

Understanding the Role of the Human Designer in More-than-Human Design

by

Armaghan Behzad Behbahani

M.F.A., Virginia Polytechnic Institute and State University, 2019

M.Arch., Virginia Polytechnic Institute and State University, 2017

B.S., Azad University, 2010

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Declaration of Committee

Name: Armaghan Behzad Behbahani

Degree: Master of Arts

Title: Understanding the Role of the Human Designer in More-than-Human Design

Committee:

Chair: Alissa Antle
Professor, Interactive Arts and Technology

Ron Wakkary
Supervisor
Professor, Interactive Arts and Technology

Kate Hennessy
Committee Member
Associate Professor, Interactive Arts and Technology

Thecla Schiphorst
Examiner
Professor, Interactive Arts and Technology

Abstract

In recent years, HCI designers have become more aware of the limitations of designing from a human-centered perspective. More-than-human theories have emerged in HCI to highlight the pressing issues of today's ecological and technological challenges and help view design as more-than-human. HCI designers are left with the challenge of orienting themselves and needing to better understand their role in this context. In this exploratory thesis, I borrow Wakkary's notion of *the speaking subject* to situate the human designer within more-than-human design. I take a first-person approach, use two design cases, and employ techniques such as retrospective analysis and poetry to show the importance of the role and its embodied nuances from a queering angle. This research offers HCI designers new orientations, attitudes, experiences, and qualities for working within this new context. Ultimately, this work contributes to strengthening the position of HCI designers in more-than-human design.

Keywords: More-than-human design; Speaking subject; Queering; Queer phenomenology; Retrospective analysis; Poetry; First-person research; Research through design; HCI

Dedication

To all the humans and nonhumans who gave their lives in the face of injustice

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List of Acronyms

EDS	Everyday Design Studio
HCD	Human Centered Design
HCI	Human Computer Interaction
OCAD	Ontario College of Art & Design University
RtD	Research through Design
SFU	Simon Fraser University

Chapter 1. Introduction

This thesis holds the journey of the first-person researcher attempting to humbly understand, make sense, embody, and explain the concepts and ideas around the role of the human designer newly surfaced within more-than-human design. As a new trajectory in HCI, more-than-human design inspires designers to design for impact beyond human values and take into account matters of cohabitation (Giaccardi & Redström, 2020; Wakkary, 2021). My journey unfolds over three consecutive years and around two design cases after recognizing the urgency for new ways to design within a world that is on the verge of crisis and desperate for change.

In this opening chapter, I present an overview of my research motivation, explain the research problem and why it matters, the approach I take to conduct the research, my target audience, ways in which I see the research benefitting design-oriented HCI, and an outline of the following chapters.

1.1. My Motivation for this Research

Before joining the Everyday Design Studio (EDS), I considered myself an HCI design researcher established in interaction and human-centered design. Through years of human-centered training and practice, I found comfort in the methods and ways in which I practice design research, attend to design problems, and occupy collaborative workspaces with fellow team members and colleagues. During my previous graduate studies, I had grown fond of human-centered ways of thinking about the world but mindful of the critical and speculative perspectives that research, such as those from EDS, explored. Later, as a member of EDS, I was immediately immersed in the critical positionalities towards viewing our relationships with technologies and the world. During this time, I came to realize that the existing methods and perspectives I had used before do not hold up when engaging with complex topics and explaining the diverse human-technology relationships. This became more significant at the time of this study, as there was a global pandemic and rapid design and technological shifts addressing the crisis. Heat waves, wildfires, and floods were also increasing at the time where I lived, which I had not experienced directly before. I started looking for ways to better understand such larger issues in relation to the existing design perspectives and came to learn the

limitations of seeing humans above all other beings and the impediment of human-centered design. Inspired by fellow colleagues and through in-depth conversations with them, I turned to philosophical questions and theories as a way to rethink my assumptions about designing within a world in crisis and my role as a design researcher. This marked the transformational journey I endeavored through this thesis.

1.2. The Research Problem and Why it Matters

Aligned with my motivation, in recent years, it has become apparent that the unanticipated consequences of designing human-centered technologies have contributed to crises such as matters of sustainability, ethics, and climate change. This has alerted HCI researchers and designers to see the limitations of human-centeredness in design, provoking concerns around human-technology relationships and arguing for seeking other forms of relations that shape and broaden the ontological and epistemological inquiries towards the needs of today's social, ecological, environmental, and political challenges. So, what does this mean for an established HCI designer, and how might they begin to design differently from a position that is not human-centered? The following section discusses recent shifts in human-technology relations in HCI, which informs my trajectory in this thesis.

As an early response to the rising concerns, technological mediation and postphenomenology positioned design and computing within a broader range of relations (Verbeek, 2015). The various reciprocal human and technology relations laid the ground for designers to better understand the inseparable notion of humans, technologies, and the world that impacts the dynamics of design, politics, and ethics (Verbeek, 2005, 2006). Following this path, a more recent strand that has informed HCI borrows from posthumanism and more-than-human philosophy. More-than-human theories go a step further in revealing the world as a relational entanglement of all humans and nonhumans, where sites of entanglement are ubiquitous. More-than-human perspectives stretch the idea of inclusivity, previously tailored to human-centered design

(HCD), towards nonhumans that HCD's narrow perspectives have overlooked ¹. Christopher Frauenberger's Entanglement HCI also draws from posthuman and more-than-human philosophical theories to discuss how HCI can shift in a more inclusive direction (Frauenberger, 2019). Frauenberger introduces HCI's new wave, turning away from human-centered design to exploring the lesser-known relations between humans and nonhumans. This turn has inspired HCI design researchers in the last few years to acknowledge, rethink, and develop new understandings of human and nonhuman entanglements in design to take a more critical stance towards common ways of understanding and forming our relations with technologies, politics, animals, the environment, and other nonhuman bodies and temporalities.

Within the entanglements of humans and nonhumans reside multiple agencies that are central to accounting for nonhumans in a more-than-human world. Original to Indigenous perspectives and critical to new materialist views, is that our anthropocentric understanding of living things is faulty; all nonhumans are vibrant matters and are ready to be acknowledged and heard through their unique agentic capacities (Bennett, 2010, 2012; Coole, 2005; Todd, 2016). Such perspectives invite humans to view our relations with nonhumans as connected and interdependent, critiquing existing ways of viewing the world as hierarchical or human-centered. This suggests an expansion of *what is* and provides a bridge to *what needs to be* in order to cohabit with all other nonhuman beings (Abram, 2012; Braidotti, 2013; Haraway, 2016; Light et al., 2017; Wakkary, 2021). So, how might HCI designers design for such a world?

While several HCI design researchers have explored and experimented with methods and ideas such as thing-centered perspectives (Bachler, 2020; Chang et al., 2017; Cila et al., 2015; Giaccardi et al., 2016; Oogjes & Wakkary, 2017; Reddy et al., 2021; Wakkary et al., 2017), multi-species interaction (Dew & Rosner, 2018; French et al., 2020; Hamidi et al., 2021; Hauser et al., 2014; Lawson et al., 2015; Mancini et al., 2014; Mancini & Lehtonen, 2018; Ofer et al., 2021; N. Smith et al., 2017), and object-oriented ontologies (Coulton & Lindley, 2019; J. Lindley et al., 2017, 2020) to design for a more inclusive world by engaging with more-than-human theories in design, they fall short in

¹ Nonhumans include animals, plants, technologies, micro-organisms, dust and dirt, objects, artifacts, things, natural phenomenon, etc. (Coskun et al., 2022)

positioning the human designer alongside or in direct dialogue with the nonhumans of design. Many of the works explore decentering the human as the user, or participant, and focus only on the nonhumans, which is also limiting given how more-than-human theories advocate for new human and nonhuman relationships, orientations, collaborations, shared agencies, mutual benefits, and a strengthening the matters of cohabitation. The existing body of work are all valuable responses to the flatter ontology that more-than human theories depict, however, designing within emerging relations and the shared agencies of the human designer and the nonhumans of design have been less explored. Only a handful of research dive into the role of the designer on an equal spectrum with the nonhumans of design (Devendorf & Ryokai, 2015; S.-Y. Liu, 2020; Oogjes & Wakkary, 2022), leaving room for more research to take on this nuanced area.

Following this thread, in a recent published book, Ron Wakkary takes a step back and tackles this issue more explicitly. He offers *designing-with*, a new theoretical approach for reworking design, that brings more-than-human theories to HCI for repositioning the human designer (Wakkary, 2021). Designing-with considers the designer as both human and nonhuman, providing a grounding for design as explicitly relational and based on the shared agencies of the nonhumans that co-evolve with the human designer within the design process. As such and compared to other more-than-human approaches mentioned earlier, Wakkary helps reframe the earlier question concerning ways design researchers can design *for* such a world towards exploring ways to design *with* it. In that sense, he offers HCI designers a more balanced position between being human and working with the nonhumans of design. Within this transformative space, Wakkary suggests new more-than-human design commitments, proposing new language for recognizing, understanding, and involving nonhumans in the process of designing alongside the human designer. He argues that in a more-than human world, the human designer must transform to becoming a “co-habitant that designs” (Wakkary, 2021, p. 248). This perspective strengthens the need to view and position the human designer differently in more-than-human design as interdependent to the nonhumans which they design with. To that end, he proposes the concept of *speaking subject*, a central idea to help the human designer navigate the more-than-human trajectories, agencies, and narratives. The speaking subject refers to the human designer who is responsible to notice the non-speaking nonhumans and speak on behalf of them. Reframing the role of the human designer, critiques the “imbalance between the speaking subject and the

mute object” (Wakkary, 2021, p. 25), and positions it as “a humble role” against the agencies of nonhumans and matter (Wakkary, 2021, p. 185). Additionally, the embodiment of the speaking subject enables a “subtle transmogrification of the designer from an outsider to an insider” (Wakkary, 2021, p. 248), allowing a deeper understanding of what the role entails. In a way, speaking subject provides a strong basis for the human designer to position themselves in the profoundly philosophical context of more-than-human design while establishing new orientations, qualities, relations, and responsibilities required in working within those grounds.

This depiction requires revisiting the earlier questions and focusing the inquiry more squarely on ways HCI designers can benefit from understanding and adapting to the role of the speaking subject. Therefore, I frame this thesis as exploratory research and an opportunity to build on the existing work, while challenging prior assumptions, and established perspectives. I particularly aim to explore: **how can HCI designers better understand their role as the speaking subject in the context of more-than-human design?** My goal is to reveal the importance of the role of the speaking subject in design-oriented HCI and propose actionable strategies for this role that HCI designers can use. In taking on this challenge and to help guide my research trajectory, I turn to queering.

1.3. Queering in this Research

1.3.1. Queering as Positionality

It is important to explain the more personal motivations behind this choice. Underlying my choice of queering are my own personal and professional lived experiences. As an ongoing migrant, I was brought up, have lived, and worked in transcultural contexts, with social and ethical norms contradicting one another, with values, cultures, and politics always head-butting and never seeming to get along. My origin—assigned at birth—belongs to a geographical place profoundly concerned with the societal issues of basic human needs and rights—what are considered primarily global south concerns. On the flip side, I have become familiar with a completely different culture over many years, with different ways of learning, thinking, embodying, and performing, that is more attuned to the technological and ecological concerns—what are considered primarily global north concerns. My experiences with the two have

shaped how I occupy space, my ways of being in the world, and overall, my identity, personally and as a professional. Although, I have not been fully successful at moving past this binary— finding it hard to commit to one set of values, perspectives, or disciplinary norms over the other in my creative practice and research trajectory. Still, as a growing HCI design researcher, I continually navigate different contexts and the particular concerns and expectations that go with them. Embodying and holding at times contradictory perspectives and philosophies, ways of learning, ways of communicating, ways of thinking and designing, and caring and forming relationships are sewn within how I am required to constantly shift, take new positions, and consider new orientations. This speaks strongly to transcultural experiences, where one's place and commitment to norms of appropriate behaviors are constantly shifting based on context. Moreover, given the many dichotomies and frictions I bring to my design research practice— which I have found both rewarding and limiting at times— Sara Ahmed's queer phenomenology and in particular *migrant orientation*, speaks greatly to how I have encountered my personal and professional life. Similar to migrant orientation, where one is directed towards two or multiple directions simultaneously (Ahmed, 2006), my orientations at instances in time and place have not been singular. It is through such strong resonance and connection with Ahmed's work, that my positionality can be considered as queer(ing) in this research.

Since I have never been able to sit still and take comfort in one view, queering gives me— the first-person design researcher of this thesis— the motivation, language, and permission, as I navigate the more-than-human design landscape to explain how breaking from what is disciplinary established as acceptable or normal, is welcoming to the many orientations designers like myself learn to take and carry. Therefore, within this research, queering equips me to strengthen my position and interpretations without feeling invalidated in not wanting to take one side or not having to abandon or prioritize human concerns over nonhuman ones and vice versa. This is important to disclose as it strengthens the credibility of my position and research.

1.3.2. Queering as a Lens

Returning to the more rigorous reasoning for my choice of queering, it is important to know first what the designer entails in more-than-human design. As Wakkary explains, the designer is not explicitly human and includes both the human

designer or the speaking subject and all the nonhumans of design, including the materials, tools, equipment, and milieus. As such, the human designer requires a shift in perspective from the common ways of viewing the world and design to a completely new and perhaps disorienting way of understanding the world and the design space. Such change enables the speaking subject to then notice, account for, and attend to the nonhumans of design in a collaborative space for making and becoming. Therefore, queering and, in particular, queer phenomenology's notion of orientation offers the human designer the opportunity to understand, embody, and practice ways to bring forth new positionalities, experiences, and directions in relation to the overlooked nonhuman agencies and assemblies. In short, queer phenomenology— explained in detail in chapters 2 and 3— is how our particular bodily and perceptual orientation towards objects shifts by turning towards different directions outside of our original view. As such, the notion of orientation becomes central to how we can understand queering and our view of the world differently. In a way, orientation is considered a starting point for apprehending a shared inhabitation of humans and nonhumans in a more-than-human world that involves “directions toward objects that affect what we do, and how we inhabit space” (Ahmed, 2006, p. 1). In other words, taking a new orientation entails redirecting one's attention and action toward different human and nonhuman bodies and agencies. To that end, in this research, I explore new orientations for the speaking subject through the lens of queer phenomenology— which I refer to throughout this thesis as queering. Additionally, concepts within queer phenomenology, such as oblique becoming, slipping away, distancing, and resistance, help view and explain the role of the human designer in relation to the more-than-human world more acutely. As I will explain in chapter 3 and later in detail in chapter 5, I use poetry as a form of queering through which I show a new orientation for the human designer towards the nonhumans that the speaking subject comes into contact with. I will also detail how my personal interest and practice of poetry guides my *attention and action*— as an academic design researcher— toward viewing theory as the nonhuman designers in more-than-human design.

Lastly, queering makes it possible to explain and see other positionalities and orientations for the human and the different assemblages they form with nonhumans in design practice.

1.4. Establishing the Research Questions

Returning to the main research question mentioned earlier: **how can HCI designers better understand their role as the speaking subject in the context of more-than-human design?** I take into account the benefits of employing queering and the notion of orientation in my research to guide my explorations. To that end, I ask the following sub-questions:

- What can HCI designers understand about the speaking subject when exploring the role through a queering lens?
- How can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?

Through analysis, writing, and illustration, I give a first-person account of the ways in which HCI designers can better understand the importance of moving toward and making sense of the underlying theories and entanglements around the speaking subject. I utilize two design cases— in which I was actively part of the design research team— as a basis to articulate, explain, and expand the role of the human designer in more-than-human design. I also employ propositions to inform my trajectory as I move along in the undefined territories and progress in this thesis. First, I will reveal the important role of the speaking subject by means of exploration and later suggest a new orientation for the human designer towards embodying the role and generatively extend the understanding of this new position. This is achieved through poetry— a new orientation and a strategy other than design for learning how to leave behind established perspectives to head toward a new direction. As mentioned earlier and will explain in greater detail in chapter 3, my own practice of writing poems informs my choice of poetry as a form of embodiment for the speaking subject to expand on the role and better understand what the role entails from an internal position. In writing the poem, my view and position of theory shifts towards accounting for them as the nonhuman designer— explained in detail in chapters 3 and 5— that, together with the speaking subject,

collaboratively write a poem. Independent of poetry, seeing theory as the nonhuman designer suggests a queer phenomenology where it helps guide and strengthen the design direction.

1.5. The Audience for this Research

While I hope this body of work can inspire a range of disciplines and curious professionals, my primary audience are HCI designers and researchers who are interested in transitioning from one way of looking at or experiencing the world or their practice to rethinking the possibilities of design in a world that is made up of networks, collective gathering of all scales, elements, bodies, and beings all in dialogue with one another. A world in which humans and nonhumans cannot persist by holding on to their past orientations and are in need of new reconfigurations and relationships that the new more-than-human design scape and the role of the speaking subject bring to bear. It is also directed toward those who find comfort in learning possible ways to look past the status quo through embodying a queer identity. No doubt, shifting long-established perspectives or orientations is challenging and requires work, certain degrees of flexibility, and new methods and strategies. Therefore, HCI researchers looking to take on the challenge of disorientation, position themselves differently towards nonhumans, and notice and involve them more actively in their practice, can also benefit from this research.

As explained at the start of this chapter, more-than-human design is a new trajectory, and the speaking subject is a new role within HCI that together stress a shift for the human designer towards attending to the agencies of the nonspeaking nonhumans to collectively respond to the urgent concerns of our technological and ecological problems. As such, the younger generation of designers who are less biased or fixed towards past HCI approaches and are willing to engage with more-than-human and designing-with concepts early on can utilize the new articulations for the human designer presented in this thesis. Lastly, this thesis might resonate with those interested in reading about how complex philosophical thought unfolds through sense-making analysis and poetic exercises that later give way to generative opportunities for engaging theory in design practice.

1.6. Thesis Outline

To carry out my goals and research trajectory, I structure my thesis in the following chapters:

In **chapter 2**, I will give an overview of what posthuman, and more than human theories entail and explain the philosophical concepts and theories that motivate more-than-human design in HCI and designing-with. I then provide an overview of designing-with and detail the concept of speaking subject. I will then review queering as a phenomenological lens and look into how HCI has adopted queering in research and design. Lastly, I will explain the productive alignment of more-than-human design and queering as they inform my research questions and trajectory.

Chapter 3 is dedicated to explaining my methodological commitments and approaches, the objectives and research questions, and methods and tools I use in this research. I also explain my role as a first-person design researcher and how my first-person perspective informs the knowledge production throughout this thesis. Within this chapter I further unpack the origins of the two design case studies —Machine Intentionality and Morse Things— that I will use as a basis to navigate my research. I will also share the methods used in each design case and the ways I back my research validity.

In **chapter 4**, I unpack the first design case called the Machine Intentionality. I use a queering lens to explain and analyze the work retrospectively and present my findings. I describe how the study can be positioned within more-than-human design and how the role of the speaking subject evolves in relation to nonhumans. I then provide findings and reflections that help inform the next design case.

In **chapter 5**, I explain how the findings from the previous design case, inform the case of the Morse Things. I use this case as a setup to demonstrate how the role of the speaking subject can be embodied through bringing together multiple theories in the form of a poem. I later discuss how this exercise generates new understanding about the role of the speaking subject and provide reflections and findings from this exploration.

In the **final chapter** I summarize the work, return to the research questions, and provide answers found through conducting this thesis and give closing remarks on the impact of the speaking subject in design HCI. I offer lessons I learned as the first-person

researcher, suggest future directions, and conclude the thesis by proposing new course of action for HCI designers.

Chapter 2. Related Work

In this chapter, I summarize the philosophical posthuman and more-than-human theories that challenge our understanding of the world. I review the existing how design researchers have adopted and utilized these theories within HCI to learn the critical and epistemic stance within design and inform my positionality and commitments within this thesis. I then focus on the particular role of the speaking subject in designing-with—as a more-than-human design framework— and later present theories of queer phenomenology and queering approaches in HCI. From there, I will explain the alignments between designing with and queering to better articulate my position, analytical reasoning, and research direction moving forward.

2.1. Posthuman and More-than-Human

2.1.1. Posthuman and More-than-Human Perspectives

Posthumanism is a branch of theory and philosophy that destabilizes and challenges the enlightenment and modern understanding of the human that has been established as white, straight, enabled, euro-centric man. It takes a critical stance towards positioning the human above all other beings.

In posthuman philosophy, feminist technoscience scholars such as Donna Haraway describe humans as hybrids or cyborgs, encouraging them to let go of the binaries, insisting on fluidity, ongoing-ness, and arguing for a world where all human and nonhuman species are to make trouble, stay with it, and develop kinship between one another in their ongoing coexistence (Haraway, 1991, 2016). Rosi Braidotti also explains posthumanism as a chance to “identify opportunities for resistance and empowerment on the planetary scale” (Braidotti, 2013, p. 195). She invites us to critically think about alternative ways of knowing who and what we are capable of in the process of becoming and re-inventing our relations with the world at large. Both Haraway and Braidotti unpack posthuman philosophy as not only a way of thinking about the human but also its actions and positionality within the world. From another angle, Graham Harman explicitly suggests flat ontology as a way for entering a decentered and more inclusive space for acknowledging and giving equal attention to nonhumans (Harman, 2018). Similarly, Lars Spuybroek draws on gothic architecture to explain gothic ontology as a type of flat

ontology that understands existence as an interaction between things allowing them to constantly become or change (Spuybroek, 2016). Thus, attention to material agencies is central to accounting for nonhumans. Supporting this idea, concepts of agentic capacities (Coole, 2005), thing agencies (Bennett, 2010), and the Indigenous ways of knowing and kinship with the land (L. T. Smith et al., 2018; Todd, 2016) suggest that everything around us is animate and has a unique agency of its own, wherein our anthropocentric views fall short in understanding things as living, vital, and agentic. Jane Bennett's study with hoarders further reveals new understandings of how humans relate, speak, and listen to gathered items and nonhumans as part of their everyday life (Bennett, 2012). As such, posthuman philosophy promotes for ideas of nonhuman agencies, human-nonhuman entanglements, non-hierarchical relations, and decentering.

While many philosophers use the term posthuman to engage with nonhumans and decenter the humanistic understanding of man, David Abram introduces the term *more-than-human* world, a world in which humans and nonhumans co-exist and dwell (Abram, 2012). His choice of this phrase comes from his frustration with distinguishing the human world of awareness, consciousness, and culture from the rest of nature, as if they are separate. He explains that there is a human world nested within and permeated by the wider more-than-human world, in which it always exceeds the human. Abram is convinced that we are human only in contact and conviviality with what is not human. Immersion into this mode of perception can bring us closer to participating in the greater-than-human conversations constantly happening around us. He turns to Merleau-Ponty to explain how our perception and looking outwards can bring the more-than-human world into nourishing reciprocity with strategies of human meaning-making. Abram's ideas of more-than-human speak harmoniously with rethinking agency and what counts as living. I subscribe to Abram's definition of our shared world with nonhumans and use this term to refer to the philosophical and theoretical perspectives that are not human-centered. My position also acknowledges Indigenous epistemologies (Todd, 2015, 2016) that hold relational understandings of the world (Lewis et al., 2018; Tuhiwai, 1999), and decentralize the human through decolonizing methodologies (Barcham, 2022).

2.1.2. More-than-Human Design

In recent years, more-than-human perspectives have inspired HCI designers to broaden the ontological and epistemological inquiries that are more attuned to the

current needs of today's social, ecological, environmental, and political challenges. As such, Frauenberger's Entanglement HCI, has borrowed from posthuman philosophical theories to discuss how HCI can shift in a more inclusive direction (Frauenberger, 2019). Frauenberger introduces HCI's forth wave, turning away from human-centered design to exploring the lesser-known relations between humans and nonhumans which provokes designers and researchers to think beyond methods, approaches, conversations, and techniques, that are tailored towards human needs and values.

This turn has also inspired design researchers to acknowledge, rethink, and develop new understandings of human and nonhuman entanglements through design and take a more critical stance towards common ways of understanding our relations with technologies, politics, animals, the environment, and other nonhuman bodies and temporalities. For example, design researchers such as (Forlano, 2016, 2017) and (Giaccardi & Redström, 2020) discuss more-than human perspectives in relation to design. Building on these work, other HCI researchers argue for decentering the human, by taking nonanthropocentric perspective in design (DiSalvo & Lukens, 2011; Wakkary et al., 2022), thing-centered perspectives (Cila et al., 2015; Oogjes & Wakkary, 2017; Wakkary et al., 2017, 2018) thing ethnography (Giaccardi et al., 2020), interviewing things (Chang et al., 2017; Reddy et al., 2021) as ways for understanding design in relation to nonhuman things is a more-than-human world. Several HCI design works have contributed to noticing nonhumans by developing new approaches by adopting the art of noticing (Tsing, 2015) and exploring different ways that humans can make nonhumans more present in design research. Designing for collaborative survival through noticing and engaging with mushrooms (S.-Y. Liu et al., 2018), watching birds (Biggs et al., 2021), noticing the fragilities within the design process (Oogjes et al., 2020), and developing systems for attending to nature (Gaver et al., 2019) are examples that HCI researchers have explored. Yoko Akama breaks away from looking into what is present and moves towards noticing hidden things and getting lost between the masses, in which she introduces Ma, a state of in-betweenness that attends to emptiness such as silence, atmosphere, reading between the lines, or elements (Akama, 2015). Ma embraces the in-betweenness of things, events, and instances to notice beyond what is human and in turn things noticed inform the human. Other design researchers attend to the agentic capacities of nonhumans, such as attending to wood particle orientations in construction (Dew & Rosner, 2018) and exploring alternative ways for rethinking

fabrication tools as non-passive agents in designing in tandem with humans (Devendorf et al., 2016). These works lay the groundwork for understanding nonhumans in the more-than-human world as active members in an assembly with other humans and nonhumans. As such, the works reveal a shift in human designers' commitments as they enter a shared collaborative space of making. Thus, understanding a more-than-human world in relation to design is reciprocal and one of shaping and reshaping each other. On the one hand, design allows us to understand how a more-than-human world is situated within broader concerns and entanglements with nonhumans, and on the other hand, a more-than-human world offers context for pause, critical reflection, inclusive expansion, care action, and diverse partnership. To that end, other ways of understanding a more-than-human world can emerge and critique our technological assumptions through taking a more-than-human design approach.

2.1.3. Designing-with and the Speaking Subject

While theoretical approaches such as ontological design (Willis, 2006), pluriversal design (Escobar, 2018), defuturing (Fry, 1999) and ideas like fluid assemblages (Redström & Wiltse, 2018) offer insight into more-than-human design, Wakkary takes up this space as an opportunity to unbuild design and address the challenges of the human designer more squarely within a posthumanist understanding. To that end, Wakkary proposes *designing-with*, a theoretical approach to designing that draws on relational ontologies and shared agencies between humans and nonhumans (Wakkary, 2021). It suggests attending to nonhumans in the design and the making of things that are more attuned to values and concerns that include nonhumans. Designing-with also accounts for nonhuman participation grounded in humility and seeking more-than-human cohabitation. Wakkary outlines this term as a posthuman design in which design is reconsidered as a practice that sees “humans and nonhumans bound together materially, ethically and existentially” (Wakkary, 2021, p. 5). To that end, he draws from more-than-human theories to rethink design as a more-than-human practice, suggesting a more inclusive way of including nonhumans as partners before, within, and after the design process. As such, he proposes new concepts and vocabulary for designers to rethink their role and responsibilities in designing with nonhumans in a more-than-human world. Designing-with can also be a humble yet provocative call for designers in ways of critiquing the well-established human-centered

design approaches and inviting researchers to be open to experiencing the world more horizontally. It affords designers to better understand how we are deeply entangled with nonhumans, and while design is commonly understood as a problem-solving discipline, designing-with asks designers to complicate their relations with the things designed. Within the framework, Wakkary offers a central concept: humans as the *speaking subject*.

Here, the designer is considered as an assembly of humans and nonhumans that collectively design. Materials, tools, and technological configurations all have agentic capacities and are non-passive agents. The human designer in this assembly is the speaking subject, referring to the unique capability of the human designer to speak amongst and on-behalf of the non-speaking nonhuman designers. This role of representing nonhumans is the means to account for their presence but also to assure their participation, while articulating to make a thing and speaking to what the aims of that thing are. The position of speaking subject contributes to the epistemic perspectives and actions within more-than-human design.

While works within textile design have touched on the concept of the speaking subject (Oogjes & Wakkary, 2022) yet, the role requires deeper exploration and articulation. As such, within this thesis, I situate my research within designing-with and more broadly more-than-human design and look into the concept of speaking subject to further elaborate on its qualities, dynamics, and challenges.

2.2. Queering

2.2.1. Queer and Queer Phenomenology

The term queer is commonly used in gender studies and is referred to as “a sexual or gender identity that does not correspond to established ideas of sexuality and gender, especially heterosexual norms” (“Queer,” n.d.). More specifically, in queer theory gender is considered as performative (Butler et al., 2013). That is, “how we understand gender, and how we position ourselves as gendered or sexual beings in relation to others is achieved through the repetition and enactment of these activities” (Meyerhoff, 2014). To better understand the broader implications of the term, I will first look into the critical ideas of queer(ing) and know its fundamental conceptions.

In broader terms, queer is explained as “whatever is at odds with the normal, the legitimate, the dominant. There is nothing in particular to which it necessarily refers. It is an identity without an essence” (Halperin, 1997). Queer theory embraces transgression in the form of visible difference from norms. The performative idea presented by Judith Butler (Butler et al., 2013) can also be used to problematize the social categories of what is norm, whether it be gender, sexual identity or other heteronormativities, where it must be enacted through a series of repeated acts emerging from individuals’ lived experiences. As such, queering is “something we do, rather than something we are (or are not)” (Barker, 2016) which “dismantles the dynamics of power and privilege persisting among diverse subjectivities” (Young, 2012). According to Ann Light, to queer something is “to treat it obliquely, to cross it, to go in an adverse or opposite direction. It has movement and flex in it. Queering is problematizing apparently structural and foundational relationships with critical intent, and it may involve mischief and clowning as much as serious critique” (Light, 2011, p. 432).

From a philosophical and epistemological standpoint, queering is explained as a reworking of phenomenology that emphasises on “what is queer within phenomenology and use that queerness to make some rather different points” (Ahmed, 2006, p. 4). These rather strange or out of norm points, “depend on the relegation of other “things” to the background” (Ahmed, 2006, p. 27) that guides phenomenology to face a certain direction. Moreover, queering *phenomenology* involves “an orientation toward queer, as a way of inhabiting the world by giving support to those whose lives and loves make them appear oblique, strange, and out of place” (Ahmed, 2006, p. 179). Ahmed calls this *queer phenomenology*, and further elaborates it through unpacking Husserl’s example of the table where she explains how phenomenology and the experiencing of a table in front of the philosopher limits his view to only experience a particular direction. The experience of the table is an act of a limited orientation that takes away the focus from all the other possible orientations the viewer can have to experience of the surrounding environment, elements, and the people. For Ahmed, being orientated is feeling at home, knowing where one stands, or having certain objects within reach (Ahmed, 2006). Therefore, in support of re or disorienting and expanding what is already known, queering entails an embodiment of the otherwise strange or the lesser-known perspectives, spaces, and ways of being. Therefore, queer phenomenology might also be “one that faces the back, which looks “behind” phenomenology” (Ahmed, 2006, p.

29). Through queer phenomenology, we may see how our actions shape how we relate to the things we work with and how our bodies change. We become aware of other things that may have been overlooked, hidden, or suppressed from view during the process. Taking a queer orientation does not mean other orientations should be replaced or dismissed. Rather, our reorientating articulates our many paths that can connect us to other things. Taking a queer orientation can raise ethical concern: “when we experience disorientation, before quickly pushing the strange object out of sight so we can orientate ourselves again, we must know that there is an opportunity for learning—of self, others and worlds—that we could not see before” (Kojima, 2008).

2.2.2. Queering in HCI

Queer Theory is useful to many different research fields outside of gender and identity studies, including HCI. Queering in HCI is typically used as a method to challenge heteronormativity and question assumptions around normalization strategies in technology, most prominently gender binarism (Rode, 2011) in data, meta-data, and algorithms. As such, Queer HCI has become an established part of the larger field, supporting queer populations and researchers by employing queer theories and methods (DeVito et al., 2020). As such, scholars have engaged with questions of queer self-representation and identity on social media and dating apps (Birnholtz et al., 2014; DeVito et al., 2018), trans people’s safety in relation to gender recognition technologies (Scheuerman et al., 2018), and queer technology design tools to build new hybrid identities (Baeza Argüello et al., 2021). While much work is underway in supporting and engaging with the queer community within HCI, researchers have more recently shown interest in employing queering as a method in rethinking human-technology relations in designing technologies. For example, design researchers have questioned assumptions around usefulness in HCI and argued for queer use through collaborating with robots to knit with humans (Treusch et al., 2020). Other scholars have turned to queering to critique urban networks and build ambiguous and alternative communication devices within public spaces (Gatehouse, 2016).

It is worth noting that within design-oriented HCI, queering differs from most critical practices, in that it does not aim to “out the values of the designer or the socio-technical system” (Light, 2011, p. 433) but requires moving beyond the split identity of critical technical practices. That is, queering dismisses the dualism within design of having “one

foot planted in the craft work of design and the other foot planted in the reflexive work of critique” (Agre, 1997), arguing for “practical naughtiness based both on craft and reflection” (Light, 2011, p. 433). Light also takes issue with the traditional approach to HCI in co-opting design to particular ends and argues that the field is capable of playing a significant shaping role in society and intervening in the process of establishing identities. Light motivates HCI designers and researchers to support designs that are “spaceful, oblique, and occasionally mischievous” (Light, 2011, p. 431) and insists that taking a queering stance allows a fluid response to change in the technological and methodological commitments within HCI. Queering resists over-definition opens space for exploring pluralist experiences that are uncentred, eccentric, critical, reflexive and self-analytic. It refuses to be wholly design or evaluation, technology or application, critique or experience, rather somewhere in-between (Bassoli et al., 2007). Queering further encourages engaging with a value system that are divergent with no final or fixed arrival point. In addition, HCI calls for engaging with queer strategies to disturb, trouble, and design against the status quo (Harmon et al., 2016; Khovanskaya et al., 2018; Spiel et al., 2019).

Therefore, following Ahmed’s disorientation, queering in HCI is predicated on surfacing new values, positionalities, contextual factors, and mischievous ways for making and reflecting on social, technological, and ethical considerations in design research.

2.3. Alignments between Queering and More-than-Human Design

In this section, I build on my description from the previous chapter for how queering is valuable to this research. By reviewing the theories and concepts that designing-with, and more broadly more-than-human design, and queering offer in HCI, we can better articulate how the two align in order to help broaden our understanding of the challenges, nuances, and possibilities surrounding the speaking subject. Following the threads of Wakkary’s unbuilding design, queering suggests the resistance to over-definition and exploring of pluralist experiences. Other nuanced alignments bring the two together in a more productive way. For example, the fundamental aspect of more-than-human design and queering acknowledges the multiplicity of agencies. As explained earlier, queer phenomenology enables us to see how our positionalities shape our relation to other (nonhuman) agencies and, in turn, informs our actions and directions

toward the things we design. The diversity of human and nonhuman agencies suggests new ways of collaboration, participation, co-constitution, and alteration that stem from perspectives of queer. As such, queering lens enables the designer to notice the nonhuman agencies, adjust to new orientations accordingly, and direct what needs to be designed. Moreover, Ahmed's ways of disorientation, in combination with Wakkary's definition of the human designer as not explicitly human, can better articulate and broaden the concepts of the speaking subject, leveraging the diverse intersections of human and nonhuman bodies.

Orienting, disorienting, and reorienting are practices that can inform the speaking subject of when, how, and what needs to be noticed and brought into the conversation or on the stage with the designer to design with. After all, by means of queering within a more-than-human context, we can notice and give way to (other) values and lifestyles to emerge and flourish. Additionally, it can be assumed that given the explanations, the speaking subject exists within a queer orientation of humans and nonhumans.

Lastly, queering and more-than-human design, taken together, productively disrupt expectations of common ways of collaboration, sense-making, and becoming. Queering takes pleasure in interrupting design norms that celebrate human values and position them above all other beings. As such, I will move forward with queering as a lens throughout my explorations. I will further build on this rationale in the following chapter.

Chapter 3. Methodology

This chapter explains the methodological choices I make as the design researcher to conduct this study. The following sections detail the research objectives and research questions, the methodological commitments and research methods, as well as a brief overview of the two design cases that I will use as a foundation to work through my research questions.

3.1. Research Objectives and Research Questions

As explained in chapter 1, there is a need for the contemporary HCI designer to adopt new perspectives that can benefit designing for the current issues and challenges. Shifting and taking new perspectives and positions can be challenging in and of itself—especially given the somewhat unorthodox view of understanding the world as more than human—let alone operating from and within a particular position. For HCI designers to understand their position within a more-than-human world, they require shifting orientations that can help embody their new role. Speaking subject—the human designer’s role in designing-with and more-than-human design—offers a basis for this transition. It encourages the human designer to view design as more-than-human while designing technologies that support values beyond that of the human. It further requires the designer to take new orientations to transform viewing design from exclusively human to becoming with nonhumans through design. Additionally, the concept of speaking subject attends to the nonhuman agencies to think differently about the human designer’s responsibilities, relationships, and actions more attuned to today’s challenges. Because the concept is fairly new, it requires unpacking, parsing, and further exploring its terrain. Therefore, my objective is to show the importance of new orientations that the human designer takes towards the humans and nonhumans of design and embody the role of the speaking subject when working within more-than-human design. I use both analysis and generative exploration to work towards this goal. The importance of understanding and embodying this role stems from the shift in viewing the human designer on the same ontological plane as the nonhuman agencies, as Wakkary explains in designing-with. This is a challenging position for the established HCI designer from which they must *detangle* from human-centered perspectives and

later *entangle* with and embody the role based on new understandings that can generatively expand its qualities and characteristics.

In this exploratory thesis, my main question is: How can HCI designers better understand their role as the speaking subject in the context of more-than-human design?

To explore this question, I ask the following sub questions:

- What can HCI designers understand about the speaking subject when exploring the role through a queering lens?
- How can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?

As mentioned earlier, I use a queering lens and attend to these questions using two design cases. I use a propositional approach to help articulate and inform my process. I explore the first sub question through using retrospective analysis and mapping the concept of speaking subject to an existing empirical design research work. In so doing, I show how design is more-than-human and unpack the potential orientations needed for positioning the human designer as the speaking subject in this design context. I use the case of Machine Intentionality and explore the following research question and proposition:

Research question: What can HCI designers understand about the speaking subject when exploring the role through a queering lens?

Proposition: HCI designers can understand the importance of new orientations for the speaking subject through a queering lens in a retrospective analysis.

In this case I retrace the steps taken in structuring the original research process, revisit the gathered data from the interviews, and focus the analysis on the human and nonhuman relations through a queering lens that inform the emergence of the speaking subject. I then reflect on my findings and apply the understandings I gained around the speaking subject to another existing design case called the Morse Things. The

proposition for this case is informed by the reflections and new understandings from the first case. Therefore, in the second case I explore the second sub question and following proposition:

Research question: How can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?

Proposition: HCI designers can embody the speaking subject through poetry and take the orientation of a poet to better understand their role from an internal position.

I use the case of the Morse Things as a setup and suggest rethinking the ways HCI designers can embody the role of the speaking subject differently through poetry and from an internal position. I arrive at poetry from my engagement with writing poems from a young age. Perhaps my transcultural experiences as a child—explained in chapter 1—and their bilingual necessities influenced my form of verbal expression. I was always curious to make sense of the two different languages by finding a balance between their connection in employing words, concepts, and thought. Poetry became my meaning-making strategy, a playful space for exploring how language, thought, emotions, and actions ground my understanding, orientation, and position in the world. This practice continued in my adulthood as a creative outlet and sense-making technique when learning new things in school and, much later, confronting experiences and navigating life's disturbances as an ongoing migrant. As such, I find value in poetry as a way to simplify, navigate, and communicate ongoing re/disorientations and experiences that come with it. Therefore, in this design case, I argue for poetry as an underexplored method for the speaking subject to view theory differently and internally navigate the role and its relations with nonhumans of design. In this instance, I consider poetry as both a queering lens and an embodiment of the speaking subject: As a form of queering, poetry suggests a new orientation for the human designer towards the nonhumans of design. Poetry directs the human designer towards viewing theories, concepts, words, and objects of writing as nonhuman agencies, which I will explain in detail in chapter 5. Poetry is also the embodiment of the speaking subject when assuming the orientation of a poet. Through writing the poem, connecting, articulating, and working with theory as the nonhuman agencies of design, I show how HCI designers can develop new intrinsic understandings of their role as the speaking subject that can later inform their design

trajectory. In a way, poetry as queering and poetry as embodiment are one in the same. That is, the queering orientation for the human designer as a poet becomes the embodiment of the speaking subject.

The following section explains the methodological commitments and methods applied for this research.

3.2. Methodological Commitments and Methods

In writing this thesis, I adopt a Research through Design (RtD) methodology and take a first-person approach. I explain my use of propositions to support and validate my claims, findings, and knowledge production.

As explained earlier, I will use two design cases through which I explore my research questions. Each case holds separate methods, tools, and techniques to help uncover new insights for HCI designers and the speaking subject. I will explain these methods in detail in section 3.3.1 and 3.3.2.

3.2.1. Research through Design and First-person Perspective

RtD is an established methodology within HCI, where it acknowledges the knowledge produced through processes, methods, and design artifacts (Zimmerman et al., 2007). RtD allows design researchers to contribute knowledge through the process of design and the artifacts themselves (Odom et al., 2016). Other researchers employ RtD for doing philosophy through design (Encinas et al., 2020; Hauser, 2018; Hauser et al., 2018; Wakkary et al., 2018) as it brings different perspectives and disciplinary backgrounds together, arguing for new ways of conducting scholarly research. The field has recently been more accepting of detailed processes as forms of knowledge-making (Desjardins & Key, 2020; Gatehouse & Chatting, 2020) over finished artifacts and designs. My work follows this emerging thread and includes design activities such as, design analysis, exploring design concepts, developing methods, documentation, and employing philosophy in design. I use propositions (Mackey et al., 2020) to work across the design cases, explore my research questions, and make sense of philosophical theory and design concepts. Propositions are helpful in that they allow the first-person researcher to critically reflect on the attempts. Propositions are considered iterative

intermediate knowledge-making and “act as the broad strokes of changed understandings over time” (Mackey et al., 2020, p. 354). Similar to Angella Mackey and co-authors, I formulate propositions at the beginning of each design case and reflect at the end. I move forward with a new research question and proposition for the second case that is informed by the reflections from the first case. Hence, the propositions can be considered to situate, reflect, and act according to the new understandings developed over time. This further supports the rigor and integrity of the research.

Within this research, I take a first-person approach. As Wakkary suggests, first-person perspectives, autobiographical positions, and autoethnographical approaches are potential ways to focus on the relations between humans and nonhumans that can result in “subtle transmogrification of the designer from an outsider to an insider that is active within the designer’s own living world” (Wakkary, 2021, p. 248). As such, in line with my motivation and objectives, taking a first-person approach enables me to rely on firsthand experiences as a form of knowledge inquiry and production. The first-person approach allows me to commit to the research as the main participant while gathering, documenting, and reporting detailed descriptions of the study. This approach does not require user studies, interviews, or deployments, demonstrated by HCI research such as autobiographical design (Lucero et al., 2019; Neustaedter & Sengers, 2012) and design memoirs (Devendorf et al., 2020). Rather, the researcher relies on reflexive and descriptive ways of contributing to knowledge production while acknowledging their interpretation and positionality. For this thesis, taking a first-person approach allows me to work through the challenges of explaining and taking new orientations as I explain the process of gradually moving away from the more common approaches towards viewing design and the designer as more than human. The reflections from each design case further describe the transformative journey of taking new orientations as experienced by the researcher.

While other methodologies, such as grounded theory (Charmaz, 2006), can be used for this research, it limits the performative and embodied aspects of my exploration. Therefore, I argue that utilizing RtD as my methodology is more appropriate in that it allows me to move back and forth between theory and design —conceptually and practically— exploring the possibilities and challenges embedded in the role of the human designer when taking more-than-human perspectives. Moreover, embodying the conceptual explorations of the human designer can only be possible through taking the

first-person position. Therefore, my selected methodology and approach align well with my objectives and research questions.

Measuring research success has also shifted over the years in HCI design, which is more considerate of generative and ongoing conversations and actions. Therefore, my research can be considered successful by ways in which I arrive at a more detailed understanding about the role of the human designer, operating within more-than-human design.

As my research is concerned with reorienting and positioning the human designer towards and within a more-than-human design context, I rely on careful self-reflection as I continuously examine my understanding of the relation between theory and practice, and the human designer and nonhumans through analysis, writing, and illustration. I approach RtD differently in each case: in the first case, I approach RtD to situate the analysis and new orientations in design research, and in the second case, I utilize RtD in proposing a new strategy, i.e poetry, for designers to bring together design HCI and philosophical theories more explicitly in support of expanding the realms of more-than-human design.

My prolonged engagement with the two design cases and my transparent and honest account of the processes help support and validate my claims in this research. Immersing myself in theory and each design case allows me to gain rich data that could not have been gained otherwise. The credibility of my work is demonstrated by using two existing and peer-reviewed design cases that are part of the ongoing conversations and publications. Additionally, my situated and deep engagement with Ahmed's work—elaborated in chapter 1— help support my arguments and firsthand experiences as a valid form of knowledge. This supports the first-person approach, where the design researchers commit to the research as the main participant while gathering, documenting, and reporting detailed descriptions of the study.

I enlist queering as a lens to navigate my research questions. Queering provides and underlying criteria for investigating the broad range of relations between the humans and nonhumans of design that opens to new concerns, understandings, and positionalities for the transforming human designer in becoming the speaking subject. In the following

section, I explain in depth why I chose the two design cases and utilized queering as a lens to work through them.

3.2.2. Queering and the Notion of Orientation

Apart from my reasoning for adopting queering previously explained in chapters 1 and 2, my intention for enlisting queering and choosing to explore two existing design cases go hand in hand and are multifold:

First, I use Ahmed's idea of queering and, in particular, the notion of *orientation* as a lens for explaining how HCI designers can better understand design as more-than-human and their role as the speaking subject within it. As the first-person researcher, I also take new orientations and occupy the new design space while I move through this thesis. As Ahmed explains, in order to be oriented, one must also experience disorientation. Being oriented is a feeling at home that we may never notice unless we lose it. For an established HCI designer, if the "home" is a design space that consists of a particular set of values that are exclusively human, how is it possible to lose that home and become disorientated? While the familiar home is no longer a space to occupy—given its sincere limitations towards existing problems and challenges—designing-with and the role of the speaking subject seems to be a place that is more suited for the human designer to inhabit. Ahmed explains such positionality as *migrant orientation*, that is "the lived experience of facing at least two directions: toward a home that has been lost, and to a place that is not yet home" (Ahmed, 2006, p. 10). Therefore, I consider more-than-human design *not yet home* but a new space for HCI designers to explore their role as the speaking subject and find new orientations, forms of being, and designing. As such, in this thesis, I explain how our orientation is informed by *moving away* from the commonly known design spaces as well as *arriving* to reinhabit the newer spaces that more-than-human design and designing-with offer.

Ahmed also warns that orientations consist of "finding our way" with the help of "homing devices" (Ahmed, 2006, p. 9). For the want-to-be more-than-human designer, through tools, techniques, or strategies, in a way, "we learn what home means, or how we occupy space at home and as home when we leave home" (Ahmed, 2006, p. 9). Within this research, I consider the two design cases as the *homing devices*, which Ahmed refers to, that help position me within this research. The cases are close to home in that

they are both familiar to me, yet I see them as points of departure to leave my existing position in order to reorient and occupy the more-than-human design space. Each design case provides a starting point for a new orientation from which my explorations unfold.

To that end, I first use a retrospective analysis as a way to leave "home", so to speak, and experience a certain level of disorientation. I use a design case called the Machine Intentionality, which I had originally been part and fully familiar with its process, intentions, and goals. In taking a post hoc position to map the concept of speaking subject and explore its relationship with the nonhuman agencies, I *find my way* out of the existing orientations. Therefore, the first case is a step towards disorientation while making sense of what the role of the speaking subject as the vocal designer entails.

In the second case, I use an existing design case called the Morse Things as a setup. With this case, I build on the surfaced understandings of the speaking subject and include Ahmed's depiction of orientation through notions of "otherness"— what is associated with the "other side of the world." Ahmed argues that in order to experience other sides, one must come to *embody distance*. Coming to embody distance for the HCI designer entails a familiar *starting point* for a new embodiment. Embodying the speaking subject is necessary for the want-to-be more-than-human designer, in that it positions the researcher alongside other nonhuman agencies to design collectively and collaboratively. Borrowing from Ahmed's language, enacting and embodying the role of the speaking subject enables HCI designers to not only further their *distance* from the origin and what was once "*here*", but to unfold ways for getting closer to what is "*there*" on "*the other side*" (Ahmed, 2006). That is, in occupying the space as the speaking subject in the second case, I attempt to take other orientations, disorient and reorient to ultimately position myself within the *other side* to notice the nonhumans and collectively redesign the Morse Things with them. In doing so, I demonstrate how taking the orientation of a poet and in writing a poem, the speaking subject can engage with theories as a nonhuman agency of design before moving forward with the design iteration. Poetry as a form of queering and embodiment—explained earlier in this chapter—helps orient the speaking subject towards other perspectives, bodily and perceptual orientations that are not in-line with normative expectations and directions in design HCI. Ultimately, poetry and acting as a poet offer the human designer an

opportunity for distancing from common ways of understanding their role and make strange the typical practices pertained to design.

The following sections explain the origins of the two design cases, their original methodology, research methods, and design process.

3.3. The Two Design Cases

In this section, I explain the research questions, and propositions I take for each design case. I explain the origins of each case and then describe how I use them as starting points for disorientation and refining the role of the speaking subject. I also detail the methods used for each design case.

3.3.1. The Case of Machine Intentionality²

This case attempts to respond to the research question:

What can HCI designers understand about the speaking subject when exploring the role through a queering lens?

Proposition: HCI designers can understand the importance of new orientations for the speaking subject through a queering lens in a retrospective analysis.

The research origins

3D printers are well suited for creating efficient and accurate prints of 3D models. But what other qualities are 3D printers capable of expressing? What intentions might the machines offer besides accuracy and efficiency? And how do these shape the dialogue between the maker and the machine? Machine Intentionality applies a postphenomenological lens (Verbeek, 2005) to understand and identify new human-

² This design case is primarily based on an original research published as a peer-reviewed paper in the *International Journal of Design*, titled: *Exploring the Composite Intentionality of 3D Printers and Makers in Digital Fabrication* (Somanath et al., 2022). Original text from the paper is used in this section to describe the four reconfigured printers. In chapter 4, this design case traces the original research process—explained in this chapter—and reframes the work to analyze and elaborate on the role of the researchers and makers through queering.

technology relationships in order to explore the intentionalities of 3D printers that may have been overlooked. As a group of design researchers from the Everyday Design Studio at SFU in Vancouver and the Interactions Futures Lab at OCAD University in Toronto, we explored an alternative approach to 3D printers and the maker-machine relationship. We conducted a research study by first modifying four 3D printers that highlight one particular technological intentionality by either reducing, redirecting, reshaping, or redistributing the CAD model and filament of a given print. We arrived at four reconfigured 3D printers: breezy, postal, dwindle, and skimpy. We then interviewed ten experienced makers before inviting them to engage with the new printers by selecting one printer of choice and submitting a 3D model through our designed website. Our research team members handled the files, supervised the printers, packaged them, and shipped the completed prints to the makers. Upon receiving the print, the makers were invited to resubmit a second file to the same printer. Finally, we conducted a closing interview at the end of round two.

My role in this research at the time entailed brainstorming ideas with the team, visual design, recruiting participants, having a conversation with the makers through interviews, and later finding themes and analyzing their feedback and comments to better understand their relationship with an altered 3D printer.

The original reconfigured printers

We created four distinct printers, each aimed to reflect the combined intentionality of the machine and the researchers that is possible for a 3D printer. We altered the local configuration of the printer (fan speed and filament flow), used the network capacities of the printer to connect with data and processing available on a network, and utilized the socio-technical assembly to include the distribution of the prints through mail and delivery services as well as the production of the prints. Our configurations altered the parameters of the printers at the level of G-code/M-code and through the slicer, to arrive at the four printers:

Dwindle: The Dwindle printer increasingly reduces the print quality in relation to how long a given print takes and where it is in the queue of print jobs for that day. This printer works with two different temporal frames. With each print, the speed and the flow of the machine reduces as the printer continues to print, typically “degrading” as the printer adds layers to the print. The second temporal frame considers the overall queue of print

jobs in a given day of printing. The further down a print job is in the queue, the slower the initial speed and material flow rate is in comparison to the previous print job. The technological intentionality of Dwindle is that its "labor" and resources like filament are limited in relation to time measured as numbers of jobs and print duration.

Skimpy: The Skimpy printer determines the amount of filament required by the 3D model and then redistributes the amount across multiple copies of the model. This printer calculates the filament density of each object and changes the flow of the print to make "better use" of the material by redistributing the amount of material it saves in the initial print job to make additional copies. The technological intentionality of Skimpy is that it optimizes the efficient use of its resources like filaments to produce more quantity.

Breezy: The Breezy printer redirects the printer nozzle based on the wind data of the maker's location on the day the maker uploaded the file. This printer collects the wind's direction and speed of the selected location for the last 24 hours and maps it into the print by dividing the print into 24 layers and shifting each of these layers by the amount of wind in the direction of the wind. The technological intentionality of Breezy is that its functional boundaries as a printer include the Internet and that it can access any data on the Internet to be used as input parameters.

Postal: The Postal printer reshapes the model for more convenient shipping. This printer looks at the dimensions of the planned print and decides among three different parcel sizes which one is "best" for the print. It determines this by finding a shipping package that fits the height of the planned print and then the printer modifies the remaining two dimensions of width and depth in order to conveniently fit the print inside the selected shipping package. The technological intentionality of Postal is that it is part of a large physical and digital system and aspects of the system, like distribution and shipping, create important specifications to complete its tasks.

Our findings from the original research contribute to understanding human-nonhuman relations through a postphenomenological lens and composite intentionality, which we have presented in our peer-reviewed publication (Somanath et al., 2022).

Methods for Analysis

To explore the initial research sub-question, I use retrospective analysis to first reposition the design case within a more-than-human design context and later unpack the role of the human researcher/maker as the speaking subject. I use memoing and post-reading data from the original interviews and map the concept of the speaking subject onto the human agencies. I also draw from the original human-nonhuman relations to expand the relational qualities of the speaking subject that have been formed throughout the research by retracing the steps from the original research process. These attempts provide a scaffolding to deliberate on how the concept of speaking subject emerges through a queering lens. Finally, I argue that the retrospective analysis helps explain ways the human agencies can find their way out of the original design space initially occupied and begins to yield to taking other positionalities and orientations.

Within this case and through the retrospective analysis, I follow Ahmed's queer phenomenology as underlying criteria to explain new orientations for the speaking subject while mapping the role of the speaking subject on the human members involved in this design case. As a result, I disclose new understandings of the speaking subject and the new orientations they take for noticing nonhumans and giving voice to them. Figure 1 depicts an overview and methods used in this design case.

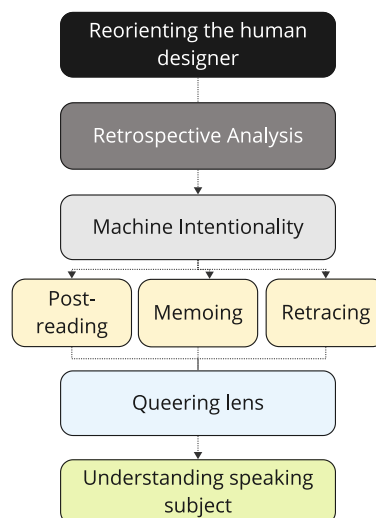


Figure 1. An overview diagram of the first design case

3.3.2. The Case of the Morse Things

In this design case, I ask: How can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?

Proposition: HCI designers can embody the speaking subject through poetry and take the orientation of a poet to better understand their role from an internal position.

While I use the case of the Morse Things mainly as a setup for my exploration, it is worth introducing the origins of the design for better context.

The research origins

Morse Things explores possible relations we have with technology through a thing-centered approach to IoT. The project consists of a series of internet-connected ceramic cups and bowls that communicate via Morse Code. The original study began back in 2017 at EDS, where a team of design researchers were interested in inquiring what it means to be a thing on the internet while being part of our everyday human experiences. The cups and bowls were designed, crafted, produced, and later deployed to six households for study (Wakkary et al., 2017). Following a failed deployment in the second phase, several bowls and cups of the Morse Things broke while shipping between the studio and participants. At that point, the researchers came to see repair as a creative opportunity from which to consider its remaking. As a result, the broken cup was sent to a professional Kintsugi craftsman in Japan for repair. Although, the cup broke again during reassembling, and a new phase for the Morse Things was marked.

It is worth noting that I joined EDS in 2019; therefore, I was not involved in the original design and research process. However, I was familiar with the work before joining the studio through the publications, and after joining, through conversations with the original members of the team. I was later brought into the team to help with rethinking the ways we can redesign the broken bowls and cups.

Methods for Generative Exploration

In the new phase, we were interested in moving past repairing the broken cups and bowls and curious about finding ways to attend to their breakage as an opportunity to challenge our human assumptions and look for new ways of engaging with nonhuman forces. Therefore, as an initial step, we turned to more-than-human theories to expand the scope of our research.

Although I was well versed in the Morse Things project, the new design research direction was fairly new and unfamiliar. The complexity of theories we were looking to apply—namely Spuybrouk’s notion of sympathy, Wakkary’s designing-with, and Bennett’s Vibrant Matter—created an obstacle for some of the design members, including myself. How can we bring these philosophical concepts into our design, and how might we—the design researchers—take action and work *with* these concepts in a productive manner? Such questions made it challenging to anchor an actionable trajectory to design with what was left from the cups and bowls. This suggests the challenge of acting from and within a more-than-human design context without fully understanding the philosophical concepts that influence the design landscape. Scholars such as Bassoli and co-authors have argued for “closing the gap between theory and practice... through the conceptual, intuitive, experiential and analytical component that constitutes the design dialogue” (Bassoli et al., 2007). In design HCI, photography (J. Liu et al., 2018), annotated portfolios (Hauser et al., 2018), workbooks (Gaver, 2011), and videos (Oogjes & Wakkary, 2017) are commonly used for this purpose. However, such techniques work as mediators between theory and design and do not explicitly position or articulate the designer in relation to theory. Emphasizing this shortcoming alludes to Wakkary’s idea of the designer in more-than-human design, that is, that the designer is both human and nonhuman. At this stage of the project, I thereby choose to pause and queer the role of theory by viewing it as nonhuman agencies of design which our team aims to work *with* in this project. I argue that theoretical concepts and philosophies are the overlooked nonhuman designers collaborating with the human designer to direct the design process. Considering this position, as well as the orientations and queer relations that surfaced for the speaking subject from the first case, I turn to poetry, as an underexplored strategy in HCI, for positioning the human and nonhuman designers next to each other. In exploring the second research sub-question, I bring three theoretical books into a poem, and in writing the poem itself, I show how HCI designers can

embody and gain new understandings for the speaking subject that are more open-ended and situated.

Why a poem? Poetry is not a new method in academic research. It has also been adopted as a valid academic practice in anthropology as a form of representation and meaning-making since its postmodern turn (Maynard & Cahnmann-Taylor, 2010; Salberg et al., 2009). Given its “deep engagement with the world and its inhabitants (human and nonhuman) in all of their diversity”, poetry has been rewarded in anthropology as a valuable method and a way to be in the world (Weeber, 2020). “Poetry has been framed as a critical engagement that resists dominant forms of thought and communication in academic discourse” (Paiva, 2020, p. 2). Poetry is considered a form of embodiment (Hoult et al., 2020), ways to gather multiple voices (Fitzpatrick & Fitzpatrick, 2020) and a research method for conveying subjectivity that traditional discourses such as those used in academia cannot (Paiva, 2020). Paiva argues that “poetry is vital if we truly wish to engage with and express a pluriversal world” and its value as a method “lies within its power to change minds” (Paiva, 2020, p. 2). Alternative to common literary approaches that are bound to time and place such as vignettes (Wright & McCarthy, 2008), stories (Rosner, 2018), and memoirs (S. E. Lindley, 2012), poetry—as a method—can be considered a form of reflexivity, narrative writing, communicating, thinking and being in the world, which has previously been adopted in fields such as social sciences (Faulkner, 2016), geographical studies (Cresswell, 2014), indigenous studies (L. T. Smith et al., 2018), and anthropology (Weeber & Wright, 2022). In HCI, designers have briefly used poetry as data (Bødker, 2015), site-writing and data gathering techniques (Helms, 2021) and artists such as Damiani have written poems as an output of their research (Damiani, 2019). For this case, I build on the existing work and promote the use of poetry in design HCI.

My use of poem is threefold:

The primary purpose of writing a poem is methodological. Since complex philosophical theories and concepts of more-than-human impose a challenge for designers to grasp, adopt, and bring into practice, poems can be considered as a way for the human and nonhuman designers to engage in a shared process grounded in an ongoing embodiment and intrinsic understanding that supports the research inquiry. It enables the speaking subject to gather, assemble, articulate, and give voice to the nonhuman

designers (i.e., theories and concepts) that, in turn, suggest new orientations and understanding for the speaking subject.

Second, poems “reject the notion of a single voice” and are “increasingly used as an accessible method of working with diverse groups of people who might otherwise not engage with the written word” (Hoult et al., 2020, p. 91). Therefore, I direct the poem toward HCI designers and members of the CHI community as an invitation to provoke and cultivate discourse around the necessity to consider new orientations for working within a more-than-human world. In a way, poetry offers a space to describe the world in ways that are in the “not yet” (Vasudevan, 2011). That is, for those who are *not yet* immersed, this poem offers a way to learn about more-than-human concepts and consider more-than-human design as a new space for research and making.

Third, by deliberately queering the theory/practice and human/nonhuman binary, the poem attempts to problematize the normative ways designers engage with theory, articulate, and mobilize their newfound assumptions in design.

For writing the poem, I use close reading to review the theory books and use illustrations to elevate the rhetoric strategy. These methods help reveal new orientations for the speaking subject that stems from an embodied position. Figure 2 provides an overview and the methods used in this design case.

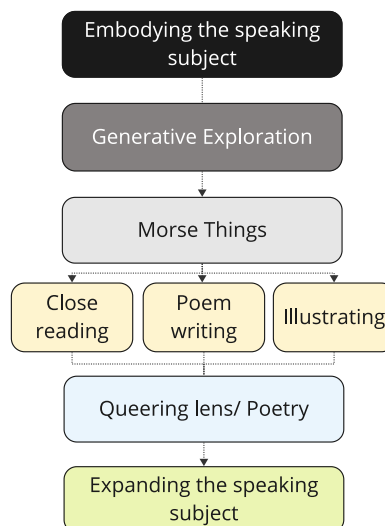


Figure 2. An overview diagram for the second design case

3.4. Summary

For conducting this research, I give a first-person account of the ways in which HCI designers can better understand their role as the speaking subject when working from more-than-human positions. I use two design cases to help navigate my research questions and objectives. The cases are both considered familiar places from where one leaves the past orientations and departs towards new paths and positionalities. The transformative journey of the human designer is informed by the notion of orientation and queering angles. Cumulatively, the two design cases elaborate on the role of the speaking subject. In the first case, the role of the speaking subject is viewed and explained from an external position through retrospective analysis. The second validates the role internally by embodying the speaking subject. The following figure (figure 3) depicts an overview of the thesis structure and trajectory.

Design Case	Machine Intentionality	Morse Things
Sub Question	What can HCI designers understand about the speaking subject when exploring the role through a queering lens?	How can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?
Proposition	<i>HCI designers can understand the importance of new orientations for the speaking subject through a queering lens in a retrospective analysis</i>	<i>HCI designers can embody the speaking subject through poetry and take the orientation of a poet to better understand their role from an internal position</i>
Methods	Retrospective Analysis Post-reading Memoing Retracing	Generative Exploration Close reading Poem writing Illustrating
Findings	Retrospective analysis and queering reveal new orientations and queer-relations for the speaking subject	Acting from an embodied position and the orientation of a poet allows directed, situated, and open ended understandings to emerge for the role of the speaking subject
Reflection	Understanding the importance of new orientations for the speaking subject from an external point of view is still abstract and limiting for it to inform designer's actions and directions <div style="border: 1px dashed red; border-radius: 10px; padding: 5px; display: inline-block; margin-top: 10px;"> <p>there is a need for the human designer to understand the role of the speaking subject internally</p> </div>	Engaging directly with theory as a significant nonhuman agent in design can inform the speaking subject's course of action when designing-with nonhumans

Figure 3. Thesis overview

Chapter 4. The Case of Machine Intentionality

In this chapter, I unpack the design case of Machine Intentionality, wherein I retrace the steps taken in the original research process and provide a new description of how, in hindsight, the case could have been read as a designing-with and more-than-human design attempt. Due to my involvement with the original research process, it is important to disclose that my position in this analysis reflects a retrospective first-person account through a queering lens. This position entails partial distancing from the original position in order to map the concept of the speaking subject onto the human agencies of the research and uncover new orientations for a better understanding of this role. Therefore, in the analysis, I do not discuss the process from a speaking subject standpoint but rather as a first-person account of how my role— as one of the human agents— would have played out as a speaking subject. Navigating the analysis, I rely on queering and the notion of orientation as a lens to guide the process and exploration.

4.1. Retrospective Analysis

In this case, I explore the following question: What can HCI designers understand about the speaking subject when exploring the role through a queering lens?

My proposition for this case is: HCI designers can understand the importance of new orientations for the speaking subject through a queering lens in a retrospective analysis.

Analyzing in retrospect, Machine Intentionality follows aspects of more-than-human design and the interconnectedness of human and nonhuman agencies that designing-with offers.

Reviewing the original research questions driving this project invites us to consider other possibilities for 3D printers and our interactions or orientations toward them. In order to support this aim, the machines are altered and reconfigured to expose their hidden capabilities that go against the human-established knowledge or understanding of a machine. A 3D printer is known and understood as a tool for productivity, accuracy, and precision. However, the research questions put forth a different perspective on what might have been suppressed and the interactions that have been missed. As explained in earlier chapters, designing-with and queering both invites the human designer to

challenge the status quo, question the existing views, and ask to look in new directions. As such, perhaps the question becomes *if we are turning away from the familiar, how and what are we turning towards?*

This resonates with the importance of exploring and understanding different orientations for the human designer that has not been explored before. Returning to Wakkary's concept of the human designer as the speaking subject, I post-read the original research process to identify the human agencies involved in the process and reposition them in a more-than-human design context as the speaking subjects. Doing so enables me to frame the analysis around the different roles of the speaking subjects and further elaborate on their position and relations to the nonhuman agencies of Machine Intentionality.

4.1.1. The Speaking Subjects of Machine Intentionality

In mapping the concept of the speaking subject onto the role of the researcher and maker in this design case, I disclose two groups of speaking subjects: The researcher as the speaking subject in relation to the machine and the maker as the speaking subject in relation to the prints. I use a queering lens and unpack the notion of orientation in relation to these two groups to explore new ways human agencies can be positioned and understood differently in relation to nonhuman agencies in this context.

The Researcher as the Speaking Subject in Relation to the Machine

Following the quest to challenge the status quo and our understandings of 3D printers, queering and the notion of orientation help explain how in the process for reconfiguring the machines, the human researcher as the speaking subject requires shifting and taking different positions.

In the attempt to reconfigure the four printers, the researcher must first acknowledge and gain a deeper understanding of multiple agencies of the nonhumans involved in the design space. As Wakkary suggests, the speaking subject can act from a position of partial or not knowing. Therefore, understanding the agencies of the nonhumans can be pursued by letting go of what is known to the researcher about the machines and taking account of the multiplicity of agencies gathered within this space for rearrangement. This

suggests a space where collaboration, disorientation, and co-queering can take place between the speaking subject and the machine. Therefore, the first step for the researcher is to concede this inclusive space and recognize the need to get down to the level of the machine, so to speak, to notice and hold a direct dialogue with the nonhuman agencies. For the speaking subject, the challenge then resides in adopting a new orientation and a queer identity— a displacement from the familiar expert to the novice explorer. Such disorientation of losing or letting go of the familiar, is what Ahmed refers to as *oblique becoming*. Oblique becoming is “a becoming that is at once interior and exterior, as that which is given, or as that which gives what is given its new angle” (Ahmed, 2006, p. 162). Thus, in taking this position, the speaking subject and machine co-queer one another. That is, on one hand, for the speaking subject, the on-going shifts of orientation and navigating conflicts and contradictions with what was once known to the researchers about the machine (i.e., precision, accuracy, efficiency, speed, etc.), gives each printer a new angle. And on the other hand, for the machine, the hidden agencies that surface, call for attention, and request participation, challenge the speaking subject to find ways to notice and attend to the intensities of agencies that suggest new gatherings and course of actions. While the speaking subject is gradually taking on a new bodily orientation internally, its angle is constantly shifting to see and involve nonhuman agencies from a new position. Therefore, oblique becoming in this process, is a matter of acknowledging the need for internal discomfort, confusion, and frustration, from the speaking subject in order to fuel the process of giving the machines their new angle.

From this new orientation, 3D printers can act or have intentions that are not compliant with the accepted standards of a 3D printer. As such, within this obliqueness, both the speaking subject and the machine *slip away* from their original alignment. That is disorienting the speaking subject and reorienting the machine happens at a contact point where “things slip as a proximity that does not hold things in place, thereby creating a feeling of distance” (Ahmed, 2006, p. 166) from all that have been previously established. As Ahmed explains, “this is how phenomenology offers a queer angle-by bringing objects to life in their “loss” of place, in the failure of gathering to keep things in their place” (Ahmed, 2006, p. 165). Therefore, abandoning the presumed placements of nonhuman agencies within the machine’s confinement enables an opportunity for the researcher to turn to moments of failure in an effort for distancing from previous angles

and becoming. This holds a queer impetus to make a difference in what we are familiar with or used to. This is not to say, the machines must be simply reconfigured to do the opposite or create a binary with the existing machines; rather, they should also be disoriented or queered by surfacing what had been suppressed in the machines intentions and expected capabilities. To elaborate further, I will use Ahmed's example of a furniture:

Consider the expression, "You treat me like furniture"-which usually means, "You don't notice me; you make me part of the background." So, if furniture is conventional and indeed directs the bodies that use it, then furniture often disappears from view; indeed, what makes furniture "furniture" is this tendency to disappear from view. A queer furnishing might be about making what is in the background, what is behind us, more available as "things" to "do" things with (Ahmed, 2006, p. 168).

This is also true for the speaking subject in relation to the machines. The speaking subject taps into what has always existed but had resided in the background, away from the view, making available ways and *things to do things with* the machine. In other words, it is the actions or performative qualities of the machines that requires surfacing. Thus, in pursuing alterations through careful collaboration with the machine, the speaking subject must attend to the agencies that have always been present and responsible for keeping the machine aligned with what is typically expected. Taking note of the rear view, so to speak—that is the nonhuman agencies that are familiar yet kept in the background—requires course of action.

Echoing Butler's conception of *trouble* as a form of action, the speaking subject turns to *make trouble* (Light, 2011) the existing intentionalities of the machine in a way that highlights agencies that support failure. For a typical 3D printer, disrupting notions of failures include friction, glitch, error, waste, or disarray, through which we can allow ourselves to "encounter some faces and not others" (Ahmed, 2006, p. 200). A troubling event in this case, draws attention to the invisible *faces* or infrastructures that guide the machines actions to do things. Troubling entails the intention and act from the speaking subject to disrupt the fundamental agencies of the machine that are the codes, the motors, the speed and direction of movement, the nozzle, the size of the print bed, the

heat required for the filament to melt, etc. Making trouble can make space for other *faces* to get the speaking subject's attention. That is, through troubling, the speaking subject queers the machine, to foreground other nonhuman *faces* and in turn manifest a queer phenomenology. The change of perspective from what has always been in line with human needs and values, to a broader consideration of the machine, implies a degree of horizontality and the breakdown of the human/machine binary. As such, the ontological assumptions also dissolve into a much even spectrum, positioning both the speaking subject and the machine in direct dialogue with one another. This attempt sets a slanted and undefined stage for other agencies such that of the prints and the human maker, to enter a queer phenomenology, that is further explained in the following sections.

From here, I look at each printer and explain how, through troubling, the speaking subject comes to notice moments of failure and give voice to the nonhuman agencies that strive to be acknowledged and put in the fore. This further contributes to the co-queering that happens between the researcher and the machine.

Troubling surfaces the intensities that are internal to the machine. For altering the dwindle and skimpy printer, troubling notions of quality, help make apparent matters of waste and decay regarding time and energy. For the dwindle, the speaking subject notices time and labor that inform the quality of the prints. Time and labor are performative qualities, which if not given care or attention will disrupt the landscape of production. Here, troubling the nonhuman agencies of the machine that partake in the conditions of the prints can inform the speaking subject to alter the machine. Based on the position of the prints in relation to one another in the queue, and over time, dwindle makes visible the active forces behind the machine's performance. It also suggests how nonhuman agents such as various temporalities, the virtual model, and the amount of power that goes into the print, can bring to bear nonhuman bodies to queer matters of labor by disrupting heteronormative assumptions of service. Similarly, in the skimpy printer, matters of waste concerning the intensities of material resources and their unique agencies surface. Troubling the binaries of production and consumption in the skimpy printer, reorients the speaking subject to notice and take action based on the intensity of the production supply agencies. As such, clustering more or less material in each and across various prints brings to bare matters of consumption and use. In relation to the two machines, the speaking subject is responsible to gather nonhuman

agencies of the machine that concern matters of labor, consumption, and productivity. In the breezy printer, quality of disposition or disarray surfaces. Utilizing the local environmental wind data at the time of print, situates the virtual model and constitutes the machine's performance, informing layers to *slip away* from its ascribed model. This assists the speaking subject to also question the size and efficacy by engaging with the agencies that are concerned with matters of distribution and dissemination in the postal printer.

Within each altered machine, the speaking subject makes way for other possible orientations for the machine— be it through internal or external agencies and forces— to take part in the collaborative space of disorientation, reconfiguration, and co-queering. As such, we can see how troubling, and the speaking subject go hand in hand in dis/reorienting the machine to manifest and take a queer phenomenological angle. In doing so, human-nonhuman entanglements co-constitute a new orientation towards viewing 3D printers beyond their familiar being.

To summarize, the researcher, as the speaking subject in relation to the machine, must first acknowledge the need to gain a new perspective and be willing to assume a position of not knowing and unlearning. Disorientation is an integral part of understanding the role of the speaking subject; thereby, slipping away, losing place, and noticing suppressed agencies through troubling can help with the speaking subject's displacement. Accounting for moments of failure, where attributes such as quality and productivity can be compromised, contributes to how the machine and the speaking subject co-queer one another to arrive at new reconfigurations for the machines. As such, the design scape turns towards a queer phenomenology.

The Maker as the Speaking Subject in Relation to the Print

From here, I will explain how the maker as the speaking subject emerges and reveals new orientations in relation to the prints and the queered machines.

Through co-constituting a queer phenomenology, the machines embody a queerness quality, making available alternative forms of interaction and interpretation through the printed things. The role of the maker as the speaking subject is informed by the previously established queerscape of the research, wherein the maker must now enter

into a dialogue with the prints. The makers are not in direct interaction with the machines, hence, the prints act as an intermediary agent between the queered machines and the now speaking subject —the human maker. Not having printed with the altered machines before, the maker’s positioning unfolds gradually and enact in resistance against their prior ways of understanding.

During the first round of prints, the maker’s position is that of partial or not knowing. While the maker is aware of the machine’s new intentions, they submit virtual models from a position of uncertainty for what the outcome may look like. This fragile position is an initial step towards disorientating the maker as the other speaking subject in this study. While the queerscape of the research has been set up by the researchers, the limited assumptions around the queered printers and their performative qualities prevents the maker to view the machines, the prints, and themselves from a queer phenomenological angle. Therefore, during the first round, the maker is committed to their normative ways of viewing the machines as tools for production and expecting for results to somewhat be close to their original model. At the time of receiving the first prints, the maker transmogrifies. The “distorted”, “squished”, “brittle”, and “clownish” looking prints, disorients the maker, unsettles their assumptions, and suggests a fall out between the maker and the machine. Comments such as “I don’t understand what it’s doing”, “the printer's role was to screw with me”, “it really doesn't care what you're putting in there” and “Oh, you tricky printer, I didn't expect that”, support how the maker’s anticipatory stance fell short given their original orientation. At this stage the maker’s orientation *slips away*, they become distant, and thus the role of the maker in relation to the print becomes off-centred and porous. While the print’s agency upholds the queer phenomenology, it also invites the maker to pause, reflect, and embrace the discomfort of the unexpected and unfamiliar, as they prepare for the second round.

The prints further move the maker between suspicion, transmogrification, and misalignment with all that has been embodied before, thus cultivating resistance towards viewing the machines as not damaged or in the wrong. While the maker is attending to find comfort in the disorientation, they “arrive in spaces where they are not already at home, where they are not “in place”” (Ahmed, 2006, p. 62). Per the makers, they view their position as not being able to “control” or “anticipate”, and a “fight” to understand what is going on, which indicates the level of displacement, confusion, frustration, friction, and hardship for the experienced makers. Unsurprisingly, taking up the “new”

space or orientation is indeed hard work as “it involves painstaking labor for bodies to inhabit spaces that do not extend their shape” (Ahmed, 2006, p. 62). This alludes to how a number of makers followed a certain direction that restricted the ways in which new orientations could appear, while others embraced the discomfort and traversed towards other orientations within a queer phenomenology. The former group of makers continuously resisted the opportunity for disorientation given through the prints. They persisted on holding their current orientation and refused to dismantle the human/machine binary.

The latter group of makers found a sense of oblique becoming “through the delimitation of space as a space for some things rather than others” (Ahmed, 2006, p. 87), and acquired a queered identity. By not following the familiar, these group of makers ontologically made themselves available to other ways of being—one that is less concerned with past assumptions and commitments, allowing to experience what has been kept *behind*. From this queered angle, the makers as the speaking subject emerges and attend to the print’s agency. Here, the speaking subject accepts the print and printer as having agentic capacities that can inform their second round of prints. It is worth arguing that in order to uphold the responsibility of the speaking subject, the human makers must actively unfollow, pave new paths, and take up space in new orientations that have not been previously taken. This is because “objects and bodies “work together” as spaces for action” (Ahmed, 2006, p. 57) and if one agency settles and stands still the other is restricted to taking limited orientations and falling flat in creating a collaborative space for mutual becoming. To that end, the prints can be considered *in-between actors* that enable the speaking subject to notice “the labor that is behind its arrival, as well as the work it allows us to do” (Ahmed, 2006, p. 201). Although the prints do not offer the speaking subject total transparency of the machine’s agencies, they provide inklings from the shift occurring around new orientations and the gradual co-queering between the maker, the print, and the machine. Thus, going into the second round of prints, the speaking subject elevates the intensities of the nonhuman agencies of the machine and works collaboratively with them while still acting from the position of uncertainty. Interestingly, the new virtual models also take a queer angle, less functional and more exploratory, “disoriented”, “loose”, and “artistic”. At this stage, the speaking subject resides in the realm of compromise and negotiation, not having to take sides, but embodying a fluid and on-going disorientation and reorientation between what was

previously behind and now in view and what was once familiar and now in the background. This space also entails having no particular assumption or commitment to a certain orientation or perspective when remolding and submitting for the next round of prints. Here, the speaking subject can be described as holding a queer positionality— a queer actor moving toward kinship with nonhuman agencies and acting alongside them from a position of disorientation and ambiguity.

Upon receiving the second prints, most of the makers were again disoriented. In not having a clear vision of the machine's agencies, the makers found the prints "playful". The co-occurrence of disorientation and playfulness supports the conflicting position the speaking subject is required to navigate. It can be argued that the playfulness of the prints strengthens the horizontal relation between the maker and the machine and brings to bear the new ways of interpreting the prints, suggesting queer use and queer aesthetics. As such, the emerged queer relations can help reveal "how we interpret tools and integrate them into our daily lives according to our sense of who we are and the norms of behavior that flourish in our circles" (Light, 2011, p. 430). In turn, the new position for the maker co-constitutes alternative understandings of the machine that stem from acknowledging multiple perspectives that are simultaneously resistant and playful in terms of orientation and identity.

In summary, the maker as the speaking subject in relation to the print may not immediately experience the queer phenomenology or the queerspace in which they are positioned. However, over time and across rounds of print, they begin to notice the oddness of the prints, which as the intermediary agents, inform the makers of the altered shared intentionality of the machine and the researchers. Taking up new space or orientation in relation to the prints is intense work rooted in hardship and perseverance. Not all are open to accepting the discomfort and are resistant to letting go of past orientations or understandings. Those who embrace the uncomfortable of disorientation in relation to the prints allow new possibilities to emerge, such as queer use and queer aesthetics. They open themselves up to new norms, which in turn contributes to developing queer relations and their identities as queer actors.

Speaking Subjects in Relation to One Another

Given the two groups of speaking subjects depicted in this case —the researchers and the makers— I argue that the queer relations mentioned earlier also traverse temporally, meaning that re/orientations of one speaking subject can influence the experiences and orientations of other speaking subjects and nonhumans in different phases of the design process. This is in line with Wakkary’s account for design as ongoing that exists beyond a limited timeframe. The ongoingness of design welcomes other nonhumans to the design space via the same or other speaking subjects over time. This illustrates design as expansive and divergent and the role of the speaking subject as fluid and queer: someone who makes do and adjusts its orientation according to what has been passed on and is at hand. As such, perhaps the speaking subject can be considered a *bricoleur* (Lvi-Strauss, 1966), who understands its position not as something fixed but as something provisional and shifting. Bricoleur is someone “heterogeneous in sensibility, interrogating a situation from within and from multiple perspectives with whatever means the situation affords” (Tanenbaum et al., 2012, p. 1589). In a way, recognizing the speaking subject as a form of bricoleur “provides a way to think without establishing a new center, a privileged reference, an origin, a truth” (Klages, 2006, p. 61). As such, I argue that queer relations exist within learning to be with what is through dialogues, negotiations, collaborations, and alterations. These relations form across time and must remain ongoing in order to eliminate a stillness of possibilities, a formation of new binaries, or a predetermined point of arrival. Only then can the speaking subject welcome new orientations and trajectories for change in designing in a more-than-human world.

4.1.2. Summary of Findings

In this case, I explored new orientations for human agencies to reveal the importance of understanding the role of the speaking subject in a more-than-human context. I inquired into the role of the speaking subject through retrospective analysis and focused on the human members involved, and explained how the different acts of queering can help find new orientations. I further explored how making trouble can support the role of the speaking subject in voicing hidden agencies to collectively manifest queer phenomenology. We can learn from looking at a failed print, for example, and not see it as an error but as an opportunity for creative reflection and thoughtful

production. Finally, I argue that the co-constituted queerscape extends the responsibility of speaking subject beyond giving attention or acting on behalf of the nonhumans, but that the role requires patience, practicing ongoing compromise and negotiation with the nonhumans, and a commitment to continuous repositioning.

In the case description, I followed the researcher's journey from its original standpoint to taking a new stance towards viewing the design case as more than human. I showed how in order to take new orientations, one must first disorient themselves. I adopted framings such as abandoning, distancing, losing balance, and slipping away to explain how the human researcher can disorient themselves and allow obliqueness to emerge. Later, the disorientated position of not-knowing and unfamiliarity guided the researcher to see nonhuman agencies as co-queering forces. The internal and external agencies and networks hidden behind anthropocentric assumptions surfaced as the researcher turned to moments of failure and made trouble the human/nonhuman binary. It is clear that not only the epistemic stance of the speaking subject congregates its position in relation to nonhuman agencies differently, but its ontological positioning is no longer hierarchical.

Lastly, the queer analysis helps us better understand what other phenomenologies and possibilities we turn toward when we open ourselves to accepting undesired moments of confusion, uncertainty, loss, instability, and misalignment. With this acceptance and the expectation that there are struggles and discomfort, we are able to explore and expand beyond our current position.

4.1.2 Reflection on the Proposition

At the beginning of this chapter, I proposed that HCI designers can understand the importance of new orientations for the speaking subject through a queering lens in a retrospective analysis

In this section, I reflect on this proposition and explain how I have answered the related research sub-question: What can HCI designers understand about the speaking subject when exploring the role through a queering lens?

As the findings suggest, understanding the role of the HCI designer as the speaking subject in the context of more than human design requires unpacking. The retrospective

analysis provides a deeper theoretical insight into better understanding the new role and the possible dis/orientations it may require. I argue that the coupling of retrospective analysis with queering— what I will call *queering analysis*— can help articulate the human designer towards viewing their role as less bound to fixed orientations and assumptions and more as fluid and transforming: co-shaped by nonhuman agencies that reside before, during, and after the design process.

My queering analysis presented an entry point, a sense-making practice, and familiarizing strategy for HCI designers. It explained the importance of recognizing and learning to reposition and reorient oneself differently from the positions and orientations that were held before. It uncovered how the speaking subject is not the mere composer of design research but a negotiator who must consider participating in an exchange of agency and control through owning different and multiple orientations towards the nonhumans of design.

While through this analysis, I have shown the importance of understanding the speaking subject and its different orientations in more-than-human design, I recognize that the findings are limited to a particular set of arrangements understood from an external point of view. This limitation prevents the human designer from fully becoming immersed in the role of the speaking subject and intrinsically vocalizing nonhuman agencies. I argue that understanding new orientations alone does not bring about change; it is only when these understandings are used to explore how to act differently that unlearning and transmogrification actually happen. It is helpful to explore and pivot towards taking an embodied position now that the role of the speaking subject is better outlined and understood. Without this initial step, it would have been dismissive of the theoretical concepts of more-than-human to commit to a new position without fully understanding its purpose or intention. Therefore, to understand, accommodate for, and adapt to the speaking subject and its new orientations on a practical and deeper level, there is a need for the human designer to understand the role from an internal position.

Following this reflection and moving into the next design case, I ask how can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?

Chapter 5. The Case of the Morse Things

As mentioned in the last chapter, reflections on the new orientations for the speaking subject help inform the research question and proposition for this design case. As such, in this chapter, I use the case of the Morse Things as a setup and basis for exploring the following question: How can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?

My proposition for this case is: HCI designers can embody the speaking subject through poetry and take the orientation of a poet to better understand their role from an internal position.

I explore how an internal positioning can help validate the multiple angles from which the speaking subject can operate and voice other nonhuman agencies. The following sections unpack the ways in which HCI designers can pivot towards taking an embodied position using poetry to better understand their role and adapt to the speaking subject. As a reminder, poetry, in this case, is used as a new orientation towards the nonhumans of design—a queering lens for the human designer through which it embodies the speaking subject differently.

5.1. Theories as Nonhuman Designers

Revisiting Wakkary's idea of the designer as both human and nonhuman, I consider theories as the nonhuman designers in more-than-human design. I argue that philosophical theories and concepts hold agency in assisting the speaking subject to work with them more directly and collaboratively in practice. However, theories have not been viewed as such in design HCI. As mentioned earlier, inserting more-than-human theories in design is somewhat recent in HCI, and the particular relations between the human designer and the adopted theories in creating new methods, techniques, and approaches remain untold. I argue that when considering adopting more-than-human theory as the nonhuman designers, the speaking subject is required to give way to intermediary agencies that are the dwelling places for such theories. Like the prints in the previous design case, intermediate actors such as books and other nonhuman sources holding theoretical concepts and ideas provide a window into understanding nonhuman arrangements, positions, and orientations in relation to each other and the

speaking subject. As such, it can be explained that theory encourages the speaking subject to acquire resonance and nuance when appended to design as the nonhuman designer. Therefore, I use the present stage of the Morse Things as an opportunity to rethink and reframe the relationship we, as designers, can form differently with theory within our process. At this stage, I attempt to engage with the ideas put forth in three theory books: *Vibrant Matter* (Bennett, 2010), *Sympathy of Things* (Spuybroek, 2016), and *Things We Could Design* (Wakkary, 2021). These references are the intermediary agencies that the team considered exploring in redesigning the Morse Things. Inspired by Ahmed, I turn to what has been somewhat close to me but hidden in the background of my professional practice: poetry.

5.2. Embodying the Speaking Subject by Writing a Poem

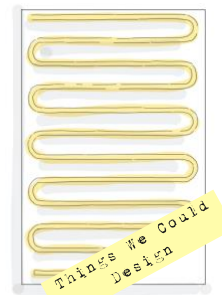
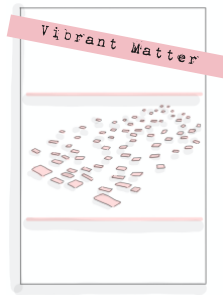
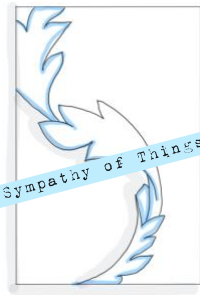
Ever since I was a child, I have been writing poems and lyrics as a creative outlet. While I hold poems near and dear as expressive ways for making sense of the world and orienting towards it, from an academic standpoint, it seems rather odd to discern them as a strategy to gather and connect philosophical thought for design purposes. However, building on the few examples of work that use poetry in research, and as previously discussed, this is precisely what Ahmed and Light argue for. Therefore, I offer HCI designers insight into embodying the speaking subject through writing a poem. As a response to HCI's call for moving against the status quo (Harmon et al., 2016; Light, 2011) and embracing the complexities of the theoretical concepts, I push against the normative methods and strategies for sense-making and reorient myself towards what has always been available to me, yet in the background. As Hoult and co-authors suggest, poetry is a form of embodiment (Hoult et al., 2020), through which I explore how HCI designers can begin to experience the role of the speaking subject internally. The poem is strange, unfit, or somewhat queer to prior modalities that help the speaking subject connect theories to an intrinsic articulation for nonhuman agencies that suggest design actions. Consequently, it offers a queering outlook toward ways of knowing by depicting alignments between different ideas from the three theory books. For writing the poem, I bring together two poetry techniques:

Inspired by Dadaist writer Tristan Tzara, I loosely use a cut-up technique. Simply put, a cut-up technique separates a written text and rearranges it to create new texts (Elger, 2004). It uses fragments from diaries, books, and magazines and positions them next to

each other to form lyrics and poems. This technique was first used by Dada artists and decades later adopted as a creative technique by writers and musicians such as William Burroughs and David Bowie. In writing this poem, I gather fragments from the three theory books and assembled concepts and words based on a technique called *rhyming couplets*. A rhyming couplet is typically a two-line poem that shares the same rhythm and end rhyme. This technique fosters attention and gives substance to ideas and words. In this case, rhymes can encourage the writer—the speaking subject—and the reader—perhaps another speaking subject in the future—to pay attention to particular words that hold ideas while being part of a larger assembly or message. More importantly, rhymes help strengthen the meaning and ideas of the poem (Obermeier et al., 2013). A good example of rhyming couplets, where ideas are arranged playfully and in an engaging articulation, is in Dr. Seuss’s poems (Nel, 2005). By coupling the two techniques, I intentionally use this combination of the cut-up and couplet techniques to explore how my position can shift from an academic design researcher to an amateur poet and how that embodied experience extends the role of the speaking subject.

Considering the importance of creating ongoing dialogues and conversations across speaking subjects—carried from the findings from the previous case—I choose to direct the poem as an invitation to the HCI community, encouraging them to look past the normative human-centered ways of understanding the world; all with the hopes of dis/reorienting the readers through the poem and illustrations towards experiencing a queer phenomenology. Therefore, the rhyming technique strengthens the poem in drawing attention, provoking, and cultivating discourse around the necessity to consider design as more-than-human, but in doing so, recognizing that theory can be regarded as a nonhuman designer in this context. In closely reading the three books, I then begin to write the poem from a position of partial knowing, yet uncertain of how the words come together and will be arranged. In allowing the poem to shape organically as particular rhyming words sit next to each other, the speaking subject and the nonhuman designers collectively guide the narrative’s direction. This also supports the findings from the previous case, in that a more-than-human context is a collaborative space for both resistance and playfulness co-occurrence.

The poem is presented in a series of caption-less figures and encourages the reader to think differently about the ways to understand, adapt, apply, and generate more-than-human concepts in a more-than-human world.

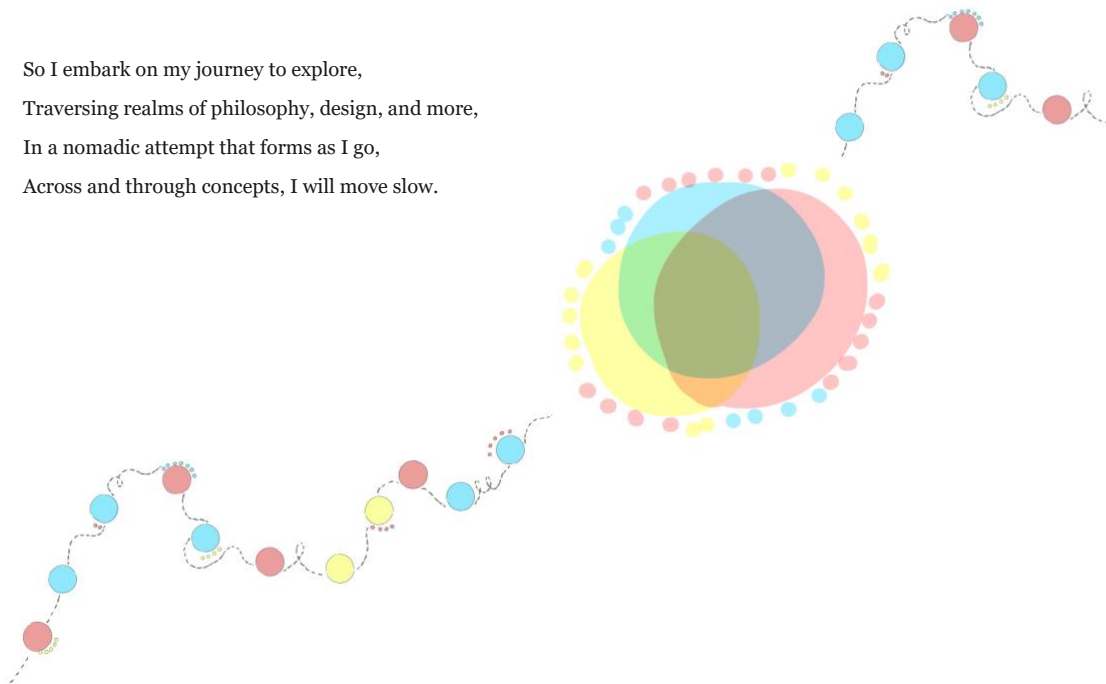


To the CHI community and all involved,
I present a poem recently evolved.

From my readings and reviews of theory books,
I bring forth a perspective that looks,
Across disciplines, thoughts and the mind,
Or what is explained as feelings or something combined.

A new way to mobilize and see,
To understand knowledge or what could there be,
Beyond our typical ways of knowing,
Seeking growth through nonhuman undergoing.

So I embark on my journey to explore,
Traversing realms of philosophy, design, and more,
In a nomadic attempt that forms as I go,
Across and through concepts, I will move slow.



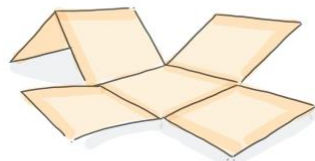
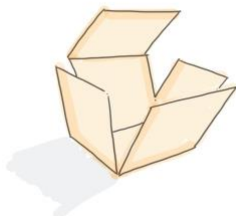
From a series of thoughts presented by three,
Jane Bennett, Lars Spuybroek, and Ron Wakkary!



Starting with critique on human exception,
We ought to redirect our worldly perception,
Through troubling the human uniqueness,
Highlighting our anthropocentric weakness.

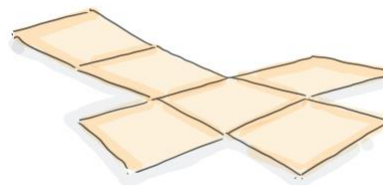


Drawing from Bennett and Vibrant Matter,
Depicting the world ontologically flatter.



For Spuybroek, flatness is *gothic ontology*,
Existing variations, a new epistemology.

For Wakkary this is unbuilding design,
A nomadic way to diverge or align.
It's the relationalities, conflict, and overlapping,
The plural alternatives that he is unpacking.



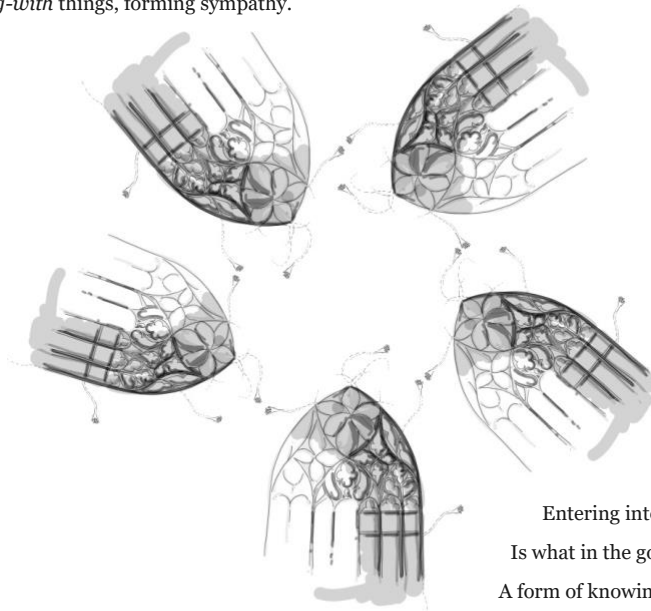
An *active becoming* and ongoingness,
Co-shapes a new form of togetherness.



For Bennett, she begins to unfold,
Her insights and thoughts on the thing-world.
The call of things is easy to ignore,
Turning our attention to those unnoticed before.

This leads to what is called *thing-power*,
Nonhuman agencies— not so different from our.
The life-matter binary no longer exists,
As long as human-nonhuman assembly persists.

Spuybroek sees things differently,
Through *feeling-with* things, forming sympathy.



Entering into rather than going around,
Is what in the gothic, Spuybroek has found.
A form of knowing, that comes from the feel,
Knowledge which typically cannot reveal.



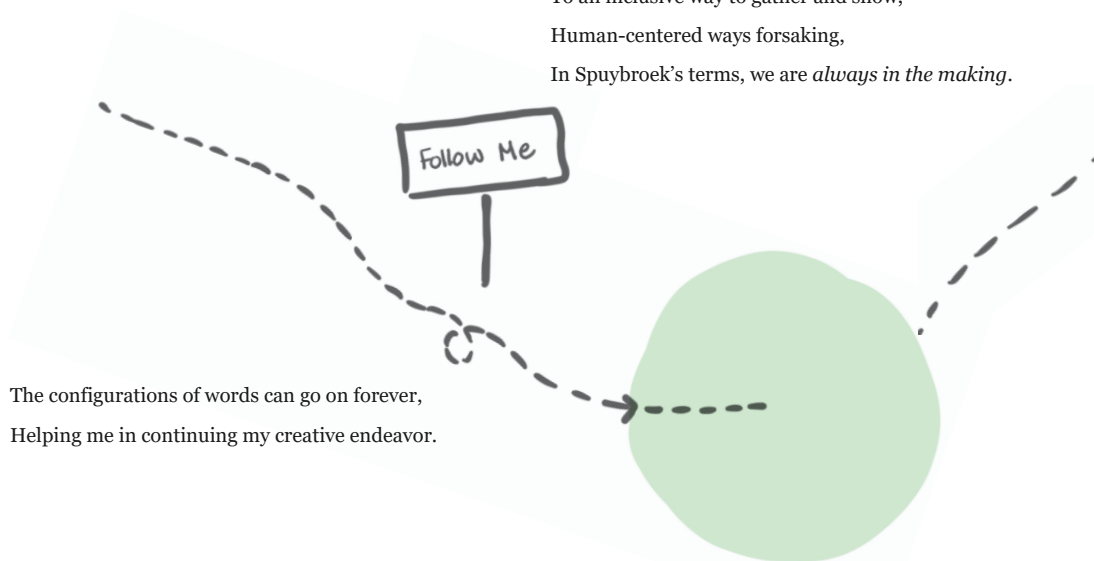
Inverting perceptions to things that could be,
With nonhumans we form Wakkary's *constituency*.

Humans and nonhumans, whatever there is,
We are all interdependent and relational that is.
It's the material world, horizontal relations,
Humans, nonhumans and all their vibrations.

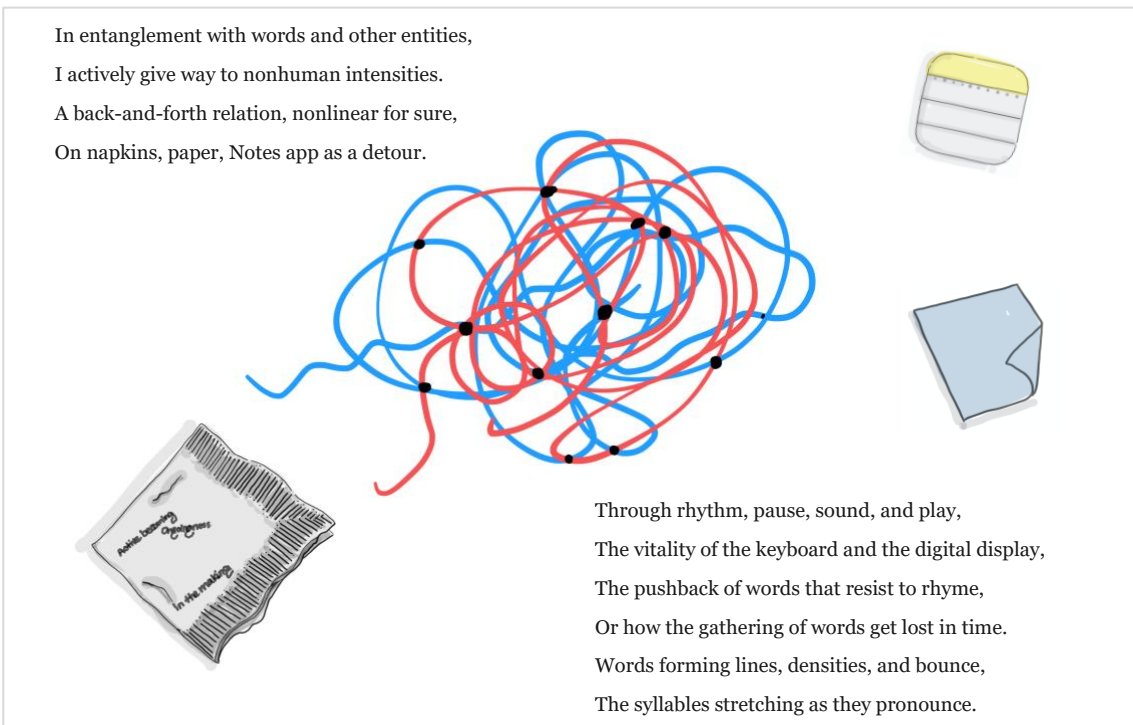
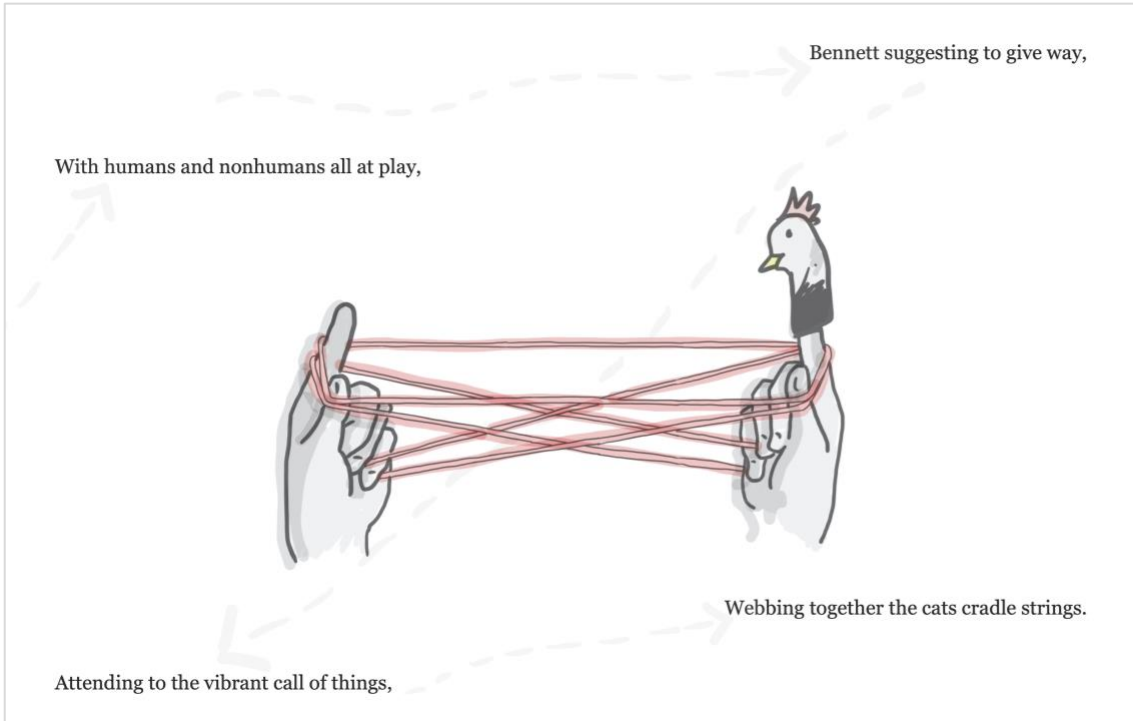
Matter as vital, lively, and quivering,
Forming a world through emergent considering.

Allowing nonhumans to guide the making,
Transmogrification caused through norm-breaking.

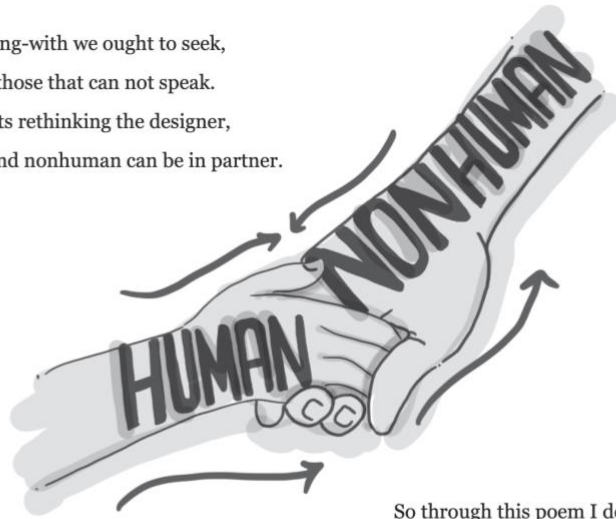
Following the thread of words and sound,
I arrive at Wakkary's *repertoires* unbound,
From methods that we already know,
To an inclusive way to gather and show,
Human-centered ways forsaking,
In Spuybroek's terms, we are *always in the making*.



The configurations of words can go on forever,
Helping me in continuing my creative endeavor.



Through designing-with we ought to seek,
The agencies of those that can not speak.
Wakkary suggests rethinking the designer,
Where human and nonhuman can be in partner.

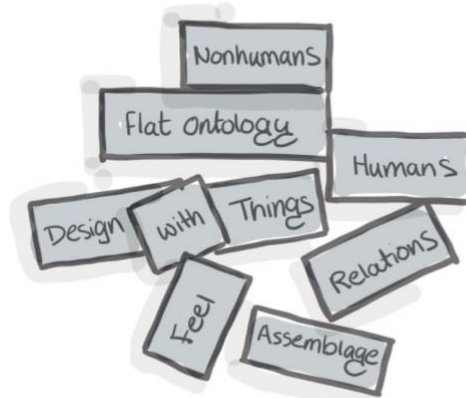


So through this poem I demonstrate with care,
A sense of humility in all that I share,
A ludic gathering through copy and paste,
Fragments from books, not-knowing embraced.

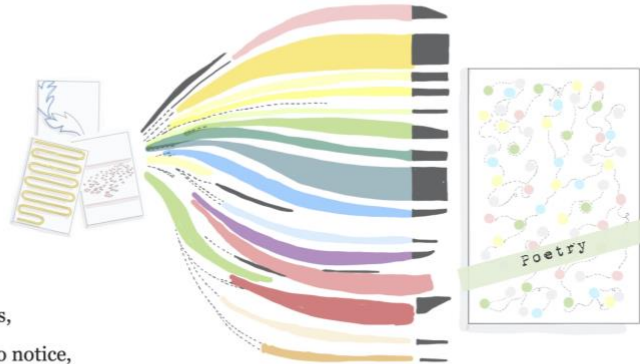
An equivalence among all things that perform,
A flat ontology if you will, to transform,
Our encounters with the world at large,
Understanding a nonhuman assemblage.



Turning to words and how they hold power,
In relation to me, or to each other.



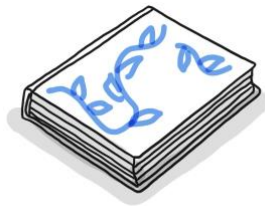
I have attempted to insert the words,
Generating new sympathies, just like the hoards.



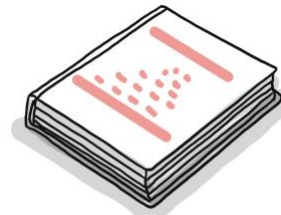
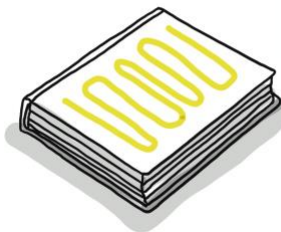
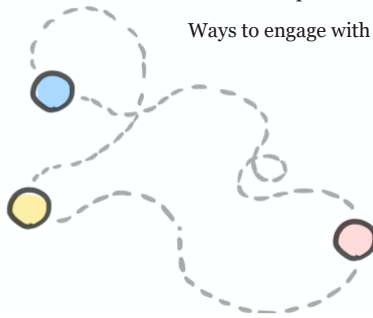
Avoiding to presume, see, or focus,
While concepts in books ask me to notice,
Words feeling words across the three,
Has co-created a nomadic assembly.

A way to access thing-power according to Bennett,
Is turning our attention to words and giving them credit.

A form of insight into nonhuman agency,
Can be pursued through such poetry.

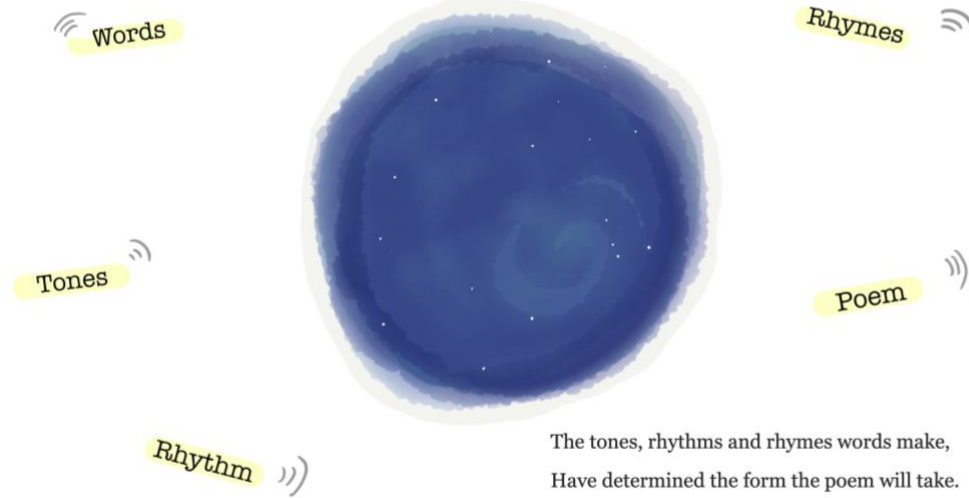


From *Sympathy of Things*, and *Things We Could Design*,
To *Vibrant Matter* and calling of the hoards intertwine,
These concepts invite us all to think beyond,
Ways to engage with nonhumans and how to respond.



How can we work with nonhuman agency?
Or in what ways can we design more responsibly?
As a researcher, and a human designer,
I'm literally responding to a call of matter.

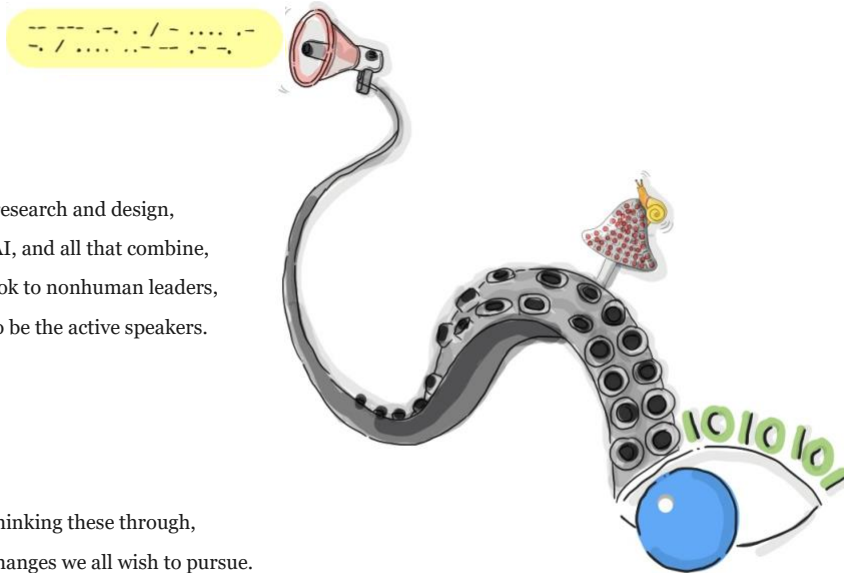
Sympathy belongs within an exploratory space,
Feeling-with things and showing some grace.
What things feel when they shape each other,
Is sympathy of words from the books that inspire.



Looking further I slowly realize,
How the more-than-human world applies.

Within, across research and design,
Through data, AI, and all that combine,
Outwards we look to nonhuman leaders,
Helping them to be the active speakers.

Guiding us all thinking these through,
Achieving the changes we all wish to pursue.



From Wakkary's *design-with* and Spuybroek's *feel*,
Bennett's *assemblage* of all that appeal,
Avoiding to project what the end goal will be,
I have arrived at this point, unknowingly!

From here, I begin to understand,
How things come together and go hand in hand.
Accepting the limits of vertically standing,
Horizontally moving is the way of expanding.



So let's see the world from another angle,
Human and nonhuman forming kinship and entangle.
The desire to see what nonhumans can do,
Stepping away from knowing *what is*, embracing a new.



From the *feeling-knowing* that this poem accounts,
To *designing-with* things, I provoke and announce,
The path to the future is perfectly clear,
Join me in exploring it, starting from here:

With nonhumans attending to what *could be*,
We can co-shape a new CHI ecology!



5.2.1. Reflection on the Poem and the Speaking Subject

The poem unfolds the internal positioning of the speaking subject in relation to the nonhuman designers— the philosophical theories and concepts. While the rhyming aspect may be considered somewhat amateurish or silly, I argue that the juxtaposition of its simplicity and the complex philosophical concepts give the poem a queer disposition and the speaking subject a new angle for becoming.

The poem can be considered a queer enactment of what Ahmed refers to as “bodies becoming objects, but also the disorientation in how objects are gathered to create a ground or clear a space on the ground” (Ahmed, 2006, p. 160). The bodies, in this case, consist of the human body—the speaking subject— and the nonhuman bodies, which are the books, theories, concepts, words, and sounds that, in bringing together, create the *grounds* on which the new design orientation can later occupy.

The poem opens by acknowledging the world as more-than-human, a position for where I, the speaking subject, not only reorient myself towards the nonhuman designers but also establish kinship and partnership with them. As the poem progresses, I oscillate between noticing, gathering, listening, partnering, assembling, pausing, following, speaking, and reflecting. These ongoing engagements and exchanges happen when nonhuman intensities are brought forth by the nonhuman designer, enabling me to experience an eccentric orientation. I argue that without this process, the design direction and activities may be conceived prematurely and fall short in addressing the main concerns that more-than-human design aims to tackle.

Other findings are the serendipitous reflections that organically make their way into the poem. They show how the speaking subject’s positionality is an interplay between giving voice to the nonhumans and the internal voice of the speaking subject. Perhaps the poem can be considered an ambiguous attempt, by which, on behalf of the nonhuman designer, I trace the direction towards a space for design that can “feel at home” (Ahmed, 2006, p. 10), where the home is more-than-human. This echoes a consideration for understanding design as a space that acquires direction in supporting matters of cohabitation. As Ahmed explains, “we might walk slowly, touching the wall, following it, until we reach a door. We know then what to do and which way to turn” (Ahmed, 2006, p. 7). This strongly resonates with the epistemic stance of design as

more-than-human and how the human designer finds new orientations and paths by following their nonhuman counterparts. Extending our scope to include theories as nonhumans in the design process situates the speaking subject in a strange or unfamiliar setting but ultimately points to new possibilities informed by external arrangements and internal knowing.

As applied in the poem, rhyming couplets help regulate the flow and pace of the poem. They accommodate white space on the page, which, compared to a solid block of text, can enhance other qualities of the speaking subject. For example, in this poem, the emptiness or separation of lines can be understood as moments of switching orientation that are either left empty or later filled with illustrations. As a result, the poem is a light, playful, familiar, yet oblique space for positioning, distancing, and disorienting the speaking subject (the writer) in relation to the objects of writing (e.g., the books, concepts, texts, tones, sounds, images, the note-taking devices, etc.). In a way, the two techniques spark queer relations and position I and the theories on the same plane to co-create new directions for the poem.

As the speaking subject, in this process, I embodied and practiced the conceptual orientations of slipping, tilting, and oblique becoming carried over from the previous case. Treating words, ideas, and theories as nonhumans of design adds emphasis to noticing the diverse range of nonhumans the designers work with. In a way, the poem not only brings attention to the theories but also brings together multiple speaking subjects from different temporalities— those behind the books and thought experiments, the active human member of the design research team, and the future reader. Working with a limited collection of theories and cut-ups as the nonhumans at hand and composing them rhythmically also reminds us of how the speaking subject embodies its position as a bricoleur. The poem's interplay of illustrations and words strengthens the bounds between thought and action. It guides the pace through which the speaking subject moves across abstract ideas and practical means while reinforcing ongoing experiences of disorientation and impermanency.

Additionally, in line with Ahmed's migrant orientation, which is facing different directions at the same time, and the speaking subject as a queer actor— emerged from the past design case— the speaking subject embodies an *anti-identity* (Walters & Auton-Cuff, 2009). An anti-identity is a positioning that reflects ways the speaking subject is not. A

nonanthropocentric identity can also be a form of anti-identity to which the speaking subject complies and gives its autonomy away in exchange for plurality and multiplicity. This confrontation is mainly reflected in the poem when experiencing pushbacks, resistance, and internal discomfort in connecting concepts across theories or rhyming instead of designing. I argue that poetry, as a strategy that is not design, can accommodate a range of agencies, enabling the speaking subject to identify a *third* or *queer voice*, one which is not fully human and not entirely reliant on nonhumans.

The manifestation of polyvocality embedded in this process diversifies the voice of the speaking subject when speaking on behalf of other agencies. I argue that the intensities offered by the nonhuman designers—the concepts from each book in this case—help manifest the third voice and generate new *grounds* for other ideas to emerge.

Lastly, in an attempt to challenge the normative approaches for diversifying and mobilizing new ideas across the field, I consider my particular use of the rhythmic poem as an attempt to demonstrate a new form of communication in HCI. The rhythmic poem can be considered as a form of research creation—an established approach to research in Canada’s academic milieu that “combines creative and academic research practices and supports the development of knowledge and innovation through artistic expression, scholarly investigation, and experimentation”³. In HCI, rhythmic poetry can be considered an open-ended, playful, strange, and uncomfortable practice, which places emphasis on unlearning and giving the HCI designer an anti-identity. In doing so, and by embracing the displacement from a designer/researcher to a novice poet, the process modifies new orientations for the human designer to assume a more humble position in collaboration with the nonhuman designers.

5.2.2. Summary of Findings

In this chapter, I used poetry as a method for embodiment and an exercise for adapting to the role of the speaking subject from an internal position. In so doing, I showed how the speaking subject evolves and generates new orientations and

³ <https://www.sshrc-crsh.gc.ca/funding-financement/programs-programmes/definitions-eng.aspx#a22>

trajectories throughout the poem. As the speaking subject, I also took a queer angle, reviewing theories and their possible connection. Attempting to work together with the nonhuman designers helped in viewing how philosophical concepts come together and how nonhuman agencies such as writing tools, words, materials, and the writing setup contribute to how I, as the speaking subject, grapple with the constant connections and disconnections, orientations and disorientation, and placements and displacement of thought and positionalities. I argue that the intensities of the concepts from each book play as nonhuman agencies that inform my direction in gathering words, assembling ideas, forming rhythms, and shaping the poem collaboratively. In turn, the poem shows how the speaking subject is situated within a more-than-human context long before engaging with the design space for iteration and making. Simplifying complex ideas and using rhymes to draw attention to particular concepts and relations help direct the speaking subject, to better understand the grounds on which they are working within. As such, the speaking subject is equipped to carefully choose which nonhuman agencies can continue and which ones must be dismissed as the design process progresses.

Following this internal positioning, I am closer to what I referred to in earlier chapters as a new *home*. In gathering and working through the theoretical concepts of designing-with, sympathy of things, and material agencies and vitalities, the process enabled me to *create a ground or to clear a space on the ground* for the nonhumans that occupy the collaborative space in more-than-human design. I begin to take new bodily orientations, such as following the lines on a column, listening to the call of fabric waiting to align with a needle or noticing the bumps on the ceiling sitting firmly upside down as I lie horizontally on the ground. These new bodily orientations virtually prepare and inform how the human designer can enter into a collaborative space with other nonhumans of design, namely broken Morse Things, to collectively rethink and iterate their design.

5.2.3. Reflection on the Proposition

At the beginning of this chapter, I proposed to engage with theoretical concepts as nonhumans of design through poetry as an initial step for the human designer to embody the role of the speaking subject.

In this section, I reflect on this proposition and explain how I have answered the related research sub question: How can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?

Understanding the speaking subject from an embodied position adds to the value and integrity of the role. Accounting for theory as the nonhuman designers and attempting to collaboratively write a poem deepens the speaking subject's understanding of the particular attitudes, actions, and responsibilities the role entails. In coming together, the speaking subject and nonhuman designer collaborate and decide what human and nonhuman agencies and design directions come into view. Additionally, the degrees to which resistance and playfulness contribute to queering the human designer's identity in relation to nonhuman designers can be considered the main takeaway for how embodying the role details internal and bodily orientations. The ongoing shifts of agencies, paths, endings, or outcomes are beneficial to the speaking subject in that it cultivates a new form of critical reflection.

As an underexplored method in HCI, this case has demonstrated how poetry can be a productive method for the human designer to consider for transitioning from one form of becoming to another. Rhythmic poetry as a research creation, attends to the complexities, networks, and assemblies of epistemologies, ontologies, and phenomenologies and supports exercising various orientations, resonances, and nuances. It not only gives attention to the significance of theory but also asks the human designer to become more horizontal, notice, and include other nonhuman agencies in co-constituting what it means to be a designer in a more-than-human world.

Chapter 6. Concluding Remarks and Future Work

In this chapter, I first reflect on my account as the first-person design researcher. I will go over the limitations of my research and revisit the research questions and propositions. I will then suggest future work directions and give a summary of my contributions to conclude the thesis.

6.1. Reflection on the First-person Researcher

As the first-person design researcher, it is important to critically reflect on the processes and outcomes.

As the first-person researcher, I was also required to assume a new orientation in the first design case. Given that I was part of the original research process, I had to practice distancing myself from the original position and was confronted with levels of resistance to unlearn the assumptions tied to the original research. The distancing had to be partial, not too far from the original events or the gathered data from interviews such that the process became unknown, but far enough to disconnect me from the original orientation and commitments. Oscillating nomadically from one perspective to another can be a tricky task and, at times, confusing. Finding the appropriate distance from my original role required pause, patience, self-reflection, and thought iteration, which was possible through a queering lens.

In the second case, I occupied space differently as the speaking subject. I embodied the role by positioning myself directly with complex theories that I considered active partners. This led to a compelling revelation in my understanding of what it means not only to speak but also actively listen to nonhuman agencies. This realization helped me understand the poem as more than a medium for gathering, sensemaking, or storytelling, but a deeper appreciation for the complexities of human and nonhuman entanglements that the more-than-human context offerings.

It becomes increasingly clear that given the ubiquity of agencies and their range of scale, form, relations, and qualities, I must reconsider my attachments to my existing knowledge and professional experiences. The compelling queerscape of the two cases also inspired me to find comfort in my own queer positionality as the first-person

researcher. However, at times overlapping experiences of uncertainty and unsettling orientations challenged my commitments and put them to the test. However, I continued to stay with the trouble (Haraway, 2016) as I was determined to explore what it takes to assume a new role and view design and the designer from a different angle. Therefore, my persistence reinforced me to form a deeper understanding of the nonhumans that I encountered.

Although my orientation truly began to shift after my attempt at co-authoring the poem with the nonhuman designers, I argue that transitioning from an established position varies from person to person, and its process and pace are dependent on the level of a person's privilege, willingness, and curiosity.

6.2. Limitations

The first limitation of my work is that it only focuses on western philosophies to explain our more-than-human world and does not engage with other forms of knowing, such as indigenous knowledge that have a long history in accounting for nonhumans and their vibrancies. The work would benefit from including such perspectives to broaden and diversify what it means to design within a more-than-human world.

While my research questions aimed at HCI designers, my methods were other than design. My choice of the two methods— analysis and poetry— can be explained by my failure to engage design directly with theoretical concepts and philosophical perspectives. I also recognize that the techniques I chose for writing the poem are one of many ways poetry can be manifested.

Transitioning and taking queer identity takes time, and given the urgency of acting from a more-than-human perspective, it might be valuable to explore other ways for HCI designers to responsibly take nonhumans into account and take on the role of the speaking subject that is more aligned with design practices.

Lastly, bias is also an inevitable downside of taking a first-person approach. However, continuous reflections, peer reviews, and discussions mitigated such consequences. The first-person approach limits the work, particularly the poem, to be fully generalizable. Therefore, in future research, it would be valuable to present the poem to a range of audiences in the CHI community— designers and non-designers— to understand its

applicability and usefulness as an invitation, a method, a new form of communication, and knowledge mobilization.

6.3. Revisiting Research Questions and Propositions

In this section, I revisit the research questions, sub-questions, and propositions and summarize the findings supporting the speaking subject's role in more-than-human design.

Throughout this research, I have explored ways to expand the concept of the speaking subject to collectively answer my main research question:

How can HCI designers better understand their role as the speaking subject in the context of more-than-human design?

I argued for design as more-than-human in this research and positioned two cases within it. In doing so, I aimed to reveal and develop new understandings of the human designer as the speaking subject.

The first proposition entailed: **HCI designers can understand the importance of new orientations for the speaking subject through a queering lens in a retrospective analysis.**

In chapter 4, retrospective analysis and queering (queering analysis) were used as a strategy and a lens for unpacking what it means to articulate the human agencies as speaking subjects and answering the following sub-question:

What can HCI designers understand about the speaking subject when exploring the role through a queering lens?

My findings support and contribute to the following understandings and main takeaways about the importance of the role of the speaking subject and its new orientation:

In more-than-human design, the human designer does not act alone and collaborates with nonhuman agencies in the process of design. Acknowledging this stance is the first step in exploring other orientations. In this context, ontologies, phenomenologies, and epistemologies take a queering angle and transforms the design space into a

queerscape where humans and nonhumans come together to form queer relations. Queering strategies such as distancing, obliqueness, slipping away, and abandoning help the speaking subject to disorient and face nonhumans and engage with them on a much equal plane of becoming. Making trouble also has significance for the speaking subject in that it is a rebellious act of disruption for pushing the familiar aside and surfacing suppressed agencies.

Lastly, new orientations bring about new attitudes, such as confusion, frustration, discomfort, and resistance. Thus, the speaking subject is a role that holds resilience at times of uncertainty and disorientation. The speaking subject is a queer actor, a negotiator, and a bricoleur who traverses temporally. These positions force the speaking subject to practice flexibility, stay with the trouble, and recognize the oddness and discomfort of the role in relation to the available agencies.

These findings benefit HCI designers in providing insight into different orientations, which can be expected when understanding their role in a more-than-human context.

The second proposition entailed: **HCI designers can embody the speaking subject through poetry and take the orientation of a poet to better understand their role from an internal position.**

In chapter 5, poetry, particularly a rhythmic poem, was co-authored with theories of nonhuman designers. This strategy was used to support and explore the embodiment of the role of the speaking subject to help answer the following sub-question:

How can HCI designers embody the speaking subject differently through taking a new orientation for better understanding the role?

My findings and main takeaways from this proposition contribute to revealing strategies, understandings, and experiences for when and how the speaking subject is embodied:

The designer in more-than-human design is not exclusive to the human. As human designers, the more we can offer ourselves that acceptance, the more we are able to remove past expectations and orientations and begin to extend outwards and occupy space differently. Theory in more-than-human design does not exist in separation to practice. Considering theory and objects of writing as nonhuman designers is a valuable effort in our willingness to let go of our autonomy and show our vulnerability.

In poetry, human and nonhuman designers share agencies, form relational ties and identities, and co-constitute directions and courses of action that support their mutual benefit. Therefore, it is a relational and co-constitutive type of knowledge-making in which theory and words participate as matter.

Poetry is a useful method for embodiment and sensemaking practices. It is particularly valuable to those willing to understand their role more profoundly. It grounds the speaking subject and prepares the human designer to take on new internal and external bodily orientations, responsibilities, and actions of a speaking subject. While acting from an internal position, the identity of the speaking subject is experienced as queer, nonanthropocentric, or anti-identity as it is in constant shift and repositioning. Poetry also clears the ground for the speaking subject to speak on behalf of its collaborator—the theories— through a queer voice that is not fully human nor nonhuman but of a polyvocal manifestation for mutual becoming. Here, the goal of the speaking subject is not to voice all but those suppressed by cultivating a queer voice that comes through in various forms, including poetry.

Lastly, poems can also be used as open invitations to HCI designers and scholars, or any other community for that matter, to consider beginning their transmogrifying journey in working with the broader network of humans and nonhumans.

The contributions of the two cases show the complexity of the speaking subject and its significance, which other researchers can unpack and further develop its subtleties and nuances. In this research, I explained the importance of the speaking subject and showed how HCI designers could adapt to the role through poetry. Not only in answering the research questions did my findings offer designers an extended understanding of the speaking subject, but it also inspired me to find greater value in designing with nonhuman agencies. As I look back on my journey, it is difficult for me not to understand design as an interconnected and interdependent network of agencies. The processes and, in particular, the poem instilled and ingrained a significant shift in the way I view design and pay attention to my surroundings as potential partners, collaborators, co-authors, co-designers, and co-workers.

In investigating the role of the speaking subject, and as the poem initiates, my research advocates for immediate consideration for repositioning our view towards a more

inclusive plane, a queer phenomenology, or a collaborative becoming. Lastly, this research gives us the initial understanding and tools to reroute and move from a path that has served its time towards a path better suited for the type of designers we strive to become in a more-than-human world.

6.4. Future Work

In furthering my exploration for what my role entails in the context of more-than-human design, I will continue to stay open and flexible in taking new orientations and identities. While considering this endeavour, I still find it disorientating and uncomfortable to place focus on engaging and noticing overlooked nonhuman agencies as partners. Perhaps this is inevitable for a designer with my background or perhaps it can be perceived in resonance with queer identity. Therefore, I am also committed to not lose sight of the human agencies that typically reside in the margins.

In line with my interest in further exploring sensemaking techniques for the speaking subject, I see experimenting with other forms of poetry, collage, zines, and comics as possibilities for future directions.

Moving forward, I take initial steps towards designing with the nonhumans of Morse Things. As explained earlier, the case of the Morse Things is an ongoing exploration for ways to iterate the design from a more-than-human angle. I use the poem as a backdrop from which I begin to design-with the broken cups and bowls as the nonhuman partners and consider other methods such as repertoires (Wakkary, 2021) to inform other aspects of designing within a more-than-human context. Our short paper provides an overview for how we plan move forward with iterating the design of the broken Morse Things (Behzad et al., 2022).

6.5. Conclusion

In this thesis, I actively explored the role of the speaking subject. I built on philosophical ideas and more-than-human design concepts to depict how design is indeed more-than-human and the significant role the speaking subject plays. Acknowledging the world as more than human was an initial step in rethinking other possibilities for the designer's position in design. Against this backdrop, using the first-

person approach, I offered insight into viewing the human agencies as speaking subjects and how, through a queering analysis, they move towards a new *home*.

My work also provided an entry point for established HCI designers to see the importance of their particular role in a new light and on the grounds of more-than-human design. Illustrating the role of the speaking subject in different orientations helped concretize the significance of the role and suggested a deeper reflection on roles and relationships we form with humans and nonhumans as designers. I also explored new embodied orientations for the speaking subject by collaboratively writing a poem with nonhumans to encourage HCI designers to take a similar approach to better understand their role in relation to nonhumans. While queering is useful in increasing awareness within HCI, poetry accentuates it by allowing the human designer to witness how nonhumans inhabit the design space and lead the narration and possible design trajectory.

Lastly, the work helped in viewing how our role is not fixed and how we must reconsider our attachments to our existing knowledge and professional experiences. Speaking subject is indeed a complex role, and it can be rewarding for those willing to be open, flexible, patient, and take comfort in the uncomfortable. Therefore, I invite other designers and researchers to consider exploring other ways to expand the role, its goals, and its qualities to inform the ways in which we can begin to design more exclusively with our more-than-human world.

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