



MASTERARBEIT | MASTER'S THESIS

Titel | Title

WHERE IN MY BODY IS STS?

An embodied ethnography of artistic methods for social science research

verfasst von | submitted by

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angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of

Master of Arts (MA)

Wien | Vienna, 2024

Studienkennzahl lt. Studienblatt |
Degree programme code as it appears on the
student record sheet:

UA 066 906

Studienrichtung lt. Studienblatt | Degree
programme as it appears on the student
record sheet:

Masterstudium Science-Technology-Society

Betreut von | Supervisor:

Assoz. Prof. Mag. Dr. Maximilian Fochler



Figure 1. Katharina Lorenz. (2023). *Hands*. Vienna, Austria.

Acknowledgements

For the coming together of this thesis I would like to thank many people who helped, guided and supported me along the way. First of all, I would like to thank my supervisor Maximilian Fochler, who gave me the freedom to put together this thesis in my own pace and in such an unconventional way. Thank you for trusting me to find my own path in this MA program and for my thesis.

Next, I would like to thank my incredibly kind participants, who were thinking, brainstorming and working with me from beginning to end: Inés Peláez, Sophie Olivia Taleja Schmidt and Xavi Sosa. Thank you so much for your time, effort, creativity and trust in this project. This would not have been possible without your efforts. In this context, I would also like to thank Chiara Juriatti who provided exactly the missing piece of the puzzle for my film and written state-of-the-art chapter.

Then, I would like to thank my dear friends Rachel Bell and Lisa Chmarra for giving feedback, holding writing-sessions together where we could help each-other stay on track, and for pushing me when I felt stuck in or overwhelmed by my project.

Lastly, I want to thank my mom, Bianca Bartels, who was in her own writing process at a similar time-frame as me with my thesis, with whom I was able to share frustrations and stuck-ness, as well as achievements and breakthroughs. My partner Samuel Gürtl, who patiently dealt with me on long writing days and my dog, Nero, who kept me company during the entire writing and editing process.

Chat GPT statement

For this thesis chat GPT has been used for creating structure and re-writing sentences to fit better in the style of academic writing. It has not been used to create knowledge or provide sources. Chat GPT solely had the function of a writing tool.

Table of Contents

1. Taking my body to Science and Technology Studies.....	6
1.1 The body as a research instrument.....	7
1.2 Research Questions.....	10
1.3 Overview of the thesis structure.....	12
2. Standing on the shoulders of giants – setting the base	13
2.1 Visual Anthropology.....	13
2.2 Science and Technology Studies: visual research in knowledge production.....	18
2.2.1 STS and the academic practice of arts-based research.....	20
2.3 Embodied practices.....	24
2.3.1 Embracing feminisms – different waves of embodiment	25
2.4 Where is the body in Science and Technology Studies?	29
2.4.1 What about practice?	34
3. The multimodality of playing with film, materials and body placement.....	35
3.1 Participants and relations	38
3.2 Bridging the gap to academia	42
3.3 Interaction or intra-action? The eye of the spectator	43
3.4 Film as a way of seeing	44
3.4.1 Work experience	45
3.4.2 Film as a method in academia.....	46
3.4.3 At the other end of the camera – limitations to filmmaking practices	46
3.5 Constructing a story – postproduction of filming	49
4. Reflection and discussion	51
4.1 How is the body used as a research tool/instrument by three students from the <i>Arts&Science</i> program at <i>Die Angewandte</i> ?	52
4.2 What type of knowledge is created through the three demonstrated embodied research practices?	55
4.3 How can these methods add to already accepted knowledge production practices in the social sciences – specifically Science and Technology Studies – to diversify the scope of research methods in the field?	58
4.4 Rounding up	59
4.5 Original Research Question.....	62
4.6 The End	62
5. References.....	63
List of figures.....	77

1. Taking my body to Science and Technology Studies

Having a background in performing arts, I know the importance of the body for transmitting information. If my face does not match the text I declare during a performance, no-one in the audience will believe me. And if my body is in an unactive position during a scene that is supposed to be convincing, the audience will disengage with me and lose interest. A director has the task to guide actors and give them notes on how to make their performance more convincing (V. Turner & Turner, 2020; Yekanians, 2020). They tell the actors how to position their bodies, how to use their voices and facial expressions. They teach them how to use their bodies as communication vessels and transmitters.

In academia however, bodies, bodily performance or embodied knowledge, are for the most part still underrepresented topics and only rarely used as research methods (Askins & Blazek, 2017). Creative research methods that are more inclusive to embodied practices, are often not taken seriously (Kara, 2015) even though many very interesting projects have already shown ways in which these methods can contribute to creating knowledge that could not have been obtained in other ways (Harman, 2019; Pink, 2007; Srivastava, 2022). In this thesis project, I learn from creative research methods in artistic practices, and translate them to potential social science research methods, in order to contribute to creating a more embodied approach to social science – and specifically STS – research.

I question how bodies are and could be used as research instruments for academic research, which kind of narratives the information gathered through the body can bring, and how our bodies collaborate with other research instruments. In my case, I dive deeper in the research practices of three art students who use their bodies for their research in three unique ways. I document their practices through documentary film and reflect on the use of my own body, as well as the camera and how I collaborate with this instrument. In this thesis, I start with an inquiry of embodied and film-based research practices from the past and then make one step further towards using embodied-and film-based research methods as approaches to social science (Science and Technology Studies) research today. The empirical part of this thesis is a documentary film that can be watched here:

Link to film: <https://www.youtube.com/watch?v=2P5OxQ48yN4&t=2164s>

1.1 The body as a research instrument

Within Science and Technology Studies there is the notion of knowledge production, how that works in different contexts, what knowledge is and how it is, can and could be transmitted (Jasanoff, 2010; Latour & Woolgar, 1986). My interest in investigating the specific way of knowledge production and transmission through bodies, links to a wish to diversify the types of knowledge found in academia, and in my case specifically social sciences, to make it more inclusive for different types of learners or those without a social science background like myself. I personally continuously use my body - and the way it feels in different moments in time and space - as a research instrument. Coming from an artistic background where this was common practice, it was almost odd to me to find out that this was not the case for other researchers in the field of STS. Although it initially made me feel misunderstood and out of place in this new field I had entered, it also inspired me to look for ways to include this method in the field and possibly contribute to the discipline and its methods. And although this research mainly focuses on research practices of others, I continuously relate the research findings back to my own practice throughout this thesis. I want to step outside my personal experience and research how other students use their bodies to create and bring across knowledge, to then apply it back to the context of Science and Technology Studies.

To discover ways in which other people use their bodies to create knowledge, it is important to account for the type of bodies that are per definition not standardly represented in academia and which bodies are. Because it influences the ways in which people are able to use and connect their bodily knowledge to their academic practices. For that I want to firstly draw on the work of Carol Azumah Dennis (Azumah Dennis, 2018) who tries to define the boundaries of the scholar that is allowed to speak for all scholars. Or in other words, a scholar that is fully and universally accepted in their academic position.

Some bodies, female bodies, bodies racialised as black, bodies with disabilities, queer bodies make up the constitutive boundary that defines the universal space of the unmarked scholar. Such bodies are out of place and denied the right to speak for us all. Such bodies are marked as trespassers and do not belong, nor do they have the right to belong. They are – as Puwar’s¹ analysis so evocatively shows – space invaders. (Azumah Dennis, 2018, p. 190)

¹ (Bourabain, 2019): “In her book *Space invaders: Race, gender and bodies out of place*, Nirmal Puwar introduces a framework to understand the inextricable link between bodies and the spaces they inhabit. This framework is relevant to understand today’s buzz around “diversity work” or “diversity management” in institutions. Institutions are confronted with demographic changes due to the influx of new groups such as women and ethnic minorities. Even though institutions are changing demographically, they fail to make everyone feel “at home”. This failure is explained by Nirwal Puwar by defining women and ethnic minorities as “space invaders”. The opposite of these space invaders are the natural occupants of a space, which according to Puwar are currently still predominantly white men in most institutions. Space invaders interrupt the normative order, which is resisted by the natural occupants using different dynamics to maintain the status quo.”

By referring to those who feel left out as “bodies” Carol Azumah Dennis captures the physicality of exclusion. Something I find very important for my research as well. Drawing also on Molinari’s work, there are some students for whom we can quite easily imagine a mismatch. An example given in one of her texts is from a student who had extensive personal experience with psychologists because of her mentally ill brother, and did not see any of her real-life experiences represented in her psychology degree (Molinari, 2022). Her personal and embodied experience did not match the theoretical input she received and therefore she felt like she did not belong in that academic field. How and where could these two types of knowledge have met? And why is practical knowledge/experience often dismissed as non-academic? Exclusion can happen in many different ways, and the embodied experience of it influences how well someone is able to perform at their measured theoretical output.

Of course, there have already been people who looked into alternative ways of producing academic knowledge. A great example is the work of Helen Kara (2015) who wrote a practical guide for creative research methods in the social sciences. Her work writes about the benefits of including creative methods, and how it can enrich social science knowledge to incorporate less formal or strictly theoretical knowledge. Some educational initiatives, such as the Mission Impact minor at The Hague University of Applied Sciences (NL) have already applied her ways of working and uphold an active embodied approach to knowledge production in practice (Van den Berg, 2021). Especially in the light of so called wicked problems such as climate change that require drastic societal change (Boode, 2023; Pörtner & Roberts, n.d.; Van den Berg, 2021) alternative methods of knowledge production and experimentation are embraced. *New problems* – such as climate change – benefit highly from (research) methods that do not comply with the same systems (economic/educational/growth-based/production-based) that are and have been causing these problems (van den Berg et al., 2022). The focus of this thesis is not on these problems, so I do not elaborate on these specific issues. However, I want to address programs that focus on new/creative methodologies such as Schumacher College, where they have embraced working with “the heart, the mind and the hand” as a philosophy for their education programs to address these types of ubiquitous challenges (such as climate change) (*Schumacher College*, 2022). Using these types of methodologies can be interpreted as a form of activism as it questions the powerful status quo that determines how new generations are being prepared for the world. I want to share a quote from STS-PhD student Livia Regen about activism at the STS Austria conference in 2023:

I’m personally very tired of the dispassionate indifference that comes with the non-normative. Given we find ourselves in times of multiple crises, including conflict, war, rising inequality and, with it right-wing populism. In times where we bear witness to destroyed

eco-systems, a destabilized global climate, forced migration, modern slavery, neo-colonial practices and labour exploitation. (Regen, 2023)

Her words were a call for a new approach within the field that acknowledges the wicked problems that the world is dealing with right now. Including more creative and embodied practices, that could shed light on or have the potential to include thus-far ignored sides of debates, could be one of the initiatives to start doing that. (With the side note that embodied practices can of course also be used for other goals, and do not have to only be considered in already ongoing debates.)

1.2 Research Questions

The empirical part of my research will be carried out through reflective ethnography and film. It is important to me to practice what I preach, and therefore combine my theoretical research with my embodied experience as I go about this process. The filming part will draw on a combination of my work experience as a documentary maker, as well as previous research on film as a research method by both myself and other researchers. Sophie Harman, Professor of International Politics at the Queen Mary University of London, wrote a chapter on “Film as a method of seeing” in which she describes the process of storytelling and knowledge creating in a film-making process and how using a camera allowed her to see things that she might not have seen through a different research approach (Harman, 2019). The technology of the camera, for her functioned as an extension of her body and her physical senses.

Within STS I have noticed, there are quite strict rules for the creation and documentation of accepted knowledge. Some creative methods such as visual anthropology or film are accepted for empirical research, such as for this thesis. However painting and fashion (Jungnickel, 2023) for example, are still not embraced as documentation or research methods. Inspiringly, within the field, more and more research is being done on creative methods, such as the work of Elena Pérez, Sophia Efstathiou and Tsjalling Swierstra that promotes the use of improvisation, performing arts and playfulness to investigate the intimate relationships between people and the technologies they use (Pérez et al., 2019).

Although I celebrate these movements, I also notice that many of these methods or presentation forms are not yet widely accepted in the academic community (Jungnickel, 2020, 2023). Even when writing this, many works that would not count as academic sources inspired me just as much, if not more so, to think about this topic than the academic papers that did. Like a street performance I saw that reminded me of the importance of using our bodies to communicate, or a documentary series about young people who started working in pornography and how they used their bodies to perform for the pleasure of others (Bauer et al., 2017). Often being inspired for me is a combination of the theoretical input I get, with these less-tangible moments/experiences/sources. In communicating my inspiration, however, I often choose to adhere to standards from the academic community, because not doing so could be problematic if I would want to make a career in academia. I try to reach for and stretch the boundaries of whatever is allowed and combine different methods. But in the end, even when artistic methods are used, they are most of the time eventually translated back to papers, PowerPoints and standard lay-outs like

this thesis (Jungnickel, 2020). When I started this project, I asked myself: How can I do that differently/more radically or impactful, and still obtain my master's degree?

Another thing that I have noticed during my STS-studies and the course of this thesis project is that translations of scientific knowledge towards artistic presentations are often celebrated by both the artistic and scientific community. Think of the Science Fiction(s) exhibition in the Welt Museum Vienna (Wien, 2023), and the different educational programs arising on this border, such as the Arts&Science program (MA) at the University of Applied Arts in Vienna (*Art & Science - dieAngewandte*, n.d.). This merging of the fields however, happens mainly one-sided.

Scientific knowledge → Artistic output. Translating artistic knowledge towards scientific output is not as widely happening, nor accepted as valuable knowledge within the scientific community (Lehmann & Gaskins, 2019).

So, within my research I want to focus on exactly this translation from the embodied, artistic knowledge to scientific output. I want to dive into these artistic research methods and figure out how they can contribute to academic knowledge production in social sciences, hopefully motivating other researchers/departments to also look into alternative methods for knowledge creation and/or accepting a broader scale of types of knowledge. And hopefully slightly stretching what we understand as scientific knowledge production. For the purpose of my thesis, I want to research students of one specific educational program, although I will not focus on the program itself, but rather on the individual practices of the students.

My main research question therefore is:

How do the three chosen students from the Arts&Science program at *Die Angewandte* use their bodies to produce knowledge?

I chose three specific students from the Arts&Science program at *Die Angewandte* because they all have very different approaches to embodied research, but all use their bodies to create knowledge in their research. In the methods section I will elaborate on my choice of this program, how I got access and which specific students I chose. To investigate this research question, I created three sub-questions:

- 1. How is the body used as a research tool/instrument by three students from the Arts&Science program at *Die Angewandte*?**
- 2. What type of knowledge is created through the three demonstrated embodied research practices?**
- 3. How can these methods add to already accepted knowledge production practices in the social sciences – specifically STS – to diversify the scope of research methods in the field?**

1.3 Overview of the thesis structure

The written part of this thesis will consist of a state-of-the-art chapter in which I reflect on the research that has already been done in the field of embodied research, film-based research and visual ethnography. A methods section that will dive deeper in the use of film as a research method, and also the ethical implications of that method. Followed by a reflection chapter that discusses the findings of the research and how these findings can contribute to diversifying academic research practices and knowledge production in the social sciences (more specifically Science and Technology Studies). And that will discuss overall reflections of the process. The empirical part of this thesis will be in the form of a documentary film that will be publicly available for everyone with an internet connection.

Throughout this thesis, you will find links to small exercises that help you stay connected with your body while engaging with this work. I highly recommend doing at least three out of the six exercises that are provided, for a full experience. Most exercises are about 5 minutes long. The exercises are partly created and/or suggested by my participants Inés, Sophie, Xavi and Chiara.

2. Standing on the shoulders of giants – setting the base

In this chapter I will firstly give an introduction to visual research methods in social sciences that have been used before to provide context for my choice to use film as a research method, as well as elaborate on what the medium of (documentary) film allows us to see. This connects to my empirical research, for which I will also provide literature background on practice observation in the field of Science and Technology Studies – laboratory studies. I will then connect it to embodied knowledge/research practices and in the meantime connect it to the theoretical frameworks of feminist technoscience and applied co-production. In this way I can show how my research contributes to the field of Science and Technology Studies, visual social research and making social science practices more diverse and inclusive.

2.1 Visual Anthropology

In this part I will talk about the historic development of visual social science research, to learn from questions that have been asked in the past, have been reflected upon and methods that have changed because of these critical reflections. As I build on a rich history of visual research practices, and do not want to re-invent the wheel, it is important to me to acknowledge and clearly state the body of knowledge I lean on and intend to contribute to. I will reflect on broadly used practices through specific examples, and position myself towards the researchers and practices I discuss. I intend to learn from their work, reflections and the critique they received and apply this to my own empirical research. As STS specifically does not have a particularly rich history of visual research methods, I aim to translate the findings from my empirical research back to this specific field and the research traditions of STS.

To start talking about bringing visual research into science and technology studies, we have to make an inquiry of visual research methods that have already been used in the social sciences. One of the most important and prominent of which is visual anthropology (Srivastava, 2022). This methodically rather interdisciplinary field has already employed visual media such as photography, film/video as tools for ethnographic research for decades (Banks & Ruby, 2011). Its origins can be tracked down to the late 19th century as anthropologists began to recognize the potential of visual materials to enhance their understanding of diverse cultures (Maxwell, 2013, pp. 123–142). That is to say, cultures other than the ones of the researcher. A famous example would be the photographs made by anthropologist Franz Boas through which he tried to document the appearance and culture of native Americans (Ganderup, n.d.). Boas was one of the first people to actively attack the idea of racial superiority and the “...nationalist sentiment that had arisen on the back of these beliefs, and which in the period 1912 to 1940 had caused Europe to become a hot bed of racial hatred and

intolerance.” (Maxwell, 2013, pp. 123–142). He used anthropometric photography to prove his points. Interesting here is that similar anthropometric photographs had previously been used to instate the idea of racial hierarchy. It was therefore risky to employ this same technique to discredit this very idea. Contrary to standard practices of anthropometric practices however, Boas did not ask his participants to undress, nor did he photograph full bodies. This was a clear difference to how it was done before. A possible explanation for this given by anthropologists that critically reflected on Boas’ work, is the friendship Boas had with his participants (Maxwell, 2013, pp. 123–142). An example of his research can be seen in the photo below. I wonder if “friendship” in this sense can be considered part of a method to reduce power differences, through which visual research becomes less hierarchical. As power differences and hierarchy play a big and problematic role in visual research (Harman, 2019), it is important to reflect upon ways to reduce this imbalance. We can see that in experiments with collaborative research approaches, or “participatory action research” (PAR) these hierarchical structures are indeed reduced (S. G. Collins et al., 2017; Harman, 2019; Verstappen & Davies, 2022).

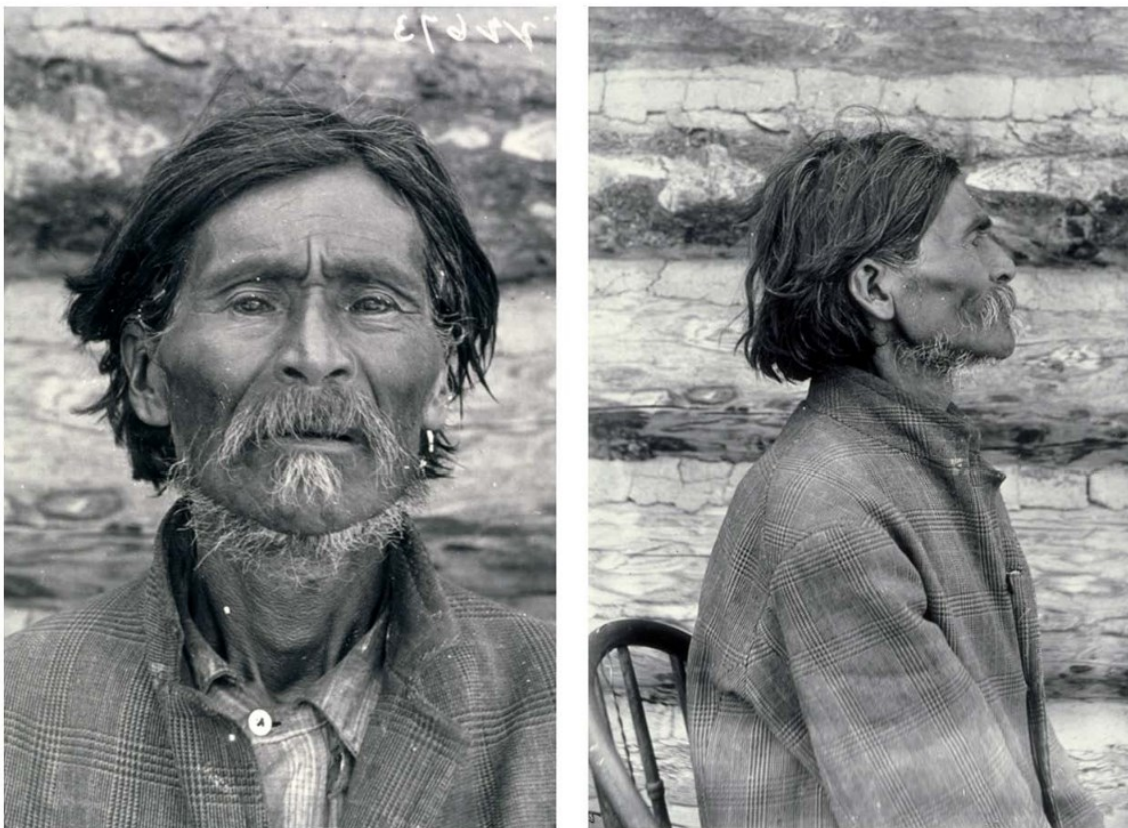


Figure 1 Harlan Smith collection, neg. 22661 (front view) and neg. 22663 (side view): a Native American middle-aged man taken at Spences Bridge on the Thompson River (1897). American Museum of Natural History Archives.

Figure 2. (Maxwell, 2013, pp. 123–142)

Moving forward in time towards the early 20th century, the emergence of film opened up a whole new chapter of visual anthropology. A famous example of a research project from this time is the documentary film “Nanook of the North” in which anthropologist Robert J. Flaherty spends one year following the lives of an Inuit family living in the Arctic circle (*Nanook of the North*, 1922). Flaherty was criticized because parts of the film were staged, while documentary film often claims to be “[...]about actual situations and honour known facts” (Nichols, 2010, pp. 142–171). Although staging situations might officially not be part of documentary making, we should ask ourselves if the documentary maker is not always staging the story and context in some form, as they decide what is being shown and what not (Harman, 2019). Nichols also reflects on this by saying: “Documentaries are not reproductions of reality, they are representations.” (Nichols, 2010, pp. 142–171) I wonder if something is representational, is it then inherently wrong to stage situations, as long as these situations did occur at some point in time?

The film itself was also criticized for “exoticizing indigenous people and relegating them to history and antiquity.” (The Economist, 2022, p. 1). This is of course, an important critique that is very present while working with specific, often marginalized communities. It reminds us to be very aware of our positionality, the power differences and prejudices we (researchers) take with us to the places we do research, and especially when that position involves a camera and an assumption of “representing the truth” (S. G. Collins et al., 2017; Harman, 2019; Nichols, 2010). When film was used as a documentation and research method, visual anthropologist did reflect on the role of the camera in the outcome, meaning: they were aware that by holding the camera, they decided what was being shown and what not (Emerg Techlab, 2018). They often lacked however, critical reflections on the power imbalance that brought with it, and the one-sided perspective from researcher to “object of study” (Grimshaw, 2001). This type of reflection is a practice that comes more into play nowadays, and something I intend to bring in my own empirical research by using a more collaborative research-approach where the person behind the camera shifts and all participants get to film, be filmed and edit. I will elaborate on this in my methods section.

In the middle of the 20th century, visual ethnography started to gain recognition in the academic field. This was supported by the arising and growing of the American Anthropological Association (AAA) which now is “the world’s largest scholarly and professional organization of anthropologists.” (*About American Anthropological Association*, n.d.). After it’s solidification as an academic field, visual anthropology slowly started to influence other disciplines and vice versa. The interdisciplinary nature of film and visual media led to collaborations between anthropologists, filmmakers, and artists. This cross-pollination resulted in innovative and often controversial approaches to documentary filmmaking and ethnographic representation. A famous example is the

film “Les Maîtres Fous” made by filmmaker and ethnographer Jean Rouch in 1955 that displayed the “Hauka Movement”. (Grimshaw, 2001; Rouch, 1956). The Hauka Movement is a religious movement that arose in French colonial Afrika. In the film, the elaborate military ceremonies (belonging to the colonial occupiers/oppressors) including dancing are portrayed. The film got a lot of critique because of racist narratives and its disruptive nature, but is still “widely acknowledged as a classic of modern cinema; its impact, the film’s power to move and unsettle audiences has not been diminished by the passage of time.” (Grimshaw, 2001). The story of the film is very much told from a colonial Western perspective. Reflecting on this, I learned that for my own empirical research, I do not want to create a voice-over that is based on my reflection alone. Here, again, I want to co-create the story that is told with my participants and make sure it is “our story”, rather than “my” story “about them” (‘Mapping Indigenous Engagements’, 2019; Moraga & Anzaldúa, 2015).

In the late 20th century, technological advancements such as lightweight video cameras and digital editing tools democratized visual anthropology and filmmaking practices in general. These cameras allowed researchers to film while walking, and include their perspective as a researcher more easily. It also allowed for a more inclusive documentation of people’s environments, as the objects of study no longer had to come to the camera. The camera could come to them (Emerg Techlab, 2018). Of course this still did not solve the issue of telling stories solely from the researchers’ perspective, a practice that is now looked more critically upon in visual anthropology (Srivastava, 2022).

What we’re recording when we film with video is not just what we can see, but also the standpoint or the position of the filmmaker in the world. We’re actually tracing recording of that position that we have in the world in that particular moment as we’re engaging with the experience that the other person who’s showing us that world, wants to show us.

(MacDougall, n.d., p. 1)

Researcher and filmmaker Sarah Pink made a relating statement in one of her recent videos, underlining why this technological development was so important and what it brought to the field:

By being in the task with them, and using video as a way to actually enable them to show and to perform the task, we are able to look at the detail, look at what it meant, look at what it felt like, to actually understand the embodied knowledge that people use when they engage in such tasks.[...] It allows you to gain knowledge that people have that you would not have had access to if you would have just sat there and interviewed them. (Emerg Techlab, 2018, pt. 00:05:22)

In that statement Pink captures something vital to my research, namely the connection of film as a research method to observing, documenting and communicating embodied knowledge. The camera in these situations might notice things we would miss if we had been in that situation merely with our eyes, or if we had tried to bring across the knowledge to others solely in words. Of course, here too, we should be careful with presenting the camera as if it brings only more accurate and detailed documentation. We have to reflect upon the effect the camera has on a situation, and that bringing a camera to a person or location (especially into a personal space) changes the space and behaviour of involved participants (Dear, 2018). Still, adding a camera to the research allows us to see or remember different things and/or things we would not have been able to notice without involving the technology.

It is important to capture people in their environment if you want to bring across the embodied experience. If you do that via video that people participate in creating themselves, others are able to empathically engage with that material and learn from it. Which is very different than reading a text about the topic by an expert who does not have the embodied experience. [...] It goes beyond words. (Emerg Techlab, 2018, pt. 00:06:03)

Note that again, Pink highlights the importance of co-producing this kind of material, so that people that interact with the film material afterwards can empathically relate to the practices that are being shown. To highlight this type of interaction, I find it important that the people who interact with the documentary I make, will also engage in exercises that help them embody the information they learn from the documentary film.

I feel that, as an anthropologist, video enables me to see things that are happening in the world that wouldn't ordinarily be visible. [...] I think video is one of the most important ways that we can engage with the world and engage with the knowledge that people have that is normally not verbalized, normally not seen. (Emerg Techlab, 2018, pt. 00:10:40)

To come back to the goals of ethnographic filmmaking, we have to become aware of a shift. Where ethnography started with a colonial perspective of documenting different types of humans, ethnography slowly shifted and is still shifting towards a more de-colonial and feminist (read: not based on classical power-structures/hierarchies, more collaborative, focusing on benefiting all parties involved, taking equality as a starting point) approach to understanding different cultures, locations or phenomena. This move goes from knowledge about bodies towards embodied

knowledge. From “differences” to “similarities” and from outsider perspective towards a more collaborative approach (Srivastava, 2022). Although my research and documentary do not focus on a specific cultural group, but a group of people who are part of the same working culture, I still actively perpetuate the shift towards collaboration and embodied knowledge in an attempt to make my work more explorative and intersectional in approach (Casaglia, 2022; Guzman & Hong, 2022; ‘Mapping Indigenous Engagements’, 2019; Moraga & Anzaldúa, 2015). Especially in a world where all kinds of crises, of which predominantly climate change are instigating a rapid change in systems (IPCC, 2022; van den Berg et al., 2022), I deem it important to stay experimental, inclusive, flexible and open for collaboration in all my practices. And that includes questioning and challenging my own research approaches, to at the very least not contribute to hierarchical research practices that are built on inequalities and power differences.

I call on all anthropological filmmakers to interrogate your own practice and consider how anthropological film as a collective project might better address, intervene and collaborate with other stakeholders in the crucial challenges that we face as we stand at the edge of the future. (Pink, 2023, p. 1)

In the next part of this literature review I will relate these film practices to research in science and technology studies. And the visual research approaches that have already been performed in the field.

2.2 Science and Technology Studies: visual research in knowledge production

In STS there is a long history of investigating knowledge-making practices. In fact, that is where the field of STS started (Fleck, 1981; Latour & Woolgar, 1986). This relates to my research, as I investigate the research practices of Art Academy students of Die Angewandte. However, STS is not alone in exploring this phenomenon:

Ethnographers and sociologists, historians and philosophers, gender theorists and media historians- all have wanted to know about the shifting productive nature of scientific practice in particular times and places. (Galison et al., 2014, p. 7)

Investigating knowledge practices in Science and Technology Studies (STS) involves scrutinizing how knowledge is produced, validated, and disseminated within scientific and technological communities. STS scholars delve into the entangled social, cultural, and political processes that influence the creation and acceptance of knowledge (Felt et al., 2016; Rogers et al., 2021). This

inquiry encompasses examining scientific methodologies, laboratory protocols, collaboration dynamics, and the role of expertise. By critically analysing these practices, STS sheds light on the underlying power structures, biases, and social contexts shaping knowledge production. It emphasizes the importance of understanding not only what is known but also how knowledge is constructed, challenging conventional notions of objectivity and revealing the layered interplay between science, technology, and society.

But here and there, something new is emerging from within the local attention to the visual – as source, evidence and form of reasoning. We are by now familiar with the idea that diagrams, charts, maps and photographs can serve as fundamental part of scientists' argumentation. What about science and technology studies itself? Can the visual function there too as a form of research, not just as popularization or illustration? (Galison et al., 2014, p. 7)

What this quote highlights, is the rich history in Science and Technology Studies of researching visual representation of scientific knowledge – referred to as *illustration*. – The main part that is researched here, is not so much the visual image/chart/graph itself, but rather the process of translation from data to image (Berger, 2008; Gray et al., 2016; Hacking, 1983; C. A. Jones et al., 1998, 1998; Lynch, 2006; Steen, 2011). And how these images then gain agency as *inclusive* and conclusive representation of both the data and the situation the data is collected from (Burri, 2012; Dumit, 2021; Lynch, 2006). As this is of course, a type of visual research in Science and Technology Studies research, my interest in a visual research approach in the field goes more in the direction of the last question of the above provided quote (Galison et al., 2014). How can we use the visual as a way to *do* Science and Technology Studies related research?

Slowly but surely, visual research methods are finding their way into Science and Technology Studies. Mainly in exploring research practices, a method called “Visual Ethnographies of Science” (Verstappen & Davies, 2022). Film in particular has proven to be useful for researching “...embodied aspects of social life, such as movement, clothing, skill, and various kinds of practical knowledge.” (Banks & Ruby, 2011; Verstappen & Davies, 2022, p. 2). Where visual anthropology has a history of investigating cultures in a more traditional interpretation of the word (Ruby, 1975), Science and technology Studies is more interested in researching practices and practice cultures of specific contexts such as for example departments or institutions that come with their own set of (social) norms and values (Mößner, 2011). Combining the approach of visual ethnography with the interest of department cultures, we get a specific type of visual research that contributes to capturing tacit

and embodied knowledge of workplaces in detail. Documentary film, while being aware of its shortcomings, could prove to be helpful for investigating this specific combination (*Documentary and Ethnographic Film*, 2021; Guzman & Hong, 2022).

The work of Science and Technology Studies Master student Elaine Goldberg, at the University of Vienna (Goldberg, 2023) is a very good example of this. For her thesis project, she made a film in which she researched how the surroundings of researchers influenced their practices. For example, which sounds they were making, which objects they needed to be able to work, how their surroundings influenced their moods, work ethics and production. She used audiovisual research for this project, and through that was able to document details of the research practices of these academics she followed, that would have been impossible to capture only in writing. Elaine Goldberg was the first student at the Science and Technology Studies department in Vienna to use this type of method for her thesis research, which exemplifies that this type of research is still very much in the beginning stages.

Of course, there is a difference in observing experts working in a specific field, to observing students working in that same field, and students are not always exemplifying the current new waves/practices within the fields they work in (like Elaine Goldberg was). For my research it is therefore relevant to emphasize that my participants are not chosen to represent the field they study/work in, but for their individual practices/methods.

2.2.1 STS and the academic practice of arts-based research

Within STS specifically, arts-based research has been introduced and investigated in different shapes and forms. In the context of laboratory studies, one does not have to focus on natural-science labs as it was traditionally understood, but can also choose to investigate the practices of for example design-labs or media art labs (Tanaka, 2011). However, not much research has been done on these art-lab based practices. For a big part because its dedication to art-practices can be questioned, as these labs are often under harsh economic and/or academic pressures to come up with innovative projects as quickly as possible (Hörtner, 2009). This type of investigation can however still be seen as an approach to investigate arts-based research through a Science and Technology Studies lens. But what actually is considered arts-based research?

In 2006, Dutch researcher Henk Borgdorff wrote an article in which he distinguished three types of arts based research (Borgdorff, 2006):

1. ***“Research on the arts** is research that has art practice in the broadest sense of the word as its object. It refers to investigations aimed at drawing valid conclusions about art practice from a theoretical distance.”* One way to do this would be this type of laboratory studies in “artistic labs”.

My own project could fall under this as well, as I am investigating research-practices of art students from one specific institute. However, to properly adhere to this definition, and draw conclusions about the institution itself (which is not my focus or goal) I would need additional research into the educational practices of this institute, and investigate more closely the practices related to the institute specifically.

2. ***“Research for the arts** can be described as applied research in a narrow sense. In this type, art is not so much the object of investigation, but its objective. The research provides insights and instruments that may find their way into concrete practices in some way or other. (...) In every case these are studies in the service of art practice.”*

This type of research aims to give back to the art practice. This would be if my project was done in opposite direction. Say, an art student would look into STS-research practices and translate methods back to their artistic practice. I am interested to see what is meant by “applied research” in this definition, as I think all case-based-studies are applied. Maybe this refers more to the type of research itself, although I do not know how “applied” is defined and what research methods would fall under that category.

3. ***“Research in the arts** is the most controversial of the three ideal types. (...) It concerns research that does not assume the separation of subject and object, and does not observe a distance between the researcher and the practice of art. Instead, the artistic practice itself is an essential component of both the research process and the research results. This approach is based on the understanding that no fundamental separation exists between theory and practice in the arts.”*

This approach is the closest to my research project, as I too include artistic practices in both my methods and subject. And in my opinion, it would have been way more difficult to do only either or. Looking at/researching an artistic context, without applying any of the methods to your research approach, is in my opinion a missed opportunity for finding/creating a better understanding of the field. And applying artistic research methods, is in my experience always linked to an artistic context

(even when the object of research as such is not artistic) as these methods find their origin in artistic practices. In my specific case, it is obvious that both are included.

Other examples of STS engaging with artistic practices are when STS scholars examined the materiality of art-making tools and their implications in the creative process, or how the use of new technologies shape artistic practices (Salter et al., 2016), which would fit to the first definition of Borgdorff. Or some STS scholars who explored the convergence of art and biology, particularly in the realm of bio-art. This involves artists working with living organisms, biotechnology, and scientific processes to create artworks (Fischer, 2003; Ginsberg et al., 2017; Salter et al., 2016). And then, of course, there are plenty examples of STS scholars using art as a communication for their research (concepts) (Borgdorff et al., 2019; Salter et al., 2016). However, artistic communication of scientific practices is a whole different topic, that I will not explore further in this thesis.

So how can we do an STS-research-project through the lens of art-based research (practices)? For that I want to share a quote from the Handbook of Science and Technology Studies (fourth edition) published in 2016 (Felt et al., 2016):

“The inclusion of art and design in STS raises methodological challenges: How can artistic and design methods be involved and used in STS to reflect on science and technology? In other words, how to do (social) science through art and design? When exploring this issue, STS itself becomes experimental; it not only observes people "thinking with eyes and hands" but uses eyes and hands to intervene and interfere in spaces and sites where science and technology are constructed, distributed, used, incorporated, and enacted. Such a performative approach to the exploration of science and technology can be understood as practices of "witnessing," which produce "knowledge without contemplation" (Dewsbury 2003). Rather than just passively observing and reflecting, knowledge emerges through an active engagement and interplay of senses, bodies, implicit knowledge, and material objects. (Dewsbury, 2003; Salter et al., 2016)

In the chapter on “Art, Design, and Performance” in the fourth edition of the STS handbook (Salter et al., 2016, p. 140), the authors introduce four ways in which they think STS can “broaden its ways of investigating and intervening into technoscientific worlds” from interaction with art and design practices:

1. *The involvement of art and design in exploring both the production and stabilization of scientific facts and the development and use of technological artifacts and sociomaterial networks can generate other enriched forms of knowledge, which includes aesthetics, across all of the senses.*
2. *STS (and science in general) could tap into enlarged methodological repertoires. Art and design works can thus counterbalance the more standard cognitive and social science approaches of STS by injecting ambiguity, complexity, speculation, and agonism when displaying and communicating science.*
3. *Art- and design-inspired ways of enacting and communicating research results can enable STS work to reach broader audiences than written scientific work, thus facilitating the inclusion of wider publics in the reflection on science and technology and contributing to its democratization.*
4. *Art and design interventions can be forms of radical political engagement with sociomaterial worlds and thus can participate in the shaping of technoworlds and the formation of technosocieties. Art and design methods might enable an alternative way for STS to get involved in sites where science and technology are constructed - experiments in codesign, participatory and adversarial design, and critical making are key in this respect.*

The chapter then proposes two questions we should ask ourselves when interacting with this interdisciplinary approach (Salter et al., 2016, pp. 140, 141). The first one is: What can the field of Science and Technology learn from art and design practices, that could be applied to the broader scope of analysis of STS research practices? This is very similar to what I do when looking at the artistic research practices of the students I follow, by looking how their methods could be applied in STS research. The second question is more focused on knowledge production, and asking: “[...]if science has traditionally been seen as the premiere site of knowledge production (Knorr Cetina 1999), then what kind of knowledge does art and design, produce and how does this knowledge challenge traditional paradigms of scientific knowledge (production)?” (Salter et al., 2016). This question goes a bit further, by almost proposing to find the places where scientific research production has created a blind spot for itself by taking for granted being the primary source of knowledge production. I think, as an academic outsider like myself (having a bachelors in Interdisciplinary Art from the Art Academy rather than an academic background) it is easier to notice such blind spots, as these often are exactly the points of difficulty when trying to fit in, in the academic world.

An example from my own experience is the focus on academic papers as a primary source of information, rather than “alternative” sources such as every-day experiences, conversations, movies, music, images etc. which are all accepted primary sources of information in artistic research practices. When starting a project, my main interest and first interactions with the topic are more found in these practices, rather than papers. When starting my STS Master’s, I found it difficult to switch to academic papers for finding inspiration – which I saw many of my peers with academic backgrounds doing with ease. However, when I then asked my peers, which kind of *other* (than scientific papers) sources helped them get to know more about their topics, they struggled and found that question rather peculiar. In my opinion, this could be considered one of these blind spots that are described.

2.3 Embodied practices

Now that we have elaborately discussed the history and use of visual research methods, and the engagement of Science and Technology Studies with visual research and art-based research, it is time to dive into the second part of my approach by looking into embodied research practices. Which is the topic of study for the empirical part of this research in the form of a documentary film. With embodied research, I refer to research that either uses the body as a research tool by using multi-sensory observations to create knowledge, research that focuses on specific movements or skills of bodies, or research that can only be communicated in an embodied way. To understand where this move is coming from, I want to contextualize traditions of scientific practice, so that we can see how embodied research was a reaction to those traditions. As it is not the topic of this chapter (nor possible) to summarize the entire history of scientific knowledge-making, I will only briefly address this context and then move on to the different forms of embodied knowledge that my research engages with. After this introduction to embodied knowledge, I will address the different ways in which STS has been in touch with embodied research, and also how this interaction can be deepened according to me.

For this written part of my thesis, I would like us to become aware of our bodies while we read. Reading is often portrayed as a rather body-less practice, while I would argue that our bodies are very much involved in the practice. If I haven’t slept well, my eyes have a harder time focusing on the words. My parents need glasses to be able to read because their eyes have become worse over the years. And some people are not able to read at all due to disabilities, dyslexia or concentration difficulties. Our bodies are very much part of our reading experience. To highlight this, I will suggest small embodiment exercises in between the reading, that will hopefully lead to a different type of reading experience than we have when we read theses or papers without these

exercises. It would be interesting to note for yourself what the differences were between *regular reading* and reading with the exercises in between. I would be grateful to receive your feedback on this.

2.3.1 Embracing feminisms – different waves of embodiment

From the 17th centuries' scientific revolution onwards, thinkers like Descartes made a case for rationalism and inductivism, trying to frame the brain as separate from the body as a means to create trustworthy, neutral scientific knowledge (Garber, 2001; Parkinson, 2003; K. Smith, 2021). For centuries, this provided a successful but selective framework through which many important scientific *discoveries* were made, proven and shared (Andrew, 1977; Schuster, 2011) and still nowadays, these structures highly influence research practices of scientific fields ranging from law to biology, philosophy and from psychology to AI (Fleck, 1981; Gauch, 2003; Hook, 2020; Latour, 2001; Lavin et al., 2022; Ulen, 2002). But throughout these decades of so-called objective scientific research, there have also been critiques on this focus on rationality and neutrality, and the division of the body and the brain. Particularly in fields like social sciences that deal with human interaction, unmeasurable knowledge creation or morally sensitive subjects for which the body is an important research instrument and research topic (Blockmans, 2007; M. C. Smith, 1994; Ward, 1997).

Embodied research (using the body to create knowledge, documenting feelings, tacit knowledge, using the body as a research or documenting tool) was one form of this critique, and did so by highlighting the undeniable influence our bodies and subjective experiences have on the data we produce and thus the findings we create (Hine, 2020; Myers, 2008). Embodiment in social sciences is not a new concept, and has had many forms over the years. I will now walk you through the developments and different streams of embodied research.

One of the first scientists who focused on embodiment of knowledge and the inseparability of the mind and body was French philosopher Maurice Merleau-Ponty (Toadvine, 2016) who, in the early 20th century, incorporated traditions of phenomenology (direct description of phenomena without bringing in outside knowledge) and existentialism ("a philosophical theory or approach which emphasizes the existence of the individual person as a free and responsible agent determining their own development through acts of the will." (*Oxford Languages*, n.d.)) These theories played an important role in emphasizing subjective experience and the lived body. Merleau-Ponty explored in his works, how we could study perception, as he argued we need to consider every organism as a whole to find out what comes out of confrontation with a certain set of stimuli (Merleau-Ponty, 1942, 1945). Interestingly this argument Merleau-Ponty made in 1942, is still relevant nowadays. At the STS Austria conference 2023 on "Activism, Community and the Politics of STS" (*STS Austria*

Conference, 2023) multiple people spoke up about feeling that their bodies, opinions, worries and activism were not welcome in their research and/or job as a social scientist.

I have tried to write my Master's Thesis, but I feel like I have to abandon my body and my feelings to do so. And that is not something I'm willing to do. I am here at the conference because I want to find out how I can create space for my body and the activism I'm engaged in, while at the same time connecting to academic practices. (Anonymous STS Master Student, personal communication, 27 November 2023)

In a floor exercise that was done later at the conference, hosted by Sarah Rose Bieszczad, participants were asked to position themselves in space according their positions on certain statements (*Floor Exercise Activism in Academia*, 2023). One of the statements was: "I fear that my academic career will be harmed if I express my stance in certain activist topics." For "Yes, I do fear this" people had to walk to one side of the room, for "No I do not fear this" to the other side.



Figure 3. Picture of floor exercise – STS Austria Conference (2023, November 27).

Many people walked to the side of expressing fear, and some even spoke up, saying that they had already been asked to leave their personal ideologies out of their work, or had been rejected for positions when expressing that they were not willing to do so. I do not quote directly here as the people who expressed those sentiments did not consent to that. I did want to share this experience here however, because it visually demonstrates the tendency towards leaving out the "personal" of research (Harding, 2015; Ward, 1997). And the belief that personal motivations, involvement in activism or "strong feelings" take away from objectivity, and therefore credibility of research (Askins, 2009; Askins & Blazek, 2017; Reger, 2001). Feminist scholars have been disputing this claim for years already (Reger, 2001), and that brings us immediately to the second important

wave of embodied research supporters, which is feminist epistemology that started to come up around the 1970's.

Exercise 1 for reader: <https://www.youtube.com/watch?v=7Ep5mKuRmAA>

Embodied research, highlighting the importance of personal experience and emotions in understanding social phenomena, was pushed by feminist scholars in the 70's to break away from male-centric perspectives in academia (Guzman & Hong, 2022; Harding, 2015; Lyon & Conway, 1995). One of the central figures in this movement is feminist philosopher and sociologist Sandra Harding who argues for a more inclusive and socially situated approach to understanding how knowledge is created and validated (Harding, 1992, 2015). Although there are many feminist scholars that contributed to diversifying and feminizing scientific research methods (Ahmed, 2017; Cadena, 2015; de la Bellacasa, 2012; Haraway, 2016; Suchman, 2007; Willey & Subramaniam, 2017; and many more) to whose research I will come back later, I specifically point out the work of Harding here, as she explores how traditional scientific methods often perpetuate gender biases (e.g. through using mainly male participants, or publishing in settings where non-males have less access to it etc.) and argues for the need to reconceptualize scientific inquiry from a feminist standpoint (Harding, 1986), which was one of the first feminist moves critiquing the scientific method I referred to earlier. Harding also advocates for something called standpoint epistemology, which is the idea that individuals situated in marginalized or oppressed social positions may have unique and valuable perspectives that challenge dominant knowledge paradigms. This approach emphasizes the importance of considering diverse standpoints in the pursuit of more robust and equitable knowledge (Harding, 1991, 1998).

Moving forward in time, in the late 20th century, we encounter scholars like Judith Butler, who explored performativity and the role of the body in shaping identity, laying the groundwork for embodied approaches to studies of gender and sexuality (J. Butler, 1990, 2004; Jenkins & Finneman, 2018; Lovaas & Jenkins, 2007).

“Science” and “naturalness” are discursive constructs and, although it might seem strange to refute the authority of “science” after quoting apparently “scientific” data, the point Butler is making is clear: the body is not a “mute facticity”, i.e. a fact of nature, but like gender, it is produced by discourses such as the ones Butler has been analyzing. [...] sex as well as gender can be performatively reinscribed in ways that accentuate its factitiousness (i.e. its constructedness) rather than its facticity (i.e. the fact of its existence.) (Lovaas & Jenkins, 2007, p. 1)

Around the same time, we see the emergence of “Sociology of the Body” as a subfield that focused mainly on the social and cultural dimensions of bodily experiences. Scholars like Bryan Turner and Thomas Csordas explored how societal norms, practices, and institutions shape the ways individuals perceive and experience their own bodies (Banks & Ruby, 2011; Csordas, 1994; Tamari, 2020; B. S. Turner, 2007, 2008). A type of research from which Science and Technology Studies also integrated parts (B. S. Turner, 2012), for example in laboratory studies where publishing pressure is influencing the daily research practices of observed researchers (Waaiker et al., 2018).

If embodiment is an existential condition in which the body is the subjective source or intersubjective ground of experience, then studies under the rubric of embodiment are not "about" the body per se. Instead, they are about culture and experience insofar as these can be understood from the standpoint of bodily being-in-the-world. They require what I would call a cultural phenomenology concerned with synthesizing the immediacy of embodied experience with the multiplicity of cultural meaning in which we are always and inevitably immersed. (Banks & Ruby, 2011, p. 20)

Acknowledging both cultural embodiment and gender as performative structures that are reinforced by societal standard and repetition (J. Butler, 2004), we can clearly see the relation to Performance Studies that added another layer to the formerly mentioned embodied research methods. The added layer of performance studies can be found in studying how people present themselves and how they communicate their identity through their bodies and cultural expressions (Calhoun et al., 2022; Edgley, 2017; Goffman, 2014).

When an individual plays a part he implicitly requests his observers to take seriously the impression that is fostered before them. They are asked to believe that the character they see actually possesses the attributes he appears to possess, that the task he performs will have the consequences that are implicitly claimed for it, and that, in general, matters are what they appear to be. In line with this, there is the popular view that the individual offers his performance and puts on his show "for the benefit of other people." It will be convenient to begin a consideration of performances by turning the question around and looking at the individual's own belief in the impression of reality that he attempts to engender in those among whom he finds himself. (Calhoun et al., 2022, p. 27)

Aside from social sciences, embodied research methods also found their ways into other disciplines. In cognitive science, the “embodied cognition paradigm” came up, challenging traditional views that separated the mind from the body. Researchers such as George Lakoff and Mark Johnson argued that cognition is inherently grounded in bodily experiences, influencing the development of

embodied research in psychology and neuroscience (Borghi & Cimatti, 2010; Foglia & Wilson, 2013; Lakoff, 2012; Lakoff & Johnson, 2020; Wilson & Golonka, 2013).

Traditional views in philosophy of mind and cognitive science depict the mind as an information processor, one whose connections with the body and the world are of little theoretical importance. On the contrary, mounting empirical evidence shows that bodily states and modality-specific systems for perception and action underlie information processing, and that embodiment contributes to various aspects and effects of mental phenomena. (Foglia & Wilson, 2013, p. 1)

As embodied research theory got more and more established throughout multiple disciplines, new methods also kept arising. In social science, qualitative research methodologies including ethnography and phenomenological inquiry, incorporated embodied dimensions more and more often. Researchers began to experiment with more participatory and experiential methods (Born & Barry, 2010; B. E. Butler, 2017), recognizing the value of embodied practices in generating rich, contextually embedded data. In the next section I will discuss what this meant for STS specifically, and how the practice of applying embodied methods, differs from the theory.

Exercise 2 for reader: <https://www.youtube.com/watch?v=eUB4o-8heVE>

2.4 Where is the body in Science and Technology Studies?

Embodied research methods in science and technology studies look at the relationships between science, technology and bodies, trying to learn more about the *lived experiences* and interactions shaped by and between these three entities. One of the earliest examples of this is by the feminist scholar Donna J. Haraway. Her work, that started to take off in the 1980s, particularly the essay "A Cyborg Manifesto," explored the interconnectedness of technology, gender, and identity. This approach has made her one of the leading scientists in cyborg and posthuman studies (Haraway, 1985, 2004, 2016). While the manifesto itself does not explicitly talk about specific embodied research methods, it does introduce concepts that are important for understanding embodiment in Science and Technology Studies research. Haraway's approach to the cyborg offers a perspective that challenges traditional boundaries between human and machine, nature and culture, and self and other (Haraway, 2016). Her cyborg is a figure that embodies a fusion of organic and technological elements.

The manifesto suggests a blurring of boundaries between the human body and technology (Haraway, 1985). Researchers that use her work and ideas, deal with the challenge of (re)considering how they conceptualize and study the body in relation to technology (Britton & Semaan, 2017;

Zylinska, 2002). When conducting embodied research specifically, scholars influenced by Haraway's ideas might focus on the ways in which individuals incorporate technology into their everyday lives (Bayer, 1999; A. Jones et al., 2001). This could involve studying practices, habits, and perceptions related to the use of technology, something we also often see in laboratory studies in Science and Technology Studies (Kerr & Garforth, 2016; Latour & Woolgar, 1986). Haraway's manifesto has political sides as well, as it advocates for a *politics of affinity and coalition* (building connections and alliances based on shared values, goals and interests). In the context of embodied research, this could inspire researchers to explore the political dimensions of bodies in relation to technology, including issues of power, privilege, and resistance (Haraway, 1997; van Amsterdam, 2013). So even though Haraway's "Cyborg Manifesto" may not hand us specific methodological approaches, its theoretical framework challenges researchers to think critically about the embodied experiences of individuals in technology driven societies, and therefore should absolutely be considered part of embodied research in Science and Technology Studies.

Another very important and influential work is Actor-Network Theory (ANT), that emerged as a theoretical framework in the late 20th century, emphasizing the interconnected agency of both human and non-human entities within scientific and technological networks (Latour, 1996; Moser & Law, 1999; Quinlan, 2014). ANT provides a lens through which researchers can explore how bodies, both human and non-human, participate and influence the construction of knowledge and social reality (Baron & Gomez, 2016; Sage et al., 2020). I find it interesting that a theory that focuses specifically also on the agency of non-human entities, through that acknowledges the influence the human body, or human-like traits have on (the outcomes of) research. By extending the notion of embodiment beyond human bodies, ANT considers how non-human elements, such as technologies or scientific instruments, *become* embodied in social practices. For example, a laboratory instrument may actively shape the actions and interactions of researchers, becoming an unmissable part of the embodied research process. Similar to how I described my camera as an extension of my body, ANT acknowledges not only how this instrument strengthens the researchers' perception, but how the camera, in my case is an actor on its own (Aanestad, 2003).

One of the key principles of ANT is the principle of general symmetry, which means treating human and non-human actors equally. (My camera deserves the same acknowledgement as I do.) To summarize: embodied research within this framework investigates how material artifacts, technologies, and environments contribute to the embodied experiences of individuals and communities. As ANT also acknowledges and creates space for disruptions of the networks (every ANT-constructed network is constructed from a point of view that could also be seen differently, and is unlike other definitions of networks unstable and constantly changing (Latour, 1996)), researchers

who deal with embodied knowledge and ANT may also want to examine moments when certain technologies, potentially disrupt or transform the embodied practices within a particular social context (Bird, 2014). This is something I use to reflect on the role of the camera in my research, and how this instrument changes the behaviour of the participants of this project as well as my own behaviour.

Some other work that relates a lot to my project, is the research of physicist and philosopher Karen Barad who introduced and developed the concept of *agential realism* (Barad, 2007). This is a theoretical framework that offers a perspective on the relationship between the material world, human perception, and knowledge production (Holford & Hadaya, 2017; Murris, 2022). In the context of embodied research, agential realism challenges dualistic notions of the separation between the observer and the observed, emphasizing the entanglement of the researcher's body with the things that are being studied. In my research I also made the active choice to make myself, my perception and my body as much part of my research as the other participants and their views and bodies. The concept of agential realism prompts exactly that. It asks researchers to recognize that the act of observing or studying a phenomenon is not a detached process. The researcher's body is inseparable from the phenomenon being studied, and knowledge is co-constituted through the researcher's intra-action with the subject matter (Plauborg, 2018). It seems logical to me: if I as a researcher make observations on a day where I have a horrible headache, my perception of that situation will be different than on a day where I feel fully fit. I might, for example, experience sounds or light more intensely, or they stand out to me more because they cause me more pain. It might leave me with a different impression of the situation that I enter as a researcher. Barads' work is therefore very important to my research approach² (Ahmed, 2008; Braunmühl, 2018).

As Science and Technology Studies progressed into the 21st century, scholars like Sarah Kember, who works at the intersection of Science and Technology Studies, media studies, and feminist theory, continued to explore the embodied implications of new media and technology, shedding light on the ways in which bodies are interwoven in digital culture (Gardner & Kember, 2021). Kember has written extensively about the embodiment of individuals in digital culture. Her

² There is however also some critique of Barads' work about it perpetuating masculinist devaluation of certain experiences, and the approach being in need of a feminist re-structuring if it wants to go beyond hierarchical approaches. As the work of Sara Ahmed, has also been very influential for me, and as I support her feminist critique as well as her call for less hierarchical research approaches (Ahmed, 2017), I found it important to create space for the critique that builds on Ahmeds' work here as well.

work looks into the ways in which digital technologies and online spaces impact the lived experiences and bodies of users (Kember, 1998, 2003; Kember & Zylinska, 2012). This involves examining issues such as identity, agency, and subjectivity within the context of digital interactions. As a feminist scholar, Kember also brings perspectives into her work that explore how gender intersects with technology and digital culture. Her research often considers issues related to gendered embodiment, feminist epistemologies, and the ways in which technology can both reproduce and challenge gender norms (Green et al., 2006). A researcher that works on a similar feminist-digitality-embodiment-intersection is Adrienne Massanari, a communication scholar, who applied embodied approaches to her research on online communities and digital culture, particularly examining issues of gender, identity, and power in digital spaces (Massanari, 2015). Massanari has written about online harassment and the embodied experiences of individuals who become targets of such behaviours (Massanari, 2019). Her work examines the gendered dimensions of online harassment, including how it can be a form of gender-based violence, and explores the impact on the embodied experiences of those who experience online abuse (Massanari, 2016).

Something that I have not talked about in detail yet, but cannot be left out when talking about embodied research, especially in a Science and Technology Studies context, is the concept of tacit knowledge. Which simply said means all knowledge we are not aware of possessing, and that can only be passed on by collaborative practice. An important scholar that engages with this concept is Harry Collins. He distinguishes three types of tacit knowledge in scientific practices:

1. Technical Tacit Knowledge: This type encompasses the practical skills and know-how essential for carrying out specific scientific tasks, such as using laboratory equipment or performing experimental techniques. Technical tacit knowledge is often acquired through hands-on experience and apprenticeship within scientific settings.
2. Tactical Tacit Knowledge: Tactical tacit knowledge involves the implicit strategies and guidelines scientists employ to navigate complex research challenges and uncertainties. It encompasses the intuitive decision-making processes and problem-solving approaches that are honed over time through engagement with scientific inquiry.
3. Substantive Tacit Knowledge: Substantive tacit knowledge relates to the deep-seated understandings, intuitions, and conceptual frameworks that inform scientific reasoning and interpretation. It encompasses the implicit assumptions, paradigms, and disciplinary norms that shape how scientists perceive and interpret empirical evidence and theoretical concepts.

(H. Collins, 2010)

When researching knowledge production practices, I think it is very important to think about tacit knowledge, as this is a very interesting thing to investigate. Think for example of laboratory studies, where (often natural) scientists are observed in their daily practice. If you would ask one of them to describe what they are doing, they will probably talk about the content of their work, the goals, why they are researching that, or why they are making certain steps. What they will probably not tell you about, but is equally important, is the tacit knowledge that comes with their daily practices.

To stick to the three definitions given by Collins, we can think of some examples from laboratory studies. For example, the first concept of *technical tacit knowledge*, could be how hard one should push on a pipet to get exactly the right amount of liquid in the instrument. This would be very difficult to describe, and the description would probably also not help anyone further. One would have to try it out themselves and practice to understand which force should be used.

The second example of *tactical tacit knowledge* could refer to the order of things that are done, e.g. the cleaning of the surface before doing a certain action. Something we as outsiders would not per se know, but experienced researchers would not think twice of (for example because they know an un-clean surface has messed up their experiment-results before.)

The third concept of *substantive tacit knowledge* refers more to relational knowledge, and things that are hard to pin-point. This could be institutional norms, or expectations that are not spoken out, but that everyone working in the field knows about. When observing practices, it is important to take into account all these types of tacit knowledge that very much shape the practices of the people we observe, but are difficult to capture, and almost impossible to describe in words. Visual research, such as film, could provide a bit more context in some situations, but the embodied practices (such as how hard to press on the pipet) are very hard to capture and/or communicate to outsiders. Reflexivity is therefore important to acknowledge all that we are not able to capture, and perhaps philosophize about different ways of inquiry that would be able to offer more insight or help into capturing this specific type of knowledge.

To conclude this part about embodied research, I shortly want to mention the posthuman research done on wearable technologies. Laura Forlano's research, for example has focused on this topic. She has explored how wearables, such as smart devices and sensors, become integrated into the lived experiences of individuals (Forlano, 2015, 2017). This includes explorations of how wearables impact the body, self-perception, and social interactions. PhD student Chiara Juriatti, who is part of my film specializes in that. In my thesis, I will not go deeper into that, but if you would like more information about that, please reach out to me so I can bring you into contact with her.

2.4.1 What about practice?

As we can see, Science and Technology Studies has a rather rich history of theories about embodiment, but what about practice? Similar to experimental approaches in Science and Technology Studies, we are often writing about it more than actually practicing them (Bartenberger & Sześciło, 2016; Bogner, 2012; Dehue, 2001). Science and Technology Studies does have a tradition of recognizing the fact that the idea of a brain/body-divide is rather outdated, and so we critique it in abundance (as shown before). We critique the Cartesian dualism of body vs brain, and support ideas of embodied knowledge creation, but we still very much enforce this division in our knowledge making practices.

The 'absent presence' of our bodies is not only striking; it is also a paradoxical trait of our academic persona with regards to the general consensus within STS against Cartesian dichotomies (subject/object, material/immaterial, nature/culture, rational/irrational). We use the prevalent notions of 'entanglements', 'biosocial', 'naturecultures' and similar material-semiotic companionships and devices as a response to the western precept of the mastery of the mind (read Euro American imperialism and colonialism) over the body (read also non-whites, women, microbes). Yet, in spite of our epistemological registers, I find an evident mismatch between our theories and how we enact them or, to be more precise, why we rarely enact them by bringing them together with our fleshy bodies and lives. Our individual and collective bodies as academic workers, our 'carnal knowing' (Sobchack, 2004), are systematically elicited and concealed in our research, partly, as I will elaborate below, as an effect of today's academic system focussed on 'outputs'. (Núñez Casal, 2021, p. 1)

As Núñez Casal says, one of the reasons for the lack of embodied practices, might be the pressure to produce academic output at a staggering rate, which might lead to scholars feeling pressured to using research methods and forms of output they already know will be accepted/approved or beneficial to their careers (Graeber, 2014; Stengers, 2018). A lack of time, can lead to people not investigating *how* they can approach their research differently. And this is exactly where my research aims to contribute. I hope to show that creative, embodied research methods can contribute significantly to the field, and can be accessible and not more time-consuming than text-based research. By using accessible tools/technologies and collaborating with differently skilled people throughout my entire project, I also hope to demonstrate that there is no need for extensive knowledge on complicated technologies, to enact these methods or parts of them in research approaches. And last, I hope to inspire researchers to think about the aim of their research, who they are doing it for, and how they hope to make impact, to then adjust their research approach to

that value, rather than producing knowledge for the sake of producing knowledge. In my methods section, I will elaborate on *how* I aim to do that.



Figure 4 - Method session with Sophie O. T. Schmidt (November 2023)

Exercise 3 for reader: <https://www.youtube.com/watch?v=fYCKVttqBx4>

3. The multimodality of playing with film, materials and body placement

In this research I used a variety of methods to explore a multimodal approach to knowledge creation and distribution. As it is important to me to practice what I preach (and research/support) I combined theoretical literary knowledge with practical ethnographic research as well as film-research and embodied research. Throughout all these parts I left room for experimentation and exploration.

For this project I held three so called “method-sessions” with students from the Arts & Science Program of the *Angewandte University of Applied Arts* (more about selection procedure for the participants in the next section of this chapter). These three method sessions all went very differently, but the preparations were similar. The idea was to hold a session with a student in which they would teach me their (current) research method/approach. We would engage with this in three different ways. First, I would ask them to explain the method on camera. I would film them and ask questions such as:

1. Could you explain to me what your research mainly focuses on?
2. How did you get to this interest/method?
3. How has your method developed/changed over the years?

4. Why do you find it important to share this method/what do you think others can learn from this method?

The rest of the questions were improvised, based on the answers, existing literature I read as a preparation for this project and my interest in specific topics that were brought up. This part could be interpreted as semi-structured interviews (Husband, 2020), and lasted anywhere between 25 and 75 minutes, depending on the person.

For the second part of the Method session, the participants would show me, physically, their method. We would put the camera on the side and let it film both of us, to capture the process of transferring the method from one body (student) to another (mine). I would try out their methods, and see what it did for/to/with me (although there were no reflections happening in these moments yet). The goal of this part was to really capture this embodied knowledge transfer which would have been hard to capture without a camera. E.g.: At one moment a student taught me how to knit with a knitting machine. She moved my hands to the right spots when I made mistakes. This is a process that would have not been documented if it were not for the camera. This part could be considered both ethnographic as well as embodied research.

For the third part of the Method session, I asked the participants to film me while I tried out their method, to also visually capture through their lens what aspects they found interesting. This part turned out to be the most difficult as the participants were not extremely familiar with the equipment, and they felt uncomfortable dealing with it. This part could be considered collaborative and experimental ethnography.

The estimated plan for these method sessions was that each part would take about one hour, so the session in total would be about three hours. The first session with Sophie was more or less exactly three hours. The second session with Inés took five hours and even then, we were actually still not finished. And the third session with Xavi took only one and a half hours. More information about the participants later in this chapter.

The multimodal (film-body-ethnography) approach to qualitative research triggered the topics and stories I find most interesting. In this case, it managed to bridge the theory about different methods with the lived experiences of my participants. Unlike quantitative methods that quantify phenomena or even a stricter interpretation of qualitative research, this approach allowed me to deep dive into the "whys" and "hows" that underlied the choices my participants made, including the not-so-conscious decisions made through movement, experimenting or even just making mistakes. Using my "mistakes" as part of my approach, and treating them as valuable rather than

wasteful, empowered me as a researcher to explore the complexities, nuances, and contextual influences that shape these methods I was learning about in a very honest way. It is easier to dive into unknown territory when you allow yourself to make mistakes.

My integration of experimental methods (e.g. not sticking to rigid interview schemes, specific time frames, forethought storylines/outcomes etc.) offered flexibility. It sometimes almost felt like a dance where the rhythm adapted as the music evolved and then we, as the dancers reacted accordingly. It accommodated unexpected twists, offering room for emerging themes and unforeseen discoveries.

However, the unpredictability of course also brought difficulties. It was hard to prepare for unknown situations (especially for a person like me, who often comes overly prepared/scheduled and organized to meetings), and when not sticking to pre-prepared interview questions, conversations might also end up getting stuck or remaining shallow. It was therefore extra important to stay sharp during these meetings, which required a different kind of preparation: sleeping well beforehand, limiting disturbing factors in filming such as light/sound change by bringing plenty different apparatuses and preparing microphones and light settings beforehand. This was not always easy. The night before my last session I had not slept at all due to personal reasons. This made it extremely difficult to concentrate or energize my participant. The shortness of that session might have been partly attributed to that.

In this research I really made an active effort not to take the role of a solo researcher or storyteller, but to work collaboratively with all participants as to create a film that reflects all our experiences honestly. My research, in this way, can hopefully be seen as a bridge between participant perspectives and those interacting with the film-thesis afterwards, granting voice to those involved and enlarging their potential audience. It would make me very happy if my project allows/inspires future researchers and/or master students to also access a diverse scope of viewpoints, creating a narrative that leads to creative, academic and artistic future research in the social sciences. In my journey, my approach is not just a method but a philosophy that mirrors my commitment to holistic, embodied knowledge, its ability to craft authentic narratives, embrace context, adapt to complexity, and amplify other peoples' voices. I understand that I have a rather positive tone in my research, as I am personally passionate about the approach I took for this project and believe it can add something to the academic working field. It is however my intent to inspire rather than convince, and am aware that this approach of course, does not work for/benefit everyone.

3.1 Participants and relations

Choosing my participants for this project turned out not to be so difficult. The *Arts&Science* MA program at the university of Applied arts in Vienna offers students from various backgrounds a space to explore the relationship between academic and artistic research (*Art & Science - die Angewandte*, n.d.). I chose this program because I knew I could find students who work with both their bodies as research instruments and more standard forms of research data such as literature. I knew about the program because I auditioned to be part of this program before I started my Science and Technology Studies master's in 2021. Because I had gone through the audition process, I also had contacts at the program and was already very informed on their research practices and the goals they aim for within it. For my research, I do not investigate the program as such, but rather the individual practices of the students who are part of the program. My first point of access was Gerda Fischbach who is in charge of communication for the program, next to having her own artistic practice (*Gerda Fischbach / Art & Science*, n.d.). She gave me access to the program's main communication on Discord. My second point of access was a student called Inés Peláez, who proved to be the more successful entry-way as she connected me to the other two students who participated, Sophie and Xavi. After telling them about my project and approach, they agreed to meet with me for filming sessions and signed informed consent forms that included the right edit any part in or out during the editing phase.

The first person I worked with in this project was Sophie Olivia Taleja Schmidt. A German student with a background in textile and surface design from Berlin who now focuses on “themes such as hand gestures and behavioural structures of the human body, optical and physical processes of perception, the reciprocal shaping of body and material, and the in-between.” (*Sophie Olivia Taleja Schmidt | Art & Science*, n.d.). I was particularly interested in how she sees the human body as a research object as well as instrument. In the method-session with Sophie, I focused on hand movement and feeling texture, and the information this can bring us. We also created some materials together that I bring to the presentation of the film so that the viewers can engage with the physicality of that experience as well.



Figure 5 - (SCULPTURE - Sophie Olivia Taleja Schmidt, n.d.)

The second person I worked with in the project was Inés Peláez, a student from Mexico City, Mexico. She has a background in theatre and founded her own theatre company with whom she performed for more than ten years. Her theatre background often encouraged her to work more with her body and so she has been trying out new embodied research methods over the past few years. For the session I did with her, I asked her about the role of her body in her research practice, and tried out replicating them for a mini-research on the spot. For the results of this, see the film project. The first work of Inés that I saw was at the exhibition in the Künstlerhaus. For this exhibition she created a work that questioned time and space relating to familiar moments. In the Method session I did with her, we focused on researching through space, and putting our bodies in relation to that space. E.g. by creating Tableaux Vivants, to portray/depict a situation or interest.



Figure 6 - (Peláez Robles & Aust, 2023)

The third person I worked with, was Xavi Sosa, a student and experienced sound performer from Asuncion, Paraguay. They have a background in political science, music and theatre and try to bridge the gap between the theoretical and artistic ways of producing knowledge. “Xavi’s work deals with questions of Power, Ideology, and Identity. Currently, they create conceptual works using sound as the main medium.” (*Xavi Sosa / Art & Science*, n.d.). In June 2023 I visited and filmed at an exhibition/performance they did in the Künstlerhaus in Vienna. There they first presented their work “Heavy Metal” for which they created metal singing bowls that made music through electrical signals transmitted by a Raspberry Pi device. Later they also created a live performance of which I show parts in the film. When I did the method-session with them, they taught me how to make metal bowls for sound-installations, the embodied practice of welding metal, and how this practice requires our body to be extremely present.



Figure 7 - (Sosa & Aust, 2023)

3.2 Bridging the gap to academia

Next to the Method sessions I did with these students, I held one additional semi-structured interview with a PhD-student in Art History who focuses on bio-art/embodied art experiences, Chiara Juriatti. In the first instance, an expert interview was not planned to be part of my project. However, during the sessions I did with the students, I felt that I missed a bridge from their practices to an academic context. When I read Chiara Juriatti's (not yet published) paper on how an embodied experience with an art work changed her understanding of a theoretical concept (extinction) she had worked with, I knew that she might be able to provide exactly this missing piece of the puzzle. Which is why I then asked her to participate in my project.

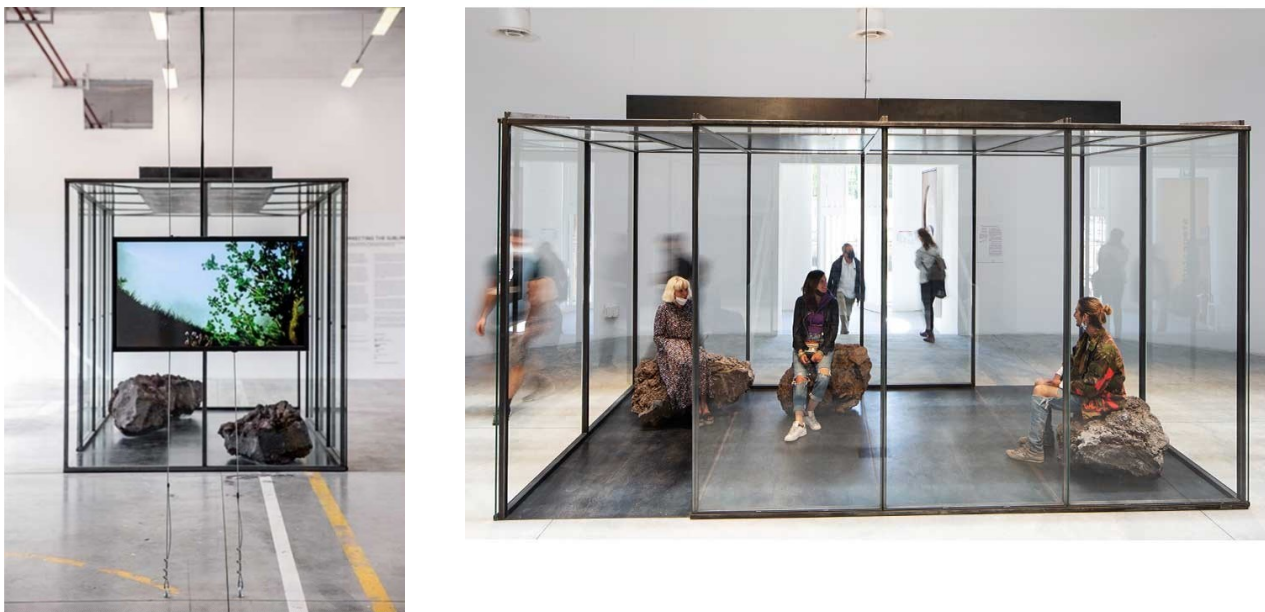


Figure 8 - (Art work from Chiara Juriatti's paper: (Daisy Ginsberg, 2019))

I chose the format of a semi-structured interview, as I did not intend to learn from her research practice, but rather her – already obtained – knowledge. She also told me she would feel most comfortable in this type of setting, and I prioritize comfort of my collaborators in any form of interaction. For her I prepared these questions:

1. What does the word “embodied” mean for you?
2. What about “embodied knowledge?”
3. Do you think we can do research where we leave our body completely out?
4. You studied art history; can you think of an embodied practice that could have deepened your knowledge of art history?
5. For this project I'm going to try to translate methods from the art students back to social science; Could you think of a situation where an embodied research method could help understanding a specific situation?

6. Why, according to you, is it a feminist approach to consider the body in research?
7. Can you explain what post-humanism means, at least to you and in your research?
8. Can you tell me about the paper you wrote in which you described your embodied encounter with an art-work?
9. You research a lot ABOUT these kinds of embodied practices, but is there also a part where you actually DO this kind of research yourself?
10. Can you brainstorm with me about embodied exercises that I can add to my thesis and/or film project?

The rest of the questions were improvised, or asking for a deeper understanding of the answers she gave. Having some questions prepared to make sure I would be able to create this bridge in my research that I felt was missing, was important. I often prefer to have semi-structured interviews (as opposed to full-structured) to still leave space for spontaneous interaction (Kutsyuruba & Mendes, 2023). Or to follow-up on a topic that comes up during the interview, that I find more interesting or relevant than the original questions I prompted. In my experience semi-structured interviews provide a basic structure in which previous knowledge that is looked up/known beforehand can be deepened and personalized (Husband, 2020). It provides space for the interviewees to talk about something they feel comfortable talking about and have often talked about before (since this is public information.) It also offers space to clarify any false information that was found, as well as elaborate on things that were not clear from the beginning. Online one can mainly find successes of people, so it is also good to dive deeper in the stories behind the successes and the road to their successes.

3.3 Interaction or intra-action? The eye of the spectator

When I decided to work on this topic, with in the back of my mind always the larger goal of diversifying academic practices, I knew that I did not want to stick to interviewing, as that is already a big part of social science practices, and the method felt unfit/incomplete to capture the embodied experiences I was interested in capturing. Although interviews, as described above, certainly were a big part of my practice, I saw them more as a baseline from which I could dive deeper. As I looked into people's practices, and specifically how they used their bodies in those research practices, wanting to translate those practices back to social science research, I felt that I needed to embody the research myself. My body in that sense, became a research tool through which I experience embodied research practices, that I can now hopefully pass on to other bodies.

Since I did not want to translate this data back to solely written documentation, my film would only reach its goal when created and watched in combination with interactive embodied

exercises that push the audience to embody the methods themselves. Instead of being passive knowledge-receivers, my audience has to interact with my film in order for my research to fully succeed. On top of the three-part method-session process as described at the beginning of this chapter, there is a fourth step that happens after the data is collected, when the audience of the film interacts with the material. In the next part of this chapter I will reflect on the use of film as a research method.

Exercise 4 for reader: <https://www.youtube.com/watch?v=vVkJQzIZdEE>

3.4 Film as a way of seeing

My main research method in this project is film. Documentary film to be precise. As discussed in the State-of-the-Art chapter, I am not the first person to see documentary film as a potential research method within social science or Science and Technology Studies.

Can documentary film, for example, be scholarship - can it be something more than another means of advancing the public understanding of science, more than another box of raw material? Is the analytical power of propositional concepts the very essence of research, and do words alone leave nothing out, other than superficial reportage or arbitrary art? (Galison et al., 2014, p. 197).

Important from this statement is the distinction between film as a documentation method, used merely to show something, and on the other hand acknowledging the power film can have as a research method in itself (Bolton et al., n.d.; Kara, 2015). Coming back to earlier posed questions such as: “How does the camera influence my behaviour as a researcher?” or “What can we document with a camera that we could not have documented without one, and so how does the camera influence our research topic?” Another important point that is made in this statement, is the fact that written text, at least in the field of Science and Technology Studies, is broadly accepted as a thorough documentation method, although of course, there are also critiques on that. This statement, for me, summarizes how film can transform a research that focuses on information-transfer, meant to educate the public on what is going on in the “complex world of science” (Suárez, 2023), towards a research based on practices, more like the approach of laboratory studies (Latour & Woolgar, 1986).

3.4.1 Work experience

Of course, my interest into the world of film as a research tool is not merely guided by my academic pursuits or interests in diversifying Science and Technology Studies-research, but also highly influenced by my background and current position as a documentary filmmaker. It is exactly this dual perspective, embracing both my artistic and my analytical side, that forms the foundation of my exploration.

Sophie Harman, researcher in the field of International Politics at Queen Mary University of London, has opened up an interesting path with her chapter on "Film as a method of seeing" (Harman, 2019). Her journey into film as a research method reflects the idea that film, beyond being a medium of entertainment, has the potential to be a powerful instrument of inquiry (Grant et al., 2020). Harman's insights reveal how the camera extends the boundaries of our physical senses, allowing us to perceive facets of reality that might remain concealed through other research approaches. Interesting about her approach is the combination of the human physical senses, our bodies and the observations we make through being in certain situations and places, with the technological aspect of the camera.

She too experiences the camera as an extension of her body. This combination, offering an immersive human experience that captures human practices in more detail than solely human observations or textual documentation could provide, touches upon something interesting: bringing in a technology, therefore making the experience itself perhaps less human-focussed, can make for a more accurate human-representation than the human-researcher could have done without that technology. It is like having an additional pair of eyes, each with its own interpretative lens, enhancing our capacity to see, understand and communicate complex phenomena. How can bringing in something non-human account for a more human focussed documentation?

This notion of film as an extension of one's sensory perception, reflects my fascination with human bodies and modes of observing. Just like the camera extends our vision, other technologies can also extend our sensory capabilities and deepen our embodied experiences, such as microphones, sound systems etc. So, although my personal method to extend my senses in this research-practice will be my camera and a microphone, the people who participate in my research work with all types of different sense-extending and embodied methods that I dove into with them collaboratively.

Exercise 5 for reader: <https://www.youtube.com/watch?v=0E9-UHcwgVA>

3.4.2 Film as a method in academia

Within the academic community, there exist quite distinct boundaries and conventions regarding what constitutes "acceptable" research methods or knowledge (production). As touched upon in the introduction of this thesis, the rules can be quite strict, with certain creative methods, such as painting and fashion, still yearning for recognition. The exploration of unconventional methods is often met with scepticism. A growing body of research however, led by scholars like Elena Pérez and Sophia Efstathiou, welcomes methods of improvisation, performing arts, and playfulness into research with open arms (Pérez et al., 2019). This paradigm shift seeks to probe the relationships between humans and their bodies in academic contexts.

The tension between these rigid academic structures and experimental and artistic methods that I feel not only in academia but also within myself, is also an opportunity. It urges me to push the boundaries further, to explore more radical and impactful ways of disseminating my research. To question my own approaches, prejudices and to seek where I am stuck in linear thinking to then break through it and do something outside my comfort zone. It prompts me to ask how I can convey the depth and breadth of my research, grounded in film and ethnography, in ways that defy the normative "constraints" of academic discourse. I continually ask myself: how is what I am doing actually different than what has already been done? Am I really contributing to diversifying academia, or am I just trying to rebel against some structures in myself?

In conclusion, my journey into film as a research method embodies a fusion of the artistic and analytical, echoing sentiments of scholars like Sophie Harman and the work of earlier named researchers advocating for creative methodologies. Ultimately, it's a journey that challenges me to harness the power of visual inquiry to deepen my understanding of the world and, in doing so, creating meaningful, diverse and impactful research.

3.4.3 At the other end of the camera – limitations to filmmaking practices

While film as a research method opens doors to a whole world of visual inquiry and storytelling, it does come with its own set of limitations that must be acknowledged. Much like any method, it is not a miracle maker but a tool, and understanding its constraints is crucial for a comprehensive and honest use and evaluation.

One of the most obvious limitations is its narrow view aspect. As a filmmaker, you decide which way the camera is looking and which parts of an interaction are being documented and which are left out. Even if we only speak about documenting (because with special effects and post-production, especially in the age of accessible AI tools, footage can easily be manipulated) a

situation with a simple camera such as a phone. The person holding the camera decides when to press “record” and when to stop the recording. Even when the responsibility of recording is shared by multiple people, or if multiple cameras are involved, there is no such thing as including all possible perspectives. This much reminds me of the idea of the “oligopticon” presented in an article by Huub Dijstelbloem and Annalisa Pelizza (Pelizza, 2019) that investigated immigration policies. In this context they say: “...there is no independent position from the outside to oversee the whole.” No matter from which side you look, you always miss something. This illustration of an “oligopticon” exemplifies that concept for me:



Figure 9 - (*Data Circulation System* | ZERO1NE, 2020)

Imagine yourself standing in the structure on the image in the middle. No matter from where you try to look at the round structures on the outside, there is always a part you cannot see. The same thing goes for the camera. There are always perspectives left out. Of course, this also happens with writing or other form of documentation. But what makes it tricky in the case of filming, is that the detailed documentation the audience observes, and the way it includes different senses (hearing, seeing, feeling) gives the impression that it did capture everything, which might make an audience less reflective about what is left out.

A second important limitation is that filming requires some technical skills, resources and a lot of time. Crafting a visually engaging and conceptually rich film can be a daunting task, and not all researchers possess the necessary filmmaking expertise. This can lead to a potential mismatch between the intended research goals and the actual cinematic outcome. If I want to film a scene in

the sun, because I find that important for the story I want to tell, I need to know how to record in bright light, and to adjust my camera settings so that no footage gets lost because of overexposure. Not to mention that every camera works differently so it requires time (and money) to learn how to work with different appliances. I would argue that experimentation with the devices, up until a certain extent, are therefore part of the research process when one uses film as a research method. Especially for researchers who use this method for the first time, which poses a serious challenge. This limitation could also cause many researchers not to use this method as many people simply do not have the time and/or resources available to dive into this. Especially in a time where researchers are often already under a lot of pressure with many deadlines for publishing etc. (van de Schoot et al., 2021; Waaijer et al., 2018). it can be hard to step outside the boundaries of accepted research methods and do something more time-consuming of which one cannot even be sure it will be accepted by the academic community (Jungnickel, 2020).

Then of course, we also deal with ethical considerations. In documentary filmmaking, for instance, ethical dilemmas may arise when balancing the obligation to document while at the same time respecting participants' privacy. Ensuring informed consent and mitigating harm can be complex in this context. For example, if I were to make a documentary about foreigners in Austria, and want to tell the full story of what it is like to be an immigrant here, that would require me to record in uncomfortable and sensitive situations. Where is the border of “now it is okay to film” and “now it is not”. In my case the topic is less sensitive than the example I just gave, so this was easier to navigate. However, people still feel vulnerable in front of a camera and I should be aware of people’s vulnerability when they are being recorded. This is also one of the reasons I find it very important to involve my participants in the post-production process, to make sure they feel properly represented.

Lastly, there may be limitations related to the audience reach of films. While visual storytelling can be compelling, it may not always be accessible to all demographics or cultures, potentially limiting the dissemination and impact of the research findings. To combat this as well as possible, I will publish my film publicly so that at least to a certain extent, money does not play a big role in accessibility. Of course, one still needs a working device with a screen that is able to connect to the internet and internet access to be able to watch the documentary.

Exercise 6 for reader: <https://www.youtube.com/watch?v=oBlpW40mvGA>

3.5 Constructing a story – postproduction of filming

The post-production process of working with film material is essential and plays a crucial role in transforming the raw footage into an understandable narrative. In the context of research, this process serves as a form of data analysis, shaping and interpreting visual and sound data to extract meaningful insights. The first step in dealing with all the material is simply going through everything I have recorded and selecting relevant footage. Just as textual researchers go through literature to select paragraphs and quotes that align with their research topic, I go through the footage and select all material I in any way deem possibly useful – content and sounds wise; visuals can be solved later through post production or putting other images over the filmed part –. It is important not to be too strict in this first selection because it is impossible to know exactly which data could be of use in a later stage. This first selection is merely to take out all footage that is unusable. For example, moved footage, footage that was re-done later because it did not work out the first time, scenes where unforeseen noise or appearance of people disturbed what was going on etc.

The second step is the structuring of the footage. Just as data analysis requires organizing and structuring data, post-production involves arranging shots in a logical sequence (this was not made beforehand, but constructed from frame to frame, iteratively) matching parts of different interviews with different participants together, etc. The editor, which in my case is not just me, must create a narrative flow that effectively communicates the research findings, much like arranging data points or connecting data to literature. In previous projects I did the entire selection and arranging-process (the entire post-production for that matter) by myself. But in this research project, I collaborate with my participants to let them help choose which footage they find appealing, fitting and important for their story.

Video editing is not just about connecting different shots to each other, but also about interpreting them to convey their meaning. If I have a shot in which a participant tells me how important e.g., dancing is to them, it is helpful for the viewer and the narrative to support that text with footage of the participant while dancing. While recording, one must therefore also pay close attention to what is being said, to make sure one has these recordings before the editing process starts. It is important to identify key topics, patterns, things/people that re-occur in the storytelling as well as visual cues, body language that indicates to something etc. Editors make decisions about e.g., pacing, transitions and visual motifs to guide the viewers' interpretation. To make sure this interpretation is as close to the experiences as possible, this close connection to the participants as well as an active approach and interest in the moment of recording is very important.

Then there are effects that are added in post-production such as close-ups, zooming in- or out, slow motion or acceleration of material, or adding music. All things that are added to the footage to convey or highlight a specific point, message, emotion or finding. This could be compared to highlighting the “key” points in data analysis or summarizing a long piece of text into a few sentences, to repeat for the audience what is important to take-away from that information. Ensuring that the most critical information is highlighted. After making the most important points, the information needs to be contextualized. Just as qualitative data analysis often involves contextualizing findings within existing literature, film editing places scenes within a broader narrative context. It provides viewers with the necessary background information to understand the research’s significance. How much context is given, is of course dependent on the target audience. If I know the film will only be shown to Science and Technology Studies-scholars, I do not have to explain in detail how that field operates. But if my goal is to show the film outside this discipline, it is important to explain the basics of Science and technology Studies and how research within that field takes place.

Film editing is an iterative process, much like data analysis editors review and revise their work multiple times, refining the narrative and addressing any inconsistencies or ambiguities. In this process, the role of outside viewers is very important. Something I personally often do, is showing the footage to a family member (like my grandmother) who does not know anything about the context of my research. To see where she loses her understanding or when things in the story do not add up for her. Then I know these are the points I need to revise and contextualize better. In this project that was not possible as my grandma does not speak English. However, I let my participants go over the edits and feedback what they wanted to change. From the first draft, there was only one re-edit to incorporate all the feedback of both my thesis supervisor and all the participants.

In the end both film editing and data analysis aim to engage their respective audiences. In film this means creating a compelling and immersive experience that resonates with viewers. In data analysis it involves presenting findings in a way that captures the audience’s attention and conveys the research’s significance through words. In essence, film editing is a form of data analysis that transforms raw visual and sound data into a coherent narrative that aims at making impact. It involves selecting, organizing, interpreting, and presenting data in a way that communicates research findings effectively. Just as data analysis is a critical step in the research process, film editing is a vital component of using visual data to convey research insights. Together, they allow researchers to leverage the power of storytelling and visual communication to share their research with a broader audience, therefore diversifying the public and academia.

4. Reflection and discussion

When I started this research, I was interested in exploring artistic research methods and practices, to connect them to social science research. This interest probably comes from the mismatch I felt between the artistic research methods I was familiar with using during my Bachelors and work as a documentary maker, and the academic, paper-based, theoretical approach I found myself surrounded by at the Science, Technology and Society department of the University in Vienna. I personally believe that all research stems from wanting to understand ourselves and the world around us better, so if I am completely honest, the initial urge to do this project was to build a bridge between my past experiences and current situation. I was however, happily surprised by a large scope of social science research trying to connect visual methods, artistic and embodied methods and design practices to social science, and even specifically Science and Technology Studies research. In the state of the art, I tried to make an inquiry of what has been done before, and in my film, I investigated the practices of three students to see how they used their bodies to do research, and what we could learn from that for Science and Technology Studies.

So, what have I found out? Well, firstly that all three of the students I followed, had very different ways of using their body for their research, and that those different ways were clearly shaped and developed over time, and supported and practiced through and by their practical experiences. This is a conclusion I could have thought of before investigating. The interesting thing to investigate was *how* they used their bodies, and *how* their environments shaped these practices.

In this part of my thesis, I will dive deeper into these practices, and how I got to understand them better. Although the main part of my research project is the film *Where in my body is STS?*, the film is not long enough to cover all of the practices and discoveries in depth. In this part I will give attention to those insights that did not find a space in the film or in the rest of the written part of this thesis. For the structure of this chapter, I will stick to my sub-questions and finally answer my main research question:

How do the three chosen students from the Arts&Science program at *Die Angewandte* use their bodies to produce knowledge?

Since it is a highly personal project that relies a lot on my personal interpretations, and those of the students I collaborated with, I will continue to relate my findings back to my own practice, and those of the students. The contents of this have been discussed with the students as well, to ensure they feel well-represented by my words, and keep this project as collaborative as possible. This is in line with the over-all collaborative and co-production approach I upheld through this project, aiming to work less hierarchically and so not re-produce power structures as criticized by feminist scholars.

4.1 How is the body used as a research tool/instrument by three students from the Arts&Science program at *Die Angewandte*?

In this section I will dive deeper into the specific embodied practices of the three students, specifically the parts that did not get much attention in the film. I will start with Sophie, who has a main interest in observing and studying individual body parts, in particular hands. She says that by looking only at the movement and details one can find in one body part, she is not distracted by the surroundings and so can focus on the stories these hands have to tell. For example, the length of the nails, and whether there is earth under the nails, can teach us that a person is working with their hands a lot, or working in the garden perhaps. If someone has nails that are freshly polished, and hands covered in jewellery, that can tell us that this person prioritizes their appearance. If a person has a lot of calluses, the person might do intense sports, or work with heavy machinery. And then we have not even talked about the movements yet. Sophies initial way of documenting, started with recording short videos in moments of small irritation. When a situation was slightly different than she would have liked it to be. Making these videos helped her process emotions that she did not always manage to in the moments themselves. Here are some screenshots of her videos:

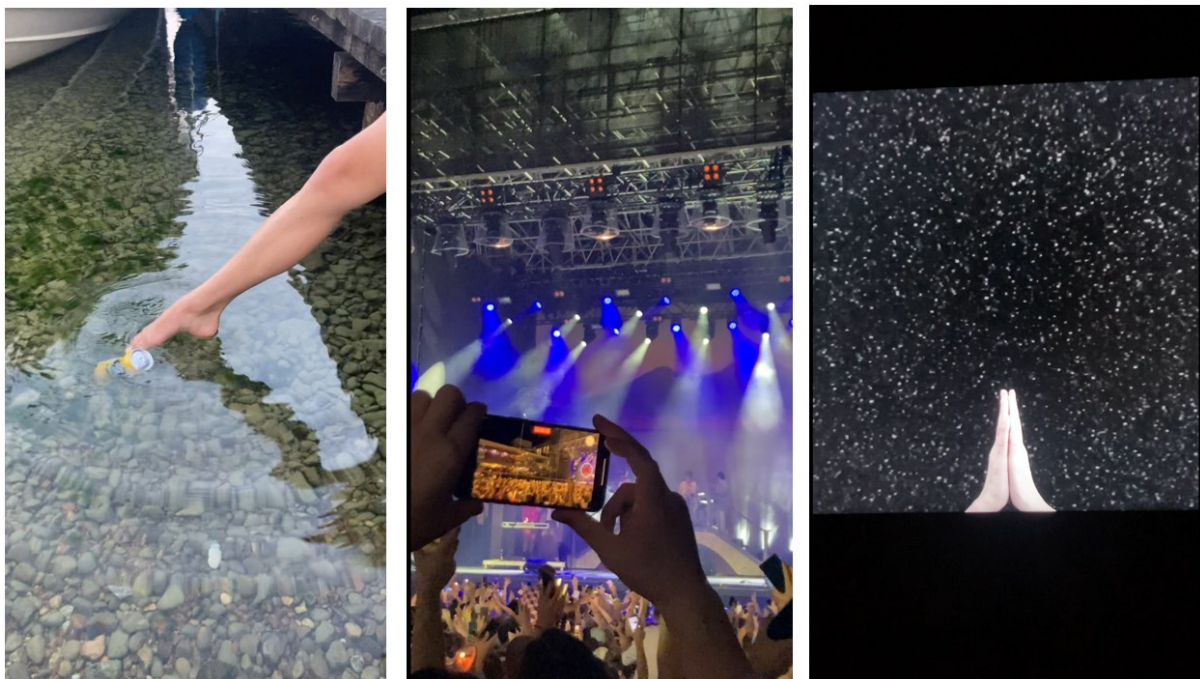


Figure 10 - (Sophie Olivia Taleja Schmidt, 2023)

Sophie uses capturing other people's bodies with videos, as well as re-enactment of the movements with her own body, and material practices like knitting, painting, working with textile and clay to transform these experiences and practices in new touchable works that others can interact with as well. For Sophie, her body is very important in all the work she makes. In a conversation that we had

on the day of the collaborative session we did, but that is not on video, she said: “Hands can be used as a tool. They can think for themselves, and then my brain follows later. But my hands tell me where to go.” Embodiment for her, means to think with her body, specifically her hands, and start doing, creating, re-creating, re-enacting without thinking of a concept or idea beforehand. And gaining an understanding of her interests through observing her own and other people’s embodied practices.

Xavi had a completely different approach to using their body, emphasizing how they use their senses to navigate their way through their research practice. Xavi started with playing and listening to music when they were still a child. As they became a teenager, performing and creating their own music, became a big part of their life as well. Increasingly, Xavi started to develop an interest in sounds. First music, then music improvisation, then by questioning the meaning of sound and what music actually is. They started to experiment with sound: “What if I pitch this up, or way down, what will happen? How will it come across? Which story can I tell with that?” Where their work in the beginning stuck to conceptual practices, improvisation and material practices became more and more important. They started questioning “What should be the task of art itself?”

They concluded that for them, it does not have to be educational, but it should always be inspirational. It should spark fun and joy. Diving into improvisation, they got more interested in experimenting with different materials such as metals. Which sounds could they produce with that? And what role did sound play in working with these materials? While creating their sound installation “Heavy Metal” as shown in the film and on a picture in the methods section, they created sound bowls from metal. To create these, they had to hammer on a metal plate to create the bowl-shape. The way the sound of the hit of the hammer sounds, tells you if you hit it correctly or not. Xavi taught me this practice. They said: “the practice of listening, makes you more aware”.

After multiple years of working with sound, Xavi has now included small bodily exercises to their daily routine, such as body stretches and closing their eyes to register all the sounds of the surroundings. This helps them to be more in the moment, and learn new things about the sounds and therefore area surrounding them. Interestingly, Xavi also told me, that for them embodiment also means to work from your own values. “If you do not listen to your body, its boundaries, your values; if you are living up to someone else’s standards, what is the point of using your body at all? You have to listen to your body and what it tells you, and for that, you have to stick to your values.” I found that a very interesting addition to the definition of embodiment that I had never thought of or heard about before.

Inés, had again a very different approach to embodied artistic research by using her body and the way she places it in a space to create a narrative and find out what she wants to tell the world. Inés started with acting when she was a little girl. In a school play where she got to play one of the 101 Dalmatians, she felt seen for the first time in her life – ironically, she says herself as she only had one sentence in the entire play. But she realized that she has an influence on how she wants to be noticed. On that stage, she could be a Dalmatian, which meant she could be anything. From there she started thinking about stories she wanted to tell, and how she could use her body and voice to do so. She started training her body: “Physical strength was really important for me. I needed to feel like my body was strong enough to play with it.”

After acting in different plays, from which she took many different character traits and developments (playing a very outspoken Russian woman in a play about Dadaism, taught her how to express self-confidence, which she takes with her till this day), she started her own theatre company *Los Conjurados*. With this company she developed a method of storytelling in which her body is a very important tool. This method exists of four steps:

1. What do we want to say? → Thinking, feeling, what is on your mind? What has been bothering you? What is going on in the world that I want to pay attention to?
2. Research about that topic in the broadest sense of the word → Art works, experiences, music, movies, photographs, dance performances, books, papers, anything that could be relevant for you that relates to the topic. To learn as much about it as possible.
3. Experimentation with the topics and research that was found by everyone → Here they make Tableaux Vivants (living photographs), which is a commonly used improvisation technique in theatre (Donohue, 2009). All players get e.g. 10 seconds to create a photograph with their bodies. Inés and me also did this practice in our session together, which can be seen in the film. Underneath you can find a screenshot of that.
4. Collecting and organizing these Tableaux Vivants to create a story line. → Create a play that is based on those embodied captures of the research that was done before.



Figure 11 – (Living Photographs, 2023)

4.2 What type of knowledge is created through the three demonstrated embodied research practices?

Apart from the different senses that all three students use in their embodiment-practices, the types of knowledge also differ. Sophie is using film to capture, and has a very material practice-based outcome (Vones, 2019). Transforming her knowledge into objects and physical art works. If we think back to the state of the art, we can easily connect her practice to the three different definitions of tacit knowledge (H. Collins, 2010) for the skills she had to work with all these different materials and transform observations into substantive work. Earlier I applied these definitions to a laboratory setting, but here I would like to apply it to Sophies practice for two reasons. The first, to demonstrate how the theoretical part of this thesis is inextricably linked to the applied (film) part of this project. And secondly to show that many STS-related concepts, could as easily and successfully be applied to artistic practice contexts (Rogers, 2022, pp. 20–25). The three different types of tacit knowledge that Collins defined were Technical Tacit Knowledge, Tactical Tacit Knowledge and Substantive Tacit Knowledge (H. Collins, 2010).

Looking at Sophies practice, we can see she had lots of different Technical Tacit Knowledge. This refers to the know-how she had e.g. of the knitting machine. In the film you can see snapshots of her working with the machine, as well as her trying to teach me how to use it. Even though she had first told me how to use it, that did not mean I was able to do it with my body. That was a perfect example of where I lacked the Technical Tacit Knowledge that she already possessed.

Her Tactical Tacit Knowledge is exemplified by her know-how of the processes. When I made a mistake with the knitting machine, she knew how to fix it, or what I should have done to prevent it. Without thinking about it, she knew where to move the machine, which buttons to press, where to put the thread to be able to continue etc. Her experience had taught her problem-solving abilities and process-knowledge. The same thing counted for when we worked with clay and latex. I asked her how long it would take to dry, and she knew the process of this, and what would help to make it dry faster.

The concept of Substantive Tacit Knowledge refers more to knowledge that is hard to pinpoint or connect to a certain moment in time or place. This could be skills or paradigm-rules she learned at the art academy, or knowledge she learned as a child already. Even values she learned from her family, friends and colleagues. This is what forms the deep-rooted knowledge and “gut-feeling” approach that formed the basis of e.g. how she translates an experience into something material. There are countless of ways to interpret a certain moment/situation/person. The way she did that specifically, is what this Substantive Tacit Knowledge refers to. Sophie worked with and created both tacit and material knowledge, as well as embodied and technical knowledge.

Xavi's practice was both sound, therefore embodied and material based. His research approach was probably the furthest removed from my own practical and research experiences. Working with sound art, was earlier (1960/1970) often described by researchers as a dematerialised practice, that only re-gained its relation to material when John Law and Bruno Latour introduced the idea of the "material system" in which interaction between materials, sound and the artists was connected (Pigott, 2019). I really like this approach because it binds together the process of the artist and their growth through working with materials, and the materials themselves. Which is very evident for Xavi's work, as they developed their skills and expanded their work with metal through their first experiments with it. Their interest in sound art, is inherently connected to the metal, and the process of metalworking. Xavi had to learn a lot of technical skills, both for the metalworking, as well as digital skills to create a sounds installation from the material. They had to use their knowledge of music and music production to come up with ideas that they then had to learn to program in a raspberry-pi device that was connected to the metal bowls they created (Sosa & Aust, 2023).

With Xavi's practice, I want to get back to the concept of *agential realism* (Barad, 2007). The earlier discussed theoretical framework that offers a perspective on the relationship between the material world, human perception, and knowledge production (Holford & Hadaya, 2017; Murris, 2022). Agential realism challenges dualistic notions of the separation between the observer and the observed, emphasizing the entanglement of the researcher's body with the things that are being studied. In the case of Xavi this is very fitting, as their listening skills were continuously developed through their work with metal, and experimentation, which then led to new embodied practices in their daily life such as stretching and awareness-exercises where they trained their body to be even more susceptible to sounds, which then led to more (complex) sound installations that led to growth in their skills again etc. The borders between the practice, the materials related to this practice, and their body blurred into each other. One would have not been possible without the other. The knowledge that comes out of such an intertwined practice of body, material, experimentation, and the technical, is a perfect demonstration of agential realism, as well as embodied research, as this is often derived from many different information sources.

I would argue Xavi worked with many different types of knowledge, some easy to identify (e.g. musical knowledge from music classes) and some difficult to pinpoint or connect to specific places and times (e.g. technical knowledge, sound-composition knowledge) because they developed step by step throughout multiple years, sources, classes, inspiration and experimenting. And they produced different types of knowledge as well. Technical, embodied, material and musical knowledge.

Inès' practice combines many different types of research and knowledge to combine all of that different knowledge in living photographs called tableaux vivants. These living photographs are embodied representations of both theoretical and artistic knowledge. Both factual and emotional. For this practice I would really like to refer to the concept of materializing memory (Muntean et al., 2016b, pp. 2–8, 140) which describes the process of transforming memories – in Inès' case the knowledge she and her colleagues gathered during their research phase – into material practices. This can be physical art works, but in the case of Inès these are the living photographs in which the entire theatre company team tries to encapsulate all their different types of knowledge in their bodies, expressions, composition and space. These photographs are then transformed into theatre plays that create different types of knowledge as well.

Inès described in her interview (a part that did not make it to the film) what the role of the director was, and how impressive she found it. She said that during rehearsals, the director would be present to give notes on their acting, as well as their positions on the stage and how the combination of those made the play convincing and entertaining, or not. "If we would play the play, the director would watch, and afterwards be able to tell me: "In scene x you were 2 meters too far to the left on the stage, which made your interaction with character y less convincing." So Impressive how he would notice that, then remember it in comparison to how it was supposed to be and then communicate that to me. And then in the next play see if it improved or not." Memory is very important in this practice, as the director would keep track of these types of notes for all players at the same time, and continuously changed the material – the play – by building on that continuous and growing knowledge. Of course, this also counts for the actors playing the play (Muntean et al., 2016a, pp. 140–150). They would have to know which scene the director was talking about, remember what moves they made, and then remember the changes they have to make all while acting (which in itself is a very memory-based practice: text, facial expressions, composition, when and where to be on the stage, emotional expressions, body movement, posture etc.).

Of course, we can also argue that capturing the knowledge in living photographs, is a type of visual research method as well. Without capturing these "living photographs" and transforming them into "material photographs" such as the screenshots I showed above, they would not be able to puzzle around and create a story line. Getting from these photographs to a story line requires another round of visual interpretation, and deciding what is important for the story and what not. Much like I described I did for my film in the methods section. I would conclude that Inès uses both material, embodied and visual research and creates knowledge in all those fields as well as theatre and performance.

4.3 How can these methods add to already accepted knowledge production practices in the social sciences – specifically Science and Technology Studies – to diversify the scope of research methods in the field?

This last question is already mainly answered in the end of the film by proposing specific ways in which we can apply methods from the students to STS research practices:

- ➔ Doing a Science and Technology Studies-lab study where the researcher documents only the hand movements of the observed researchers working in the lab. Focusing on tacit and embodied knowledge in laboratories. (Inspired by Sophie's approach of only focussing on one specific body part and the information we can gather by doing that.)
- ➔ Researching sound of working spaces, and how different sounds influence research practices. (Inspired by Xavi's interest in sounds, surrounding sounds, and zest for becoming more aware of their environment and the influence their environment has on them.)
- ➔ Trying to contextualize our research by creating a living photograph out of our research projects that visually portray the main topics of our interests. (Inspired by Inès' practice of capturing research in Tableaux Vivants to embody research, and then create a story line based on the visuals captured in the Tableaux Vivants.)

These proposals are rather evident, and I am sure there are many ways in which the knowledge gained through their practices can be applied to STS research, dependent on which research is done, different things and aspects could be interesting. In general, something that all three practices have in common with each other, is a focus on knowledge for which their body is used, and the information their bodies tell them, is taken seriously. Whether these are observations (audio, visual, gut-feeling etc.), emotions, memories, or other types of information: they are all welcome and important sources of information. I would like to share a piece of the book "Art, Design, and Performance" (Salter et al., 2016, p. 143) which related to these different types of including the senses in Science and Technology Studies research:

What "embodied knowledge," "material engagement," and "somatic modes of attention" ultimately suggest is that knowledge itself is forever entangled with bodily senses. While the visual sense has received much attention in STS when looking at the ways scientific images are interpreted and perceived [...], more recent studies draw attention to bodily senses other than vision that are involved in scientific and artistic knowledge production, such as listening [...], touching [...], and tasting [...]. Such body-centric studies framed through the more general concept of "affect," the process by which emotions and feelings affect bodies

without being able to be described in language or representations [...], deserve much further exploration in STS. Concepts like "good hands" involving embodied skills used in biology [...] or "haptic creativity" in which scientists and artists' "data, instruments, and bodies and identities are continually reconfigured within their apparatuses" [...] suggest new avenues for exploring how researchers' "thinking with eyes and hands" [...] generate new forms of knowledge. (Salter et al., 2016, p. 143)

I think that excerpt summarizes perfectly how including different types of sense-based research can create new perspectives. Especially in Science and Technology Studies, where we often investigate practices, finding *new* or *different* ways of researching and documenting, could lead to new insights about already well-documented (in words) research practices such as e.g. life science laboratories. It is therefore that my first suggestion focused on that specific context. What I hope most of all, this thesis will reach, is trigger curiosity in those who engage with it to explore embodied and artistic research methods in fields that do not actively engage with those methods traditionally speaking.

4.4 Rounding up

One person I have not talked about in this discussion section yet is the PhD student Chiara Juriatti, whose insights were incredibly helpful for me to connect the practice-knowledge I gained through the sessions I had with the three students (Inès, Sophie, and Xavi). In the film, it is not so self-evident how exactly Chiara Juriatti cleared up so much, as her part describes mainly one example from her field (the embodied experience with an art work that made her realise the power that embodied experience can have in creating specific, well-remembered types of knowledge) where she discusses her experience with the art installation "Resurrecting the Sublime" (Daisy Ginsberg, 2019). Much of the interview with Chiara Juriatti that did not end up being used in the film however, was about the development of embodied knowledge throughout history, which has inspired much of my state-of-the-art chapter, and gave me a way clearer view on which points and stories to highlight from my participating students in the film. Her input might therefore not be as clear as that from the students, but was very insightful for me, and her contributions were absolutely vital for the creations of all part of this thesis.

Next, I would like to discuss the collaborative approach of this thesis project. My intention was to make this project as collaborative as possible. In the first instance I planned to do all filming, editing and writing together with my participants. However, since all participants had their own projects going on, they did not have the time to be as that involved. In the end, the filming part was the most collaborative, as I let all participants (apart from Chiara Juriatti, as she did not feel

comfortable with that format, which I respect) film me as well. This turned out to be slightly more difficult than I expected as they were not trained to work with cameras and camera gear (such as a stabilizer or microphones) which made some footage shot by them unusable for the final film. However, much of that content, especially by Xavi and Sophie has been used in the film successfully. The editing process was basically done by me alone, as the participants had no prior experience with editing and no interest or time to learn that in this moment of time. However, to still make sure they felt included in every step of the process, I summarized my findings from our sessions together, and sent it to them for approval before I started editing. I used their feedback on that, and the edited versions of these summaries as the starting point for the editing process. After the first edit-draft was done, I sent it to all of them, and adapted the film based on their notes to ensure that they felt well represented. All of them gave back to me in their feedback about this project that they were very grateful to work in such a collaborative way, and that they felt very seen and heard by how they were represented. Both in writing and in the film.

The most collaborative part of this thesis project was with Inès. She used our session and the content created for and by the session (videos, writing, sound recordings, reflection videos etc.) for her own thesis project and a workshop she gave about her own method, to other students from the *Arts&Science* program. The whole process of this thesis, from start to finish, does make me reflect on how we can do truly collaborative projects within an academic system that celebrates individual success and requires individually produced projects, such as this thesis that will be handed in under my name, but would not have been possible without all the wonderful people that participated and worked with me. It makes me wonder about all the hidden collaboration that is taking place behind the scenes, and critically question why we have created a system that prefers individual over collaborative work – where I think group work often leads to way more insightful projects. Collaboration over competition, if you ask me. Although that seems to be an unpopular approach in academia, at least for those making the rules (Askins & Blazek, 2017).

Lastly, I want to reflect on the use of film in this project. It was important to me to use film for my thesis, as I am extremely familiar with the medium, and know that I can better create impactful stories through documentary film than through writing alone. Especially because a 40-minute documentary film is way more accessible to a broad audience than a 60-page academic master thesis. I have already reflected on the impact and shortcomings of the camera as a method/tool in my methods-section, so I will not repeat that here. I only wanted to reflect shortly on the combination of film and writing here. At first I expected that the written part would only be supporting my main product: the film. In the end, I truly think the two go hand in hand. Yes, you can read the thesis without watching the film and still receive insights and learnings and vice versa. But I

do think the two different parts, offer different types of insights that support each other, rather than one-sided. My original plan also was that the film would only be about 20 minutes. The film turned out to be 40 minutes, and still was not able to include all of the learnings, insights and backgrounds that I witnessed over the last year that I have spent on this thesis project. It was definitely more work than I anticipated, but the entirety of the project – although there are many spots that I was not able to cover – turned out to be way more insightful and complete than I could have ever thought of in the end, particularly the written part.

For future research that continues on my line of thought here, I would like to propose a broader creative approach than only film. Throughout this project I have learned much about the relation between different types of art (music, performance, sound-installations, dance, physical at works etc.) and how they influence knowledge production, especially in relation to Science and Technology Studies. Visual research through documentary film was probably one of the safest creative options I could have taken. Would this research continue, I would propose a more multimodal approach in the research itself by using different types of artistic approaches and multiple method-sessions with participants exploring the different types of knowledge that come out of these different artistic approaches. Whether that will be me or someone else: it will be a big project, that would probably require multiple years of active engagement with the topic as well as practical engagement with the art-field and multiple artists who are willing to participate over a longer period of time – which will lead to practical difficulties. However, I think this can lead to very interesting insights that can contribute to many different fields, whether this is Science and Technology Studies, Sociology more broadly, artistic research or any other field.

4.5 Original Research Question

My original research question was:

How do the three chosen students from the *Arts&Science* program at *Die Angewandte* use their bodies to produce knowledge?

This question should have been answered by now through the elaborate discussions of my sub-questions and reflections as well as the film. The short answer – that does not do justice to all described and portrayed details – would be something along the lines of: The three students all used their bodies in very different ways to transform and produce different types of embodied knowledge according to their own definitions of embodiment. In this process there were multiple artistic disciplines involved such as theatre, performance, sound installations, music, and material engagement with different materials such as clay, wool, latex, paint and metal. There were also different types of technical knowledges involved to capture, translate or create information that was used for the production of art works. The one thing their approaches had in common, was the acknowledgment that their bodies were unmissable and vital tools in their research practice.

4.6 The End

Just like in my film, I will end this written part of my thesis with some questions to take with you, that I hope will stick with you after engaging with either the film, the written part or both:

- 1: What stories do the movements of your hands tell? And what do they say about your research practice?
- 2: Which sounds impact your research? And why do you think that is?
- 3: How would you visualize your research interests if you had to build a living photograph in space?
- 4: What artistic research method, could you imagine yourself using in your next research project? Why? And what insights do you hope it can bring that your standard approaches up till now have not been able to bring?

And since we want to keep this project as collaborative as possible, please reach out to me (joiaboode@hotmail.com), or the participants through me so that we can learn from your methods and practices and keep up the collaboration for as long as possible, with as many people as possible. Together we can keep building alternative knowledge spaces, where we are free to create collaboratively, experimentally, multimodal and interdisciplinary. Let's make academia (and arts) a space again where we all come because we are happy to learn something new, and where competition does not have a place.

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5.1 List of figures

Figure 1. Hands, Katharina Lorenz	3
Figure 2. Maxwell, 2013, pp. 123–142	15
Figure 3. Picture of floor exercise – STS Austria Conference	27
Figure 4. Method session with Sophie O. T. Schmidt	36
Figure 5. SCULPTURE by Sophie O. T. Schmidt	40
Figure 6. Art Work Inès Paláez, 2023	41
Figure 7. Art Work Xavi Sosa, 2023	42
Figure 8. Art Work Daisy Ginsberg, 2019	43
Figure 9. ZER01NE Art Work	48
Figure 10. Screenshots of film by Sophie O. T. Schmidt	53
Figure 11. Living Photographs, 2023	55

German Abstract:

Diese Masterarbeit untersucht die Integration verkörperter künstlerischer Methoden in die sozialwissenschaftliche Forschung, insbesondere im Bereich der Wissenschafts- und Technikforschung (Science and Technology Studies, STS). Die Autorin, die aus dem Bereich der darstellenden Künste kommt, untersucht, wie Körper als Forschungsinstrumente genutzt werden können und wie verkörpertes Wissen die akademischen Praktiken und Wissensproduktion in den Sozialwissenschaften diversifizieren kann. Das Hauptziel besteht darin, die traditionelle Trennung von Geist und Körper in Forschungsmethoden in Frage zu stellen und den Wert verkörperter Praktiken bei der Generierung reichhaltiger, kontextuell eingebetteter Daten zu demonstrieren.

Die Forschung konzentriert sich auf die Praktiken von drei Kunststudenten aus den Arts&Science-Programm an der Universität für angewandte Kunst in Wien (Die Angewandte). Jeder Student nutzt seinen Körper auf einzigartige Weise, um Wissen zu produzieren, und ihre Methoden werden durch eine Kombination aus schriftlicher Analyse und einem Dokumentarfilm dokumentiert. Der Film dient als empirischer Teil der Arbeit und erfasst die Praktiken der Studenten sowie die Reflexionen der Forscherin über die Verwendung ihres eigenen Körpers und der Kamera als Forschungswerkzeuge.

Die Arbeit beginnt mit einem Überblick über verkörperte und filmische Forschungsmethoden, bietet einen historischen Kontext und diskutiert deren Relevanz für die zeitgenössische sozialwissenschaftliche Forschung. Die Autorin argumentiert, dass, obwohl visuelle und verkörperte Methoden in Bereichen wie der visuellen Anthropologie und der Kognitionswissenschaft verwendet wurden, ihre Anwendung in STS und den breiteren Sozialwissenschaften weiterhin begrenzt und wenig anerkannt ist.

Bei der Erforschung der Nutzung des Körpers als Forschungsinstrument geht die Autorin darauf ein, wie Körper in verschiedenen Kontexten Wissen vermitteln. Die Arbeit stützt sich auf die Werke von Wissenschaftlern wie Carol Azumah Dennis, die die Inklusivität verschiedener Arten von Wissenschaftlern in der akademischen Welt thematisiert, und Judith Butler, die die performative Natur von Geschlecht und Identität diskutiert. Die Forschung hebt die Notwendigkeit hervor, die Vielfalt der Körper in akademischen Umgebungen zu berücksichtigen und wie diese Vielfalt die Produktion und Vermittlung von Wissen beeinflussen kann.

Ein wesentlicher Beitrag der Arbeit ist die Betonung der performativen und verkörperten Aspekte der Forschung. Durch die Dokumentation der Praktiken von Kunststudenten zeigt die Autorin, wie verkörperte Methoden Nuancen und Details erfassen können, die traditionelle schriftliche Methoden möglicherweise übersehen. Der online verfügbare Dokumentarfilm bietet ein visuelles und immersives Erlebnis der Forschungspraktiken der Studenten und demonstriert das Potenzial des Films als Forschungsmethode in STS.

Die Arbeit ist so strukturiert, dass sie einen aktuellen Überblick über bestehende Forschung, einen detaillierten Methodenteil und ein reflektierendes Kapitel enthält, das die Ergebnisse diskutiert. Der Methodenteil befasst sich mit den ethischen Implikationen der Verwendung von Film und den

Herausforderungen bei der Übersetzung künstlerischer Methoden in wissenschaftliche Ergebnisse. Das reflektierende Kapitel verknüpft die empirischen Ergebnisse mit dem breiteren Kontext von STS und plädiert für einen inklusiveren und verkörperten Ansatz zur Wissensproduktion.

Während der gesamten Arbeit bietet die Autorin Übungen an, die den Körper des Lesers einbeziehen sollen und die Bedeutung verkörperter Engagements beim Verständnis und der Durchführung von Forschung betonen. Diese Übungen, die in Zusammenarbeit mit den Forschungsteilnehmern erstellt wurden, zielen darauf ab, die Lücke zwischen den theoretischen und praktischen Aspekten der verkörperten Forschung zu überbrücken.

Abschließend argumentiert die Arbeit für die Integration verkörperter künstlerischer Methoden in die sozialwissenschaftliche Forschung und hebt deren Potenzial hervor, akademische Praktiken zu diversifizieren und zu bereichern. Durch die Dokumentation und Reflexion der Praktiken von Kunststudenten zeigt die Forschung, wie verkörperte Methoden zu einem ganzheitlicheren und inklusiveren Verständnis der Wissensproduktion in STS und darüber hinaus beitragen können.