ESTUDOS EM DESIGN
DESIGN ARTICLES

# Design com seres viventes – uma análise e proposta preliminar para o trio design multiespécies, design interespécies e design transespécies

## *Design with the living – analysis and a preliminary proposal for the trio multispecies design, interspecies design, and transpecies design*



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**Resumo**
A terminologia para o design mais-que-humano, aquele que se relaciona a outras entidades não-humanas viventes e não viventes, parece ser fragmentada. Com o objetivo de esclarecer alguns termos relacionados ao design mais-que-humano com viventes, este trabalho olha para o trio de conceitos "design multiespécies", "design interespécies" e "design transespécies". A análise se dá por meio de revisão sistemática da literatura e exploração dos significados e etimologia dos elementos de formação de palavras "multi-", "inter-" e "trans-" em dicionários. Na amostra de 103 publicações analisadas, não foi possível identificar uma diferença de sentido entre os três conceitos. Contudo, nos dicionários os significados de "multi-", "inter-" e "trans-" são distintos. Assim, uma diferenciação preliminar dos conceitos é proposta com base na interação (ou não) entre humanos e entidades viventes não-humanas e com base nos interesses de cada um dos atores no processo de design (humanos, viventes não-humanos e além).

**Palavras-chave:** Design Mais-Que-Humano, Design Multiespécies, Design Interespécies, Design Transespécies

***Abstract***
*The terminology for more-than-human design, which relates to other non-human living or non-living entities, seems to be fragmented. Seeking to shed light on some of the concepts related to more-than-human design with living entities, this paper looks into the trio "multispecies design", "interspecies design", and "transspecies design". The analysis is based on a systematic literature review and an exploration of the meanings and etymology of the word-forming elements "multi-", "inter-" and "trans-" in dictionaries. In the analysed sample of 103 publications, it was not possible to identify a difference in the meanings of the three terms. However, the dictionaries show that the meanings of "multi-", "inter-" and "trans-" are distinct. Thus, a preliminary differentiation of the concepts is proposed based on the interaction (or lack of interaction) between humans and non-human living entities and based on the interests of each of the actors in the design process (humans, non-human living entities, and beyond).*

***Keywords:*** *More-Than-Human Design, Multispecies Design, Interspecies Design, Transpecies Design.*

## 1 Introduction

"More-than-human" design takes into consideration the existence and agency of others, from animals to rivers – placing them in the centre of the design process (Edwards et al., 2022). Within this context, it is possible to distinguish a focus on design that accounts for other non-human living entities (like animals), rather than other entities (like rivers). The "Animal Turn" and the "Plant Turn" are examples of the trend of designers looking to other non-human living beings in their practice.



Harriet Ritvo (2007) suggests that the "Animal Turn" would relate to an increasing focus on animals as subjects in humanities and social sciences. In that sense, Daniel Metcalfe (2015) connects design to the "Animal Turn", aiming for greater human-animal interaction in transforming anthropogenic systems. To illustrate, Figure 1 presents Metcalfe`s development of a shared walkway to the sea - for humans to walk on and for molluscs to grow freely on.

Figure 2: Metcalfe`s design

Source: Metcalfe (2015, p. 50)

Similarly, in 2015 Natasha Myers announced a "Plant Turn", meaning "[…] a recent swerve in attention to the fascinating lives of plants among philosophers, anthropologists, popular science writers, and their widely distributed, electronically-mediated publics" (Myers, 2015, p. 40). In design, the "Plant Turn" might be seen in initiatives like the exhibition "Plant Fever. Towards a Phyto-centered Design" (D-o-t-s, 2020). Figure 2 presents Elowan by Harpeet Sareen and Pattie Maes, a piece developed to give agency to the plant, moving it wherever it prefers to get more light (D-o-t-s, 2020).

Figure 2: Exhibition tour Plant Fever

Source: D-o-t-s (2020)

Besides the ethical concerns that more-than-human design aims to address, like treating other beings with respect (Roudavski; Davis, 2021) - approaches to more-than-human design are often researched as a means to reach sustainability through fostering biodiversity (Metcalfe, 2015; Roudavski, 2020; Cotsaftis et al., 2023; Herrmann-Pillath et al., 2023; Hernandez-Santin et al., 2023; Keeve, 2023).

Although a very prolific trend, it seems that the terminology referring to these design approaches is very fragmented (Vacanti et al., 2023). Seeking to shed light on some of the concepts around this practice, this study looks specifically into the trio “multispecies”, “interspecies”, and “transpecies” design. This article begins by introducing the methodological strategy. Next, in the findings section, the literature is systematically reviewed to understand how different authors are articulating these terms/concepts and understanding their nuances. Still in the findings section, the meanings and etymology of the word-forming elements “multi-”, “inter-”, and “trans-”, are explored. Continuing with the discussion, a preliminary differentiation of the three terms is proposed with examples. Finally, the conclusion outlines final considerations and possible future developments.

## 2 Methodological Strategy

The methodological strategy consisted of: (1) A systematic literature review and (2) a dictionary exploration of meanings and etymology of multi-, inter-, and trans-. After analysing the outcomes of these two steps, a preliminary proposal for differentiating the concepts of multispecies, interspecies, and trans-species was made and graphically illustrated.

The (1) systematic literature review was conducted in April-May 2024. The selected database was Google Scholar. This database was chosen based on explorations in different databases like Scopus and Web of Science – but Google Scholar presented a higher number of results, also encompassing the results from other databases. The searched terms were “Multispecies design”, “Interspecies design”, “Transpecies design”, “Trans-species design”, and “Transspecies design”, all under quotation marks. The third term had three different spellings – so a specialist in English

was consulted and it was decided to perform the search with the three spellings, although it was agreed that "trans-species" would be the best fit. It was decided to limit the results to the last ten years (2014-2024). There was no filter for the type of publication (conference papers, journal articles, book chapters, etc.), only citations were removed from the results. Publications were only considered if written in English, French German, Portuguese, or Spanish. Results were checked for repeated entries, which were excluded from the sample. All publications were then downloaded and the abstracts were read with the exclusion criteria of not being design-related. For some publications, there was no access granted through this researcher's university, so they were also not considered. The next step was using the PDF's search tool to check if the publication really mentioned the searched term. This process led to a sample of publications for each concept. The sample was not analysed in a bibliometric manner, the focus was to find the authors' definitions and understandings of the investigated concepts.

In the second step of the research (2) the three word-forming terms, "multi-", "inter-", and "trans-", were explored in definitions and etymology. The chosen dictionaries for this exploration were the "Merriam-Webster Online Dictionary" (2024) and the "Concise Oxford Dictionary of English Etymology" (Hoad, 1996). This analysis led to a preliminary proposal of a differentiation of the three concepts, which was graphically represented.

## 3 Findings

A sample of 103 studies was analysed according to Table 1. The sample consisted of journal articles, conference papers, theses and dissertations, book chapters and even exhibition leaflets. The supplementary material presents the complete list of analysed publications organised by term.

Table 1: Sample of analysed studies

| **Concept** | **Total results** | **Design-related/ not repeated** | **No Access** | **Not mentioning the term** | **Final sample** |
|---|---|---|---|---|---|
| "Multispecies design" | 229 | 94 | 10 | 17 | **67** |
| "Interspecies design" | 62 | 47 | 9 | 4 | **34** |
| "Transspecies design" | 2 | 1 | 0 | 0 | **1** |
| "Trans-species design" | 2 | 0 | 0 | 0 | **0** |
| "Transpecies design" | 1 | 1 | 0 | 0 | **1** |

Sourced: Organised by the author

The findings for each term are summarised in the following.

### *3.1 Multispecies design – literature review*

The search for the term "multispecies design" resulted in a larger number of design-related publications compared to the other terms. The findings on this concept are here thematically

organised in: 3.1.1 Definitions and 3.1.2 Level of proposed non-human participation in the design process.

### 3.1.1 Definitions



Metcalfe proposes a definition for multispecies design: “Multispecies Design is the practice of designing systems and artefacts that address the needs of humans as well as wild animal species” (Metcalfe, 2015, p. 6). Later, many authors will refer to this definition (Gatto, 2019; Paci; Mancini; Nuseibeh, 2022; Sloth, 2022; Keeve, 2023; Coterón; Triviño, 2023). Metcalfe is specifically interested in design with wild animals. He proposes that "Three distinct views define this emerging design approach [multispecies design]: recognising animals as clients of design, recognising human-animal interactions as designed experiences, and the view of manmade systems as further extensions of ecological systems." (2015, p. i). To Metcalfe, multispecies design “sits within the emerging landscape of expanding design principles from ID (Interaction Design), UCD (User Centred Design) or PD (Participatory Design) to include nonhuman species" (Metcalfe, 2015, p.10). Similarly, Davidová, Barath, and Dickinson (2023) recognise in case studies that multispecies design must understand the trade-offs between the needs of multiple inhabitants within the design process: plants, animals, humans, and microbiota – equally accounting for human and non-human requirements.

Differing from this perspective, in a second comprehension of the concept, Edwards et al. (2022), understand that multispecies design would not consider human and non-human needs equally, but would rather place other non-human species in the centre of the design process. This approach would involve recognising non-human rights and relinquishing human control of shared spaces.

In a third distinct perspective, Gatto (2019) suggests that the multispecies design process already happens even without the help of human intervention, he would consider, for instance, the multispecies dynamic that happens in a forest as a multispecies design process. To him, multispecies design means “that people can be decentralized from the design process, and simply become one of the many actors that benefit from its outcomes” (Gatto, 2019, p. 66). A paper addressing the same research that Gatto writes with McCardle (2019) will be cited by Tarcan, Pettersen, and Edwards (2022), and by Crosby and Vanni (2023). Later, Gatto will elaborate on his understanding of multispecies design research:

> Doing multispecies research asks us to learn to comprehend the entities we are about to work with. Not only their biological identity but first and foremost their ways of weaving relationships, the power relations that link them to others (humans and otherwise), and the factors that regulate the network in which they operate (Gatto, 2021, p.62).

Hafazoglu (2022) will later refer to this last definition.

In a fourth meaning to multispecies design, Westerlaken seems to have a more open idea of the concept, which would involve “many stories of our encounters with other animals in which design plays a role.” (2020, p. 294). In this case, any design initiative which would connect, relate, or interfere with another non-human living being could be considered multispecies design.

Finally, in a fifth perspective, Demirbilek (2020) proposes that multispecies design approaches would imply in seeing through the lenses of inclusive design. He compares models of inclusion for disability to designs that enable non-human living beings to have access to passages in streets, for instance.

Additionally, many entries of multispecies design refer to architecture. Within an architectural multispecies design context, Grobman et al. characterize: “Multispecies design in this context refers to an architectural design process that considers human and non-human needs (e.g., animals, plants, and microbiota)” (2023, p. 4). To them, multispecies design would imply a shift to biocentrism, “where humans would no longer be prioritized above other species” (Grobman et al., 2023, p. 24) – and human-animal relations need to be at the core of the project. Similarly, Mestrinho proposes that multispecies architecture searches to “integrate non-human species in the design of the built environment” (2023, p. 651-2). These definitions converge to Metcalfe`s (2015).



### 3.1.2 Level of proposed non-human participation in the design process

In the sample of studies analysed for the concept of multispecies design, it is possible to recognise different levels in the participation that authors attribute to the other non-human living entities in the design process.

Recognising other species as stakeholders inspired Morrison and Chisin (2017) and Vacanti et al. (2023) to build multispecies personas for their projects. On that matter, Veselova and Gaziulusoy (2021) propose a multispecies stakeholder typology. Hernandez-Santin et al. (2023) propose a participatory continuum for non-human stakeholders, categorising biodiversity as active, incidental, or passive stakeholders. To Daneluzzo et al. (2023), there should be a new interpretation of the term "user", moving from anthropocentrism towards biocentrism, "including nonhuman lifeforms as partners in design research, either as informants and co-designers or as users" (Daneluzzo et al., 2023, p. 1). The non-human agency level is also discussed by Lähdesmäki, Aivelo, and Savolainen (2024): “In design research, users or stakeholders are often passively referred to as users or informants, actively as partners or co-designers, and some researchers challenge whether any boundary between designers and stakeholders as actors exists at all” (2024, p.3).

Metcalfe (2015), refers to the participatory approach. He argues that it is important that someone is “the voice” of the animal, like a specialist, who would act like a representative of the animal in the project. Similarly, Gatto and McCardle (2019) adopt a multispecies speculative design approach with plants, having scientists as informants to their project, as representatives of the plants. They understood the plants as performative and active in the design process, observing, for instance, the plant`s ability to absorb heavy metals and the plant`s life signs of health and growth. According to Gatto (2019), non-human agents should have a bigger participation in the design process: “My wish is to provide an understanding of the interaction mechanisms that can position plants as active rather than passive agents in the production of design” (2019, p. 67). Metcalfe (2015) suggests that non-humans could be active in the design process by interacting

with many prototypes. Another author who argues for non-human participation is Roudavski (2020):

> As in other forms of design, more-than-human design can achieve better outcomes by designing 'with' nonhuman users and not only 'for' them. This need to 'design with' highlights the existence and importance of overlapping human/nonhuman worlds: spaces, structures, behaviours, memories, stories (Roudavski, 2020, p. 738).



From the architectural perspective, Bracke et al. (2022) state that non-human clients ought to be considered, as well as their agency: "At the same time, designers need a deeper understanding of how non-humans feel, behave, live, move, decide, organize, etc." (Bracke et al., 2022, p. 4). Farías, Criado, and Remter propose that in multispecies architecture they could approach "[...] urban animals as epistemic partners for rethinking architectural practice, thus engaging their capacities in attempts at designing with them [rather than "for" them]"(2024, p. 93). For them, a multispecies architectural practice would involve being committed to "creating conditions for more-than-human co-design" (Farías; Criado; Remter, 2024, p. 101).

One crucial topic regarding the participation of non-human living entities in the design process (the multispecies design process) is power relations. On that matter Metcalfe states that "[...] although power relations will always exist within these interactions, MD [multispecies design] does not aim to assert dominance of one species over the other in these relationships, but rather use design as a tool for reconciliation, inclusion and promoting empathy." (Metcalfe, 2015, p. 6). To him, anthropomorphism will always be a challenge to multispecies design.

Power relations might be more explicit in cases like biodesign. Williams and Collet (2020) approximate the biodesign practice to the multispecies design concept. Biodesign is a polysemic term, but it often involves designing with other living systems, such as growing objects in mycelium. Williams and Collet (2020) discuss the romanticized idea of a multispecies collaboration because usually in biodesign the other non-human organism might be killed at the end of the process.

In contrast, other authors bring forth the idea of care and respect in multispecies design (Metcalfe, 2015; Westerlaken, 2020; Guilloteau, 2022; Farías; Criado; Remter, 2023). To Metcalfe respect is in the essence of multispecies design "[…] creating more opportunity for humans to interact with other species in a meaningful and respectful way within human-dominated environments." (2015, p. 4). Furthermore, Daneluzzo et al. elaborate on the biocentric perspective in multispecies design: "All living things are morally equivalent and deserve the same respect" (Daneluzzo et al., 2023, p. 2).

### *3.2 Interspecies design – literature review*

The findings for interspecies design are also organised in: 3.2.1 Definitions, and 3.2.2 Level of proposed non-human participation in the design process.

### 3.2.1 Definitions

Roudavski defines interspecies design as:

> Consequently, interspecies design can be understood as a subset of interspecies culture, one that rejects speciesism. It is a form of design that seeks to involve and benefit both human and non-human lifeforms; to design for and with all life. Interspecies design can have human or non-human clients, consider human and non-human stakeholders and seek participatory contributions from human and non-human parties. It is committed to further research and conceptual innovation in areas of more-than-human co-habitation, interspecies culture, aesthetics and communication (Roudavski, 2021, p. 157).

This definition of interspecies design became quite popular, given that other authors later referred to it in their own studies (Rampino, 2022; Edwards; Popartan; Pettersen, 2023; Jiang; Zhang; Wu, 2023; Herrmann-Pillath, 2023; Tarcan, 2023).

Meanwhile, a second understanding of interspecies design is brought by Fagnoni (2020) who cites Paola Antonelli`s description of interspecies design from the 2019 "Broken Nature" book**:** interspecies design would be to observe other species and imitate nature, seeking interspecies collaboration in shared activities of co-creation.

In a third perspective, Parker et al. (2022) further describe interspecies design as a means to achieve interspecies art. They define interspecies art as: "[it] consists of aesthetic practices that are (1) produced and also (2) used by more than one species" (2022, p. 352). Another paper that relates art and design is Herrmann-Pillath et al.`s (2023). The authors don`t differentiate art and design clearly in their text. They claim that some initiatives, like nest building for regional owls, would be considered art. This artistic perspective would build on interspecies design approaches that would "share this spirit in creating aesthetic experiences for humans that resonate with non-human aesthetics and thereby prepare the ground for reciprocal ecological interactions in the sense of conviviality" (Herrmann-Pillath et al., 2023, p. 2).

All things considered, besides the explicit definitions of interspecies design, two main perspectives regarding interspecies design could be identified: one that seeks interaction and claims collaboration between humans and non-humans (Westerlaken; Gualeni, 2014; Hermann-Pillath et al., 2023; Fagnoni, 2020; Cotsaftis et al., 2023) and one that only addresses non-human issues (Kirman; Lawson; Linehan, 2017). For instance, Westerlaken and Gualeni (2014) propose an interspecies design artefact for humans and cats to interact. On the other hand, Kirman, Lawson, and Linehan (2017) mean to exclude humans as users to reduce human influence over other non-human species – as they propose the design of a "dog internet", which would not be accessible to humans.

### 3.2.2 Level of proposed non-human participation in the design process

Considering the level of the proposed non-human participation in the design process, most approaches to interspecies design seem to see non-humans as stakeholders, usually users (Kirman; Lawson; Linehan, 2017; Hermansen; Tironi, 2018; Roudavski; Davis, 2021; Parker et al., 2022; Parker et al., 2023). In cases where the non-human is a user, some studies, like Hook`s (2019),

propose immersive tools to help foster interspecies thinking – like a headset of mix-reality simulating the perspective of a horse (Hook, 2019).

There are also studies in which non-humans directly participate in the design process (Hermansen; Tironi, 2018; Kar, 2019; Olofsson, 2019). In that respect Herrmann-Pillath et al. (2023) propose in interspecies art (according to them, done through interspecies design) a co-creation in the intersection of the "Human art world" and the "Biotic art world". Likewise, in a collaboration approach considering the non-human agency, Cotsafits et al. (2023) ask: "Despite the inherent anthropocentricity of certain interspecies design practices […], can we develop a practice of making that surrenders more of the process to nonhuman organisms?" (Cotsafits et al., 2023, p. 5).



Kirman, Lawson, and Linehan (2017) are more pessimistic about a shared human-and-non-human design practice: "Just as Wittgenstein (1953) argued that 'if a lion could speak, we could not understand him', then similarly we propose that if a dog could design, we could not understand what she creates" (Kirman; Lawson; Linehan, 2017 p. 564). The same authors reinforce that it is almost impossible to obliterate the anthropomorphizing inherent to the design process, because designers are, in the end, humans. Correspondingly, North and Mancini write that "If we cannot speak "animal" and animals cannot speak "human," then reckoning with our own biases is the fundamental starting point of any interspecies design journey" (North; Mancini, 2016, p. 36).

Finally, still on the non-human participation in interspecies design projects, authors also emphasized the importance of respect, dignity, and care towards the other (Hermansen; Tironi, 2018; Cotsaftis et al., 2023). Cotsaftis et al. (2023) propose a principle of "Designing Conditions for Coexistence" called "Adopting an ethics of care". They explain that "In the context of design, this would entail a mode of attentiveness to that which emerges during practice, even where that might seem to fail or contradict prior expectations" (2023, p. 9). They cite other authors discussing the complicated issue of consent, which could be speculated compared to human-centred research to acknowledge their boundaries and limits. More profoundly, on the topic of old age trees in the urban environment, Roudavski and Davis (2020) ask: "How can humanist principles of respect, dignity, and care inform and improve design for non-human lifeforms?" (p. 638). The authors discuss that some terms that are widely understood such as a "good death" for humans, are not considered for trees, for example. They propose that the notion of dignity should be extended beyond human beings. For them, "ethics of care is an ethics of relationships" (Roudavski; Davis, 2020, p. 646).

### *3.3 Transpecies design – literature review*

Finally, the word transpecies is found to be written in three different forms: transpecies, transspecies, and trans-species.

The result for "transpecies design" was a flyer from the 2023 Architecture Biennial for an exhibition in Palazzo Bembo called "Transpecies Design" (European Cultural Centre, 2023). The exhibition looks into "How might the design and development of the built environment contribute to the flourishing of a variety of species?" (European Cultural Centre, 2023, p. 458). The curator

of the exhibition, Adrian Parr, who claims to have coined the term “transpecies design” (OPB, 2023), leads the research on this movement at the University of Oregon. In an interview from Par with OPB.org we read that “Practitioners of transpecies design aim to consider the needs of all species — not just humans — in the built environment.” (OPB, 2023).

The result of “transspecies design” was a paper by Hocking from the Australian National University (Hocking, 2018). She interchanges the term transspecies design with the term “cross-species design”, but prefers the latter. In her paper, she claims that “Through analyzing the perspectives of an Australian peri-urban household’s dogs, cats and birds the paper illustrates how a cross-species design conversation could work” (Hocking, 2018, p.1). She proposes a more inclusive aesthetics, taking into account the animal's preferences – to which she defines cross-species aesthetics.



The search for the term “trans-species design” did not result in design-related studies. There was also not enough material to identify a level of proposed non-human participation in design for this term. The next sections describe the findings in the dictionaries.

### *3.4 Multi – meaning and etymology*

“Multi”, according to the Merriam-Webster online English dictionary, refers to a combining form and might imply: “1.a. many : multiple : much”, “1.b. more than one”, “1.c. more than one” or even “2. many times over” (Merriam-Webster, 2024).

Converging to this meanings, the “multi” entry in the “The Concise Oxford Dictionary of English Etymology” from 1996 is as follows:

> **multi**- comb. [combining] form of L. [Latin] *multus* much, many; the earliest comps. [compounds] in Eng. [English] are **multiformity, multiloquy** (XVI [in the XVI century]) talkativeness, **multifarious** (XVII) many and various (L. *fãriam* adv.[adverb]), and the el. [element] becomes prolific later esp. [especially] in techn. [technical] use, e.g. **multilateral**, **multinomial** (after BINOMIAL) XVII; an ex. [example] of the gen. [general] use is **multimillionaire** (XIX). (Hoad, 1996, p. 304)

### *3.5 Inter – meaning and etymology*

“Inter” on the other hand refers to a prefix, meaning: “1. between: among: in the midst”, “2. reciprocal”, “3. located between”, “4 carried on between”, “5. occurring between : intervening”, “6. shared by, involving, or derived from two or more”, “7. between the limits of : within”, or “8. existing between” (Merriam-Webster, 2024).

These definitions come together with the dictionary of English etymology:

> **inter-** L. prep. [preposition] ‘between’, ‘among’, repr. [representing] in F. [French] by *entre-* (see ENTER-), used as a prefix with the senses: (1) between, in between, in the midst, as in INTERCALARY, INTERPOSE, INTERVENE; (2) at intervals, as INTERMIT; (3) with preventive or destructive effect, as in INTERCEPT. The earliest adoptions of such words in Eng. Came through F. forms

> with *entre-*, but in XVI remodeling of these forms on the L. *inter-* began, and at the same time the use of the prefix was widely extended. Meanwhile the prefix had acquired a mutual or reciprocal sense, as in *interdependence, intermarriage, interplay*. The other large group of comps. [compounds] in which *inter-* has become a living formative is that in which it governs prepositionally (with the senses 'between', 'among', and 'forming a link between') the sb. [substantive] implied in the radical part of the comp., as in *interalveolar, intercollegiate, interdenominational, international, intervocalic*. The prefix enters freely into combination with sbs. To form attrib. [attributive] phrases, as *inter-county* match. (Hoad, 1996, p. 239)

### *3.6 Trans design – meaning and etymology*

Finally "Trans", according to the Merriam-Webster online English dictionary is also a prefix, meaning: "1. a on or to the other side of : across : beyond", "2. a beyond (a specified chemical element) in the periodic table", "2. b trans", "3. through", "4. so or such as to change or transfer" (Merriam-Webster, 2024).

Once again the Merriam-Webster definitions meet the etymology given in the entry of "trans":

> **trans-** comb. form of L. prep *trans* across, beyond, over, corr. [corresponding] to Umbrian *tra(ha)f, tra(ha)* with cogns. [cognates] in Skr. [Sanskrit], Celt. [Celtic], and Gmc.[Germanic] (see THROUGH). In several L. vbs. [verbs] and their derivs. [derivatives] the prefix was reduced to *trã* before a cons. [consonant], e.g. *trãdere* (see TRADITION), *trãicere* (see TRAJECTORY); ss resulting from composition with an initial *s* is simplified, as in *transcribe*. (Hoad, 1996, p. 501)

## 4 Discussion - a differentiation attempt

It seems that different authors use the term multispecies design interchangeably with other terminology, such as interspecies design (Westerlaken, 2021), or posthuman design (Gatto, 2019; Daneluzzo et al., 2023), or more-than-human design (Roudavski, 2020). Roudavski (2020) will write about multispecies design, later changing to the term interspecies design (Roudavski, 2021).

In the systematic literature review, it was possible to notice that the definitions for multispecies, interspecies, and transpecies design converged among the most cited authors within the sample for each term. Namely, Metcalfe`s (2015) definition of multispecies design, Roudavski`s (2021) definition of interspecies design, and Parr`s definition of transpecies design (European Cultural Centre, 2023; OPB, 2023) – they all state that human and non-human needs must be taken into consideration in designs.

There were, however, some divergences. For the term multispecies design Edwards et al. (2022) suggest that the non-human living beings should be in its centre. Similarly for the term interspecies design, Kirman, Lawson, and Linehan (2017) advocate for a design that completely excludes human will and focuses on animal interests only.

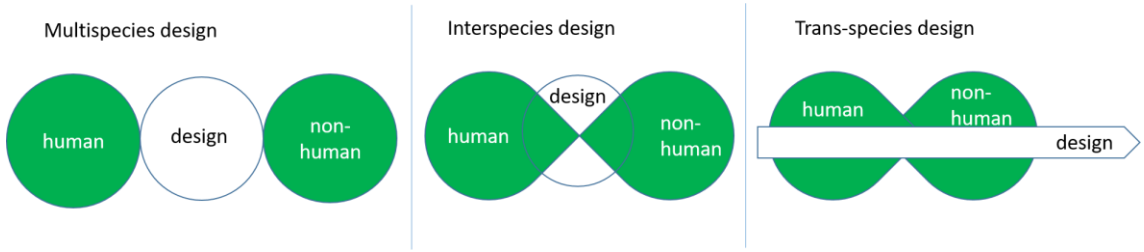
The level of proposed non-human participation in the design process for the terms multispecies and interspecies design also ranged from non-humans as users (Kirman; Lawson; Linehan, 2017; Morrison; Chisin, 2017; Hermansen; Tironi, 2018; Veselova; Gaziulusoy, 2021; Roudavski; Davis, 2021; Parker et al., 2022; Parker et al., 2023) to active participants in the design process (Metcalfe, 2015; Gatto; McCardle, 2019; Hermansen; Tironi, 2018; Kar, 2019; Olofsson, 2019; Roudavski, 2020; Daneluzzo et al., 2023; Lähdesmäki; Aivelo; Savolainen, 2024). In contrast, for the term interspecies design, authors North and Mancini (2016), and Kirman, Lawson, and Linehan (2017), don`t believe that true non-human participation in the design process could be possible given the language limitations.

The topic of care and respect in design with/for non-humans was addressed in both multispecies and interspecies entries (Metcalfe, 2015; Hermansen; Tironi, 2018; Roudavski; Davis, 2020; Westerlaken, 2020; Guilloteau, 2022; Cotsaftis et al., 2023; Farías; Criado; Remter, 2023). Also, issues regarding the inevitable lens of anthropomorphizing were raised by the authors (Metcalfe, 2015; Kirman; Lawson; Linehan, 2017).

The transpecies design concept does not seem to be widely adopted yet, considering the little material that was found in the systematic literature review of the term.

Notwithstanding that it was not possible to identify a clear difference among the concepts multispecies, interspecies, and transspecies design – it seems that there is a difference in meanings among the forming elements multi-, inter, and trans-, according to the Merriam-Webster dictionary and the "Concise Oxford Dictionary of English Etymology". In that respect, a preliminary proposal for differentiating the three concepts is outlined. This differentiation is illustrated in Figure 3 and is based on the interests of each actor in the design process: the human and the non-human and their interaction.

Figure 3: Multispecies, interspecies, and transspecies design




Source: elaborated by the author

In multispecies design, the human and non-human species would be mediated by design, they "touch it", but they keep their borders and limits, having each their own interests. As in the combining form "multi" (Hoad, 1996; Merriam-Webster, 2024), the design touches multiple interests without a necessary interaction of the parts. An example of this kind of design would be the pigeon house Capsule developed by Matali Crasset in 2003 (Haraway, 2016), which would attract the pigeons, refraining them from unwanted areas (human interest) while offering them shelter (non-human interest).

In interspecies design, the design would happen “between” (Hoad, 1996; Merriam-Webster, 2024) the human and non-human. In this case, species “touch” each other`s interests by interacting in this shared “design space”. As the prefix states, the design is “shared by, involving, or derived from two or more” (Merriam-Webster, 2024). Furthermore, interspecies design would have a mutual and reciprocal sense (Hoad, 1996). An example of this kind of design would be Michelle Westerlaken and Stefano Galeni`s (2014) videogame for human-cat interaction, staying in between human and non-human, mutual and reciprocal, interests.



In trans-species design, according to the prefix, there would be a “so or such as to change or transfer” (Merriam-Webster, 2024) between species through design. In trans-species design “on or to the other side of: across: beyond” (Hoad, 1996; Merriam-Webster, 2024) – it would imply a direction and a design that acts beyond the individual subjects involved. In such designs, the interest would be in-between human and non-human, but it also would transcend it. There would be interaction between human and non-human. One example of such designs could be Rasa Weber`s (2024) artificial reefs. She builds compositions that can be used as substrate and structure for corals and other pioneers. In this case, there is a human interest (aesthetics of the structures that could be seen in diving excursions), a non-human interest (substrate and structure for the corals and other species), and an interest that transcends human and non-human interests: the benefits resulting from the reefs, like environment protection for coastal ecosystems.

## 5 Conclusion

This paper investigated the trio of concepts multispecies, interspecies, and transspecies design through a systematic literature review - and through the exploration of the meanings and etymology of the word-forming elements multi-, inter, and trans-. Also, a preliminary proposal differentiating these concepts was suggested with examples.

The analysis of the 103 publications sample retrieved in the systematic literature review, does not reveal that a clear distinction among the concepts multispecies, interspecies, and transpecies design. The most cited authors within the sample for each term referred to designs where human and non-human needs would be taken into consideration. On the other hand, some of the authors addressed non-human needs only.

It was also noticeable within the sample that the level of non-human participation in the design process is debated. While some authors propose that non-humans should be active participants in the design process – others believe that non-human participation would not be possible, due to communication barriers. Still, others understand that design could happen completely without human participation, in a forest, for example.

When other living beings are participating or involved in the design process, there might be a risk of attributing human qualities to them. This is called anthropomorphizing. The authors within the sample address this risk, as well as the power relations that are implied in a human and non-human relationship. Despite that, care and respect were themes highlighted by many of the publications.

A preliminary proposal for differentiating the concepts of multispecies, interspecies, and trans-species design was made, based on the involved interests (human, non-human, and beyond) and

according to the interaction level (no interaction and interaction) – following the word-forming element`s meanings and etymology (multi-, inter-, trans-). Examples were given to illustrate each of the terms. To summarize, in multispecies design, the human and non-human interests would be individual and apart – there would be no interaction between them, all being mediated by design. Whereas in interspecies design there would be a reciprocal and mutual relation between human and non-human interests – there would be interaction inside a design space that happens in between the interest of the different species. Trans-species design in turn, would refer to a design that happens across and beyond human and non-human interests involved in a particular scenario. In trans-species design, there would be interaction across and beyond the design space.



This proposal of concepts is preliminary, however, and more discussion about the terms should follow. For instance, more examples besides the ones given in the discussion should be analysed. This analysis could lead to another perspective on the wording differentiation. Another interesting prospect is comparing other words formed with multi-, inter-, and trans- - such as multidisciplinary, interdisciplinary, and transdisciplinary. On that thought, other word-forming elements should be investigated, such as pluri- and cross-. Further studies could include other terminology that is used to address more-than-human design which involves non-human living entities, their methods and peculiarities.

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