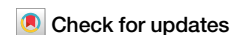


<https://doi.org/10.1038/s42949-025-00257-1>

Designing multispecies role-playing games: From human-nature partnerships towards multispecies justice

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Current global socioecological crises are rooted in an anthropocentric worldview that sees humans as separate from and superior to the rest of nature. Urban sustainability planning is also anthropocentric in that it often regards non-human species as mere service providers. While anthropocentric approaches to planning are called into question, there is currently a lack of methods for incorporating more-than-human voices into planning. This paper presents multispecies role-playing games as a method of engaging with urban planning from a more-than-human perspective. First, we show how to design multispecies role-playing games based on human-nature partnership ethics. Second, we present how a multispecies justice lens can help to improve the design and application of such games in urban sustainability planning. Our findings suggest that multispecies role-playing games are a valuable method for applying ideas of multispecies justice in urban planning education, practice and research.

Today, severe socioecological crises are destroying biodiversity and habitats in a more-than-human world. Behind these increasingly tangible crises lies a deep-rooted, intangible anthropocentric worldview in which humans perceive themselves as separate from and superior to the rest of nature^{1,2}. Anchored in the ideas of Western modernity, this worldview serves to rationalise exploitative and utilitarian relationships between human and non-human nature^{3,4}. Worldviews that determine our relationship to the more-than-human world are part of our inner dimensions and represent deep leverage points for sustainability transformations^{5,6}. However, the inner dimensions are hardly considered in research on urban sustainability planning⁷.

An anthropocentric worldview is deeply rooted in European urban planning. For example, in the 19th century, reformers saw 'nature' as a solution to the poor environmental conditions and rampant disease in the continent's industrial cities⁸. To date, the design of nature-based solutions and urban sustainability planning remain inherently anthropocentric, i.e. non-human nature is often perceived as a mere service provider to human needs, thereby reinforcing injustices^{9–11}. This view of human-nature relationships is accompanied by a lack of respect and recognition, which, in turn, undermines participation and representation in political processes¹². To overcome these unjust relationships, Pineda-Pinto et al.¹¹ suggest that we must 'challenge our relation to non-human nature from one of services and

benefits to humans, to one of stewardship, care, respect and active representation.' Planning for multispecies justice involves reimagining our ethical frameworks by posing 'a challenging What-If question: as a critical interrogation of how we should process and experience the world (and our place within it)' (ref. 13, p. 3), thereby aiming for desirable futures in which structural anthropocentrism is abolished (ibid. 2022). Such a radical transformation towards a 'good' Anthropocene involves both the recognition of the rights of non-human species and their participation in democratic processes^{14,15}.

Some planning scholars are committed to more-than-human thinking and call for a relational understanding of nature^{16–18}. Other scholars favour a strengthening of multispecies justice through nature-based solutions that create ecocentric rather than anthropocentric places¹⁰. More-than-human thinking challenges anthropocentric approaches to planning by extending the community of justice to more-than-human beings^{12,19}. Given that non-human beings cannot participate directly in anthropocentric planning processes, non-human representation is achieved through proxies^{19,20}. These proxies can be positioned to represent non-human interests, as discussed in work on ecological democracy (see ref. 21). Although proxy representation has been criticised for structural shortcomings such as limited knowledge or dependence on human translation¹⁹, human representatives nonetheless have the capacity to anticipate and represent more-than-human positions.

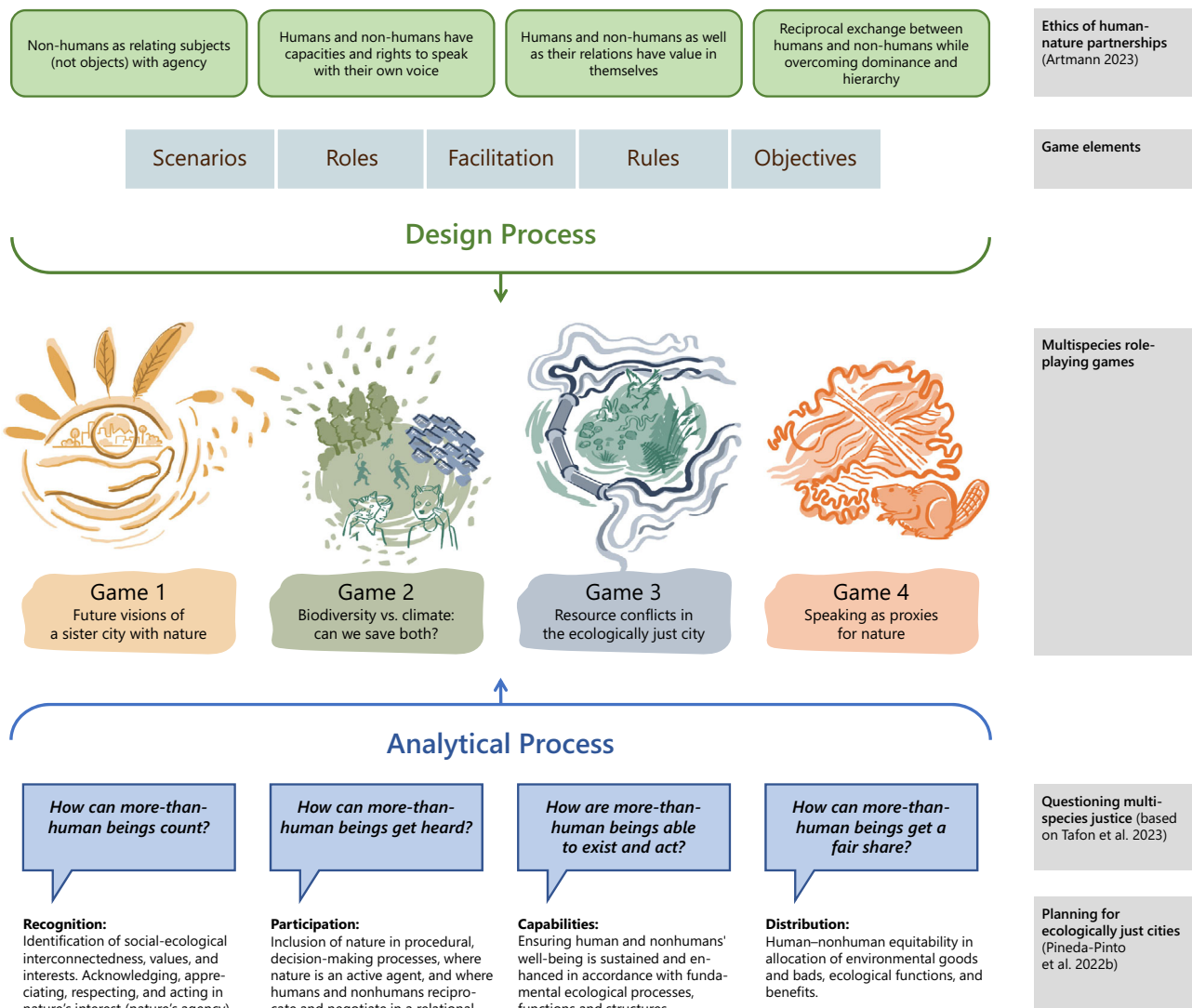
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These various human interpretations of non-human interests can increase the multiplicity of voices in planning processes²². However, there is a lack of suitable methods for incorporating more-than-human voices into planning^{23,24}. To put this into practice, in this method paper we look at serious games, more specifically the design of multispecies role-playing games to include those voices.

Serious games, which have been used in various planning contexts since the 1960s, are a suitable method for visualising complex urban problems, promoting social learning and boosting participation^{25,26}. In such games, participants can engage and experiment in an interactive environment, work in an imaginary setting that models the real world as well as learn about and participate in decision-making in a safe space^{25,27}. In particular, we highlight role-playing games as a subset of serious games that allow individuals to consciously leave their own perspective, put themselves in the shoes of others and act as representatives in an imagined game world^{28–30}. In education, role-playing games are a popular teaching tool relating to the environment and sustainability^{28,31,32}. While role-playing games can help to gain new perspectives from a multiplicity of positions, today they remain fundamentally anthropocentric. To build solidarity with the more-than-human world, however, it is vital that we adopt non-human perspectives and

experience a change of perspective. For example, in the environmental philosophy known as *deep ecology*, the ‘Council of All Beings’ ritual has long been used to transcend human identity and speak on behalf of other beings³³. Role-playing can also be such an embodied practice that promotes ecological empathy with the more-than-human world³⁴. Recently, arts-based approaches have increasingly focused on the more-than-human perspective in and on the city (e.g. ref. 35). Role-playing designs have been used for climate change education in secondary schools, in particular to explore multispecies approaches³⁶. In contrast to these positive examples that enable radical participation and challenge worldviews, game designs that deal with nature in urban planning are generally stuck in anthropocentric perspectives³⁷. However, game designs could create what-if planning scenarios that differ from the status quo^{30,38} and in this way create what-if worlds in which the needs and capabilities of more-than-human beings are respected and their political rights recognised.

To address this methodological gap, we present the design of multispecies role-playing games based on four ethical principles of human-nature partnerships (see Fig. 1). We argue that the design of such games is an important first sensitive step in bringing their voices into post-anthropocentric planning. In doing so, we align the concepts of human-



Concept: P. Harms; Design: N. Bongaerts/IOER Media

Fig. 1 | Research approach. The research followed a two-step approach. First, as part of the design process, various design teams developed four different role-playing game designs. Then, in the analytical process, these role play designs were

thematically analysed using the four dimensions of multispecies justice (Concept: P. Harms; Design: N. Bongaerts/IOER Media)

Table 1 | Conceptual comparison of Human-Nature Partnerships and Multispecies Justice based on key literature^{19,23,40,73,74}

Comparison criteria	Human-Nature Partnerships	Multispecies Justice
	Similarities	
Ontological framing	Both concepts are based on a relational ontology ⁷⁵	
Ethical framing	Both provide a normative understanding of what is morally right and wrong in terms of human-nature connections recognising the rights of more-than-human entities to flourish equally ¹⁹	
	Differences	
Field of origin	Environmental philosophy	Environmental justice
Reference to planning	Not yet applied to urban sustainability planning	Taken up and reflected in urban sustainability planning
Reference to justice	Embracing justice as one quality of human-nature partnerships	Re-thinking justice from a more-than-human perspective
Application in this paper	Bridging concept as intermediary form of knowledge to develop multispecies role-playing games	Theoretical framework to analyse aspects of justice in multispecies role-playing games

nature partnerships and multispecies justice, serving different purposes in the paper (see Table 1). Our contribution focuses on the game design, therefore, conducting the games and analysing the effects of the participants' gaming experience is not the aim of the study. In order to explore the design of multispecies role-playing games in detail, we pose the following research questions:

- How can role-playing games be designed as a method for including more-than-human voices in urban sustainability planning?
- To what extent do multispecies role-playing game designs operationalise multispecies justice?

To answer the first question, we present shared key elements of four multispecies role-playing game designs for urban sustainability planning. To answer the second, we present the results of a thematic analysis in which multispecies justice is used as an analytical lens to draw a differentiated understanding of justice in multispecies role-playing games through the dimensions of distribution, recognition, participation and capabilities (see Fig. 1). Finally, we discuss the potential of role-playing games to bring more-than-human voices to urban sustainability planning as well as challenges and limitations.

Results

Designing multispecies role-playing games for urban sustainability planning based on human-nature partnership ethics

Four multispecies role-playing games were developed by different design teams and trialled in diverse settings between 2022 and 2024 (see Supplementary Table 1). All game designs are based on the ethical principles of human-nature partnerships, which was provided to the design teams as a bridging concept that helps bridge knowledge between theory and practice to promote an interdisciplinary dialogue³⁹. Artmann⁴⁰ outlines human-nature partnerships as a vision and target knowledge for sustainability transformations that illustrates non-hierarchical relational qualities between human and non-human beings (see Fig. 1). These principles encouraged the design teams to reimagine and rework urban human-nature relationships as non-dominant and non-hierarchical, which they achieved through various designs. All game designs encourage participants to experience a change of perspective whereby more-than-human needs and interests are recognised and included in urban planning processes. The complete materials of the game designs are presented in Harms & Ortner⁴¹. In the following we outline shared key elements of the game designs, with the four ethical principles of human-nature partnerships providing structure.

For the 1st principle 'Non-humans as relating subjects (not objects) with agency' we observed the following. Previous role-playing scenarios around urban planning have largely been anthropocentric, i.e. human subjects making decisions on non-human objects³⁷. To challenge this subject-object divide, non-human characters were incorporated into the planning scenarios. The players adopted the perspective of the non-human planning subjects and were invited to participate in planning processes. For example, in Game 1 (G1) and Game 2 (G2), representatives of non-human subjects

participated in creating future city visions and took land-use decisions alongside their human counterparts. In Game 3 (G3) and Game 4 (G4), players teamed up as non-human characters to steer the planning process for urban infrastructure projects that directly affected them.

In relation to the 2nd principle '*Humans and non-humans have capacities and rights to speak with their own voice*', it was evident that the notions of partnership ethics encouraged the design teams to introduce non-humans as complex characters into the game designs that have to articulate, represent and negotiate their rights. In designing the roles of more-than-human characters (represented in the game by role cards), they were not just assigned basic survival needs such as food, water and shelter but also higher order needs and emotions generally attributed to humans such as joy, anguish, friendship and self-esteem. For example, the characters in G3 were portrayed emotionally, with players encouraged to bring these emotions into the game; or in G4, players were invited to ask themselves the following questions: '*How can you defend the integrity of the Meadow and make her voice heard?*'; '*How can you make the City see the point of view of the Cuckoos?*'; '*How will you defend the Beaver's right to stay?*'

For the 3rd principle '*Humans and non-humans as well as their relations have value in themselves*' we noted the following. The ecosystem services discourse in urban planning often places nature at the service of humans¹¹. To reimagine this one-sided instrumental relationship, attention was paid to rendering the intrinsic and relational values of nature visible in the games so that the players could act in their favour. For example, the Soil role card in G3 reads as follows: '*You are the Soil – without you, nothing works here! You form the basis for all life.*' In G1, a focus was placed on recognising and valuing every being and their differences while storytelling was used in the scenario to emphasise the non-instrumental values of nature: '*Human residents appreciate the diverse and vibrant urban nature that surrounds them in everyday life. The services and limits to the usability of urban ecosystems are acknowledged and form the foundation for political decisions and urban strategies.*'

The 4th principle of partnership ethics, '*Reciprocal exchange between humans and non-humans while overcoming dominance and hierarchy*' questions the dominance of humans in governing human-nature relationships. Instead it calls for giving and taking on equal terms⁴⁰. Reciprocity was deliberately integrated into the role-playing games, particularly in defining the rules as well as the game facilitation process. For example, in G2 and G4, where human and non-human beings negotiate different infrastructural options, the rules of the game underlined '*respectful exchange*' as a guiding principle. This was further reinforced during the game by the facilitators, particularly if human characters tried to dominate or stress human needs as essential. Furthermore, all four games featured elements of collaboration through the co-creation of planning outcomes such as a joint counter-proposal for the city administration in G4. This gave participants the experience of working as a team for and with non-human interests.

Ethically designed games represent a first step towards mobilising multispecies role-playing games for urban sustainability planning. But can these games be a method for achieving the normative goal of multispecies

justice in urban sustainability planning? With this in mind, we analysed the game material from a multispecies justice perspective to inform future role-playing game designs and applications for sustainable and just urban planning.

Analysing the game material with a multispecies justice lens

We conducted a thematic analysis of the materials of the four game designs using four guiding questions related to multispecies justice (see Fig. 1).

In general, we found that aspects relating to the justice dimensions of recognition and participation were frequently addressed in the game designs. The scenarios, roles and rules of the games seem to create a powerful setting in which more-than-human beings are recognised and heard in the planning process. In contrast, aspects related to the capabilities and distribution dimensions appeared less frequently in the material. Our hypothesis is that these aspects were less directly influenced by the game design and more by the negotiation between players. It is only through the game situation that we can see how the players act as representatives and whether they realise their objectives fairly. In addition, it became apparent that certain aspects of multispecies justice were addressed more strongly by certain game elements. For example:

Recognition was addressed by focusing the game scenarios on the interconnectedness of all beings and by appreciating the intrinsic and relational values of nature. Regarding the rules of the game, our analysis shows that recognition can be promoted, for example through the demand for openness and tolerance so as to promote respect for and appreciation of other interests. Furthermore, role cards and facilitation were used to open up an experiential space for empathy with more-than-human needs and the appreciation of socioecological relationships, for example through the use of language styles such as personalisation or emotionalisation. In addition, the facilitation supported the participants' change of perspective and demanded respect and recognition for all beings.

Participatory justice was addressed in the scenarios, firstly by recognising the (legal) rights of all living beings within imaginary decision-making processes and secondly by giving the players the opportunity to act as representatives and find joint solutions. Furthermore, the rules of the game influenced participatory justice in two ways: first, by establishing the rules of discourse (e.g. respectful interaction, active listening), and second, by establishing procedural rules to determine who is involved in decisions and how this should be managed (e.g. exclusion vs. inclusion). Moreover, facilitation strengthened justice by supporting the equal participation of all in the decision-making processes, encouraging players to claim their rights and enabling the identification of common interests and strengthening cooperation in dealing with conflicts. These aspects were also integrated via the game design by explicitly authorising certain roles for mediation. The game objectives also encouraged the players to think about issues of participatory justice, e.g. standing up for other interests or about co-operative strategies that arise through compromise.

Capabilities of more-than-human beings were addressed by the role cards, e.g. by emphasising the right of all living beings to exist and thrive or by addressing socio-ecological integrity and health (e.g. what individuals can do to promote the well-being of all). The scenarios and facilitation also created opportunities for the players to make a case for more-than-human capabilities, e.g. by welcoming all beings, by demanding mutual respect and equal rights to flourish.

Distributive justice was only partially brought up. The role cards and facilitators encouraged the players to reject inequality or maldistribution. The game objectives also demanded fair outcomes in terms of distributive justice and encouraged the players to critically reflect on the results.

Discussion

In this section we discuss on how the safe space of role-playing games offers starting points for the application of multispecies justice theory in urban sustainability planning. We also present the opportunities, limitations and challenges of multispecies role-playing games, and draw some conclusions

for the application of such games in planning education, practice and research.

In order to put multispecies justice into practice through role-playing, our thematic analysis allows us to derive first insights, as we have gained a differentiated understanding of the applicability of the principles of justice. Here we move from questions of *who* or *what* is subject to justice to questions of *how* to operationalise aspects of multispecies justice in deliberative settings. Through games, we can investigate *how* more-than-human beings can be accounted for in planning practice. This spotlights the differences between the human participants and the non-human proxy representative roles they take on. The players act with their own personalities in the game while simultaneously functioning as representatives for non-human beings. Consequently, we observed different rules within the game designs, both regarding the rules for interaction and communication between the human participants (e.g. respectful non-violent communication) and the rules governing representation of more-than-human interests (e.g. equal voting rights for non-human characters). Furthermore, in the analysed role-playing game designs, the more-than-human perspective was embedded in a broad normative setting incorporating other ethical principles (e.g. ethical Universalism, 'ethics of the Other')^{42,43}. Hence, we suggest that it can be helpful in planning practice to address other ethical principles in negotiation situations and to link these to the assets of multispecies justice. Finally, the dramaturgical structuring of the game allows thematic or normative aspects of multispecies justice to be presented in a chronological order, creating opportunities for the introduction of specific issues at different phases, even in real deliberative settings. Issues of recognition and participation are generally addressed at an early stage in the dialogue, while aspects of distribution may appear in latter phases.

In the following, the opportunities, limitations and challenges of multispecies role-playing games are discussed along five central themes. This involves radically inclusive participatory planning, in which role-playing can help to '*critically reframe planning and develop more inclusive and ethical relationships with non-human species*' (ref. 17, p. 392) by understanding environmental politics as a politics of representation and by mobilising political forces based on immediate physical experiences. The design teams took partnership ethics as a starting point for the design of the what-if worlds. This accords with approaches in the field of digital and interaction design, where games are employed to create new potential worlds⁴⁴. This feature of role-playing games could be further addressed in future research, particularly in relation to imagining a positive future to help foster a shared understanding and commitment to the sustainability transformation⁴⁵. Also, precisely because games make it possible to explore alternative ways of being, thinking and acting in a safe space in which immediate feedback is given on the likely consequences, they are also a promising method for enabling social learning⁴⁶. In the presented role-playing games, the subject-object divide was questioned through the act of representation, while non-human characters were granted agency. By taking on such roles, participants can shape and investigate the various dynamics of their relationships with themselves, others and their environment. Another future research path could thus be to explore these relational qualities of multispecies role-playing games at greater depth, focusing on players' relational understanding as transformative skill in urban sustainability planning⁴⁷.

Furthermore, perspectives, worldviews and values can be challenged through embodied practice. Thus, the games discussed aimed to scrutinise instrumental human-nature relationships and to reject the view of human dominance by indirectly questioning established values and worldviews. Another promising field of inquiry would be to directly address the actors' inner dimensions. The literature on organisational research emphasises that the subjective perspectives of actors in role-playing games can be analysed holistically, for example by examining action-related norms and values in the context of the respective work culture⁴⁸. According to²⁹, a transformative claim can also be formulated for role-playing games which focus directly on the inner dimensions of change: '*The aim of transformative role-play is to help participants recognise that they can co-create and adapt to a fictional*

world, and then invite them to explore the meaning of their playful experience through their own personal journey.’ In this way, role-playing experiences can help reflect on why and how to plan. In other words, participants become aware of personal schemes of meaning such as beliefs, attitudes and emotional reactions^{28,29}. This should seek to enhance our understanding of more-than-human relationships – particularly in the West – by combining traditional scientific knowledge with indigenous expertise⁴⁹.

In addition, the game designs deal with the question, who should act as representatives of the non-human interests. The design teams considered whether the players should be subject experts (e.g. ecologists) driven by their expert knowledge or non-experts guided by the information on the role cards (e.g. what a sparrow likes and dislikes) as well as driven by their own intuitions and feelings when speaking for non-human characters. In the end, they opted for a balance: the role cards provided some basic scientific information about the non-human beings while the game designs encouraged players to formulate their thoughts and arguments using their imaginations and personalities. In this context, it can be difficult to truly inhabit a role, as improvisation can lead to a more stereotypical plot than would exist in real life. Some basic questions here are: How can we more closely empathise with the needs and interests of non-human actors in the city? How can these be better addressed and represented by humans in role-playing games? Given the complexity of proxy representation, we encourage future games to constitute mixed teams to represent more-than-human interests, weaving together multiple evidence bases and leading to the creation of an “enriched picture” of multiple interests⁵⁰.

Another key issue is the duration of the games. In our case, all the games were designed to run for 90–120 minutes. In this limited time frame, it is challenging for players to adopt a non-human perspective. Anthropocentric mindsets that have been conditioned throughout life are difficult to discard in such a short time span. In fact, a much longer period of up to 12 hours is necessary for a fully transformative role-playing game²⁹. In the ‘Council of All Being’ ritual, the participants attend a workshop over several days³³. Another example is the Embassy of the North Sea, a speculative project involving a multi-year collective journey that was launched with an initial four-year listening phase before aiming to represent the North Sea and strengthening its presence in politics and society⁵¹. In the future, multispecies role-playing games should follow this strategy, focusing more on acts of observing, feeling, listening and embodying before human participants take on a representative role for non-human beings.

A further aspect is the integration role-playing games in real-world decision-making processes. One limitation was that the game designs presented were only tested in the classroom, at a scientific conference and at a public festival. A next step could be to integrate the games into an urban planning process for participatory stakeholder engagement, as shown by Edwards et al.⁵² in the case of adaptive governance, where role-playing games were played with policy and planning decision-makers.

Looking forward, we see three promising avenues for the application of multispecies role-playing in urban sustainability planning. Considering the applicability of gamification⁵³ and the recognition of role-playing as a pedagogical tool in planning^{54,55}, we see potential in higher education for the training of future planning practitioners. It has been demonstrated that students can acquire procedural knowledge, including negotiation and decision-making skills, through anthropocentric role-playing⁵⁴. Participants of role-playing games not only acquire insights but may also produce, practice and embody knowledge³⁸. Furthermore, role-playing games can help to reflect on and change behaviour and develop empathy by playing unfamiliar roles⁵⁶. All of this could be transferred to multispecies role-playing and lead to valuable outcomes in this new context. In addition, role-playing games provide a secure setting for students to adopt novel and disruptive perspectives, engage in peer-to-peer learning, and give and receive feedback⁵⁷. As has already been shown for secondary school students, multispecies role-playing games can promote relational learning and an awareness of justice (ref. 36).

We also see the value of role-playing games in advancing participatory planning practices. For example, involving under-represented voices in the

decision-making process – Shirley Chisholm’s famous dictum applies here: ‘If they don’t give you a seat at the table, bring a folding chair’. In this paper, we seek to conceptualise this proverbial folding chair for non-human beings by introducing role-playing games as a way of challenging conventional planning practices. The present study aligns with the position advanced by Rautio et al.⁵⁸, who advocate a multispecies approach to participation grounded in an ethics of inclusion and centred on the conceptualisation of who constitutes a stakeholder. They argue for the interrogation of anthropocentric practices by questioning the conditions under which participation occurs and whether these may contravene the interests of non-human entities⁵⁸. For example, in the case of landscape and urban planning, Hernandez-Santin et al.⁵⁹ suggest that biodiversity be consciously positioned as the ‘non-human users’ of a place who play an active role as stakeholders; the aim here is to foster biodiversity-inclusive urban design practices. Other scholars have explored place-making as a co-creation of human and non-human beings: ‘*The Parliament of Species demonstrates how arts-based methods may (...) establish relations of respect and solidarity with other species (...)*’ (ref. 35, p. 322). In the same way, game-based approaches, particularly role-playing, could be used within participatory urban planning and design approaches to engage with more-than-human cities⁶⁰. Design and planning practitioners would be offered the opportunity to consider more-than-human rights and to connect with more-than-human interests and agencies for participation⁶¹.

Furthermore, role-playing games provide a useful method for planning research as they are already established for data collection in educational research, i.e. role-playing as a teaching, learning and assessment strategy at all educational levels⁶². Here, everything that the participants experience, feel, perceive, express, act out, etc. during or after the game can be the subject of research. For example, multispecies role-playing games could be used to explore the ethical views of planning practitioners⁶³. In transdisciplinary and participatory research designs, role-playing games are also attracting the interest of the research community as a collaborative method⁶⁴. In particular, such games can help to bridge the gap between academic knowledge and other forms of expertise by focusing on knowledge sharing and social learning. Role-playing as a tool for transdisciplinary knowledge integration is closely related to the use of role-playing games for educational purposes (see above). For example, a transdisciplinary initiative in the field of water security developed a role-playing game as a way of integrating knowledge and support capacity building as part of an educational goal⁶⁵. However, a transdisciplinary research process can start even earlier if scientists and practitioners’ team up during the game development process⁶⁶.

We conclude that role-playing opens up an exciting avenue for the application a multispecies justice perspective to include more-than-human voices in urban sustainability planning. We invite researchers to experiment creatively and sensitively with this method to create dedicated spaces for more-than-human voices in urban planning education, practice and research.

Methods

Ethically based design of multispecies role-playing games

The development of the role-play designs was carried out independently by four different design teams. Their common starting point was the positive vision of human-nature partnerships based on core ethical principles (see Fig. 1 and Table 1). PH initiated and coordinated the game development process and ensured that the teams integrated a comparable structure and the same game elements into their design in addition to the ethical orientation. Details on the four role-playing game designs can be found in our guide, which presents the developed game materials in detail⁴¹.

In the following, we show how the role-playing game designs were developed. As role-playing games can be designed in different ways, it is crucial to distinguish between two extremes: spontaneous vs. guided games. In the former, the players decide completely independently (and with no prior information) how to shape their characters, whereas in guided role-playing games, the game leader or moderator provides content guidelines and steers the running of the game⁴⁸. In our case, the design teams started

with a common framework in order to develop comparable game designs. The framework consisted of five game elements: scenarios, role cards, rules, facilitation and objectives and in It is generally recommended that a role-playing game be divided into three consecutive game phases: warm-up, action and reflection^{38,48,67}. In the warm-up phase, the scenario, role cards, rules and objectives are introduced by the facilitators, and the players have the opportunity to think and feel their respective roles, perspectives and concerns of their respective roles. Transformative role-playing games existing perceptions and allow players to try out behaviours in a scenario that is as real as possible; facilitation should encourage and welcome emotional reactions during the game^{28,68}. In a guided game, the facilitators organise a specific dramaturgy. They create the appropriate atmosphere and maintain the setting, for instance by setting up the room and fixing the timeline. However, when play starts, they deliberately take a back seat. The action phase begins when the participants become active players. This can be a verbal exchange of arguments or joint action in the creation of products. In this phase role provide orientation for the representation of more-than-human interests, which limits the individual room for manoeuvre⁶⁹. The third phase is related to the objectives of the game. Among other things, it is about reflecting on the game experiences when the players step out of their role and return to their everyday perspective. For example, participants can relate the situations encountered within the game to their own real-life experiences. When designing role-playing games, there is a tension between the predetermined views, e.g. through scenarios or role cards, and the personal freedom of players to contribute their own ideas and experiences, which in turn can increase motivation and engagement^{69,70}. The voluntary agreement of players is an essential prerequisite if the game is intended to be transformative and explicitly contribute to a change in perspective or induce social learning^{28,29}. Taken together, the game elements and phases have provided a suitable common framework for the development of the role-playing game designs, enabling them to create an imaginary planning scenario in which the concerns of more-than-human beings can be represented.

Thematic analysis

We applied a deductive thematic analysis to identify patterns (themes) in our game material^{71,72}. To this end, the entire game material of the four games was divided into text files, which were then analysed. Our analytical framework was based on the summarised definitions of the four dimensions of justice by Pineda-Pinto et al.²³ and, following Tafon et al.⁷³, formulates four key questions to operationalise these dimensions for the thematic analysis (see Fig. 1). The game material was analysed by PH and SK. PH was previously involved in the game development process (see previous paragraph), which can lead to a bias in the analysis. To counter this, SK brought an external perspective to the analysis as he was not involved in any game design.

For the thematic analysis, we adopted the four dimensions of justice, namely recognition, capabilities, participation and distribution, as key concepts and the first coding category. The two authors independently read the five text files of the four game designs, marking all text passages that appeared to represent a category. In the next step, all marked passages were coded using the given codes. Any text that could not be categorised using the original coding scheme was given a new code. The two authors then compared each other's coding and, on this basis, identified how different codes could be combined into overarching themes. This abstracted the analysis to a broader level of potential themes, clustering as many relevant coded data extracts as possible within these themes. In the Supplementary Table 2 we present the coding sheet with the assigned coding categories and the identified overarching themes. It should be noted that, following this method, the authors approached the data in an informed manner that was strongly conditioned by the theoretical assumptions. Our analysis was able to identify themes in the game material that could help strengthen aspects of multi-species justice in future game designs and applications. In this paper we have analysed the game material. In our future work, we intend to combine this

analysis with an investigation of the game results and the participants' perspectives.

Data availability

The datasets analysed during the current study are available in the Zenodo repository, <https://doi.org/10.5281/zenodo.14856435>. The corresponding coding sheet is provided as supplementary information.

Code availability

Not applicable.

Received: 19 February 2025; Accepted: 26 July 2025;

Published online: 20 August 2025

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Acknowledgements

Philip Harms received funding from the Leibniz Association and was supported by the Leibniz Best Minds Competition, Leibniz-Junior Research Group under Grant J76/2019. Neelakshi Joshi was funded by the Leibniz Institute of Ecological Urban and Regional Development, Germany. We would like to thank Martina Artmann for her valuable feedback on our

manuscript and Nicolaas Bongaerts for his graphical support in creating the figure.

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Funding

Open Access funding enabled and organized by Projekt DEAL.

Competing interests

The authors declare no competing interests.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1038/s42949-025-00257-1>.

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