Where is Nature?  
Where is Nature in Nature and Outdoor Learning in Higher Education?  
An Analysis of Nature-Based Learning in Higher Education Using Multispecies Ethnography

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Abstract

The multiple crises of the 21st century once again highlight the significant role of sustainable education in all educational institutions. Particularly in higher education, the inclusion of nature and animals in the curricula is underrepresented. Using the method of Multispecies Ethnography, which recognizes the interconnectedness and inseparability of humans and other life forms of the more-than-human world, such as plants or animals, this paper discusses the presence of nature in online-based nature and outdoor learning in higher education. This study examines nature-based learning in higher education. It analyses the role of nature in the learning process in general and in sustainable education in particular. The results of the study show that a relationship with nature leads to a change in one’s worldview, which is evidence of the methodological importance of introducing nature in the learning process. The results also illustrate that – despite digitalization – direct interaction with nature is essential for a paradigm shift in education.

Keywords: Grounded theory, human-animal studies, multispecies ethnography, sustainability, teacher education

Introduction

The multiple crises of the 21st century, such as climate change, environmental pollution, species extinction, habitat destruction and the shortage of raw materials (Statista, 2018) show high interdependencies between humans, animals and the animate and inanimate environment. These interdependencies are complex and multi-layered; therefore, a scientific debate in the analysis of these interdependencies cannot be carried out by a single discipline.

This is also confirmed by the studies on the perception of nature (Braun, 2000; Becker, 2016), role concepts in human-animal relationships (Irvine, 2004), the aspect of exploitation and use of nature (Bläske, 2019; Plumwood, 2002), debates on the One
Health approach (Papadopoulos & Wilmer, 2011, pp. 1–2) or Education for Sustainable Development and outdoor and environmental education (Rieckmann, 2019).

The importance of nature and animals in educational contexts has been systematically analyzed, especially in outdoor and environmental education. It is particularly criticized that children hardly ever consciously go into the forest or have physical contact with animals. This development is understood as turning away and drawing of boundaries, thus leading to suppression of the awareness of nature and hiding different perspectives and points of view (Pschera, 2014, p. 40 ff.).

However, children’s contact with their environment and the direct sensory interaction with the more-than-human world is named as a key in tackling the multiple crises mentioned earlier (Cudword & Lumber, 2021; Roberts et al., 2020; Carvalho et al., 2020; Jickling et al., 2018). The more-than-human world describes the earthly world (Abram, 1996) surrounding us, of which humans are a part and for which they are (co-)responsible (Sauvé, 1996, p. 10). Nature and the experience of nature are understood as an integral part of educational processes, which must be included in education in the future (Roberts et al., 2020; Carvalho et al., 2020; Jickling et al., 2018).

For outdoor and environmental education, teachers in particular are often described as “key multipliers in the promotion of Sustainable Development” (Goller & Rieckmann, 2022, p.19) and door openers to nature, as they enable concrete and experience-based teaching/learning experiences. However, these experiences are influenced by the teacher’s own relationship with nature and the environment (Tsevreni, 2021, p. 14). This means that issues such as prior knowledge and experience, fears and phobias, health and safety issues, learning styles and preferences (co-)shape these teaching/learning experiences (Dillon et al., 2006) and impact their ability to “strategically design [...] learning activities to empower learners to catalyze change” (Adefila et al., 2021, p. 46).

The demand for a concrete inclusion of nature-based learning spaces in all educational institutions consequently also requires the inclusion of nature-based learning spaces in the basic training and further education of pedagogical staff. The active inclusion of actors of the more-than-human world, often named nature, in teaching/learning processes teaches the ability to reflect, which can change the learners’ and teachers’ view of nature to a great extent (Tsevreni, 2021). Conversely, this means that teacher education has a relevant role in the concrete design of nature-based learning environments for students in school (Quay et al., 2020; Jickling et al., 2018; Wals et al., 2017).

In this context, however, questions on the ultimate way of directly involving animals and nature and about understanding and including them as co-teachers become visible (Carvalho et al., 2020). This brings the question of the role and social construction of nature in the educational process into focus. It remains open how the co-interaction between teachers, learners, animals and nature ultimately looks. This is the point of departure for this article: Using multispecies ethnography, the teacher training at a university in the Nature and Outdoor Learning module is analyzed. The main focus is on the competences students build up in the module and the roles they attribute to nature as co-educators.
Nature and Outdoor Learning

The inclusion of nature is an essential pillar of environmental and outdoor education (McPhie & Clarke, 2020). The concept of nature is constructed differently in different disciplines. Brand and Reusswig (2020) describe nature as a social construct, which is constructivist or culturalist. Humans, animals and nature are not independent entities. Rather, they are determined by social discourse). On the other hand, especially in the natural sciences, nature is understood as all living things. This includes everything that surrounds humans, such as water, soil, air, stones, trees or animals (Michel-Fabian, 2010, p. 47). These dualistic, often disciplinary approaches to the construction of nature illustrate a dichotomy in the area of human-nature relations in general and human-animal relations in particular. This aspect is also taken up by McPhie and Clarke (2020), who, like Giesing et al. (2019), point out that there is no universal nature, but that different versions of nature exist. This means that human-nature relations are never a simple technical and pedagogical matter, but are always constructivist. This is also evident in the literature on outdoor and environmental education, as it is framed by anthropocentrism, biocentrism, ecocentrism, shallow ecology, deep ecology, feminist, post-structural, indigenous, new materialist, and posthuman perspectives, depending on the theoretical approach (McPhie & Clarke, 2020).

Although different constructions of nature exist, it assumes great importance as a core category in outdoor and environmental education (Cudword & Lumber, 2021; Kemp, 2020) to holistically address the alienation between humans and nature through sensory discovery and action orientation. Bueddefeld et al. (2022) maintain that petting bees do not provide a complex learning experience. In comparison, building bee boxes create a more complex learning experience. The authors conclude that complex experiential learning makes transformative learning experiences possible in the first place (Bueddefeld et al., 2022). Learning diaries are recommended as a profitable method, as they create a processual reflection of the nature encounter (Tsevreni, 2021, p. 14ff). Dialogical learning, joint experimentation and confrontation with real issues and with direct sensory practical relevance in a learning environment close to nature are intended to support students in consolidating their own world view, discussing and accepting other world views and thus initiating change.

It is particularly important to emphasize that outdoor and environmental education is not about prescribing certain ways of thinking and behaving, but about answering questions oneself and critically reflecting on one’s own actions (Rieckmann, 2019; Timm & Barth, 2020; Ferreira & Pitarma, 2021). It is necessary to consider what is learned, who planned the teaching/learning process and how it was planned, whether learning takes place passively or actively, and how all aspects together steer the educational process (Carvalho et al., 2020). Symbols, discourses and institutional segments in the category “human” are dismantled (Pedersen, 2011, p. 67). This enables plants or animals, for example, to function as co-educators (Carvalho et al., 2020) or mentors (Aikenhead & Michell, 2011, p. 79) and to profile the learning process in a participatory way. At this point, the first links to multispecies ethnography can already be established. This approach, initially described as a research method can be used in the context of outdoor and environmental education as a way of implementing observations of everyday learning and elaborating the perspective of actors in the more-than-human world, such
as plants or animals, and listening to them as a co-educator and a mentor (Ameli, 2022, p. 48).

In addition to this transformative approach in the sense of a change of perspective in favor of the actors of the more-than-human world, the importance of competence development of teachers in the context of their training is also discussed (Rieckmann, 2019; Timm & Barth, 2020). For the future, Sterling et al. (2017, p. 160) propose a competence-based approach to bridge the gap between theory, knowledge and action and enable future educators to deal with the issues they might face in their future classrooms and communities. Here, Wiek et al. (2011, p. 129) focus on system thinking and anticipatory, normative, strategic and interpersonal skills (Wiek et al., 2011, p. 129), while Glasser and Hirsh (2016, p. 129) highlight affinity with life, knowledge of the state of the planet, wise decision-making, modeling sustainable behavior and transformative social change. In this regard, Faham et al. (2017) have noted that interactions oriented towards emancipatory content, in which students develop new knowledge, perspectives and skills, are enabled to make responsible decisions in the complexity of people, animals, nature, cultures. In this context, theory-practice-transfer is an essential element, but it requires teachers to have knowledge on practice (El-Deir, 2019).

In this context, it is crucial to determine how the use of nature and animals as co-teachers can ultimately succeed. Kopnina (2017, p. 137) suggests overcoming anthropocentrism in education and reorienting education for humans, nature and more-than-human actors. She introduces the concept of a “planetary citizenship”. All species have the right to live their own sustainable lives and are automatically integrated into educational processes (Valley et al., 2017, p. 219). Other authors include the concept of environmental citizenship and stress the connection between environmental citizenship and scientific literacy (Ferreira & Pitarma, 2021, p. 133; Adefila et al., 2021). In terms of a multispecies-ethnographic approach, this requires that participatory education is designed in a triadic understanding that follows an inclusive thinking of all actors in a sustainable network. This means that all perspectives of the actors involved are always taken into account.

**Theoretical and Methodological Background of the Research**

The study conducted pursues the analysis of the complex relationships between students and the more-than-human world within a Master program in Canada. In its curricular orientation, the online-based program has a concrete reference to sustainable education. Nature and outdoor learning is concretely integrated into the curriculum as an elective module, which results in an ecological and social embedding and reference to the learning process. This means that an integration of factual-technical conditions and heterogeneous knowledge takes place (Kropp, 2015, p. 204).

The module studied “Nature and Outdoor Learning” addresses the conception of nature from historical, cultural, philosophical and indigenous perspectives. It is divided into four parts, in which the focus of the teaching/learning process is on the students’ self-designed contributions, such as essays, videos and online discussions in plenary; these always relate back to interdependencies with sustainability and in sub-areas with a direct sensory reference to nature. The first part of the module deals with (critical) place-based learning, followed by a discussion of concrete aspects around Forest School
or Outdoor Playing. The third part focuses on indigenous perspectives and aspects of colonization in the context of an autobiography of the students. It must be noted that the autobiographical data are not available for the research project and therefore could not be considered in the project. Finally, in the fourth part, the students work on self-selected topics on issues related to outdoor and environmental education with reference to sustainability.

Over one semester in 2019, the documented learning artifacts of a total of 10 students as well as the documents provided by the teacher were analyzed. All students had previously worked as teachers at an institution. The students worked in Canada (7), the USA (1), South Korea (1) and Oman (1). The ethics guidelines of the German Sociological Association and the Interagency Advisory Panel on Research Ethics as well as an Institutional Review Board apply to the preparation and processing of all data.

The analysis covered the meaning, role assignment and social construction of nature. Using multispecies ethnography, concrete interdependencies as well as perceptions and reflections – under the aspect of a change of perspective – were analyzed, always related back to individual actors of the more-than-human world.

The method of multispecies ethnography is particularly suitable for this change of perspective, as it focuses on the ways in which the human and the more-than-human world are interdependent (Kirksey & Helmreich, 2010, p. 545 ff.; Hamilton & Taylor, 2017, p. 176 ff.). Multispecies ethnography is invoked when interconnectedness and inseparability of people and other life forms are assumed (Locke & Münster, 2015; Ogden et al., 2013, p. 10). Multispecies ethnography supports the documentation of cultures, perspectives and practices in a multispecies world (Ameli, 2022, p. 81). Indigenous theories provide an essential foundation for multispecies collaborations (Kincheloe & Steinberg, 2008, p. 140). Essential characteristics of (indigenous) multispecies ethnography are empathy, inclusion and the I-you relationship, which allow for translation work with regard to the complexity of events and enable sensory access in the first place (Mathews & Kaltenbach, 2011, p. 155). Anthropomorphism serves as a heuristic instrument to illustrate this dialogical relationship and conversations (Magallanes-Blanca, 2015, p. 202; Wild, 2013). Here, interlocking processes of doing, experiencing, sharing and becoming-with as a network are observed, documented and made visible in their complex interrelationships (Kropp, 2015, p. 206). This allows for reflexivity, whereby the subjective dimensions are classified in relation to the more-than-human world and presented in a multi-perspective manner.

Multispecies ethnography assumes a fundamental recognition of agency of actors in the more-than-human world. This means that one’s own experience is documented with all senses and experiences and presented as a change of perspective on both sides. This opens up the possibility of understanding actors of the more-than-human world, such as plants or animals, as mentors. In the context of the research design, the multispecies ethnography was conducted in such a way that the captured documents of the students were analyzed under the characteristics of ME, always feeding back to the research question of role attribution and social construction named in the beginning.

Analysis with grounded theory using MAXQDA allows for parallel data collection, coding and analysis through theoretical sampling (Glaser & Strauss, 2010, p. 61). This illustrates the relevance of both areas: the collected data and the relevant theory. Theory building has already been carried out in the research process by repeatedly questioning
the material (Strauss, 1991, p. 70). In this process, categories were sought (Kelle & Kluge, 2010, p. 48) and related to each other until theoretical saturation was reached (Strauss & Corbin, 1996, p. 159). In the present case, the data pool has already been specified by the analyzed module. The strategy set out by Strauss and Corbin of processing the data as if it were always evolving was followed (Strauss & Corbin, 1996, p. 164). In the course of the analysis, the data were first deconstructed with the help of codes (Brüsemeister, 2008, p. 157), whereby dimensions of categories also emerged and commonalities and differences were presented.

Results: Nature and Outdoor Learning
Within a Master Program for Education Students

The analysis of the results shows that interdependencies and encounters between students and the more-than-human world exist, but they do so in varying degrees of intensity. It becomes apparent that the students position themselves within the natural world and ask reflexive questions about the material provided and their own everyday life. However, the cross-species encounters described for Nature and Outdoor Learning in the literature mentioned in the beginning are used in a reduced way. As a result, actors of the more-than-human world are not sufficiently represented in (multi-)perspectives.

The university teacher does not have a prominent role in the teaching/learning process. They merely control the framing of the module by providing documents and examination modalities. As a result, there is no triadic (cross-species) interaction between students and teacher(s) and nature in the entire module. Consequently, this also means that there is hardly any opportunity to understand actors from the more-than-human world as mentors or co-educators and to map their (multispecies) perspective. The largely missing sensual and direct nature encounter in a triadic interaction can be explained by the form of the module design. The largest part of the module takes place in the digital realm. It is true that the task of the video sequence allows for the implementation of a self-directed learning experience for the students. However, the video sequences allow few opportunities to map the perspective of nature within the video, instead focusing purely on the human perspective.

The discrepancy between the structural conditions of an online-based form of teaching and learning and the primarily nature-based educational processes in the courses studied illustrates the field of tension in which nature-based education finds itself at the examined university. Although the design works with digital natural artifacts and interactions, it remains largely biophobic due to the digital teaching/learning approach. This is particularly evident in the form of online teaching and learning: texts, selected concepts, videos and reflective, self-organized work assignments are used, which are then almost exclusively discussed and thematized online. It is true that, here, a complexity and interconnectedness of nature-based forms of online teaching with the diversity of reflection possibilities become apparent. Again, a triadic dialogue does not take place and highlights a contradiction: While it is assumed in schools that the teacher has a key role (Tseverni, 2021; Dillon et al., 2006), it remains open for the training of teachers why at this point an exclusively direct and sensual interaction with the more-than-human world is not also practiced by teachers in the context of nature and outdoor learning in adult education.
This discrepancy is also partly reflected in the students’ learning essays. In addition, the lack of nature and outdoor learning experience in schools is explicitly criticized. This is specifically relevant as “living experience [becomes] the basis of the ‘self’ experience” (Salóte et al., 2021, p. 156). In this context, organizational system limitations in the field of inclusion are seen. For example, it is not always possible, particularly for people with disabilities, to take advantage of outdoor educational opportunities.

These barriers are not insignificant and are attributed to safety reasons or the lack of quality of the environment. Overcoming systemic barriers in particular is seen as very difficult, as it often requires a lot of commitment on the part of the teachers. This finding is underlined by the literature, as organizational procedures are perceived as a major barrier by teachers (Grund & Brock, 2018; Brock & Grund, 2018). Nevertheless, the future teachers are aware of their own mandate: “We have to teach them how to connect to nature and build a relationship” (Sandra, student).

In addition, teachers’ own biographies also play a role in whether natural spaces are integrated into the teaching/learning processes. Here, there is a great deal of agreement among the students regarding their own contact. The students refer to a comparable early childhood socialization with close contact to nature. For this reason, the desire is expressed to open the door to nature for their own students as well. The importance of the emotional connection to nature is also mentioned by the students. “Nature [is] not just about what you see, but how it makes you feel” (Thomas, student). Furthermore, the results show that the students make connections beyond the work tasks. “Reciprocal relationship with the plants I eat, where I care for and nurture it, in the same way that it cares from me and nurtures me” (Sandy, student). However, this does not take into account the differentiated and deeper analysis and inclusion of the plant(s) as co-educators. This means that questions like what this mindfulness can look like, what the biography of a plant looks like, and the meaning and role of food are not questioned or addressed here.

Although the direct, sensual interaction with nature was limited to the presentation of the favorite place in nature, the questioning, reflection and discussion with regard to the topic also caused people to question existing structures and their own actions: Thus, it was questioned whether the questions were “critical enough and broad enough?” after processing the texts used (Stacey, student).

Overall, the codes show that topics around health, nutrition, consumption and sustainability exist in collaboration with nature and nature consciousness. This is exemplified by agriculture, as there is an exchange on the connection between food and consumer behavior as well as the related effects on the environment. In addition, individual leisure time behavior is also put into context. The students reflected on what changes in behavior and in their own lifestyle could have an impact on the world around us. However, it becomes apparent once again that nature remains largely abstract, although the basic perception with all senses is addressed. “We must be mindful of our environment, and not just interact with it, but smell, hear, touch and see it, and to have a kinship or true relationship with the land” (Anna, student). This shows close links to indigenous theory.

The sub-area where nature is actively engaged through sensory interaction is evident in the creation of a video by each student. The task was to portray a favorite place in nature on film. Here it can be concluded that the construction and representation of
these places does not speak for themselves. Rather, the students’ own person was represented within the relationship to this place. Once again, no participatory involvement of actors from the more-than-human world is discernible here. This does not mean that multispecies interactions were entirely excluded. Rather, multispecies collaborations find their place within the video sequences. For example, different animal species – a seal and a bald eagle or a moose – were mentioned or shown. However, this largely remained an objectification (Mütherich, 2004), as no classification or linkage was made. This means that the nature thereby remain largely abstract, since multispecies collaborations occurring in the interaction are not addressed or the location of the self is undertaken. As an external researching viewer, it is hardly possible to observe the perspective of actors of the more-than-human world in a differentiated way and to depict them concretely. The videos largely did not show sounds or broader perspectives. This strongly anthropocentric point of view was consciously reflected by one student in the end: “When I introduced you to [my favorite natural place], I shared more of myself than I did of the space. I think this speaks deeply to how I see myself in relation with the land” (Carolin, student). In the context of the representation of nature, a view oriented towards aesthetics is also evident, as the “beauty of nature” (Sandra, student) was mentioned. The conclusion can be drawn that aesthetics takes up an essential aspect in the perception of nature (Gebhard, 2013, p. 102).

The educational process of the analyzed course shows overall that the students struggled with the complexity of the topic of nature-based education in its embedded context of dealing with multiple crises. This conclusion stems from the fact that students emphasize seeing problems with complexity and that they lack the experience of testing it on real and sufficiently active examples in the natural environment.

A key aim of the course and the curriculum as a whole is to promote reflective skills. Although many reflective discussions can be identified, it can be argued that the students do show a high willingness to engage with the materials provided. The exclusion of nature as co-educator leaves open how learning from nature – without concrete guidance and references – can succeed.

The preceding excerpts of the results can be subsumed into three principal core elements: (1) the design of nature-based teaching and learning processes in a university teaching/learning process in the subject area of nature and outdoor learning as well as the active inclusion of natural teaching spaces; (2) social construction and understanding of the nature involved; (3) the focus on learner agency and competencies.

It becomes apparent that the active inclusion of nature can be differentiated into three subgroups, depending on the context in which nature is methodically and didactically participatory involved.

1) (Online) Learning about Nature

In the context of teaching/learning processes in the form of rigid curricular specifications, which are taught exclusively in the classroom through books or direct teacher-student interactions, learning experiences with nature are primarily created indoors and hardly ever through direct, sensual and active interaction. This means that the flow of attitudes towards nature changes, and place plays a crucial role. When learning about nature, narratives revolve around the experience of nature in a particular place, with the result of understanding one’s own biographical process of change (Schütze, 1981).
The retelling of the story is not a triadic interaction in the strict sense, since sensual and direct interactions are missing in the triadic relationship. In the social construction, nature is described as a kind of object (Mütherich, 2004) about which learning takes place. This results in a partial exclusion of nature as a third actor and, thus, prevents the participatory use of actors from the more-than-human world with the help of all senses and in the sense of interaction at an eye level.

The online-supported teaching, which is predetermined by curricula and structural conditions, essentially provides an overview of the concept of (digital) nature and natural learning without actually working in and with the natural environment. Rather, the implementation of contact with nature through work tasks on nature is done through theoretical approaches that stimulate reflection and scientific thinking. However, being very limited, it illustrates the teaching of a purely theoretical approach within this program, which actually aims to promote this approach in practice. It shows the tension between digitized and nature-based education in the 21st century (Jickling et al., 2018).

2) (Online) Learning with Nature

Online-supported learning within the framework of media, videos or self-directed learning phases allow, in addition to learning within the primarily indoor online classroom, for self-directed learning phases within nature-related spaces. These self-directed learning phases enable concrete (guided) interactions with nature, whereby the triadic interaction does not exist here, as the teacher is largely excluded from the direct, sensory interaction. This means that the primary focus is on the given learning content in the form of a performance, without ultimately stimulating participation of the more-than-human world.

Learning with nature focuses on an anthropocentric view with artificial naturalness, i.e., something is learned with nature. Here, a hybrid between indoor and outdoor occurs, where the didactic approach largely refers to a participatory teaching/learning process, where nature is involved in the learning process, but not participatory as co-learners. The narrative of the interactions is thus largely based on discovering, recognizing and feeling from a human point of view.

3) Learning from Nature

Learning with all senses in a direct and active form would require that outdoor learning really takes place primarily outdoors by using social spaces and by participatory involving actors of the more-than-human world as co-educators. Discovery takes place with all the senses and a simultaneous change of perspective about what it ultimately means, as a human being, to be connected with nature. In conclusion, learning from nature allows discovering, recognizing, marveling, performing and reflecting in a highly participatory form and in the context of the more-than-human world.
Table 1  
*Inclusion of Nature*

<table>
<thead>
<tr>
<th>Nature-based-learning</th>
<th>(Online) Learning about nature</th>
<th>(Online) Learning with Nature</th>
<th>Learning from Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social construction</td>
<td>Natural artificiality</td>
<td>Artificial naturalness</td>
<td>Natural world</td>
</tr>
<tr>
<td>Example</td>
<td>(Online) learning in a classroom by using books, teaching approaches based on direct instruction</td>
<td>Nature and outdoor learning</td>
<td>Active and sensuous nature and outdoor learning with Multi-species Education</td>
</tr>
<tr>
<td>Place</td>
<td>(Online) classroom</td>
<td>Place-based Indoor/outdoor</td>
<td>Nature-based Outdoor Social space</td>
</tr>
<tr>
<td></td>
<td>Favorite place in nature</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Mainly indoor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public learning</td>
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<td>Partially</td>
<td>Yes</td>
</tr>
<tr>
<td>Teacher</td>
<td>Partially</td>
<td>Co-learner</td>
<td>Actors of the more-than-human world as co-learner in nature</td>
</tr>
<tr>
<td>Multispecies</td>
<td>Barely</td>
<td>Limited</td>
<td>Interaction</td>
</tr>
<tr>
<td>Level of learning</td>
<td>Hierarchical</td>
<td>Partly collective</td>
<td>Collective, outside hierarchies</td>
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<tr>
<td>Narrative about learning</td>
<td>Performance</td>
<td>Discover</td>
<td>All senses discover, recognize, marvel, Performance Reflection</td>
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<td></td>
<td></td>
<td>Recognize</td>
<td></td>
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<tr>
<td>Participation</td>
<td>No</td>
<td>Partly</td>
<td>High</td>
</tr>
<tr>
<td>Level of inclusion of actors of the more-than-human world</td>
<td>Weak/Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

**Conclusion**

Following the results presented, it can be argued that questions remain open about the training of teachers with the help of a direct and sensual nature relation. It is true that self-reflection, storytelling, discussions and the link to their biographical and professional experiences allow them to develop an ecological identity and role in the learning environment (Raus & Falkenberg, 2015; Raus & Värri, 2017, p. 113). However, a lack and a discrepancy become apparent, which relate to problem-solving skills through concrete active and sensory settings (Barraza & Ruiz-Mallén, 2017, p. 262). This can be seen in the students’ thematic perplexity regarding the complexity of the questions and the answers related to them.

Karin’s statement “We cannot expect our students to want to take action to protect our species when they do not spend any time in nature” can also be applied to the educa-
tion and training of teachers. It must be questioned how education can be designed in a nature-oriented and participatory way in university teaching-learning settings. In this context, it is not enough for higher education to “give students the opportunity to be in nature” (Karin, student), but it must be didactical and action-oriented (Bueddefeld et al., 2022). This aspect is underlined by Margared Mead (1966), who pointed out that mere contact with nature would not be sufficient to develop a deep relationship with it. Rather, this deep relationship is tied to the existence of basic trust. This also applies fundamentally to schools and universities in the context of nature-based learning: “To provide equal access to environmental education for all, it must be easily integrated into the core curriculum, meet the needs of the specific community and place, and reflect and value the culture of each individual” (Emma, student). Teachers are “at the front lines of this paradigm shift” (Karin, student), which is also reflected in the literature (Tsevreni, 2021, p. 14; Bedford, 2022).

Consequently, for the future, curricula need to be expanded to actively include actors of the more-than-human world (Goller & Rieckmann, 2022). To this end, teaching must be designed to motivate and equip future teachers and educators with skills, tools and confidence to integrate environmental and sustainability education into their daily work and to give voice to actors of the more-than-human world (Aikenhead & Michell, 2011, p. 79). Here, the influence of environmental and social conditions on teaching (Vázquez-Villegas et al., 2022, p. 66) should not be neglected.

The adaptation of multispecies ethnography can be used as a didactic methodology to enable students and also pupils to change perspectives. Actors of the more-than-human world, as already mentioned, are understood as co-educators, are granted participation and their perspective is interpreted in the learning process, in which humans follow animals and plants in their living environment, work, eat, learn and live with them. Only this becoming-with allows us to capture the entire social morphology in observations (Mauss, 2013, p. 110) and make it usable for the educational process.

References


Brüsmeister, T. (2008). *Qualitative Forschung: Ein Überblick* [Qualitative research: An overview]. Springer VS.


Kelle, U., & Kluge, S. (2010). *Vom Einzelfall zum Typus. Fallvergleich und Fallkontrastierung in der qualitativen Sozialforschung* [From the individual case to the type. Case comparison and case contrasting in qualitative social research]. Springer VS.


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