temporalities and sense of agency when intra-acting with technological Matter by examining audience engagement, material responses. These narratives position the body as "nervous Matter" both physiologically and poetically, giving touch to an agency that moves between conducting, inspecting, dissecting, feeling, and attentively shaping distances.

6.4 Contribution to Knowledge

This thesis demonstrates how material explorations, tactile encounters, and artistic practices can function as transformative modes of knowledge creation. Grounded in textile and art practice, the study challenges the apparent dullness of technology in its interaction with the skin. It navigates liminal spaces of effect and reciprocity in a post-phenomenological understanding of touch as both sensation and encounter (Sparrow, 2015). The discourse on touch and practice also aligns with Haraway's (2007) concept of accountability in relationality, which I expand into the realm of tactile responsibility towards materials in studio, workshop, and everyday contexts.

A critical contribution lies in deepening comprehension of the body's activities as material and confronting the tension between bodily decay and the durability of the touchscreen. Neurobiological perspectives offered insights into processes of movement and touch, while I examined the body and skin

as nervous materiality. This established a relationship between art practice and research grounded in a personal understanding of Matter as a form of “textile thinking” (Dormor, 2020).

This thesis contributes methodologically by clarifying how practice-led research, grounded in textile thinking, can generate new knowledge about tactile encounters with technology. I situate the project within the art and design discourse of practice-led research (Barrett & Bolt, 2013; Mäkelä, 2007). In doing so, I highlight how material experimentation and textile practices—casting, embroidery, breaking, seaming—function as iterative research processes that expose hidden qualities of matter. Textile thinking (Dormor, 2020; Igoe, 2020) becomes both a conceptual lens and a methodological strategy, extending the tactile, material, and embodied logic of textile practice into the study of technological materiality.

Theoretically, the research contributes by connecting New Materialist frameworks with Neurophilosophy through a practice-led approach that provokes questions of intimacy, carnality, and future scenarios of living with technology. Investigating the evocative power of the touchscreen revealed its capacity to act as both surface and agent of intra-action (Barad, 2007). Such encounters are essential for reassessing meaningful ways of sensing, feeling, and coexisting with technological Matter. Inspired by Alice Fulton’s poem “*Cascade Experiment*” (1990), I proposed “halfway encounters” with the other—moments where volitional and emotional interactions with technology are differentiated, and overlooked interactions are brought into awareness. Observing, for example, how the thumb navigates an iPhone while the mind is elsewhere, underscores the need to understand such gestures not only cognitively but also materially, as embodied encounters between skin and glass.

This duality shaped my practice: artworks and textile technologies constituted one half of the tactile encounter, while the other involved bodily awareness and affect. Together, they highlight the temporal reality that flesh decomposes far more quickly than the devices we touch daily.

In a broader context, the study reframes the touchscreen as both a functional device and a material artefact. It emphasises care for technological materiality as an ethical stance, recognising deterioration, waste, and impermanence as central to understanding digital Matter. By addressing the ecological implications of e-waste, the thesis advocates for reclaiming agency over tactile relations with technology. Repair, alteration, and thoughtful engagement with discarded touchscreens challenge narratives of technological determinism, opening possibilities for more reciprocal and ethical material practices. By critiquing Digital Humanism (p. 182), I argue that relationships with technology must be grounded both materially and ethically, attending to production, waste, symbolic power, and skin contact.

Ultimately, this research demonstrates how practice-led inquiry into tactile encounters can generate new theoretical and methodological insights. By situating touch at the centre of human–technology relations, the thesis calls for a more reflective and caring engagement with the materials that define both the present digital age and its ecological futures.

6.5 Limitations of Touch Studies

This study encountered several limitations, particularly in exploring touch within the pre-COVID-19 pandemic context, which were addressed by adopting material-based practices. While Interaction and New Materialist studies offered a contemporary lens, the field of ethics and technological touch still needs to be explored. The attempt to convey tactile sensations through words (by integrating different disciplines), employing surfaces for language, was particularly challenging, especially during the COVID-19 lockdowns when physical touch was restricted. The pandemic posed another limitation, forcing researchers to reevaluate their methods and touch-related investigations. Consequently, the findings, though valid, might have been richer and more nuanced if they had emerged from messier, less constrained workshops and research settings; however, they might have missed the twisted nuances born from isolation. Another limit considers the difficulties in translating the collaborative moments of touching, making, and discussing ideas into written form, introducing gaps in explaining the profoundly personal yet shared experience of touch. This makes it difficult to distinguish between discovery, the creative process, and self-reflection. Touch is a mode of relating those shapes to ways of living and learning. Through this research, I grappled with the intangible aspects of understanding and material perception, recognising that some sensations and perceptions remain undefined. Like the holes in a weave (Carter, 2014), they resist being fully captured but demand attention and reflection, which, for Practice-led research, might be the main limitation but also a contribution to knowledge.

6.6 Further research and final reflection

Further research could explore semantics to elicit more explicit responses from participants while opening opportunities for new and creative methods of capturing the nuances of touch. Given that everything interacts through touch in some form (Maurette, 2018), alternative visual and material languages might be employed to uncover deeper layers of meaning. Technology, particularly in the form of the smartphone, has become a pervasive part of the environment. Despite global efforts to recycle and repurpose, the materiality of technology raises questions about its place in the ecological system. Often perceived as alien, these sleek, glass-like objects have become indispensable tools in daily life. How does technology intersect with the environment, and how might this research contribute to new ways of understanding this relationship?

It is essential to recognise the complex tensions that define the relationship with technology, particularly in the context of touch, Care and ecology. Materiality plays an active role in daily life. From an ecological perspective, the necessity of caring for e-waste, bodies and behaviours toward the world becomes even more pronounced. This research has delved into the realm of physical contact, contributing to the

broader discourse on touch within the intimate confines of the domestic sphere, to consider social and cultural implications of tactile interactions with technology. Especially when the discourse of aliveness and inertness is extended to technology as materiality. It is an exploration that seeks to unravel the complexities of touch, offering a deeper understanding of its significance.

I hope this research is a foundation for future studies on how materiality, such as the touchscreen, shapes an ongoing transformation. This practice, grounded in literature, has sharpened my awareness and agency as a researcher and artist in navigating the ever-changing landscape of technology and touch.

- What will be touched after finally closing this thesis?
- What will be touched next once the touchscreen becomes an artefact of the past?

The thesis might continue in exploring different conversations on how to relate to technological Matters. I hope this research opens a discourse on the reciprocal mutability with technological Matter, such as the touchscreen. In the continuum of mutation, the practice rooted in the literature formed the awareness of changing states of my awareness and agency as a researcher and artist. I believe my research can contribute to material-led art practices in establishing further explorations through embodiment and Neurophilosophy, to understand the materiality.

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Glossary

1. AGENCY: "Agency is 'doing' or 'being' in its intra-activity. It is the enactment of iterative changes to particular practices – interactive reconfiguring of topological manifolds of space time Matter relations – through the dynamics of intra-activity." (Barad, 2007, p. 178)
2. ARTEFACTS: The touchscreens as materials presenting fingertip samples, before being altered, or simply being present to be observed.
3. PRACTICE-LED METHODS: Referring to the description from Sophie Woodward (2020), Material Methods refer to the use of techniques such as painting, casting, melting, gilding, moulding, and in this case, includes textile techniques like embroidery, stitching, re-layering, and un-making. Material inquiries are explored through participatory methods, engaging people to touch the artwork. This art-based method works iteratively in a process of reading-making-disseminating while documenting reflections at each step.
4. ART PRACTICE-LED RESEARCH: In Practice-led research, art-based methods and material explorative approaches are used. This approach includes creating material experiments to influence further material explorative interventions, grounded in New Materialist theory and drawing inspiration from multiple disciplines. (Klein, 2017) (Barrett and Bolt, 2011) (Christensen-Scheel et al., 2022)
5. ARTIST: Refers to moments when the researcher takes on the role of an artist, engaging with materials in workshops and dissemination without the researcher mindset, allowing for deeper encounters with the material.
6. CONDUCTIVE: Refers to conduction, such as heat and pressure, particularly in capacitive touchscreens. It encompasses the transmission concept, where the body acts as a weak transmitter, while conductive threads and metals create circuits expressing the body's electrical potential.
7. DIGITAL HUMANISM: An interdisciplinary approach examining the relationship between humanity and digital technology, emphasizing the balance between technological advancement and human values. It critically reflects on how digital interactions, like those with touchscreens, shape sensory engagement and ethical implications.

8. **ELECTRICAL POTENTIAL:** The body's capacity to passively transmit electrical signals through neurons, aided by axon coating called myelination. Neurons, unlike conductive threads, transmit electrical signals via "action potential," which is elicited through changes in electrical charges.
9. **GORILLA GLASS:** A type of durable, scratch-resistant glass used in touchscreens, engineered by Corning Inc. Its significance in this research is in mediating tactile interactions between users and digital content, shaping both the aesthetic and practical dimensions of touchscreen usage.
10. **HCI (Human-Computer Interaction):** An interdisciplinary field focused on designing, evaluating, and implementing interactive computing systems. In this research, it examines touch-based interfaces like touchscreens and their influence on user behaviour and sensory engagement.
11. **INTRA-ACTION:** A Baradian term contrasting with "interaction," reflecting Matter's capacity to transmit and conduct energies and power in a continuous exchange of information. (Barad, 2007)
12. **LOCKDOWN:** Refers to the periods in 2020 and 2021 during the COVID-19 pandemic when it was advised to stay home and limit contact beyond familiar environments. Different lockdown regulations and controls existed across Europe.
13. **MAKER:** Refers to the researcher's role in hands-on activities and repetitive techniques, such as the unmaking of 50 touchscreens and production of embroideries, to understand materials deeply and solve technical challenges.
14. **MANIPULATIONS OR EXPERIMENTS:** Manipulations refer to imposed agency on materials (e.g., tearing), while experiments are planned techniques or combinations of materials, exploring new techniques or touch encounters, like the postal exhibition and inert Matter experiments.
15. **MATERIAL:** Refers to various substances (e.g., textiles, resins, silicones, touchscreens, threads, metal) in the research. It is used to describe the material-centric focus, considering everything, even the researcher's and participants' skin, as material in the context of touch.
16. **MATERIAL EXPLORATIVE APPROACH:** A research mode to investigate Matter composition and relationships, involving touchscreens, conductive threads, resins, and silicones, recontextualizing them in unexpected ways to engage with space, touch, and material relationships.
17. **MATERIAL INTERVENTIONS:** Short-term uses of materials in spaces like S1 and the YAS terrace, aimed at provoking responses and reflections from the audience by occupying and inhabiting space temporarily.
18. **MATERIAL METHODS:** Focused specifically on material changes through art practice, material experimentation, and tactile engagement. Methods include various media techniques, particularly around touchscreens and conductive threads.
19. **MATERIALITY:** Describes the concept of making everything a material, such as the touchscreen or gorilla glass. Recognizing materiality allows for technique application and alteration, observing materials as both hard and soft Matter.
20. **NERVOUS:** This term is used in a dual sense—both poetically and physiologically. These meanings intertwine, as the electrical potential of synaptic transmission finds resonance in external elements such as touchscreens or conductive threads. When referring to the *nervous body*, I foreground the motor and sensory capacities of the flesh. In contrast, *nervous materiality* builds from a new materialist framework to

relate the responsive and conductive properties of technological matter—such as the touchscreen—to the body's surface, treating both as sites of sentient exchange.

21. NEUROPHILOSOPHY: Explores neuroscience and philosophy intersections, focusing on how brain functions influence cognitive processes, consciousness, and sensory experiences. It provides a framework for understanding tactile interactions with technology like touchscreens, linking sensory experience with material engagement.

22. PHENOMENA: explored by Sauzet (2018) definition in the [New Materialist almanac](#). "A phenomenon is a specific intra-action of an 'object'; and the 'measuring agencies'; the object and the measuring agencies emerge from, rather than precede, the intra-action that produces them." (Barad, 2007, p. 128).

23. REFLEXIVITY: In research, it is defined as “using a critical, self-awareness lens to interrogate both the research process and the representation of participants’ lives in our social world.” (Finlay, 2017, p. 120)

24. RESEARCH: “the term “research” designates something as little homogenous as “science” or “art”; they are collective pluralities, assembling highly diverging processes that often trespass the categories of boundaries such as disciplines to be more closely related there than with some other members of their own faculty, subsequently grouping together more easily under their common interdisciplinary denominators, such as topics, methods and paradigms.” (Klein, 2017)

25. RESINS: Polymer-based substances used in various technologies, including touchscreens, for durability, optical clarity, and moisture protection. They influence tactile experience, contributing to touch-sensitive surfaces’ feel and performance.

26. SENSE/SENSING: Considered in its holistic conception of carnal and bodily understanding, drawing from Damasio, as mentioned in Carnal Knowledge (2013).

27. SOMAESTHETIC INTERACTION DESIGN: An HCI approach integrating somaesthetic philosophy, emphasizing the body's role in sensory perception, experience, and self-awareness. This design approach heightens sensory awareness and connects users with digital interfaces.

28. TEXTILE THINKING: Theory by Igoe (2021) exploring how textiles influence design and artistic practices through flexibility, tactility, and materiality. It emphasizes material agency, sensory engagement, and ethical, narrative contexts.

29. WORKSHOP: Has two meanings: (1) Workshop spaces at Sheffield Hallam for resin, silicon casting, metal, jewellery, and fashion embroidery studio explorations; (2) Audience and participant workshops focused on touch and sensorimotor engagement.

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Appendix

1.The Postal Exhibition

1. The gestural collection process

Sending by post an artefact was an experiment to share the meaning of the touchscreen as “handable” broken thing and Vibrant Matter (Bennett, 2010). To follow I share the Postal exhibition steps with corresponding methods of the iterative process (described in 3. Methods):

1. Alteration of the touchscreens to be touched with dust, threads, thermochromics as probes to be touched.
2. Testing and prototyping the touchscreen sample to send by post/Prototyping and test modes of interaction and engagement.
3. Organisation by couple or singular touchscreen to disseminate, with touching guidance /Organise tactile gestural collection sending and documentation.
4. Create final variations of the touchscreens to send out/send by mail
5. Touching by the toucher's execution, interaction, documentation of touch (by the touchers, other participants, or myself)
6. Receive back the touchscreens/receive videos by mail.
7. Observation and analysis by drawing with different signs and doings, consider first the drawings and then video, and taking notes. Observation and analysis of the artefact, materials, video, figures, and state of the mode of communication (e.g., envelope)
8. Use of notes to make new artwork. Repetition of the steps, to be adjusted by gesture collection in person or by distance.



Figure 105. Touch Screen layers with gold coloured powder, guidance, envelope Gesture Collection

Glove

Instructions:

- ① wear the glove
- ② open the envelope in tissue paper
- ③ Touch/handle the screen while recording with another smartphone
- ④ re-pack the screen in tissue paper + glove
- ⑤ Send it back to Marika using the envelope inside
- ⑥ Send the videos to marika.grasso@student.shu.ac.uk

Have fun!

Touch!

Marika

Instructions

- ① open the envelope in tissue paper
- ② ask someone to record a video with another smartphone
- ③ Touch the screen with closed eye - while the video is recorded
- ④ Re-pack the screen in tissue paper
- ⑤ Send it back to marika
- ⑥ Send the video to marika.grasso@student.shu.ac.uk

Have fun!

Touch!

Marika

Figure 106. Guidance about touch and the steps to follow, when opening, touching (with gloves or not) and then recording the gestures.



Figure 107. Detail of dirt and traces on glove from toucher



Figure 109. Detail of finger movement and traces on glove from toucher

5.b.4.1.1 Hand and gloves

Figure 110 (right) shows the panning of the gestural collections in which the toucher was wearing the gloves and had the eyes open; in the second option, Figure 110 (left) the participant touched the touchscreen by hand and had the eyes closed. This contrast of touch aimed to create a comparison to find diversities in the modes of touching the altered touchscreen, while considering how the glove's fabric might have been a resistance, a membrane between the skin and surface, as shown in Figure 108. The modes of touching were suggested by the alterations of the touchscreen; for couples, the touchscreen was duplicated (Figure 110) with the purpose of finding differences, which did not happen. The glove uses

implied thinking from my practice on the different sensitivity of the skin, when engaging directly with a surface or not.



Figure 110. Duplicates of touchscreen alterations for gesture collection

5.b.4.1.2 Drawing touch

To analyse the returned touchscreens, I drew on tracing paper my attentive interpretation of traces on the touchscreens, and from the video with rigour and precision, trying to repeat the same modalities each time. I employed the returned material explorations, and the videos as the only source of information. I unveiled and searched the sides, front and back, and diagonal perspectives (Figure 111.a, 111.b, 111.c). While attentively drawing, I handled and observed the touchscreen. In this process, further ideas for making and altering other touchscreens evolved. Reflections on touching from the literature were noted around the drawings, with the personal reflection around the touchscreen sensing. To handle and draw simultaneously shaped another ground of reflections; realising how the experience of touching a touchscreen is shared among most of the world population, in an embodied manner. Importantly, I was looking at the touchscreens that were touched and utilised by people around Sheffield, to be then collected by me for dissemination. In re-touching them, I realised how the drawings were modes to reflect on touching surfaces that are no longer needed.

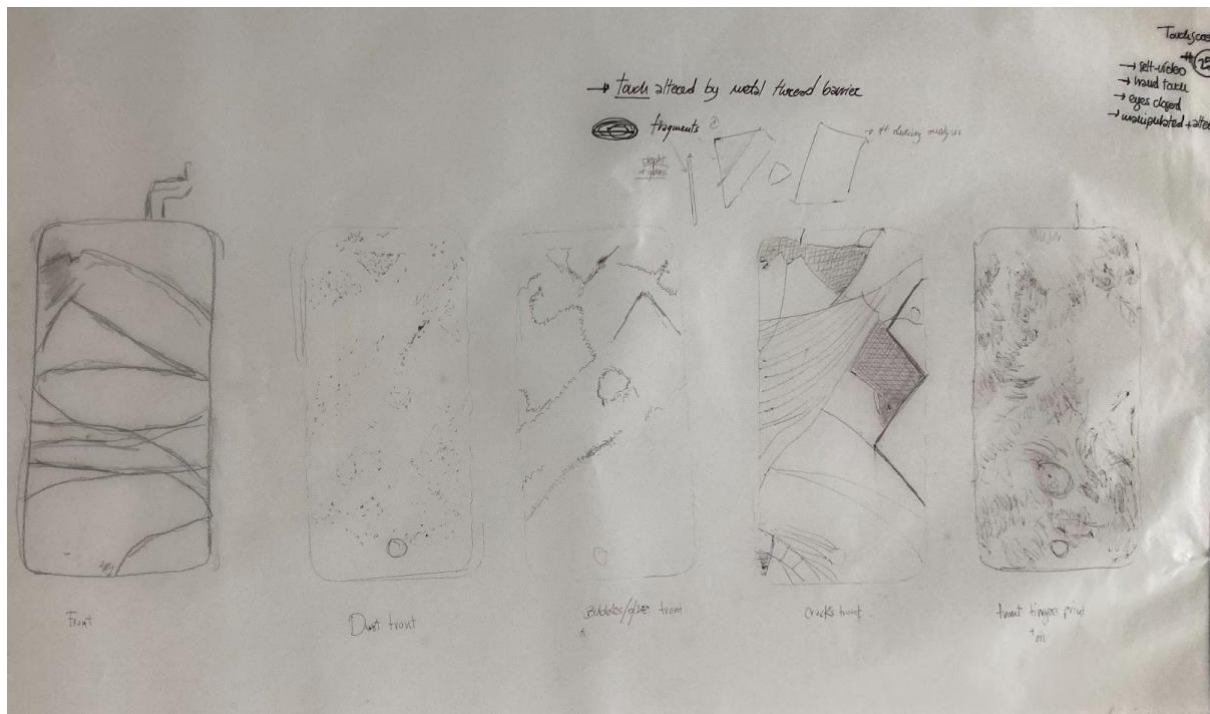


Figure 111.a Part 1 of the tracing roll paper with the drawings in sequence starting from detailed drawings of dust and marks at the front and back.

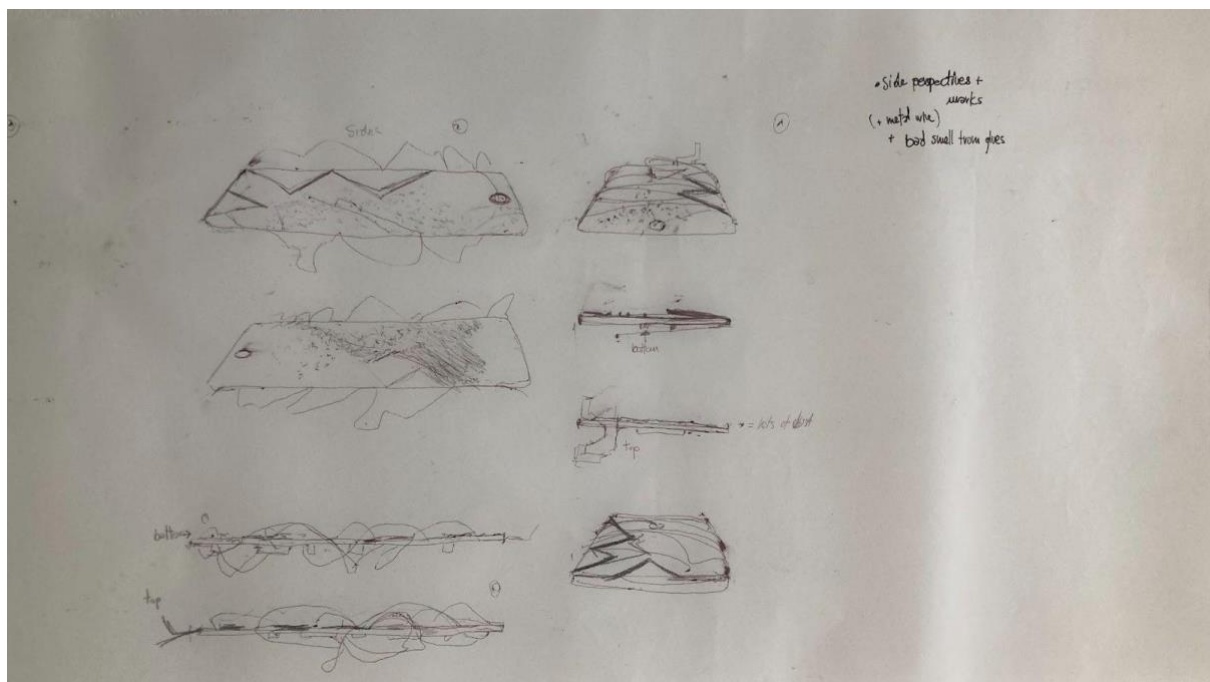


Figure 111.b Part 2 of the tracing roll paper with the drawings following with side and perspective views of touchscreen 25, showing the metal threads around.

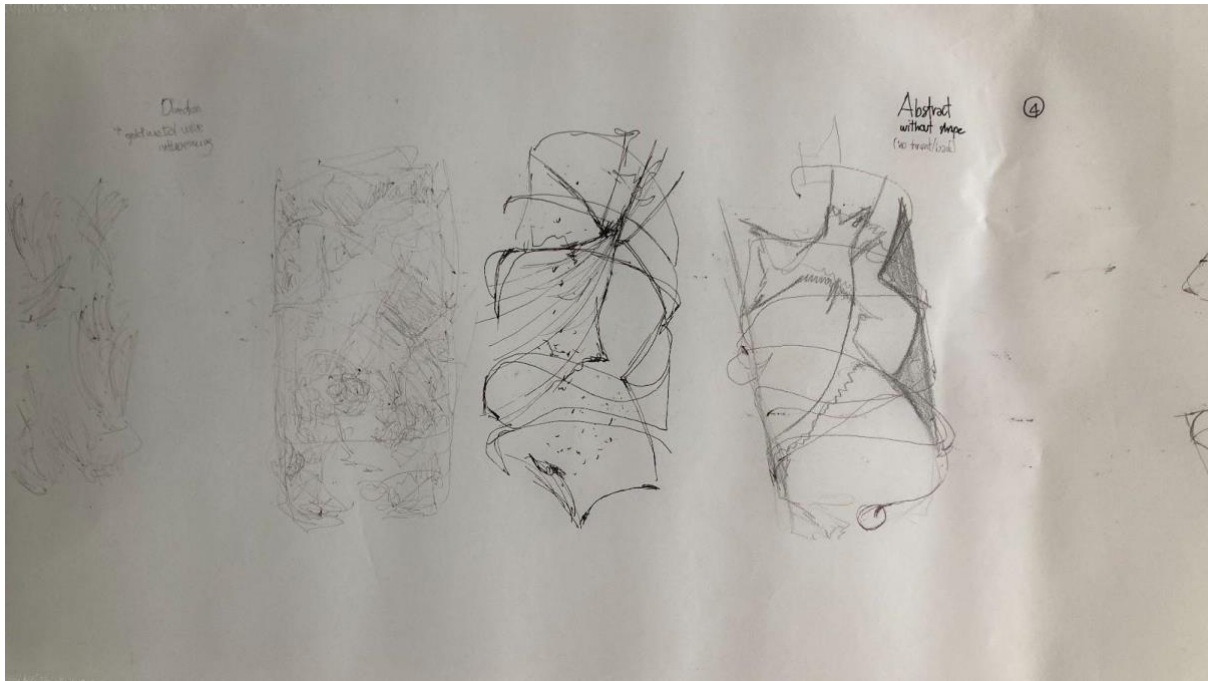


Figure 111.c. Part 3 of the tracing roll paper with the drawings ending with a freer hand trying to guess the movement and traces left by touch.

5.b.4.2 Touchscreens into embroidery

I translated the outcome from both analyses, the video boards, and the drawings, into embroideries. I expressed the capturing of touchers' touch, by translating them into the touchscreen size (iPhone SE) digital stitches. The digital embroidery drawings (Figure 111) were shaped by assembling the layers from the drawings into shapes, outline, and fills. The two figures show the WILCOM screenshot drawings (Figure 112,113), in which the green lines are stitches, with various kinds of stitches such as satin, fill, and running stitches; their combination aims to show different layering and intensity of touch marks. The decision about the material and colours was concerned with creating delicate and dense embroidery to symbolise movements of explorations and sensing. The base material for embroidery is transparent polyester, a chiffon-looking fabric that can hold together the embroideries by leaving a white margin. The embroideries allowed for a safe dissemination to allow the audience to tactilely engage with the gesture and marks, shifting the tactile dynamics; the audience can become actively engaged with the representation of broken touched touchscreens. In conclusion, the Gestural collection was a creative mode to gather touch marks using drawings, video, and then transform it into material elaborations (embroideries) to comprehend brokenness through a textile language.

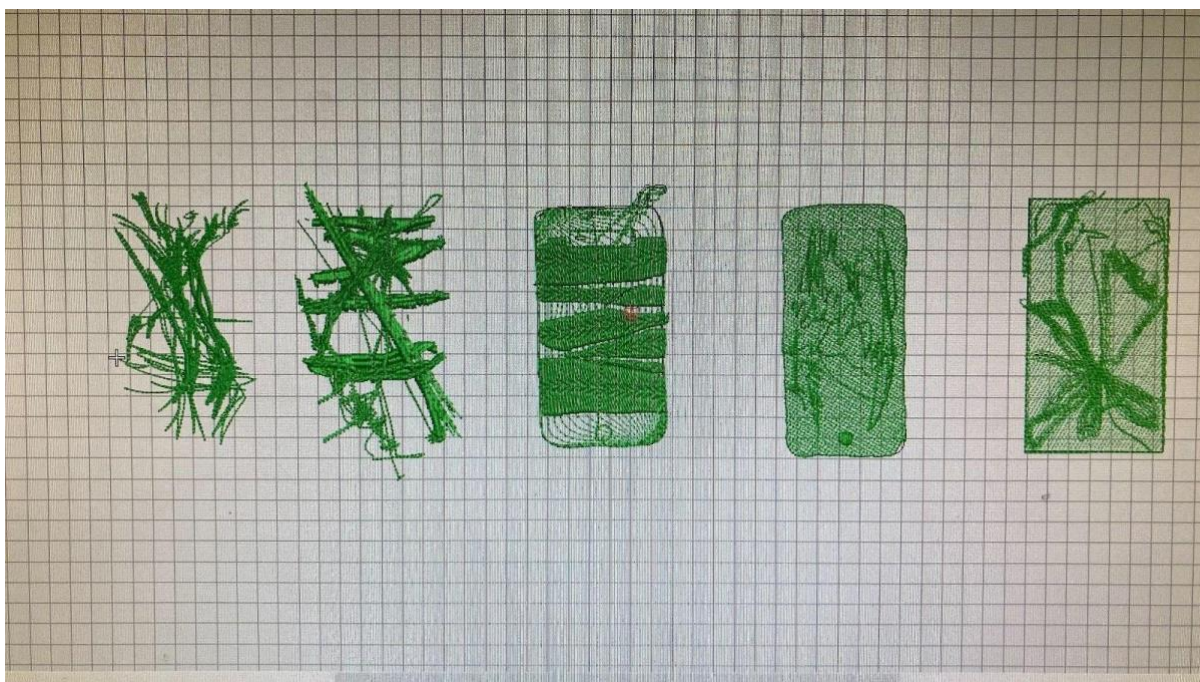


Figure 112. Drawing from WILCOM, the green lines are the stitches, which I drew and then assembled.



Figure 113. Embroidery inspired by the drawing analysis with black thread and layers from the inside of a touchscreen.

2.Ethics approval

Exploring the relationship between touch and conductive matter through art practice.

Ethics Review ID: ER22275666

Workflow Status: Application Approved

Type of Ethics Review Template: Very low risk human participants studies

Primary Researcher / Principal Investigator

Marika Grasso

(Faculty of Science, Technology and Art)

Converis Project Application:

Q1. Is this project ii) Doctoral research

Director of Studies

Eve Stirling

(Faculty of Science, Technology and Art)

Supervisory Team

Col McCormack

Daniela Petrelli

(Art, Design and Media Research Centre),(Art, Design and Media Research Centre)

3.Information sheet



Participant Information sheet

You are invited to take part in this research, you'll receive a small object to touch and keep with yourself and then post back to the researcher. Before you decide whether to take part, please read this information sheet carefully. If you have any questions, please contact the researcher on the contact details below. If you would like to take part, please sign and return the attached participant consent form.

Type of Research: Explorative material/ art Practice-led research

About the Researcher

I am a Ph.D. candidate at Sheffield Hallam University: Lab 4 Living project: 100-year life and the Future home. I'm an artist and researcher with a background in Textile. My research investigates relationships between the sense of touch and conductive materials, to explore the embodied conductive condition of human beings. She is building transdisciplinary approaches, which collectively consider neuroscience theories, art-practice, technology, and sensorial studies

About my research

Conductivity: between Threads and touch

What is the relationship between human touch and conductive materials outlining the human condition? Daily, the sense of touch is engaged with technology and especially its materiality, in the hypervisual contemporary society, focused on screen and lighting, there is a little discourse on the continuous engagement of the hand with metals, and circuits.

In the restrictive times of lockdown, much questioning has been raised on the sense of touch and with it a necessity of a better understanding of the sense. We are encouraged not to touch surfaces and objects that others have touched, or to clean them thoroughly before and after touching. A safe domestic environment is the one in which the person is allowed to freely touch things and leave marks without the fear of someone else's health is at risk. I questioned the continuous touch and use of touchscreens to be safely aware of the changes in the world and to communicate with close ones. However, the pandemic affected my perspective on touch, it has been extensively discussed, in terms of emotions, bonding, safety, agency, and health as the BBC 4 Touch Test. The radio program argues through personal narratives and research dissemination. The disruption of the pandemic allows reflection on a large social scale and personal musing about the need to be in contact with the world and the self. This perspective is mirrored in the artifacts and literature review.

Therefore, with the practice material approach, I aim to explore the materials like phone screens, and metals, and conductive threads to understand the power of the agency of touch, towards the

surroundings. On the other side is important to understand the traces and marks that the person leaves onto those materials, and so they become contemporary artifacts that hold a sign of human existence.

Request to participate

Why do you want to share the artifact with me?

The investigation proceeded between the artist and the material exploration, through building little objects.

I aim to share by post the material development of my work, to have the chance to exhibit the objects to the different participants. For the practice-led research on touch, it is important to be able to present the work to someone that knows my artistic practice and research and understands that touch is the language that will be studied when the artifacts are returned. The information I'll collect will come from your engagement and interaction with the material when returned.

Do I have to take part?

It is up to you to decide if you want to take part. A copy of the information provided here is yours to keep, along with the consent form if you do decide to take part. You can still decide to withdraw at any time before, during, or after the interview, without giving a reason, or you can choose not to answer questions.

What will I be required to do?

Provide your address, receive the artifact, open the envelope, handle the material and return it, in the following weeks/months.

Where will this take place?

At the given address by the participant. When the parcel will be delivered, three days of isolation are required, before opening.

How often will I have to take part, and for how long?

The intention is for a one-off post receiving and returning. According to the progress, I might run more posting exhibitions.

Can I decline to answer questions or withdraw from participating in the interview?

- If at any stage during the post-exhibition you wish to terminate the interview you are free to do so.
- If you wish to withdraw your consent for using any of the data gathered before the interview is terminated, you can. The touched artwork will be not considered.
- You can also withdraw your consent for using any of the data gathered in the interview at any time following the interview before the final thesis is submitted.

How will the information I provide be stored?

- All information will be coded for confidentiality.
- All the data (artifact) from the interview will be stored anonymously with a simple number coding system using the number on the participant consent form.

- The coded person identifiable information (name/email) will be stored separately
- All information (address) will be encrypted if temporarily held on my personal laptop or mobile, and then stored on the Sheffield Hallam University Research Q Drive

Who is ultimately responsible for all the information when this study is over?

Dr. Eve Stirling, my Director of Studies

Will anyone be able to connect me with what is recorded and reported?

All data and transcripts will be coded for confidentiality unless you specifically request to being named and or give consent to personally identifiable information related to your reputation as a specialist in this field is referenced.

Only the researcher and the supervisory team will have access to the information

What will happen to the information when this study is over?

The information will be stored as detailed above. It will not be used for commercial gain. Quotes from interviews might be used anonymously in presentations, websites, and blogs.

How will you use what you find out?

The intention of these interviews is to inform the study design and develop a methodology for my formal research. Specifically, it will be used to compare the ways of sharing artifacts/objects that can be touched and experienced digitally and.

How long is the whole study likely to last? 2 years – anticipated conclusion January 2023

How can I find out about the results of the study?

Details of who to contact if you have any questions or concerns or if adverse effects occur after the study are given below.

There is no element of deception involved in this exercise

There is no anticipated risk involved in this exercise

There are no obvious benefits or disadvantages in taking part in this exercise

You are welcome to contact the researcher at any stage if you have any questions

Legal basis for research for studies.

The University undertakes research as part of its function for the community under its legal status. Data protection allows us to use personal data for research with appropriate safeguards in place under the legal basis of **public tasks that are in the public interest.**

- A full statement of your rights can be found at <https://www.shu.ac.uk/about-this-website/privacy-policy/privacy-notices/privacy-notice-for-research>. However, all University research is reviewed to ensure that participants are treated appropriately, and their rights respected.
- Approval for this study has been sought by UREC with Converis number **ER25485303**
- Further information at <https://www.shu.ac.uk/research/ethics-integrity-and-practice>

Researcher/ Research Team Details:

Researcher: Marika Grasso Marika.Grasso@student.ac.uk

Director of Studies: Dr. Eve Stirling

Research Supervisor: Professor Daniela Petrelli

Research Supervisor: TC McCormack

You should contact the Data Protection Officer DPO@shu.ac.uk if: • you have a query about how your data is used by the University • you would like to report a data security breach (e.g. if you think your personal data has been lost or disclosed inappropriately) • you would like to complain about how the University has used your personal data	You should contact the Head of Research Ethics (Professor Ann Macaskill) a.macaskill@shu.ac.uk if: • you have concerns with how the research was undertaken or how you were treated
Postal address: Sheffield Hallam University, Howard Street, Sheffield S1 1WBT Telephone: 0114 225 5555	

Participant Information sheet

You are invited to take part in this research and keep it with yourself and then post it back to the researcher. Before you decide whether to take part, please read this information sheet carefully. If you have any questions, please contact the researcher on the contact details below. If you would like to take part, please sign and return the attached participant consent form.

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Conductivity: Threads and touch for Self-awareness

What is the relationship between human touch and conductive materials outlining the human condition? Daily, the sense of touch is engaged with technology and especially its materiality, in the hypervisual contemporary society, focused on screen and lighting, there is little discourse on the continuous engagement of the hand with metals, and circuits.

In the restrictive times of lockdown, much questioning has been raised on the sense of touch and a need for a better understanding of the sense. We are encouraged not to touch surfaces and objects that others have touched or clean thoroughly before and after touching them. A safe domestic environment allows the person to freely touch things and leave marks without the fear that someone else's health is at risk. I questioned the continuous touch and use of touchscreens to be safely aware of the changes in the world and to communicate with close ones. However, the pandemic affected my perspective on touch, it has been extensively discussed, in terms of emotions, bonding, safety, agency, and health as the BBC 4 Touch Test. The radio program argues through personal narratives and research dissemination. The disruption of the pandemic allows reflection on a large social scale and personal musing about the need to be in contact with the world and the self. This perspective is mirrored in the artifacts and literature review.

Therefore, with the practice material approach, I aim to explore the materials like phone screens, and metals and conductive threads to understand the power of the agency of touch, towards the surroundings. On the other side is important to understand the traces and marks that the person leaves onto those materials, and so they become contemporary artifacts that hold a sign of human existence.

Request for Video Record.

Why am I interested in recording a video touching a touchscreen?

For the practice-led research on touch, it is important to be able to record through video the interaction between the person and the touchscreen in a safe manner, in a Covid-19-safe environment either home or a safe sanitised public space. Your contribution will be used for a collection of videos investigating the gestures regarding the use of the touchscreen, the object you'll touch will be an artifact created by me. The consent to participation will be also recorded at the beginning of the video when you'll be asked if you wish to be recorded for the research purposes of the study.

Do I have to take part?

It is up to you to decide if you want to take part. A copy of the information provided here is yours to keep, along with the consent form if you do decide to take part. You can still decide to withdraw at any time before, during the video recording without giving a reason, or you can choose not to answer questions.

Can I withdraw from participating?

- If you wish to withdraw your consent for using any of the data gathered, you can. Any data will be deleted.
- If there are any questions you do not wish to answer – you can decline
- You can also withdraw your consent for using any of the data gathered at any time following the interview before the final thesis is submitted.

How will the information I provide be stored?

- All information will be coded for confidentiality
- All the data (recording and transcriptions) from the interview will be stored anonymously with a simple number coding system using the number on the participant consent form.
- The coded person identifiable information (name/email) will be stored separately
- All information will be encrypted if temporarily held on my laptop or mobile, or digital voice recorder and then stored on the Sheffield Hallam University Research Q Drive

Who is ultimately responsible for all the information when this study is over?

Dr. Eve Stirling, my Director of Studies

Will anyone be able to connect me with what is recorded and reported?

All data will be coded for confidentiality unless you specifically request to be named and or give consent to personally identifiable information related to your reputation as a specialist in this field is referenced.

Only the researcher and the supervisory team will have access to the information

What will happen to the information when this study is over?

The information will be stored as detailed above. It will not be used for commercial gain. Quotes from interviews might be used anonymously in presentations, websites, and blogs.

How will you use what you find out?

These videos intend to inform the study design, create a library of movement and gestures and develop a methodology for my practice-led research, by sharing objects that are supposed to be touched. Specifically, it will be used to compare the ways of sharing artifacts/objects that can be touched and experienced digitally and.

How long is the whole study likely to last? 2 years – anticipated conclusion January 2023

How can I find out about the results of the study?

Details of who to contact if you have any questions or concerns or if adverse effects occur after the study are given below.

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There is no anticipated risk involved in this exercise

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Postal address: Sheffield Hallam University, Howard Street, Sheffield S1 1WBT Telephone: 0114 225 5555	

4.Consent forms

PARTICIPANT CONSENT FORM FOR USE OF IMAGES

TITLE OF RESEARCH STUDY: Conductivity: Threads and touch for Self-awareness

Video taken by someone else (researcher, or someone chosen by the participant) and recorded at home or during an exhibition, would be used to add interest and exemplify the research findings and dissemination. For example, they may be used as illustrations in website summaries, research reports, summary leaflets, newspaper articles, and/or conference presentations. They will not be used in any way that would show you in a bad light.

To be completed by the participant:

	YES	NO
1. I agree to have my video collected.	☐	☐
2. I understand that my questionnaire responses will not be linked to the photograph(s).	☐	☐
3. I understand that my name will not be linked to the photograph(s).	☐	☐
4. I understand that I will not be given credit for my appearance in photograph(s).	☐	☐
5. I give the project team permission to:		
• put my photograph(s) on websites	☐	☐
• use my photograph(s) in printed material (e.g. reports, leaflets, newspaper articles, news releases)	☐	☐
• use my photograph(s) in presentations (e.g. at conferences or seminars)	☐	☐

Signature of participant: _____ Date: _____

Name of participant (block letters): _____

Signature of investigator: *marika grasso*

Date: _____

Researcher's contact details:

Marika Grasso, +44 7429 206924, @Marikajasminegrasso, b9038463@my.shu.ac.uk,

PARTICIPANT CONSENT FORM

TITLE OF RESEARCH STUDY: Conductivity: Threads and touch

Please answer the following questions by ticking the response that applies

	YES	NO
1. I have read the Information Sheet for this study and have had details of the study explained to me.	☐	☐
2. My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point.	☐	☐
3. I understand that I am free to withdraw from the study within the time limits outlined in the Information Sheet, without giving a reason for my withdrawal or to decline to answer any questions in the study without any consequences to my future treatment by the researcher.	☐	☐
4. I agree to provide information to the researchers under the conditions of confidentiality set out in the Information Sheet.	☐	☐
5. I wish to participate in the study under the conditions set out in the Information Sheet.	☐	☐
6. I consent to the information collected for the purposes of this research study, once anonymised (so that I cannot be identified), to be used for any other research purposes.	☐	☐

Participant's Signature: _____ Date: _____

Participant's Name (Printed): _____

Contact details: _____

Researcher's Name (Printed): Marika Grasso

Researcher's Signature:

marika grasso

Researcher's contact details:

Marika Grasso, +44 7429 206924, @Marikajasminegrasso, b9038463@my.shu.ac.uk,

Please keep your copy of the consent form and the information sheet together.

5.Information and consent form text for Instagram polls

Posted on @marikajasminegrasso

Hello there,

I'll be running Instagram polls to ask questions about touchscreens and touch by sharing images and asking simple direct questions. The result of the polls will be used for my Ph.D. research, if you are not comfortable with it, please don't answer. The polls are completely anonymous, they just show the final percentage. To know more about the research please contact me or click the link in Bio. And if you wish to talk about the relationship with touch, please DM.

I'll be sharing this story before every poll, I apologise for the repetition.

6.Data Management Plan

Ethics approval plan Research title: Conductivity: Threads and touch Researcher: Marika Grasso	Duration: 2 years (until January 2023)
	Location: Sheffield, UK

Participant mode	Participants	Methods of Data Collection	Data Collected	Storage	Findings aim	Documents for participants
Instagram Direct message response	Followers of @marikajasminegrasso account	Responses to artifact/process Stories shared on @marikajasminegrasso through Direct Message (private)	Images, videos, emoticons, words (Storage of screen)	Q research drive folder (anonymized)	The difference of presentation mode of artwork between online and physical reality	Participant information sheet Participant Consent Form Participant Consent Form for Use of Images

Mailing posting work	PhD Researchers , artist (20 people)	Traces, signs of engagement on a shared object by post	Marks, traces, differences.	Written notes and photo analysis of the artwork	The difference of presentation mode of artwork between online and physical reality	Participant information sheet Participant Consent Form
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Description of the Process/Activity: Workshop work RF1 Example : Studio Practice/ Material Making	Location(s): Sheffield, L4L, White building
	RA Ref:

7. Risk Assessment

Hazard	Who could be harmed?	Existing safety precautions	Risk level	Additional safety precautions needed to reduce the risk level?	Revised risk level	Action by whom?	By when?	Date completed
travel Home-to workshop white building	Marika Grasso	Medical Masks and sanitise hands regularly.	2	Considerate behaviour, follow the NHS guidance .	1	Researcher	19/03/2021	20/01/2023
Workshop/studio work	Marika Grasso	Gloves and appropriate footwear (trainers)	1	Considerate behaviour, in use of tools such as conductive thread, needle and paint.	1	Researcher	19/03/2021	20/01/2023

Communication of significant findings		
Method of communication (describe): Weekly zoom meetings with supervisors and mentors with Supervision Reports completed.	Person/people to communicate findings: Eve Stirling, TC McCormack, Daniela Petrelli	Target date(s): 20/01/2023

Approval			
Carried out by: Marika Grasso	Post:	Signature: Marika Grasso	Date: 08/03/2021
Approved by: Dr. Eve Stirling	Post:	Signature: Eve Stirling	Date: 08/03/2021

8. Modes of engagement graphs

To better explain the processes of thinking and engaging with matter the following diagrams serve as externalizations of my thought processes and my embodied engagement with the material under study. They illustrate the exchanges of agency between me (as artist and researcher), the matter, and the participants. These diagrams are intended not only to guide the reader through the different ways I interacted with the material, but also to provide an external perspective on how these interactions are organized and made visible, aiding in the deeper study and description of my engagement with matter.

4.7.1 Matter and researcher/maker

1) Matter+Artist/Researcher (studio and workshop practice)

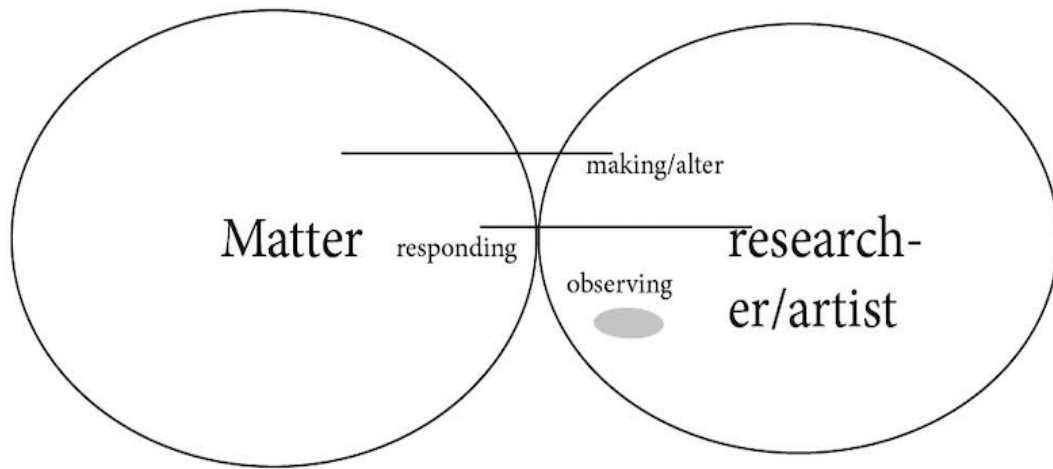


Figure 114. First categorisation of working with Matter in the studio and workshop space.

In Figure 114, I present the type of engagement between myself as a maker, researcher, and artist and the Matter as a touchscreen and conductive thread. The lines symbolise the process of making, altering, responding, and observing but have no direction to acknowledge the seamless reciprocal intra-acting (Barad, 2007). While those processes are documented by reflection, writing, photographing, and planning with Figure 114, I aim to represent all the moments in the making workshops, in studio spaces, and initially in my bedroom. To follow, I present the entanglement between the methods used to investigate the composition and reciprocal responses between myself and Matter. The studio space and the relationship with the e-waste and other responsive materials were part of an understanding of the practice by drawing from artist like Asselbergh, and Dekyndt's, the first working with disused MacBooks, and the second revisiting the role of wasted object through their materiality.

In chronological order, I introduce the processes that allowed me to expand on my agential capacity, both active and passive, which draws from Paul Maurette (2018). The day-to-day process of investigation included:

- 1) Studies about touch and vision literature regarding interaction and agency.
- 2) Translation of literature reflections into material explorations planning.
- 3) Search for material and modes of tactile expression.
- 4) Material experiments by:
 - a) touching and sensing surface features.
 - b) unmaking, breaking, un-layering, fragmenting by hand or with tools.
 - c) juxtaposing materials with different qualities (e.g. Figure 4)
- 5) Observation of the experiments for further iterations.

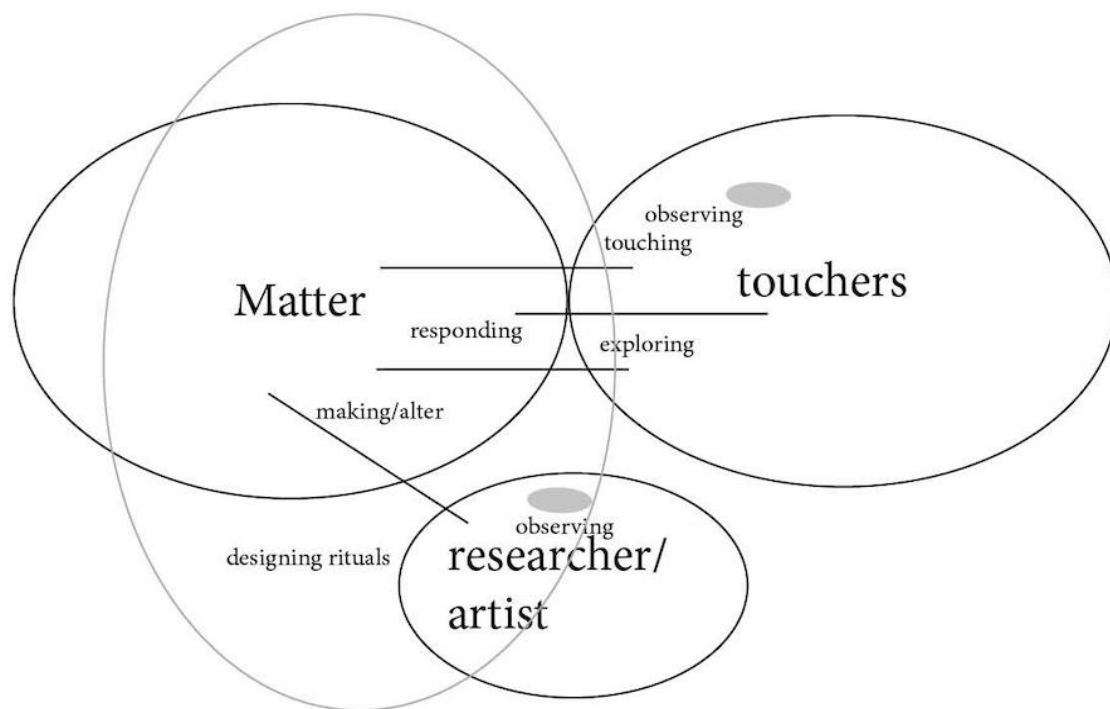
- 6) Writing and reporting on the material behaviours and reflections on materiality.
- 7) Repeat from point one until presentations or exhibitions.

The practice chapter details studio and workshop explorations, revealing how different spaces and tools shaped interactions with the touchscreen. Using textile techniques such as seaming, fraying, and gilding, I developed a tactile relationship with the material, fostering embodied and neural engagement through mundane crafting rituals. While planning explorations with materials like touchscreens, circuits, and fabrics, I identified gaps in material thinking (Carter, 2014), as methods often require distancing from direct sensory and intra-active (Barad, 2007) engagement. These explorations provided a basis for analysing Matter's entangled physicality and significance (Barad, 2007), later extended in participant interactions. The relationship between researcher and Matter contrasted with the artist's perspective, reflecting the touchscreen's dual role as a mundane and technological object. Through daily material engagement via skin, hand, and body, I incorporated embodied choices, tacit knowledge, and intimate connections with materiality into the research process.

This mode of investigation refers to the following material explorations:

- Mind Object series (2020)
- Theory of Screen-Mind (2020)
- Self-Residency (2020)
- Touchscreen Matter (2020)
- Broken Touchscreens @tr.ansienttt residency (2020)
- Wet screens @Oorbit residency (2022)
- Caring Screen (2022)
- Volitional Touch Work (2022)

4.7.2 Material, researcher, and touchers



2)Matter+researcher+touchers (gesture collection)

Figure 115. Presents the modes of investigation through material explorations with participants (touchers)

This section refers to the opening of the tactile interactions with the touchscreen and conductive thread with participants, in which the material experiments created in the first phase were altered to consider how materials might hold traces of the skin's movements.

Firstly, this mode of investigation was developed because of the COVID-19 pandemic: I found modes of sharing my material explorations without being present, presenting the surfaces as testimony, capturing fingertips. The tactile engagement happened without my presence and direct observation. This mode of investigation refers to the postal gesture collection (2021). First, it was prototyped and explored with Circuits 1 and 2 (2020), which I shared with my progress report assessors (Figure 6). After exploring my relationship with it, I placed the Matter at the centre of the interaction to observe the intra-acting (Barad, 2007) between touchers and Matter (as altered touchscreens and circuits). In practice subchapters, I discuss in detail the making of material exploration modes of dissemination and the analysis of the returned touched surfaces. This section of the engagement connects to the agential power of my material explorations to invite to touch or represent past touch. It links to the work of Arsham, Rental Cohen and Tuur Van Balen, for which the alteration of matter is not only related its properties, but it links to its

intrinsic capacity to connect to audiences' connection to it. I employed Material methods (2020) to consider Matter as probes and provocative tools in the following process:

- 1) Alteration of material explorations to capture touch and respond to it.
- 2) Prototyping and test modes of interaction and engagement.
- 3) Organise tactile gestural collection and documentation.
- 4) Alteration of materials to suit the mode of dissemination and tactile collection.
- 5) Execution, interaction, and documentation of touch (by the touchers, other participants, or myself).
- 6) Receiving materials back or photographic documentation of touch.
- 7) Observation and analysis of the materials, video, figures, and mode of communication (e.g., envelope)
- 8) Repetition of the steps, to be adjusted by gesture collection in person or distance.

I employed this mode of investigation to shape the distance between the Matter and myself, observe the behaviours of others with it, and inform the research for further material explorations. I employed this mode of investigation for the following tactile experiments:

- Circuit 1,2 (2020)
- Postal Gestural Exhibition (2021)
- TS# 25 (2023)
- Gorilla Glass Skin (2023)

4.7.3 Matter, researcher, and touchers (modes of display)

3) Matter+touchers+researcher (exhibiting matter)

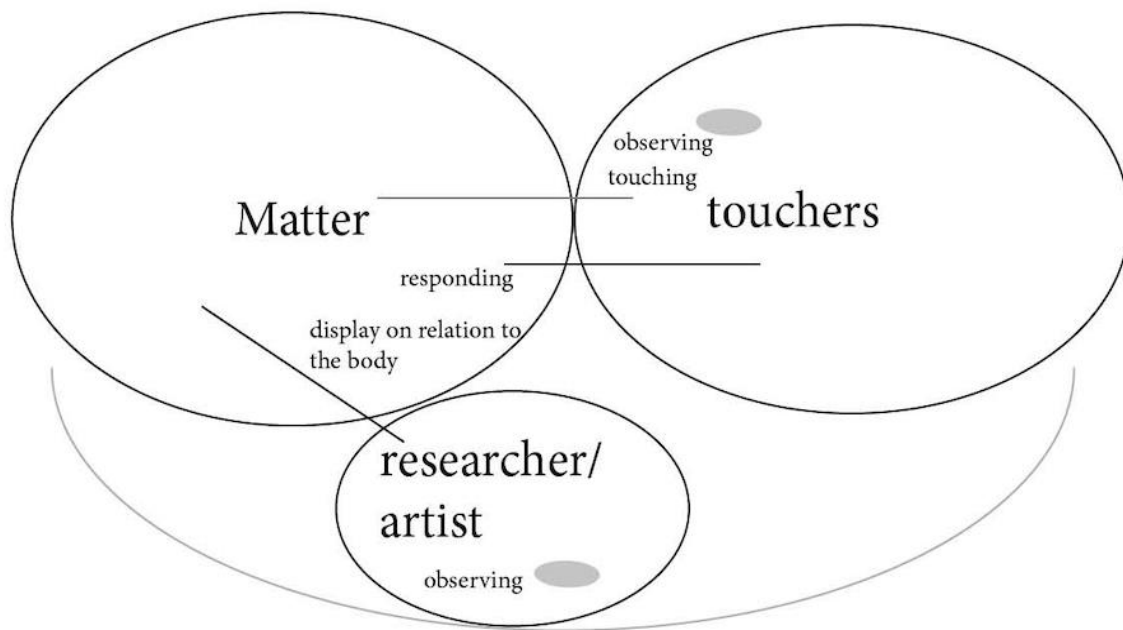


Figure 116. Shows the interaction between the altered touchscreen and circuits with my direct observation.

This section refers to my display process undertaken following the phase of material exploration and the formulation of tactile guidance for the touchers. It addresses the modes of creation and dissemination of thought-provoking material explorations. This mode of investigation refers to reflecting on touchscreen materiality and its alteration to relate to the entire body and space to stimulate thinking about its composition and mundane presence. I designed these tactile experiments (e.g. Inert Matter) and the display to highlight materiality and deliberately create free spaces to explore hidden layers of the relationship with conductive and unresponsive Matter. This mode of engagement supported an exercise of drawing away from the material explorations, to create a distance between the made material and audience, to design this kind of experience I looked at artist as Pierre Huyghe and Jan Hopkins in considering how I wished the work to be experienced by the audience meanwhile I could create a distance with my own work.

Displaying and thinking about the touchscreen beyond its functionality underwent the following process:

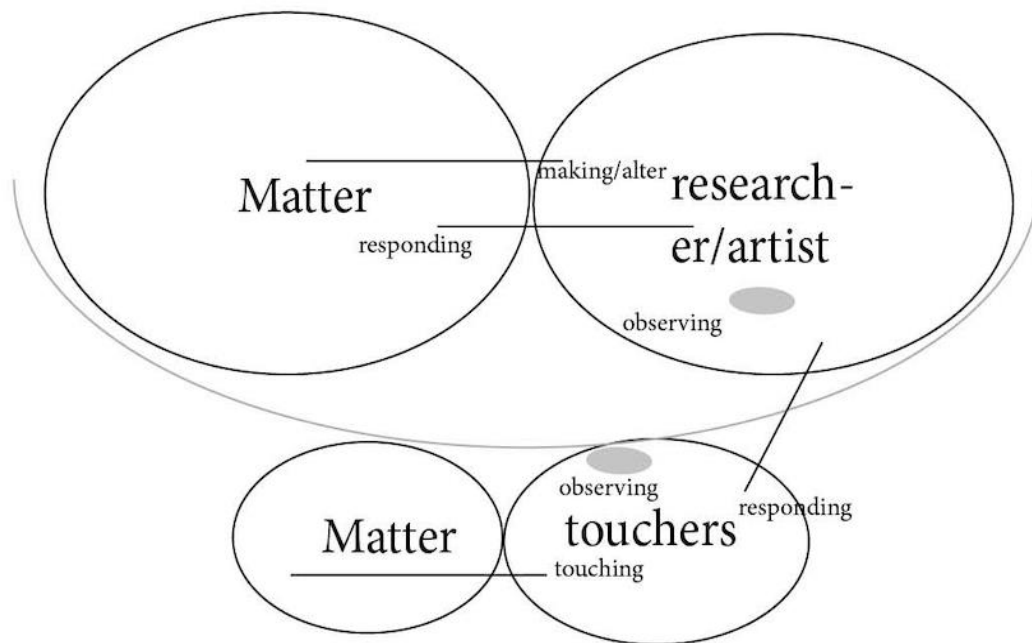
- 1) Literature review regarding the material behaviours and embodiment (e.g. Carnal Knowledge, Barrett et al., 2013)
- 2) Choice of materials and objects to inhabit the space.
- 3) Environmental, material, and light analysis of the space.

- 4) Disposition of material explorations about the body and the gesture of smartphone use, with the idea of the object's death.
- 5) Alteration of material explorations and space according to the intended modes of engagement.
- 6) Documentation in photographs of the interventions and alterations in the space.
- 7) Opening and observation of the gestures of touch, with documentation.
- 8) Reflective writing and analysis of the event.
- 9) Creation of material explorations and observation of unconsidered qualities.

Critically, the tactile engagement design moments failed multiple times in public spaces due to the difficulties of COVID-19 restrictions and considering how touchers were affected by it, as I discuss in the *Beyond the Touchscreen* exhibition at the CHI conference in Bolzano (A.P.80). Details of display positioning and modes of touching are discussed in the subchapter *Caring/Cared* (p.165). Following is the list of exhibition and tactile experiments which I organised:

- Beyond Touchscreens, CHI conference exhibition (2021)
- Touched screens, DRHA (Digital Research in the Humanities and Arts) conference exhibition, Stanley Picker Gallery (2022)
- Inert Matter (2022)
- Cloth Screen (2022)

4.7.4 Touchscreen, researcher, and touchers (on Instagram)



4) Touchscreen+participants+researcher (instagram pools)

Figure 108. Instagram sharing of the making processes between Matter and the maker, which permits interaction and asking questions.

The COVID-19 lockdowns of 2020 and 2021 prompted new forms of interaction through social media, particularly Instagram. Figure 8 shows how I used Instagram stories and polls to share creative processes and pose questions about touching the touchscreen, adhering to ethical guidelines (Brake et al., 2019). The polls targeted my followers⁵² and those familiar with my PhD research, offering simple yes/no responses to encourage engagement. These questions sometimes sparked curiosity and further dialogue with participants. This mode of investigation translated in-person material methods (Woodward, 2020) into an online format. I learned to use language, supported by provocative visuals and materials, as probes to provoke reflection on touch. The online approach combined material methods with insights from my practice and daily engagement with touchscreens to foster audience engagement through the touchscreen. By experimenting with genuine, spontaneous online sharing, I explored Instagram's potential as a platform for iterative dissemination, shaping new ways to create, engage, and work through online residencies. During the residency week, I used my capacities as a maker and un-maker; analysing and understanding the layers was a task left to the capacities of my fingertips and my sensorial knowledge as a

⁵² Mostly English and Italian speakers, between 20-38 age, residents in UK, and Europe.

material maker. Schwartzman's Instagram work was particularly insightful for this work as it helped me elaborated on the closeness and distance between touchscreens, and digital platforms, creating a possibility for online engagement and sensorial provocations.

The process of collecting gestures and sharing the residency figures was similar, and it followed these stages:

- 1) Sharing the work of reading and planning the material experiments.
- 2) First material experimentations.
- 3) Drafting of figures and questions on paper.
- 4) Sharing online figures of production and questions.
- 5) Collection of results and responses to polls
- 6) Development of further questioning and material experiments until the end of the project or the online exhibition.

The PhD partially developed online through the dissemination of questioning figure pools or by exhibiting the materiality of the touchscreen during the residencies (@tr.ansienttt, @Oorbit). Projects in consideration:

- Gesture collection, Instagram pools (2021).
- @tr.ansienttt residency (2021).
- @Oorbit residency (2021).

The Modes of Tactile Engagement demonstrate my way of finding meaning by studio work, exhibitions, mail and social media. By defining the limits, borders, and the channels to get in touch with matter, I organised my material exploration to fit the changes of distance, use of methods, and artistic reference. These modes ultimately relate to an iterative process of discovering how to intervene and progress my research with matter, as I explain in the following paragraph.

Publications list

- Touchscreen: Between the Layers, Alea Magazine (2021)
- Ethics of Touch in Art Practice during Covid-19 pandemic, Design for Health Journal (2023)
Explores touch as a critical, ethical, and sensory practice in posthuman contexts.
- Between Neurosciences and the Arts: Where is the Body? IWM Post (2023)

Conferences and presentations list

- Re-touched, AOR (Art of Research) Aalto conference (2023)
- Soft Touchscreens textile interventions, Intersection, Loughborough (2023)
- IWM junior symposium (2023)
- Touched Screens, Digital Research in the Arts and Humanities, Kingston University (2022)
- Writing About Digital Materiality, Method Conference, Sheffield Hallam (2022)
- Touching Formless Research, Creating Knowledge Conference, Sheffield Hallam (2021)

Exhibitions list

2023

- Re-Touch, Dipolo Gallery, Aalto Art of Research Conference
- Handy, Yorkshire Art Space (Interactive installation exploring touch and digital interfaces)
- Caring Matter, IWM Vienna
- Conversation in Practic/se, Yorkshire Art Space

2022

- Digital Sustainability: From Resilience to Transformation, Stanley Picker Gallery
- Soft Screens, Artbomb Doncaster
- When the Space Becomes the Screen, Sheffield Doc/Fest

2021

- CHI Interactive Experiences, Unibz, Bolzano
- Transient Residency, Curated by Lydia Griffith

