Designing for and with Care in Multispecies Kinship: Exploring Methods of Decentering the Human in Design

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Abstract
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**Sammanfattning**

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ABSTRACT
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KEYWORDS
non-anthropocentric design, decentering the human in design, multispecies kinship, designing with and through care, cultural probe, body map, extended body map

1 INTRODUCTION
Whether we name the current geological epoch the Anthropocene or the Capitalocene, whether we dismiss that we have even passed the Holocene (a geological epoch that began around "10,000 years ago, [...] when humans first began practicing agriculture" [35]), the impact that the human species has had on the ecosystem is unquestionable. From climate crisis to resource depletion, people have shown that their exceptionalism comes with a cost.

As Donna Haraway promptly implies, "[n]o species, not even our own arrogant one pretending to be good individuals in so-called modern Western scripts, acts alone" [18]. The notion of "end of nature" is often linked to the Anthropocene, which suggests that the initial concept of nature is no longer applicable to the current situation. There have been so many direct and indirect changes, e.g. modifications to the planet’s landscapes and introduction of new species, embedded in the environment that a new hybrid, composed of natural and artificial, emerged [32].

I believe that as nature is ever-changing, our designs should be adaptable to these changes as well. Thus, creating a collaborative kinship and practicing "better care of kinds-as-assemblages (not species one at a time)" [18] between humans and non-humans could be the medium towards creating a livable future for everyone and everything. By enticing people to become more compassionate, more caring towards matters that may seem insignificant to them in the present, to acknowledge their non-human cohabitants, the problem of survival could become less complex. Haraway defined this next step towards creating a collaborative survival network through the concept of Chthulucene, a time where multi-species assemblages flourish together, and places of refuge are reformed [18].

By focusing on cohabitation and a mutually beneficial relationship between humans and non-humans, new design perspectives could emerge. Such is the purpose of emerging concepts in design, e.g. posthumanism, post-anthropocentric design, and collaborative survival. Posthumanism shifts our focus from a human-centered approach to one that envelops other ways of being. In a human-centered design space, posthumanism comes to challenge the designer’s views and change their focus to more intricate systems. It draws attention to interactions between humans and non-humans, i.e. plants, animals, things and practices. Designing from a non-anthropocentric perspective requires a shift of one’s perception of their environment, of their values, applying methodologies that support and include the non-human actors [13].

Smith et al. [32] identify three main concepts embedded in human/non-human interaction: natureculture, hybrids and decentering the human in design. Natureculture, a term originating from Haraway’s work, suggests that nature is interlaced with culture, thus existing and thriving in urban
spaces as well, shaping our experiences [32]. Hybridity can be understood through the example of wildlife crossings, a design alternative for animals to safely pass high-traffic roads. Vertical forest [4] or the suspended garden at Musée du Quai Branly [6] are other examples of designs that integrate nature in urban environments with the purpose of regenerating biodiversity. Both natureculture and hybridity are based on decentering the human in design. This does not mean, however, that the human is completely disengaged from the process. On the contrary, its role is still very prevalent, interacting and collaborating with its non-human counterparts.

In the new emerging field of Animal-computer interaction (ACI), which places the animal as a user and as a contributor to the design practice [26], there are some “users” that are left out, notably plants [2]. In design, plants are hardly considered living beings, even less so a “user” with an agency to impact on a multispecies interaction. However, plants have acted as inspiration for designers, who have used them as a design material to generate emotional responses [20, 30]. Plants are different in many ways from both humans and animals, being stationary, ubiquitous and living on different timescales compared to humans [2].

In the current climate crisis, I believe there is a need for designers and design researchers to shift from prioritizing human needs to exploring the network of relations that exists in this ecology, in which plants have an invaluable potency. Changing either of the elements in this network has undoubtedly an extensive impact. Thus, the purpose of this project is to reflect on the relationship between humans, plants, and technology, emphasizing how “transforming things into matters of care is a way of relating to them, of inevitably becoming affected by them, and of modifying their potential to affect others” as expressed by Maria Puig de la Bellacasa [8]. I am focusing on the symbiotic human-plant-technology partnership, considering each component as an invaluable part of the ecosystem. Furthermore, I am exploring the concept of care, and the difficulty in designing for and with care in the context of human/non-human companionship, “finding ways to re-affect an objectified world” [8].

2 BACKGROUND
Humans have always had an interdependent relationship with nature, being at the mercy of what it provided and what it took away. However, along with technological advancements, humans have succeeded in controlling some aspects of nature, e.g. domesticating certain species of plants and animals for their own benefit, thus creating the notion of natureculture and centering the human at the forefront of existence. Today, we can situate ourselves in a time of post-anthropocentrism, where the human is no longer at the center of design, but an actor with the same potency as non-humans, cohabitating and thriving in the same ecosystem. As I focus on understanding the concept of care in a human-plant relationship and how it gets transformed by the introduction of technology in the assemblage, in the following section I present the unfolding of multispecies kinship, narrowed to human-plant interaction, and I introduce non-anthropocentric methodologies used in designing for human/non-human assemblages.

Designing for human-plant interaction
People have always interacted with plants. Whether it is for survival purposes or for aesthetic enjoyment, plants have been a constant resource allowing humans’ continued existence. Artists find nature as a source of inspiration to fuel their creativity and to express it through their creations. For example, the Patient Gardener [5] is a project that showcases the beauty of cherry blossoms, as well as the time that it takes for them to grow and bloom. Myers [28] describes how she, as a dancer and choreographer, would encompass plant movement and temporality in her own art and imagination. Through the exploration of her own body, she acquired “newly vegetalized sensuous dexterities”. In yoga practice, nature can be seen in each pose. The tree, the lotus, and the flower pose are some examples of how plants are incorporated into the discipline, thus expressing the interconnectedness of every living being through a common consciousness.

The concept of biophilia, first introduced by Edward O. Wilson [37], which he defines as humans having “the urge to affiliate with other forms of life” and be connected to nature, initiated much research into the impact of nature on people. Archambault [1] dives into the human-plant relationship in the Inhambane town in Mozambique. She describes how the gardeners are urged to care for their plants through their affection and love for them. Different from a connection to a loved one or a relative, the human-plant relation is considered to be “far more authentic”, creating new social relations between gardeners and prompting “affective encounters” that inspire reflections on what it is to be human, on new ways of being and relating, and generating new intimacies. Aspling et al.’s [2] analyze the use of plants as input and output devices in computing, reporting works that clearly express a human-centered perspective in their designs. Within HCI, plants are mostly used as output devices, a design resource to raise awareness on the state of the environment, or to engage the user into having a closer relationship with nature [2]. An example of plants serving as output devices is a current research conducted at the Wageningen University in the Netherlands. There, a Plant-Microbial Fuel Cell (P-MFC) technology has been developed that uses living plants to generate electricity [29]. What makes this technology interesting is that it is based on a commensal relationship, i.e.
we benefit by receiving energy translated into electricity and no harm comes to the plants themselves. In contrast, Botanicus Interacticus [31] is an example of an interactive technology that uses plants as input devices. By touching the different parts, i.e. leaves, stem, petals, or making discrete gestures, applications with one or multiple modalities can provide a certain response. A recent project, called Google Tulip [11], developed in the Netherlands, was introduced as a way for the tulip to communicate to their human caregiver if they need water, light or more space to grow. This type of technology could be considered non-anthropocentric as it accounts for the needs of the tulip. It also highlights the importance of micro-relationships between living organisms and caring for something other than human.

**Non-anthropocentrism in design**

The interest in non-humans as actors in design was defined along with the Actor-Network-Theory (ANT). This approach that originated in the 1980s encourages "understanding the relations between networks and 'assemblages' of humans and non-humans—'actors' that share equal agency in participating in the shaping of issues" [13]. The principles of ANT can be identified in an international ecological movement: permaculture, the ethics of it being an "attempt to decenter human ethical subjectivity by not considering humans as masters or even as protectors of but as participants in the web of Earth’s living beings" [9].

As it is a new concept, methodologies that would help to conceptually get into that mindset are still limited. However, Smith et al. [32] exemplify multispecies ethnography as a method from cultural anthropology, reinterpreted in HCI to understand human-dog relationships. Applied to the context of material objects, Giaccardi et al. [16] introduce a new approach called thing ethnography, in an effort to point out that changing one’s perspective encourages a "holistic way of understanding relationships among people, objects and practices" [16].

Liu et al. [25] describe the concept of collaborative survival, which advocates for a collective partnership between human and non-human species and explores how technology can help sustain it. The term encompasses the idea of including non-humans at the center of design as a way of promoting inter-species responsiveness, the importance of micro-relationships and seeing living beings as an ecology rather than an entity. Liu et al. created three designs that cultivate the "arts of noticing" through multisensory interactions. The artifacts were created as complementary tools for understanding human-fungi relationships.

Kobayashi et al. [24] created a clothing design that allows its users to interact with the ecosystem of a forest, enhancing the feeling of belonging and of unity with the environment. It merges "man and nature without environmental destruction", thus bringing forward the possibility of a synergetic cohabitation between nature and humans through technology.

Having a non-anthropocentric perspective "is about finding ways to re-act on an objectified world" [8], which can be achieved by transforming matters of concern into matters of care. Maria Pui de la Bellacasa [9] addresses the difference between care and concern, by noting that care has a "stronger affective and ethical connotations" and it "contains a notion of doing that concern lacks". Thus, the act of care becomes the indispensable mediator for a sustainable and thriving existence between human and non-humans [8].

Building on the concept of care, I address the need to question human-centered methodologies. Thus, I follow a Research through Design approach [38] through two activities: a cultural probe that pragmatically addresses notions of collaboration between humans and their ecosystem by fostering care; and an orienting activity that focuses on conceptually questioning what it means to be human and extending the boundaries of the human body beyond the skin, answering questions such as "What it means to be human?" and "How can one decenter from its human body?". The approach of designing a cultural probe supports an exploration of the design space and entices provocations and discussions around the topic of human-nature-technology relationship and its entanglements. Whereas the orienting activity, through its title, evokes the purpose of guiding one’s perspective from humans as the focus in design, to the network of connections that humans are a part of.

### 3 METHOD

The RtD approach adopted in this project, being an "inquiry process" [39], supports using methodologies from design practice to approach topics that could be considered vague, to take into account the ethics of what we design and to focus on the future, rather than the past or present [39]. As the topic of non-anthropocentrism and designing for multispecies kinship doesn’t have a definite set of practices, RtD offers the possibility of creating artifacts that have implicit knowledge embedded in them, opening new design spaces, inspiring future work and generating space for improvement.

**Juniper—your energy plant companion**

The designed artifact, Juniper, is inspired by an existing P-MFC technology [29]. It builds on the initial concept of cultural probes introduced by Gaver et al. [15], focused on "understanding the local cultures" and leading a discussion without dominating it. It additionally incorporates the transition to technology probes, a method used to foster inspiration in the design process [23].
The probe, as seen in Fig. 1, has two parts. The top contains the main interaction: placing the plant inside the enclosure to activate the “energy transfer”. When the plant is “connected”, the energy flow is reflected through the LED strip, which changes its color and light pattern from a pulsating blue to a charging green. The bottom part is intended to protect the electronics.

Five participants, 3 women and 2 men, all students between the ages of 21 and 28, received the probe at different times along with a bag for transportation and instructions of use. I interviewed each participant before the probe was given, to reflect upon the current state of their human-plant relationship. A follow-up interview was conducted at the end of the study, to assess changes in the relationship with the newly added dimensions. The participants fostered the probe for different periods of time, ranging from 1 to 4 days, depending on their experiences and how long they were willing to engage with it. They were also encouraged to post pictures on an Instagram account (a photo and video-sharing social networking service [36]) that I created specifically for each participant, so as to document their experience. Only one account was created, i.e. the next participant saw the previous participant’s posts. As the data was gathered in English, the quotes are presented in their original form, with the participants being referenced by pseudonym to maintain anonymity.

The main requirement was to connect the probe every time they used their personal computer. In this way, I deliberately encouraged a reflection regarding the practical and social challenges of “needing” to have the probe by their side at all times. My main interest is to create an emotional connection rather than an existential or survival relationship, as I am taking an approach of fostering care. As Maria Puig de la Bellacasa explains, “[c]are troubles reciprocity in this way because the living web of care is not one where every giving involves taking, nor every taking will involve giving”.

Cultivate your inner plant—an orienting activity

Departing from Haraway’s query of “Why should our bodies end at the skin?”, I organized an orienting activity that would become a form of conceptually decentering the human. Smith et al. [32] clarify that the concept of decentering the human does not entail leaving out the human from the conversation and putting non-humans at the center. It encompasses the idea that there are no predefined boundaries between species, “emphasizing the interconnectedness that is inherent in human/nonhuman assemblages”.

The workshop was held outdoors, in a park, to be in the center of nature. Four of the five participants were the same as for the cultural probe (3 women and 1 man), and the last one was a 20-year-old student (woman). Starting with a quick introduction, the participants were given consent forms to sign, followed by an account of the concept of decentering the human in design and the activities that would be held. The first activity consisted of drawing their Body Map (Fig. 2A), a method used in physiotherapy and more recently in somaesthetic design [21]. A Body Map consists of a “rudimentary drawing of a human body on top of which participants can draw with different coloured pens (or write) what they feel in different parts of their body” [21]. This activity allowed participants to explore and be more aware of their bodies (mind included).

The second activity consisted of drawing an Extended Body Map (Fig. 2B(1-3)), an appropriation of the traditional Body Map, which I redesigned from a non-anthropocentric
viewpoint. Its purpose was to extend the awareness of their bodies to the surroundings, to be mindful of their interaction with the ecosystem. Each participant received a set of ten pictures representing the outdoors environment. They had the flexibility of using them in their illustration as they pleased. Furthermore, they could choose to use the predefined human body as in the previous activity or to draw their own body. A discussion regarding the first two activities followed, to compare the two methods.

The ensuing activity was a meditation exercise. Before we engaged in the practice, I encouraged the participants to walk barefoot in the grass, as it has been positively associated with feeling connected to nature and it enhances "the feeling of nature immersion" [19]. The meditation practice consisted of me narrating fragments of Natasha Myers’ "A Kriya for Cultivating Your Inner Plant" [27]. The meditation had the purpose of intensifying the senses, an "opportunity to vegetalize your already more than human body" [27]. It ended with some minutes of self-reflection in silence. I subsequently explained the concept of externalism, defined by Washington et al. as "an insistence that the boundaries of an individual’s skin and skull are relatively unimportant when it comes to the nature and content of her mind, and the bases of her judgments and behavior" [34], as I found it to be a close answer to Haraway’s query of "Why should our bodies end at the skin?".

For the last activity, the participants were requested to draw a final Extended Body Map (Fig. 2C(1-3)). Additionally, they received an extra set of pictures, illustrating the meditation practice, using them in their drawings as they pleased. A discussion followed where each participant explained their illustration and their experience throughout the meditation, finishing with some feedback on the workshop. In a similar manner to the probe, the data was gathered in English and the participants anonymized under a pseudonym.

4 RESULTS

In the following section, I present in detail the most relevant findings from the two parts of the project: the cultural probe and the orienting activity. For each part, I further outline the troubles with designing for the concerned topic.

Juniper—your energy plant companion

As the probe was based on an existing P-MFC technology [29], my main concern was not to replicate the functionality of the probe but instigate through it a provocation on the topic of care when it comes to non-humans and what that entails.

The before interviews. All participants were interviewed before the probe was given to get an overall perspective of their relationship with plants, and their level of concern and/or care for them. I follow one participant’s (Bryce) categorization of relationships they have with plants, as it fully encompasses the descriptions of the other participants. According to Bryce, there are three dimensions of relationships with plants, two of them based on the biological classification of symbiosis: mutualism—both species benefit; commensalism—one species benefits, while the other is not considerably affected; and symbolical—experiencing plants vicariously through others that care for them.

**Human-plant mutualism.** This relationship is portrayed by participants that had a strong relationship with plants, specifically those that they have at home. They pointed out that the care they have for plants is different from the care for a human or an animal. However, they still offer love and nurturing, they can feel when a plant is "sad" or isn’t going to be okay and they express distress when a plant dies: "sometimes I try to give back to them but I don’t know what they want" (Daphne). They have a considerable amount of plants in their homes, "living with these other beings" (Daphne) for their aesthetics, for food, for their enhanced features, e.g. purifying the air, because it creates a "cozy" atmosphere (Ivy), gives the space a more "natural feeling" (Dahlia), a "more cozy ambiance" (Ivy) and makes it feel more "alive" (Dahila). For Dahlia caring for plants is embedded from childhood, complacency and happiness being important aspects that she receives in return.

Some have admitted to being bad at keeping plants alive, but have grown to have a better relationship with them, buying "a nice pot" (Ivy) for each one of them and giving them "a nice place to live" (Ivy). Bryce has further elaborated by referring to the invaluable role that plants have in "this whole network of living things", specifically how "if the plants went dead, I would go dead", and "they give me life and they give signs of the future".

**Human-plant commensalism.** This commensal relationship is expressed through participants’ concern for how the plants that they eat have been grown, extended to a concern for their health and ending with a concern for the "health" of the soil. Some consider acceptable not caring for plants themselves "because other people will care about them" (Aspen), him remarking that if they did have their own garden, then "I would have taken care of my plants, but not for the rest".

**Human-plant symbolism.** This last relationship is portrayed by Bryce explicitly caring for one plant, because "it is a special plant. A symbolizing plant". For him, it is an embodiment of a human relationship and "by taking care of it I am taking care of the other people", and if not cared for it would "be symbolically bad". Before having this specific plant, he did not favor the idea of having indoor plants, as he did not know how to care for them, he did not enjoy having them,
and he considered it too much of a hassle. Daphne is quite intrigued by the plants in the wild but only started having indoor plants recently, after receiving one as a gift. This triggered her desire to have and purchase her own plants. Lastly, Aspen expressed not having any relationship with plants but having them in his house because of his partner.

The after interviews. In this section, I first recount the consequences of relevant design decisions. Then, I outline the reflections that the participants pondered over while fostering the probe. I also explain the trouble that participants had with imagining a functionality, and the effect on their experience. Finally, I describe their reflections on the impact of the real version of the technology and I close with considerations on why they participated and what factors would have changed their decision.

The effects of design decisions. The main material used for this probe, wood, is referred to as craft material by Tsaknaki et al. [33] because it is connected to a centuries-old tradition, and when combined with interactive technology it evokes new meanings. Together with the embedded values in the art of crafting it generates new values that transcend notions of monetary cost [33]. One participant had no opinion regarding the crafting and the aesthetics of the probe. Others considered the probe to be robust. They felt that it would have had a different impact if it were more low fidelity: “I definitely feel that if it was given to me in a different way or more low fidelity, then it would’ve had a different impact for sure” (Daphne). Some participants who were present during the design process of the probe said it made them “respect the project more” and “want to give something impressive back” (Bryce). One participant believed that it “gave a little more of a personal feeling to it […] made it more special in a sense because it’s your design” (Ivy).

Similar to the Power-Aware Cord that makes the energy flow visible exemplified by Backlund et al. [3], the aesthetics of energy in this cultural probe have been defined by the LED strip that would display a charging sequence. I changed the light pattern after the first participant’s experience with it, as it felt more like breathing for them rather than charging. The initial pattern gave the feeling that the probe was being powered by the computer, whereas with the new pattern, the plant was providing the energy. Adding a USB cable that would show how the energy flows was suggested by a participant, which was also an initial design idea. However, it would have affected the experience with the probe, as the energy flow would be opposing the concept of Juniper providing the electricity. After the pattern was changed to being more reflective of charging, the last participant expressed that through the presence of lights “I didn’t feel like the plant was charging my computer. I felt completely the opposite, that the plant was getting energy or whatever from my computer” (Ivy). Other participants considered that the lights gave the feeling of having something living by their side, they helped make the probe noticeable.

Even though the probe was given alongside a bag for transportation, two participants didn’t have to use it at all, as they worked from home. However, when asked if they would have transported it, they answered no, because they were afraid it would damage the plant, and that there was no point of having it since electricity could be acquired from anywhere. Daphne that commuted with their bike to university, had to be more careful, saying that “it made me cycle a lot slower”, along with Ivy who was concerned about damaging the plant when carrying it: “It was slightly annoying to carry her from one place to another, because I was afraid of damaging her”. Bryce didn’t mind if the plant would be harmed in the bag: “I was happy with it being sideways and spilling out dirt”.

A final design consideration was naming the plant Juniper and attributing a female gender to it. Aspen had no opinion regarding this decision. Bryce didn’t consider it to be a “central part” of his reflection and experience, not giving it any thought. However, he remarked that when trying to relate to something “you start from yourself. Through yourself you try to understand the other thing”. Two participants, Ivy and Dahlia, thought it as normal, because they “genderfy a lot of objects”, thus becoming a habit. Ivy noted that naming the plant “gave it a sense of like I got to take care of it” and that “there is a bigger sense of responsibility or like a connection”. On the other hand, Daphne didn’t agree with the gendering or the naming of the plant. She further elaborated by saying: “I liked the playfulness of pretending that the plant can write or something, that it can say things, that it can talk or it can speak on Instagram, but for me it’s just an it. […] And the name Juniper, I wouldn’t call the plant like that, I would just call it plant”.

An overview of the change in their human-plant relationship. Despite all participants expressing that through the probe, their previous relationship to plants has remained mostly unchanged, I identified some discrete alterations in that perspective. Aspen shifted his attitude regarding the energy aspect of the probe, considering that with this technology he could make use of it when camping or being outdoors and save money by using it as an alternative and cheaper source of electricity. Daphne expressed that the relationship with the given plant changed but not regarding plants in general. She remarked that “having this plant to care for made me realize that I have other plants to take care for too”, but during most of her experience “it completely faded into the background”. Ivy mentioned that she considers plants as “beautiful, respectable beings”, but she is not “crazy about them”. She believes that she cannot “put in the time and the care they deserve” because her interests “are somewhere else”.

For Bryce, this probe made him question "the ways that I view my relationship with the environment or the world around me [...] my habitual or my assumed ways of acting or valuing certain things in nature". He employed the word "resistance" instead of "problem" because it fitted with his inner experience and reflected the feeling of "resistance towards your movement and your being", for example, when moving through water or air. Furthermore, he mentioned that he previously "had a pragmatic relation description", as opposed to now, when he "can expand on that description" becoming "more sensitive to details in the relationship".

The trouble with fictitious features. Giving that the cultural probe only emulates an existing working technology, for most participants it was hard to imagine that Juniper was actually providing electricity to its users, some did not make any connection with that aspect of the probe, and Ivy said that it "felt that it was more that I was giving it power rather than it giving me power". Some of the obstruction came from being aware that they have access to electricity almost everywhere. Having to connect it knowing that instead of charging it would actually drain the computer’s battery was perceived as upsetting, cumbersome and going "against this whole feeling of imagining that it was actually charging" (Daphne). Thus, they were being "constantly reminded of something that I am not supposed to imagine" (Daphne). Even so, Bryce expressed that his interest and reflection concerned "more than one energy-dependent relationship", him being more interested in approaching the topic from a broader perspective. Moreover, he didn’t consider the energy aspect or the imagined dependency as he was using his computer. His reflection started as he got off the computer, "and at that point, I wasn’t in the energy-dependent relationship". Thus, it came to his attention "a more general dependency [...] like how I as a human, our society and how everything depends on plants".

What if it were real? When asked about the outcomes if the functionality were real, the participants declared that a human-plant dependency would indeed be created and that it "would have been really impacting" (Daphne). Aspen suggested that "if you make this kind of project or product commercial, they would be more aware, have a more environmental mindset towards the plants as well". He admitted to having cared more about the plant if the probe were real, knowing "that I need to take care of them if I want to get something from them". Bryce expressed a two-way dependency, explaining that "it became dependent on me because I was dependent on the plant". He further developed by clarifying that "if I didn’t need a plant for energy, the plant wouldn’t have become dependent on how I was treating it". Ivy pointed out that "it would be more of me being dependent on it, but it wouldn’t be a care situation", which contradicted her understanding of care.

What if it were a stranger? Given that I have a close relationship with each of the participants, the prospect of them being compelled to take part in this project has become a subject in my inquiries. When asked if they would have participated if it were someone’s project with whom they were less or not at all acquainted, four out of the five participants said yes, and they would have provided the same amount of care. Aspen further elaborated by saying that he usually does favors for people, even if they are strangers, and not expecting anything in return: "I am more like I wouldn’t care so much about other things but with people, it is different". Bryce mentioned that "since I had a foundation of interest on this subject, I would have considered it and I think I would have done it. I don’t know to what extent I would have put this kind of effort".

Figure 3: Instagram posts from (A) Dahlia, (B) Daphne, (C) Bryce and (D) Ivy.

Documenting the experience through Instagram. Throughout their experience with the probe, each participant had the option of documenting it by creating posts on Instagram. Only one participant had no Instagram activity. Three participants created posts from Juniper’s perspective. Ivy explained that she wrote from the plant’s point of view "because other people were doing it, so I was influenced by them". Even so, Daphne disclosed that she would have posted from that perspective no matter the other posts, as she had preemptively decided on that. Bryce had the most posts (6 in total) and showed increased activity compared to the other participants. He
expressed his thoughts and reflections throughout his experience, both from his and the plant’s perspective. In each post, his train of thoughts can be seen. He reflected on the relation with nature, of the emotional distance that is created when nature is transformed, for example, into paper, and how society and culture affect our own views and decisions.

**Cultivate your inner plant—an orienting activity**

![Image of body maps]

Figure 4: Drawings of Body Maps (A1 - Dahlia, A2 - Ivy), Extended Body Maps before the meditation practice (B1 - Ivy, B2 - Bryce), Extended Body Maps after the meditation practice (C1 - Bryce, C2 - Daphne).

The following activity is a first step towards decentering the human from design by redesigning human-centered methodologies, extending one’s body beyond the skin, and recognizing humans and non-humans as integral and invaluable parts of nature, cohabitating and collaborating with it.

In this orienting activity, each body map was designed to be filled as desired, with some optional aid in the form of images and body sketches. Four of the five participants welcomed the visual aids with one participant preferring not having any images or any other set boundaries. Daphne wanted to "have the liberty to express myself without any visual help". As there were two types of body maps (a traditional and an Extended Body Map), the participants considered interesting to see the differences between the maps. Each one was drawn differently from the other; thus, the experiences were not repeated, but complementary. Lastly, the meditation practice was considered very relaxing by the participants, with Daphne mentioning: "I forgot about everything, I didn’t hear any sounds, I really focused on what you are saying and tried to imagine everything".

**Comparing two ways of experiencing one’s body.** The Body Map and the Extended Body Map activities were completed before the meditation practice, to acquaint the participants with this particular methodology of experiencing one’s body. For the first activity (Fig. 3A(1-2)), Daphne remarked that it was the first time she did body maps outdoors, which resulted in her including the surrounding environment. Two participants mentioned how the first body map evoked a "this is where I am" sentiment, focusing on negative sensations and how their state of mind reflects on these perceptions. Interestingly, Daphne said she felt that the first body map needed a gender.

For the second activity (Fig. 3B(1-2)), participants focused on "other things" (Rose), more "important things" (Ivy). They mentioned how their Extended Body Map evoked "this is where I want to be" (Ivy), centering on positive sensations, desires, and on the human senses. For most participants, the provided visuals were helpful in being aware of things that they wouldn’t have noticed or felt without. For Daphne however, the visuals were "overwhelming", making it harder to express herself. Two participants mentioned that they tried to describe "how I would like it to be" (Ivy and Bryce). Finally, Daphne remarked that, compared to the traditional body map, in this case, "the body didn’t need a gender".

**Extending the body beyond the skin through meditation.** In this section, I describe the experiences that participants had through the meditation practice and the Extended Body Map that followed (Fig. 3C(1-2)). I have identified two categories of experiences: one where the participants fully immersed themselves in the practice, imagining everything that was said and "extending" their bodies beyond the skin; and one where participants had trouble immersing themselves in the activity, experiencing resistance from their habitual way of thinking.

The first type of experience was manifested by two participants (Dahlia and Daphne). Dahlia tried to imagine "what it is to be a plant" throughout the meditation activity. She recounted how "it has to be cold, that’s why they turn towards the sun. They must be delicate, afraid that they might break..."
when there is strong wind”. This participant still felt human, but with roots growing from their feet. As they came back to their “human mind”, they thought how much stronger than a plant they were, “having feet to ground myself”. They further recalled how they loved the feeling of “putting my hands in wet soil”, which connected to their extended body experience. Daphne voiced how she felt completely static during the meditation, imagining everything that was said: “the sun on my leaves, the roots in the soil”. She remarked how she never left her human body, but she still felt the leaves and the roots forming and growing. Incidentally, she contemplated how everything is connected in this world and syncing with the moon.

The second type of experience was manifested by the remaining three participants (Rose, Ivy, and Bryce). Rose explained that she had trouble imagining the descriptions in the narration, especially when asked to sense “growing roots”. However, she felt a “vertical flow”, added to being aware of the grass, dirt, and sun, and thinking about the sunlight and sensing the leaves. She admitted to this activity being more isolated than the previous one. Incidentally, she expressed that she “did not become a plant or feel like a plant”. In contrast, she did feel as if she “elongated to the sky”, while also being grounded. Thus, she sensed the sky and the grass but did not experience growing roots or leaves. She mentioned how during the meditation practice she was reflecting on nature being and existing in a cycle. Bryce admitted to having a hard time relating to what I was narrating during the meditation practice. He mentioned how he “wanted to get closer to that feeling but I couldn’t access it”. He thought of moving, because he felt like a “static shell”, so as to “to feel what you are, what something is and can mean”. Thus, he considered more extreme scenarios, e.g. “climb, jump from a tree” or “scream like animals”, expressing that “I came here as a human and I felt that I couldn’t expand”. Bryce explained that although plants are on the static spectrum of living beings, he felt he had to move because it “was a way to strive for a transition, to see a way of becoming a plant”.

5 DISCUSSION

Following Haraway’s statement of “[i]t matters what matters we use to think other matters with” [17], both activities have shown the impact of what and how we design, and that there is a clear difference between intention and impact.

Through designing Juniper, I have come to understand the decisions that influenced its value and its potential to affect its users. The interviews illustrated different types of relationships with plants and the reflections triggered by the probe. While the Instagram account came as an additional activity of visualizing the experience. Through the orienting activity, some participants were able to transpose themselves into a non-anthropocentric perspective, becoming one with nature. However, for others it was quite difficult to shift to that mindset in such a short period of time, the activities not turning out to be helpful for them in that aspect either. Both body maps were well received, and participants enjoyed drawing them outdoors, with the added visuals helping most participants in experiencing both their bodies and their bodies’ “extensions”.

Turning multispecies relationships into matters of care

Maria Puig de la Bellacasa expresses how “transforming things into matters of care is a way of relating to them, of inevitably becoming affected by them, and of modifying their potential to affect others” [8]. Through Juniper, I wanted the participants to ponder over the concept of care, and how that is or could be manifested in a human-plant-technology entanglement. In her book [9], Puig de la Bellacasa exemplifies three dimensions of care, one being that care is ontologically wired in the species, something that they need and depend on to survive. However, in the current state of things, there is an emotional distance with matters such as the impact of human technology on nature. The need to integrate it as a matter of care for every individual seems extensive and difficult. It is an indication of some humans being more “wired” than others to care for this topic, but also that there are temporalities in the concept of care. Whether it is the emotional distance or the societal influence on our views and values, some topics require specific methodologies to become a matter of concern, e.g. multispecies ethnography [32], codesign and speculative design [12].

Juniper, as a cultural probe, has been designed from a pragmatic way of viewing the concept of decentering the human. The crafting of the probe along with the underlying vision of multispecies cohabitation and collaboration were essential in building the value not solely of the plant but the artifact itself. Interestingly, the cultural probe had a limited effect on participants who expressed a strong relationship with plants. Juniper either became part of their “plant family” (Dahlia) or a reminder that “plants are already a matter of care” (Daphne) for them. For the other participants, it provoked a train of reflection on human-nature kinship and on the notion of care.

As the plant was named Juniper and attributed a female gender to it, some reflections were generated from this design decision as well. Bryce expressed that when trying to relate to something “you start from yourself. Through yourself, you try to understand the other thing”. While Ivy remarked that “there is a bigger sense of responsibility”. Further inquiries on how attributing human characteristics to non-humans nurtures the idea of care can be considered as an important next step.
Juniper could have become a bigger matter of care for the participants had it been more personalized, appealing to each one’s values, rather than focusing on the energy aspect of it. As Aspen recognized, the probe reflected the idea of "if you give me something then I will take care of you", with Ivy saying that the care that she put in "wasn’t for her, it was more for you", making it a matter of transfer of care, rather than a first degree care. It would have been interesting to have a more diverse group of participants, with different backgrounds and different ages, exploring their value systems and how that pertains to the concept of care in human/non-human entanglements.

The ambiguity of the probe made each participant create and reflect about something on their own, without me imposing a certain perspective. It generated remarks that wouldn’t have been identified with a more defined probe. The incorporation of a fictional narrative (see, for example, [10]) could have provided a clearer perspective making the probe more defined regarding the energy aspect. A complementary catalogue, similar to the IKEA Catalogue [7], could have been designed to portray technologies emerging from the current one, how they would be incorporated in the human routine, and their effect on human-nature kinship.

Approaching design with a decentered human perspective

Manifesting a non-anthropocentric view in design is a topic that has yet to be fully understood and practiced. Multi-species ethnography, co-design and speculative design are examples of methodologies that could be used to experience the world and design from a different perspective. In the context of climate crisis, Houston et al. consider that approaching design from a non-human perspective "renders us open to ethical, perhaps grace-full encounters with more-than-human assemblages" [22].

In this project I explored methods of how reshaping a human-centered methodology could be approached by extending ones human perspective to the surrounding environment through the orienting activity, thus bringing awareness to the fact that everything that is designed stretches out beyond the human realm, creating entanglements that are not taken into account. I believe that thinking with non-humans should become a requirement rather than an option, it "should always be a living-with, aware of troubling relations" [9]. The orienting activity was a trial to bring people into this scope, but one exercise turned out to be too little to make participants feel fully comfortable with this mindset. Multiple sets of activities, spanned throughout multiple weeks, could perhaps dissipate that feeling of foreignness or disappointment of not being able to fully immerse into a different worldview. As with the probe, a more diverse group of participants could have stemmed different reflections.

Prototypes help communicate possible futures, help show how the world could or should be, bring to light problems in our current mindsets and the possibilities that a shift in views would bring. They can help raise questions surrounding topics that are yet to be fully understood [14]. Both the cultural probe and the orienting activity are first steps in challenging human exceptionalism, as was illustrated by participants expressing views from Juniper’s perspective, and by vegetalizing the already "more than human body" [27] through the meditation practice. They are a materialization of speculative thinking, which helps to consider what has been done in the past and how it can be changed for the future. Through speculative thinking we can bring forward scenarios about the world and its values, "that things could be different", as well as fueling "hope and the desire for transformative action" [9].

6 CONCLUSION

This paper contributes to an initial inquiry into designing for and with care in a human-plant-technology kinship. By exploring non-anthropocentric methodologies, the Extended Body Maps together with the meditation practice, are introduced as a new approach to viewing the human as decentered in design. It is an attempt to redefine the human experience of the world and to raise awareness of the network of human/non-human entanglements. Further reworkings of human-centered methodologies to include non-human actors are necessary to shape a future of symbiotic cohabitation and collaboration. Viewing this matter as one of care, I have defined it as one perspective of addressing human exceptionalism. Combined with prototypes and speculative design, it facilitates approaching a challenging and complex topic as the one of more-than-human assemblages, and communicating the advantages of a collective agency as a mediator for a sustainable and thriving existence.

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