What do we Teach when Teaching More-than-human Perspectives in Computing and Technology Design Education? – An Emerging Pedagogical Framework

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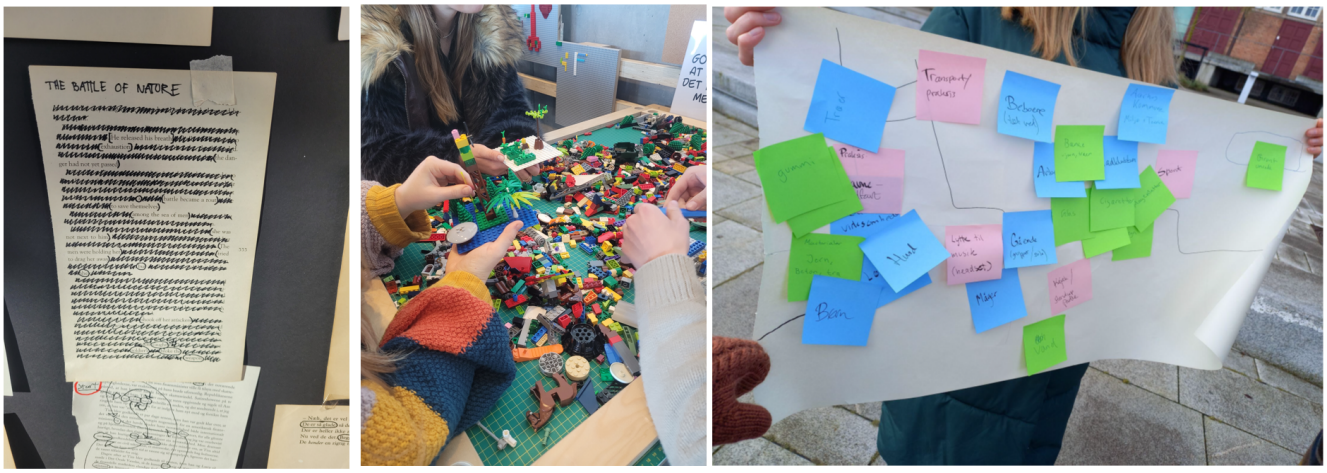

Figure 1: Students working with more-than-human perspectives (emphasizing, prototyping, and stakeholder mapping during more-than-human ethnography) in a design project course with the theme "Increase Connectedness with Nature in Urban space" (Aarhus University, 2024).

ABSTRACT

This paper aims to draw attention to what and how we teach more-than-human perspectives in computing and technology design education. There is a growing interest in the more-than-human in design research and practice, as a response to social-ecological-technological-related challenges faced in a world of ecological and climate justice-related limits. Acquiring the knowledge and skills to design computing and technologies that support a plurality of human and non-human lifeforms and flourishing biospheres, will be crucial for future generations of technology design practitioners. How do we then educate responsible designers? In this paper, we present ideas for an emerging pedagogical framework for teaching more-than-human perspectives in computing and technology design education to stimulate and provoke a discussion on what and how we should teach. Through outlining this pedagogical framework, we ask the LIMITS community: what are we missing?

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KEYWORDS

More-than-human, computing, technology design, higher education, pedagogical framework

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1 INTRODUCTION

Living and acting in a world of ecological and climate justice-related limits calls for action and concrete proposals to rethink the role of computing in society and the process of designing new technologies. In the fields of computing and technology design, we currently see a growing number of research initiatives exploring conditions for sustainability and plurality in design by going beyond human-centred thinking, towards more-than-human worldviews

and perspectives [10, 13, 19, 20, 24, 25, 43, 72]. The driving forces behind the initiatives vary, but a common motivation relates to issues connected to environmental *sustainability* addressing multiple crises of the Anthropocene [6, 12, 30, 56, 65, 75]. As we are entering into a fourth wave of entanglement human-computer-interaction [20], we also see emerging research exploring our intimate entanglement with technology, and how the human *body*, more-than-human *things* (technology) and more-than-human *species* (animals, plants, ecosystems etc.) are intertwined and interdependent [22, 23, 70]. Instead of framing the human as an independent actor controlling the world around her, more-than-human perspectives highlight the co-constitutive role of nonhumans. Other motivations behind emerging research relate to notions of *representation* in terms of human and nonhuman stakeholder representation in design processes and decision-making, but also how different stakeholders are represented and how these representations are mediated through technology and design [1, 36, 55].

As stated in the United Nations' Sustainable Development Goals [52]), to achieve sustainable development, we need to address the three levels: people (society), profit (economy), and planet (biosphere) since they are all intertwined. Up to now, the computing and technology design community has tended to incorporate the perspectives of people and profit, but not as much the planet and our entanglement with complex social-ecological-technological systems [10, 20]. Embracing a more-than-human design approach includes addressing planetary perspectives where our shared planet and all the living organisms and communities that depend on it are put at the centre of the design process [4].

Making such an ontological shift from human to more-than-human centeredness is not only important for future research and development paths, but also for rethinking what we teach the designers of tomorrow in the technology design curriculum [28]. Acquiring the knowledge and skills to design computing and technologies that support a plurality of human and non-human lifeforms and flourishing biospheres, will be crucial for future generations of technology design practitioners [10, 51]. How do we educate responsible designers about more-than-human perspectives [78]? There is a gap between the socio-environmental problems that need to be solved and the human-centred design methods that are professionally practised and taught in technology design education with a particular focus on human users (e.g., user experience design and user studies).

In line with Bekker et al. [4], we highlight the importance of challenging the dominating paradigm of computing and technology design practices primarily focusing on people and profit, by also including planetary and more-than-human perspectives in the future technology design curriculum. Perhaps the time has come to further examine how incorporating more-than-human perspectives will influence signature pedagogies for technology design education[47]? This could help us to detect the characteristic forms of teaching and learning, as they define what counts as knowledge in the field, how things become known, and how to teach students along the three dimensions to *think*, to *perform*, and to *act* with integrity [63]. This also includes relational accountability [76] where technology designers can hold themselves accountable to more-than-human stakeholders affected by the implementation of a new technology. Justice related to who/what on our planet benefits from a new technology is key.

To spur a discussion on how we can create conditions for students to grow into responsible designers who strive for sustainability and plurality in their designs by addressing more-than-human perspectives, we pose the following questions:

- WHAT could we teach to address more-than-human perspectives in computing and technology design?
- HOW can we teach more-than-human perspectives in computing and technology design?

The main contribution of this paper is to open up for discussion about teaching more-than-human perspectives in computing and technology design education. We do this by asking for constructive feedback and critique on an emerging pedagogical framework for teaching more-than-human perspectives, and a selection of teaching activities that can be put into play in the classroom. The overarching aim of the pedagogical framework is to provide teachers with means that enable them to educate technology design students on more-than-human perspectives. Through this paper outlining the pedagogical framework, we ask the LIMITS community: *what are we missing?*

2 BACKGROUND

So far, there is no shared understanding of the term more-than-human and its adoption in design [43, 69, 78]. Yoo et al. [78] have made an attempt to summarise the various more-than-human perspectives in four categories: (1) more-than-human *species* as a shift of attention away from what is possible to what is responsible for the planetary well-being and foster accountability towards life forms that goes beyond human flourishing [74]; (2) more-than-human *things* beyond living species such as robots, artificial intelligence (AI), smart products, digital platforms and applications [24, 58]; (3) more-than-human *designers* where new alignments move past the blind spots of human-centred design and address the expanding universe of algorithms, forms of intelligence, and forms of life that are entering design practice, casting them as partners in a more-than-human design practice [24]; and finally (4) more-than-human *design education* due to that our deep entanglements with the world [20] leads to questions on how this changes the technology design curriculum and what to teach the designers of tomorrow [4, 78].

This paper addresses the fourth category, more-than-human *design education*. By presenting an emerging pedagogical framework, we contribute to the discussion about *what* and *how* to teach when teaching more-than-human perspectives.

3 METHOD

The development of the pedagogical framework builds on design-based research approaches [2] guided by a three-phased model for conducting educational design research and developing educational materials [45]. The development consisted of multiple cycles conducted through the phases: (1) analysis and exploration; (2) design and construction; and (3) evaluation and reflection. For quality assurance, the teaching activities were peer-reviewed internally, piloted and iterated. The participants in the pilots were students

at bachelor's and master's levels in Interaction design, Digital design, IT didactic design, Experience economy, and Design for social innovation at universities in Denmark, Sweden, The Netherlands and Turkey. By pilots, we mean: an exploration of the teaching activities in classroom settings where the activities were integrated into existing courses. For identifying and developing the teaching activities, a modified version of the pedagogical design pattern approach was used [26, 42]. The method was applied in so-called pattern mining workshops, to elicit existing best practices from teachers and related work found through desk research. It was also used to design a template for capturing and describing the teaching activities, based on the SOLO taxonomy for defining intended learning outcomes and objectives [7].

Furthermore, based on previous experiences, we have gained an understanding of the importance of not designing teaching activities perceived as "micromanagement". Instead, they should be designed for appropriation [15], meaning that the design allows for modification of the teaching activities to fit different courses in various educational settings, across different levels and disciplines. The pedagogical design pattern approach offers a systematic way for developing teaching activities based on the core premises "systematisation", "sharing", and "adaptability" [42].

4 AN EMERGING PEDAGOGICAL FRAMEWORK

The pedagogical framework will provide teachers with educational resources to educate students on more-than-human perspectives. The overarching aim is to facilitate the development of what we propose (based on research, experiences and feedback from the computing and technology design community) as being the main knowledge, skills and attitudes that students need to acquire to *think*, *perform*, and *act* as responsible designers.

The pedagogical framework and the teaching activities it includes are developed by the MOVA (Teaching more-than-human-perspectives in design in higher education) project [49]. It is planned to be published as an online open educational resource (OER) targeting teachers in technology design programmes in higher education, such as interaction design, computer science, data science, engineering, information systems, and information technology (and other fields of relevance).

The pedagogical framework can be used for:

- scaffolding students' knowledge, skills, attitudes and capabilities to work with more-than-human perspectives in computing and technology design,
- assisting teachers in how to create conditions for students to become more responsible designers (a so-called double-pedagogical framework, teaching teachers how to teach more-than-human perspectives)
- capacity building for higher education institutions by supporting institutions in educating responsible designers.

The goal is *not* to provide a full curriculum or courses on more-than-human perspectives, but rather an inspirational repository of various educational resources for teachers to explore, experiment with and integrate into their teaching based on their particular needs and settings.

The pedagogical framework is built up around three core pillars reflecting the identified central dimensions involved in teaching more-than-human perspectives: 1) Concepts, 2) Methods, and 3) Practices, inspired by Coskun et al. [13]. For each pillar, we have drafted overarching learning objectives to highlight the knowledge, skills and attitudes the students are expected to acquire upon completing the teaching activities.

Besides introducing the three core pillars, a selection of teaching activities connected to each pillar is briefly presented below. These teaching activities serve as examples of the kinds of educational resources that the pedagogical framework will offer. In the forthcoming OER [49], the full collection of teaching activities will, in detail, be described, along with step-by-step instructions, materials (slide presentations, templates etc.) and suggestions for assessment.

4.1 Concepts Pillar

This pillar introduces the underlying conceptual and theoretical foundations of more-than-human perspectives in computing and technology design, as well as *why* this is important to consider in a world of ecological and climate justice-related limits. By partaking in the teaching activities, the students will gain knowledge about relevant concepts for considering more-than-human perspectives. They will learn to *think* like responsible designers, which will influence their choices of methods, as well as their abilities to take responsibility for their end technology designs.

After completing the teaching activities, the students should be able to:

- *Recognise* and *describe* or *illustrate* more-than-human concepts and perspectives.
- *Analyse* and critically *reflect* on how more-than-human concepts and perspectives are manifested in technology design.

Two examples of teaching activities connected to the Concept pillar are presented below.

4.1.1 ***Six Ethical Lenses in More-than-human Design***. The more-than-human turn [20] calls for a new type of ethical reflections on how and why humans should apply new technologies in connection to the more-than-human realms, and the need for a holistic rethink of what it means to make ethical design assessments [24]. This teaching activity introduces six lenses (linked to one main concept each) through which the students can ask questions about ethics in design work with more-than-human stakeholders:
Assemblage: Latour's concept of the assemblage from actor-network theory [41]. The concept can be used to understand how humans and more-than-humans are entangled and how to map out relationships to understand with whom/what a new technology should be relationally accountable.
Constituencies: Wakkary's concept about constituencies [73] relating to assemblage and the concept of the design Thing [8]. It addresses how designers can bring together stakeholders from an assemblage and select which voices are represented in a design process.
Pluriversal perspectives: Escobar's concept of the pluriversal [18] – a world of many worlds. The concept opens up for understanding the world from many different perspectives and ontologies. At the same time, it opens up to including local and cultural understandings of more-than-human stakeholders emerging from long-term human

situatedness in local natural environments.
Indigenous knowledge perspectives (also known as traditional ecological knowledge): Perspectives on human and more-than-human entanglements that are alternative to the Western perspective where the ethical concept of relational accountability is central [67, 77].
Perspectives on AI: Perspectives on how AI and machine learning might play a role in human and more-than-human entanglements. The concept of artificial actors is introduced and what ethics they are created from – what ethics do the creators of the algorithms operate with?
Perspectives from environmental sciences: Relational ontologies and ecosystems thinking [44, 59–61, 79]. These perspectives provide pedagogical reflections on how to work with relational ontologies and ecosystems thinking, and how to ethically relate to environmental more-than-human stakeholders.

4.1.2 ***Introduction to Social Practice Theory and Design.*** By moving beyond human attitude, behaviour and choice in our design framings, this teaching activity introduces students to concepts related to practice-oriented approaches in design [40, 54, 62]. The students will learn how to move towards a meso level of understanding socialmaterial action [57], presented as a complementary lens to understand and design with a more-than-human mindset. The teaching activity is inspired by Shove et al. [62]'s framework of understanding changes to everyday life, e.g., showering, washing, driving, cleaning, and cooking, as social practice. In Shove et al. [62]'s framework, social practice is viewed as social and cultural embedded configurations consisting of three elements (or concepts); *competencies*, that is, know-how and skills to perform a practice, *meanings* of social and cultural shared understandings of why it is meaningful to perform a practice, and *materials* e.g., digital technologies, objects, infrastructures, and natural resources like electricity, water, and food embedded in practice.

By making practice the unit of analysis [62], the students are also introduced to how these practices may be co-performed by both humans and non-human performers [38], e.g., domestic robots and domestic animals [66] and how then to understand the implicit (un)sustainable implications of performing such practices, e.g., increased resource consumption [33]. The students will further unfold how practices may also become a unit of design [39]. Here, all elements (competencies, meanings, and materials) of a practice are considered when designing. Moreover, design is framed to trigger meaningful change, by mixing up the (more-than-human) elements of a practice that encourages performers to experiment with alternative ways of "doing" in playful and provocative ways [34].

4.2 Methods Pillar

This pillar introduces methods and approaches for understanding, investigating, and designing technologies with more-than-human perspectives. It includes concrete methods to identify and engage with more-than-human stakeholders and practically design and evaluate technologies with more-than-human perspectives. The students will learn the skills to *perform* as responsible designers.

After completing the teaching activities, the students should be able to:

- *Identify* and *describe* more-than-human constituencies in a design process.
- *Elicit* more-than-human stakeholder perspectives.
- *Integrate* more-than-human perspectives in a design process.
- *Identify* diverse positionalities among all stakeholders and imagine how to respond to them through design.

Five examples of teaching activities connected to the Methods pillar are presented below.

4.2.1 ***More-than-human Personas.*** To adopt more-than-human perspectives into computing and technology design, non-human personas can be used in situations where human and nonhuman stakeholders are equally considered as "users". Going beyond the needs of human stakeholders when making design decisions and taking a more-than-human approach can also highlight areas for innovation [68].

In this teaching activity, students learn how to identify, create, and employ more-than-human personas in technology design. More-than-human personas can help ensure that the needs of both human and non-human stakeholders are considered when making design decisions, and when designers do not have direct access to the stakeholders. When creating the non-human personas (such as plants, technologies, AI), the students may use common guides for human personas, but add categories for non-human personas: type/species, age/lifespan, local population, needs/motivation, food/food sources, challenges/stressors, "interacts with" and habitat [68].

4.2.2 ***Extreme Characters.*** The teaching activity is inspired by Haraway's [29] concept of nature-cultures where nature-cultures are the building blocks of more ecologically just worlds where human activities (cultures) relate respectfully to elements in ecosystems (nature). With inspiration from Haraway's Camille stories, the teaching activity operates with extreme characters [16] to inspire students to speculate on how technologies might contribute to establishing human entanglements with more-than-humans.

In this teaching activity, the students will learn to create future scenarios where humans live in regenerative relationships with other species (flora and fauna) to further the well-being of all partners. They will imagine life forms and habits that contribute to living in respectful relationships with an array of flora and fauna. The outcome will be alternative narratives to the dominant narrative about the technological fix of the climate crisis [35].

4.2.3 ***More-than-human Provocations.*** Provocations have for centuries proven a powerful means for artists and activists to question what we as humans take for granted in our everyday life [3]. In design, we see provocations advocated as a method to stimulate critical engagement and reactions from participants, particularly concerning topics that may be challenging to articulate and difficult to envision [53]. In this teaching activity, students are introduced to the idea of provocation as a design means to challenge more-than-human assumptions, and how provocative means relate to design activities. Furthermore, students are introduced to how designers might create *provotypes* – concrete materializations of provocations in designed artefacts [14] – crafted to expose and embody tensions inherent in a specific domain of interest, to foster collaborative analysis and design explorations across diverse stakeholders [9]. Embedded within a perspective that transcends a human-centric

view, provotypes can serve as means to speculate with human-nonhuman collaborators to trigger reflective discussions on how design may encompass more than just human considerations by making these considerations both visible and tangible [11].

Through these design activities, students will learn to move away from a traditional prototyping framing, where design is primarily directed towards the construction of the future, towards a *provotyping* framing, where design helps to expose tensions and problems in current practice as a way to imagine and account for how possible alternative future practices may be performed [48]. In this way, provotyping can be viewed as the staging of the problematic in current practices, through which social and cultural normality is made visible by design and participants' experiences are rendered account-able – making this a highly reflexive learning process [32]. Moreover, this teaching activity will also unfold how combining provotyping with co-design activities has the potential to help explore complex and entangled topics (e.g., sustainability and more-than-human perspectives), by articulating and materialising topics seen as taboo, to promote debate around design ideas, and help generate new ideas together with participants in the design process [71]. Altogether, through this teaching activity, students learn how to describe, construct, evaluate, and reflect on provotyping and provotypes with more-than-human perspectives in design.

4.2.4 ***More-than-human Ethnography.*** Ethnography offers methods and techniques for situating research in a "fieldsite" in which researchers (students) use their own embodied experience as a way to investigate the complexity and messiness of the life worlds they are studying. In particular, ethnography is effective in uncovering unarticulated or latent needs that more-than-humans cannot express explicitly through careful observation, paying attention to minute details of the atmosphere, behaviors, and interactions in the field.

This teaching activity is inspired by the "nonhuman turn" [27] in ethnography such as multispecies ethnography [37], thing ethnography [23], and entangled ethnography [50]. The more-than-human ethnographies draw attention to the creatures and things that previously appeared only on the margins of anthropological research, such as small organisms such as insects, fungi, and lichens, and mundane objects such as a mug or a piece of garments, and bring them to the centre stage of conversations.

The students will learn to apply more-than-human ethnographic research methods to describe complex entanglements of humans and more-than-humans in shaping marginalized things and unsustainable practices. Beyond considering social justice for marginalized communities, this teaching activity encourages students to critically reflect on socio-environmental justice issues around marginalized and stigmatized things such as public toilets, trash bins, and sewage. Inspired by Bennett's work [5], students will learn to recognize marginalized things as animate, vital materials that deserve to be cared for.

4.2.5 ***Envisioning Future scenarios with More-than-humans.*** When imagining and describing the intended use of a technology design concept, students may approach the design from a single, narrow perspective without realizing its potential impact on stakeholders beyond humans. As known, computing and technology designs can have widespread consequences and long-term effects on humans as well as more-than-human stakeholders, both in positive and negative directions. If students lack an understanding of the broad impact and long-term effects of their designs, they run the risk of inadvertently causing more harm than good in the world.

In this teaching activity, the students will learn how to generate future scenarios to imagine and analyse potential consequences, effects and societal impacts of their own or others' designs. They will envision at least one use or future scenario involving more-than-human stakeholders that goes beyond what they would normally describe as the intended use of their design. By applying their understanding of potential consequences and effects on more-than-humans, they may rethink their designs and design decisions.

The teaching activity is inspired by the Envisioning Cards [21] developed by the Value Sensitive Design Research Lab at the University of Washington. The cards build on four envisioning criteria, which are used for developing future scenarios to analyse and explain a use situation: stakeholders (in addition, here also including more-than-humans), time, values, and pervasiveness.

4.3 Practices Pillar

Design problems that relate to and address more-than-human perspectives in computing and technology design are more uncertain, more nuanced, and more complex compared to working with human-centred perspectives. This complexity will be unfolded through a series of examples of how more-than-human concepts and methods can be put into play and practised in educational settings. The Practices pillar will provide stories that teachers can take part in when planning their courses, and deciding what teaching activities to include and in which order. The stories illustrate how teaching more-than-human perspectives can be organised and what the potential results of such explorations might be. By partaking in a sequence of teaching activities involving thinking (concepts) and performing (methods), the students will develop their attitudes, beliefs, and opinions towards design, and learn to *act* as responsible designers.

After completing the sequence of teaching activities, the students should be able to:

- *Select* and *implement* relevant more-than-human concepts, and methods into a design process.
- *Apply* and *adapt* relevant more-than-human methods and perspectives into technology design.
- *Analyse* and critically *reflect* on the impact of a technology design (draft) and its manifested more-than-human perspectives in context.
- *Embody* and *enact* more-than-human concepts and methods in context.

Two stories on more-than-human teaching practices are briefly presented below, serving as examples of educational resources that the pedagogical framework will offer.

4.3.1 ***Increase Connectedness with Nature in Urban space.*** This story shares experiences gained from organising a 13-week course entitled "Design project" in the master's program in Experience economy at Aarhus University (DK). The course aims to enable the student to: (a) understand and explain theory about design processes and design methods, (b) to use these for production, as well as for analysis and reflection on their own practice, and (c)

to communicate their design activities with a background in the course's methodological and theoretical subject area.

The course gives the student insight into how to work iteratively with an experience-oriented design perspective. The brief for the design projects is: Based on the theme "more-than-human", you should create an experience economy design intervention (product, service or event) that can contribute to creating a higher degree of connectedness with nature at Havnepladsen (authors' note: the site of exploration). The story outlines and illustrates the progression of more-than-human perspectives in the design project course with literature and teaching activities. A series of teaching activities were implemented, such as More-than-human ethnography (see Figure 1), More-than-human provocations, and More-than-human personas. The results from the eight student design teams were exhibited during a sustainability festival at the public library.

4.3.2 ***More-than-human Values in Design.*** This story reports a 13-week course entitled "Design: theory, method and practice" in the master's program in IT didactic design at Aarhus University (DK). The purpose of the course module is to enable the student to carry out an IT didactic design process taking into account the context, target group, values, purpose and use. The result of the design process must be an IT didactic concept that takes the form of a product, a prototype, a sketch, a plan, or the like. The course module is interdisciplinary and derives its analytical perspective from central theories, methods and models within design, IT didactics and IT pedagogy. It contains a clear practical and experimental dimension. The course has the overarching theme of *More-than-human values in design.* Additionally, there were the following sub-themes that the groups of students could choose to focus on: (1) Planetary design – designing for/with the planet: to design for/with the biosphere in an Anthropocene age, (2) Non-human design – designing for/with non-human actors: to design for/with things and technology as fellow beings, (3) Other-human(s) design – designing for/with "other" humans: designing for/with people from other cultures, genders, classes, locations, religions. The results from the six student design teams ranged from an IT didactical solution for children to collaborate with AI to a VR experience of being a bee and an app for children to empathise with trees [31].

5 DISCUSSION

The overarching aim of the emerging pedagogical framework is to provide teachers with means that enable them to educate students on more-than-human perspectives in computing and technology design. The pedagogical framework can be used by teachers to select relevant stand-alone teaching activities (see the pillars Concepts and Methods) targeting specific more-than-human dimensions or learning objectives. It can also be used to create longer in-depth learning pathways for students by combining several teaching activities, combining various concepts and methods, that develops students' understanding from simple to complex levels throughout a full course (see the pillar Practices). The framework provides a proposal for *what* and *how* more-than-human perspectives can be taught, either as a single module in an existing course or as a sequence of teaching activities run over a longer period.

The teaching activities introduced in this paper have been piloted in four different European countries and educational contexts. The pilots surfaced many complex, entangled challenges and dilemmas when working with more-than-human perspectives in design contexts. As previously reported [4], such as the challenge of *representation.* Nonhuman stakeholders might not be able to speak for themselves. Then, who might speak on behalf of whom in design projects with more-than-human stakeholders? How may we include the "voice" of a river, a butterfly, or a fungus in a design process? This calls for collaboration across disciplines, e.g., environmental and natural sciences but also collaboration with indigenous scholars representing other ontologies and ways of relating to nature [46, 64, 67, 77].

Another challenge deals with issues of *responsibilities* and how to position the designer in an assemblage of human and more-than-human actors [41]. What role does the human designer take when co-designing with more-than-human *things* or *species* (e.g., AI agents or animals), and how might this influence the design process? The judgement of the designer may be less obvious, and thus, ethical questions come into play: who is responsible for the outcome of a design process?

A third challenge faced addresses matters of is *inclusion.* How can designers (students) make sure to include all the relevant perspectives – including the more-than-human, and who/what decides what to include and what not? A challenge for students is to explain the underlying rationale for the inclusion and exclusion of multiple stakeholders.

Since we are operating in a higher education context, the learning outcomes from participating in the teaching activities must be assessed. What *assessment criteria* do we use to assess whether students have learned to work with more-than-human perspectives or whether they have become more ethically responsible [17]? What are the success criteria for designing with more-than-human stakeholders? Who/what should benefit from the outcome of the design projects? And who defines what is successful or not? Is it the human, the nonhumans or some third entity?

6 CONCLUSION

The emerging pedagogical framework on teaching more-than-human perspectives in computing and technology design presented in this paper is a proposal that we put on the table for the LIMITS community to critique and provide feedback on. *What are we missing?*

We acknowledge that there are a myriad of aspects and perspectives which we have not managed to embrace so far. As mentioned, working with more-than-human perspectives in computing and technology design is more uncertain, more nuanced, and more complex compared to working with human-centred perspectives. Furthermore, teaching such design practices increases the complexity since it also involves pedagogical aspects that must be considered.

The ultimate goal of incorporating more-than-human perspectives in teaching is to build a capacity among computing and technology design students and future practitioners to react and act upon the social-ecological-technological challenges that we are currently facing. By partaking in the teaching activities, the students will develop the knowledge, skills and attitudes needed to work towards a world of ecological and climate justice and to write the stories of tomorrow. The emerging pedagogical framework may be

a step towards the development of a signature pedagogy for teaching more-than-human perspectives that can contribute to future technology design curricula.

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