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Students' connection to nature and culturally responsive teaching in early years teacher education

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Teacher education, Culturally responsive teaching, Significant nature situations, Human-nature connection

Abstract

The study wanted to contribute to the development of culturally responsive teaching in outdoor education. To implement culturally responsive teaching in outdoor situations, the authors wanted insight into student teachers' contact with nature and engagement with environmental sustainability issues. The authors conducted a thematic analysis of student teacher discussions in an Erasmus course at a university in Norway. The data consisted of transcripts of student discussions in a statement game using claims borrowed from Nisbet et al.'s Nature Relatedness Scale. The analysis resulted in three main themes: 1) Contact and interaction with nature, 2) Bigger political things, and 3) We as teachers. Student teachers showed a broad interest in ethical and political topics, often expressing a sense of distance and worry concerning global climate and environmental issues. The study emphasises the importance of critical emotional awareness in heterogeneous student groups.

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Introduction

If one enjoys being in and has knowledge about nature, it is more likely that one will care for it (Chawla, 2006). The authors believe that positive nature experiences affect the motivation to teach outdoors. The presented case study was conducted in a five-month undergraduate Erasmus course in 2021 at a higher-level institution in Norway. The content of this international course was based on two disciplines, namely natural sciences and physical education, and was focused on play, movement and outdoor education in natural environments in early childhood education. The students were provided with didactic competences of teaching through play, movement and nature experiences (Barrable, 2019; Beery & Jørgensen, 2016; Chawla, 2006, 2015; Henderson & Vikander, 2007; Mawson, 2014; Savolainen, 2021). The course was built upon the premise that there is a link between the experience of student teachers (STs) in nature and their relationship to nature. In this article, we give examples from ST conversations covering educational, cultural and childhood experiences in the participants' home countries as well as their experiences in the course.

Curriculums in Norwegian Early Childhood Teacher Education (ECTE) in the subjects of natural sciences and physical education provide theory, models and methods mainly warranted by principles of seeking truth and objectivity. Additionally, the STs were expected to acquire awareness of sustainability issues, which are embedded in ethical and political considerations. This implies that traditional teacher education is challenged by cultural and social issues as well as by the political urge for education for sustainable development (ESD) (Sterling, 2018). Teaching about environmental issues in ESD can increase young people's feelings of worry and hopelessness. This can lead to distancing of the self from difficult topics, a coping mechanism that can lead to learned helplessness and inaction (Ojala, 2020). As a result, this is regarded as a difficult topic to navigate in the classroom. Yet, Ojala (2022) has shown that by implementing certain approaches, like critical emotional awareness, when teaching young people environmental issues, the teacher can utilise the feeling of worry as a motivator for future engagement.

From our own experiences of teaching the international course over the years, we had gained some contextual knowledge about the variety of experiences and educational prerequisites of the STs. We had seen that the STs have different attitudes towards being in nature, which

implies different levels of human–nature connection (HNC) (Giusti et al., 2018). Giusti et al. developed a framework for young children. Our target group was adults; however, the emphasis on contextual and place-based HNC was a useful contribution to the theoretical understanding of HNC in our study. Experiences in nature are strongly influenced by prior exposure to nature through education, family and friends during childhood (Chawla, 2020; DeVille et al., 2021; Savolainen, 2021). Hamilton and O'Dwyer (2018) emphasised the importance of structured co-learning opportunities to facilitate the sharing of cultural and other types of knowledge. Throughout the course, the STs were provided with an outdoor curriculum which can be described as a series of significant nature situations (SNS) (Giusti et al., 2018, p. 14). The SNS gave opportunities to build upon the STs' individual HNC while also providing a set of structured co-learning opportunities and common experiences for this heterogeneous group of students.

The authors view student diversity as a resource that can enrich educational work. Through this study, we seek to contribute to the development of culturally responsive teaching in SNS (Gay, 2010; Giusti et al., 2018; Hamilton & O'Dwyer, 2018). There is limited literature on culturally responsive teaching in *outdoor education*, and we aim to contribute to bridge the gap. Therefore, we investigated the STs' different perspectives, experiences and feelings towards nature. To collect data, we used the Nature Relatedness Scale (NRS) (Nisbet et al., 2009) to initiate group discussions between the STs, and we analysed both *what* they talked about and *how* they expressed themselves. Our research questions for this study are as follows:

A) How do student teachers relate to claims about nature in group discussions?

B) What do student teachers STs talk about?

Method

We conducted a qualitative case study. The data were collected in 2021, attained through student discussions framed by a statement game (AUAS, n.d; Botnen & Sandbakken, 2023). Framing the conversation within a statement game facilitated the sharing of the participants' perspectives and interests. The students marked their stance by putting differently coloured post-it notes on a sheet (Figure 1) with lines illustrating a continuum between "agree strongly"

and “disagree strongly” for each claim. The claims were read out loud by a student, followed by the students’ placing post-it notes along the line, initiating a discussion. During the conversation, they were free to shift position by moving their post-it note. Data for the case study were audio recordings of the STs’ conversations on eight claims. Three group discussion events are referred to as three cases (Yin, 2018).

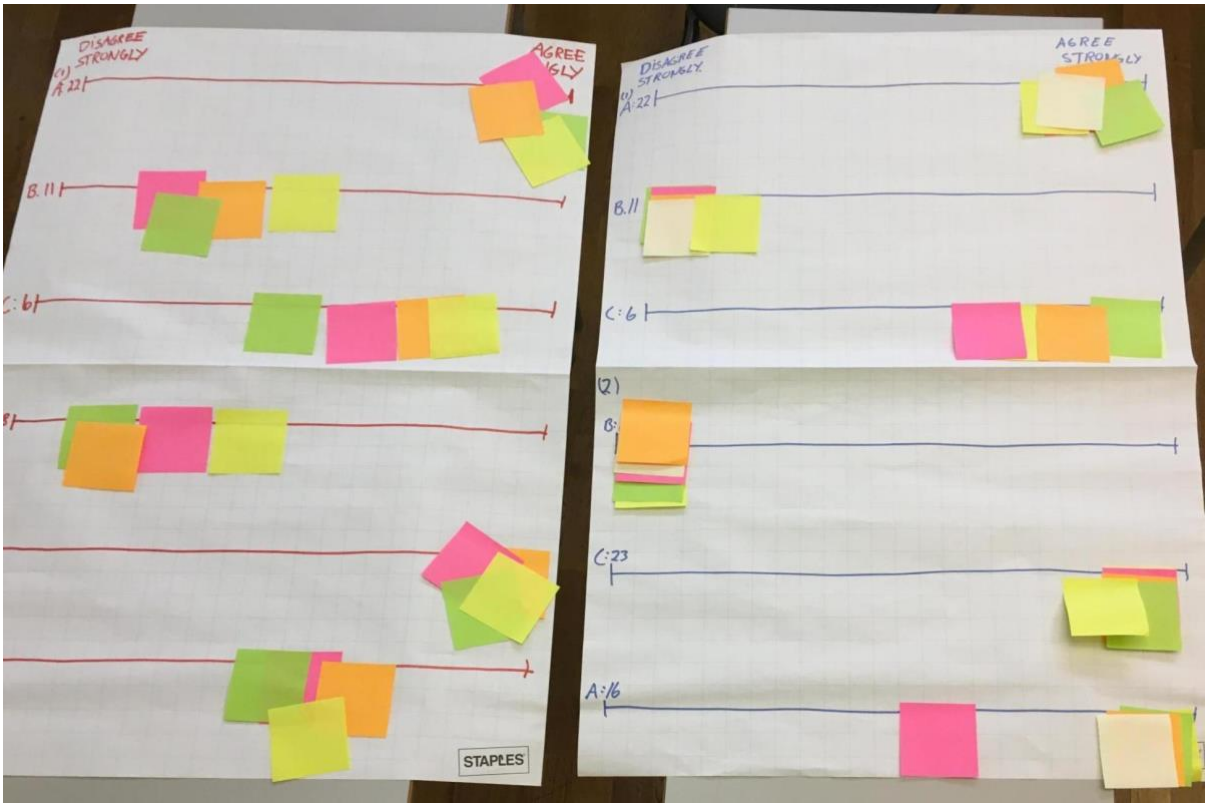

Figure 1. Each student group had a large sheet of paper (sheet from case 1 to the right and case 2 to the left). Each claim was represented by a horizontal line. The claim code (Table 1) was written along the left side of the paper, and post-it notes were placed by each student to represent their stance on each claim.

Participants

The participants were enrolled in an ECTE course and aged 22–26 years. Their countries of origin were Belgium, Germany, the Netherlands, Norway, Russia and Spain. Most were students becoming teachers in primary school or kindergarten, and a few studied to become teachers in special needs education, social work, or another professional focus. Their educational backgrounds differed, and they had varied experiences of being, and being active, in nature. The case study consisted of three cases: case 1 (five participants), case 2

(four participants) and case 3 (five participants). In each case, STs participated in a statement game, where claims were used as prompts for conversation.

The claims

In the field of environmental psychology, it is recognised that people's relationship with nature is complex and related to emotions, attitudes, experiences and knowledge. The NRS reported in Nisbet et al. (2009) was developed to assess a person's relationship with nature. The NRS consists of 21 statements concerning cognitive, emotional and physical components, covering three factors (Nisbet et al., 2009, pp. 723–725):

A) NR-self: internalised identification – feelings and thoughts – personal connection to nature.
B) NR-perspective: external, nature-related worldview – agency concerning individual human actions – impact on all living things.
C) NR-experience: physical familiarity with the natural world – level of comfort – desire to be in nature.

These three factors influenced our choices of claim prompts for the statement game. Six claims were chosen from the NRS: one claim for NR-self (A16), three for NR-perspective (B11, B18, B3) and two for NR-experience (C6, C1). The claims were coded with a letter corresponding to the factor, respectively A, B and C, and a number. Numbers refers to the order in which the NRS claims appear in the instrument. The researchers created two additional claims: A22, which we sorted under the NR-self factor, and C23, sorted under NR-experience (see all claims in Table 1). These eight claims focused on central values of the course that the STs attended.

Table 1.

Claims used in the statement game in the order presented to the student teachers in the statement game.

Code	**Claim**
A22	Being in nature is important for me to feel good.

B11	Nothing I do will change problems in other places on the planet.
C6	I enjoy digging in the earth and getting dirt on my hands.
B18	Conservation is unnecessary because nature is strong enough to recover from any human impact.
C23	Being active in nature is important for me to feel good.
A16	Even in the middle of the city, I notice nature around me.
C1	I enjoy being outdoors, even in unpleasant weather.
B3	Humans have the right to use natural resources any way we want.

Ethical considerations

Participation was voluntary. The STs received information about the research project beforehand. They gave their approval in advance based on anonymity, informed consent and right to withdraw. Approval was also confirmed at the start of the audio recording. The data collection was conducted after the scheduled lectures of the course were completed. The statement game session was offered as an extra summary opportunity before STs' submission of an anonymised written exam.

Analysis

The researchers listened carefully through the audio recordings (3 h 39 min) while adding notes to transcripts. An additional researcher participated in the analysis of transcribed material. During preliminary inductive analysis, the researchers separately took notes and kept logs of listening sessions; thus, they familiarised themselves with the data. The logs were discussed, and the researchers developed an initial thematic coding looking for patterns of *recurrence*, *repetition*, and *forcefulness* within and across cases, to identify potential main themes (Owen, 1984, p. 275). *Recurrence* refers to expressions of the same meaning, but different words are used; *repetition* refers to words that are repeated, like key words, phrases, or sentences; and *forcefulness* refers to topics that appeared important or seem to have impact (Owen, 1984).

The researchers inquired into STs' interpretation of the claims through identifying main themes in the data (Braun & Clarke, 2006, p. 90). The researchers conducted colour coding of the full transcribed data sets. This analysis produced a thematic map consisting of potential

themes. These were either rejected or clustered, resulting in three main themes in a similar manner as described in Braun & Clarke (2006). The resulting themes were: 1) Contact and interaction with nature, 2) Bigger political things, and 3) We as teachers. After the initial inductive thematic analysis, the researchers returned to the data set with several methods to test the strength of the main themes with a deductive approach. We identified and described the essence of the three main themes and named them. The audio recordings were visualised on timelines, and the main themes were coded onto these (Figure 2). Figure 2 shows the time spent on each of the three main themes during the conversations. The STs sometimes talked about more than one theme at the time, visualised in Figure 2. The STs predominantly used certain pronouns when talking about the different themes.

The transcripts were further scrutinised for use of concrete or abstract language, use of subject-specific concepts from natural sciences and physical education, personal or generalised expressions of opinions. The investigation particularly focused on the use of (singular or plural) first-person pronouns, "I" and "we", to seek insight into the STs' emotions and connections to the topics. The researchers were aware that the STs' use of pronouns may have been influenced by the pronouns used in the claims. In natural language communication, the content can be about the specifics and details of a concrete situation or about abstract ideas and broader topics. Yin et al. (2022) argued that the speaker will usually express themselves using singular pronouns (e.g. the pronoun "I") in concrete language communication, and plural pronouns (e.g. the pronoun "we") in abstract language communication. When speakers use the pronoun "I", they often express closeness to their experiences and thoughts, and when they use "we", they show a higher degree of distancing (Yin et al., 2022). The use of "we" in English can also be interpreted as either inclusive or exclusive (Scheibman, 2004, in Yin et al., 2022).

Samples of coded data (ST quotes) were selected as representative examples of the main themes (Table 2). All researchers were involved in writing and finalising the report of the analysis.

Table 2. *Samples of coded data (student teacher quotes) selected as representative of the main themes. The numbering of samples in the table reflects the order of appearance in the main*

text. The samples are colour-coded according to the three main themes in the findings: green for 1) Contact and interaction with nature, blue for 2) Bigger political things and pink for 3) We as teachers.

Sample number	Selected quote from discussions
1	When I was little, I felt always, the comments of my parents, like, "Oh take care of the clothes", "Don't get it dirty" […] that was like, "Okay, now let's go inside, stop playing outside".
2	We arrived home really tired, but it didn't matter because we were happy.
3	It's nice that it's cold and you're fresh, but it's also a really good feeling to come home and to be able to get that heat back, and if you're inside all the time, you don't get that feeling, 'cause you're just sitting there, like […]
4	You're not having really a childhood if you're not experiencing climbing in trees or getting dirty or ripped your trousers or anything. Because it's all experience that you will somehow need in adulthood.
5	I really like the calmness of nature, but I also really like the colour green […] I feel like the colour green calms me.
6	We kind of like the city noise at some point, because it makes us feel like there's something going on, there's life.
7	[…] the humans, we can't do whatever we want, because all the actions have impact on the planet.
8	We're using natural resources to such an extent where nature cannot recover from it, and obviously we don't learn from our mistakes.
9	[…] as teachers, I think that we must teach children that all their actions, the individual actions are important, because even though we don't think that, […] we need that the next generations continue with all the actions that we took.

10	If I go and talk to people about it [climate problems] […] say that I disagree or agree […] that changes already a lot of things because if you don't even think about something, then you don't do anything.
11	[…] when the weather is bad, and you worry about the nature that will get destroyed, that can also be a bad feeling, if it's too warm maybe, then you have the fear of maybe a wood fire, or you have the fear, if it rains too much, that there will be an earth, the earth coming down, like a flood.
12	Student A: Some people may think that only the politicians have the power to change the problems, but then we discussed that I, as an individual, also have the power to do small things to change. Student B: Especially because we form the politics, because we live in a democracy, and it may not be in every country like this […], you would feel put down by the system or suppressed, maybe, so you have no choice.
13	You can go to protest and to different kind of meetings, but that action that you take, I believe that it doesn't really make a really big change.
14	The Fridays for Future movement was a really good example, because with demonstrations, it's just really important that people gather, and people show their faces to it […]. If many individuals come together, we can really change something.
15	I think it's more important to go into political work and try to, for example, attend different organisations like Fridays for Future, and stuff like that, to change the system and, for example, demonstrate for better climate politics.
16	I had to bring stones to the classroom, instead of letting the kids going outside for two minutes and collect as many stones as they would like to. If they would be allowed to go outside, they would learn better as well […]. You will remember that time you went out to get those stones.
17	Student C: I think you shouldn't change children's mindsets, I think you should teach them how to think by themselves. Student D: But you still impact their mindsets.

	Student C: Yeah, yeah of course, but then, […] you can't change the mind you can only raise awareness of what their actions might be […]. Student D: So, if a student might have completely a, let's say, a negative attitude towards feminism, […] you wouldn't try to change his mindset? Or her. Student C: I feel like if you want to change mindset, you're brainwashing […] It's more like, you show them the way, like, […] critical thinking, […] like, okay, see it from this point or maybe that point. Student E: But then you are changing their mind. Student C: … Not really, saying like 'This is the facts', but like, inviting them to discover by themselves.
18	It's very important that we as teachers start to let the children know about the importance of taking care of the planet, and not just recycling, but every action in their everyday life. […] Letting them know […] of the water resources, and the forest fires […] not only that they behave in a certain way, but also their families, so that the things that they learn in school, they can transfer it toward [those] at home.
19	That's why you need to teach about sustainability in schools, because if not, people may think that's okay (to use all the natural resources).
20	I've always loved to be active in nature, I think, because my father is physical educator at the university […] so he always wanted me to ride on the bike.
21	Physical activity helps to just, okay go away, I'm focusing on the way my muscles work, I'm focusing on the way my body works.
22	Even though I would go out to nature, at some point, I aways feel drawn towards society and people.
23	To feel the connection and disconnection from, the connection with yourself and the calm things, and disconnection from the busy world.
24	Here, I learnt to enjoy hiking and observe the nature with more details. The first hike we did, we went to the snow, I say, 'Oh I don't want to go, because it's a lot of snow and it's raining', but after I enjoyed it a lot.

25	In Norway, I learnt that the weather is not a condition not to do things.
26	I like visiting The Lake or other places around here, I think when I go back home, I'll really miss it, and I'll feel the need for more connection with nature.
27	[…] children need to experience with their hands and all the body.
28	Children need to have a voice and to share their ideas, and their opinions.

Analytical considerations and limitation of the study

The researchers did not choose claims to assess the STs' relatedness to nature but rather to start discussions on topics relevant to the course in the frame of a statement game. It was not in the scope of this study to evaluate the game as a pedagogical tool. The game was chosen to acquire varied conversational data about STs' engagement in certain topics relevant for the course.

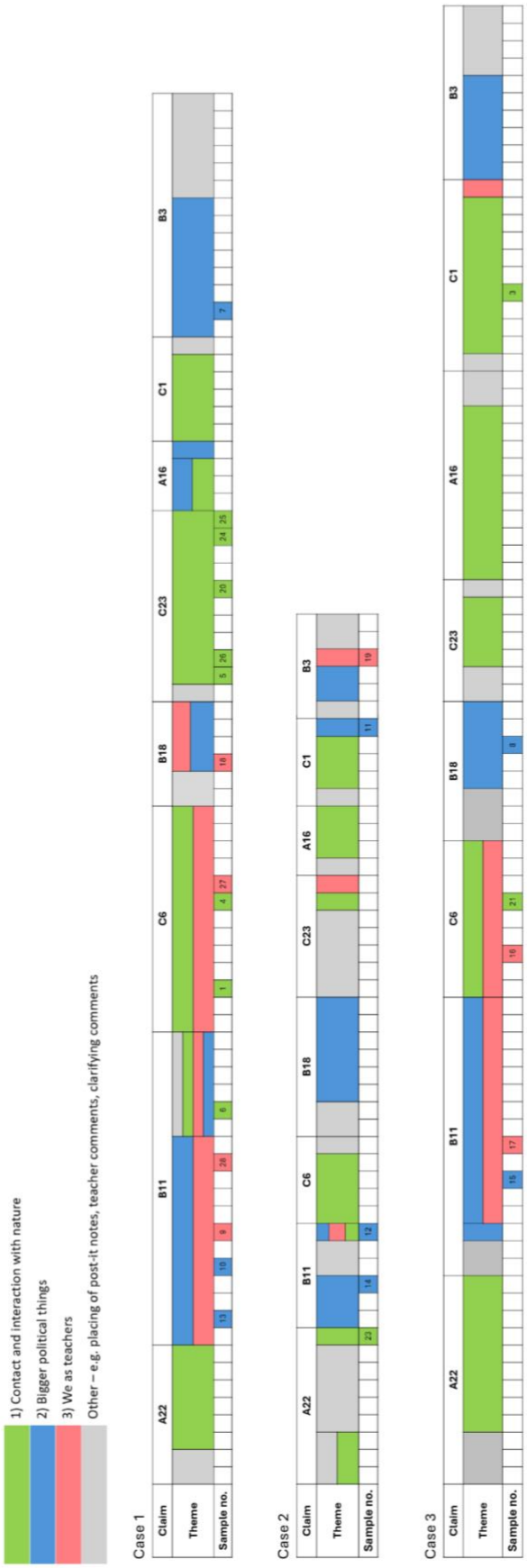
1) Contact and interaction with nature
2) Bigger political things
3) We as teachers
Other – e.g. placing of post-it notes, teacher comments, clarifying comments
Case 1
Claim
Theme
Sample no.
A22
B11
C6
B18
C23
A16
C1
B3
Case 2
Claim
Theme
Sample no.
A22
B11
C6
B18
C23
A16
C1
B3
Case 3
Claim
Theme
Sample no.
A22
B11
C6
B18
C23
A16
C1
B3

Figure 2. The figure visualises appearance of the three main themes throughout the audio recordings. The three cases are represented as separate timelines (case 1, case 2 and case 3). The three main themes are colour-coded. The claims appear on the timelines in the same order as they were recorded. The appearance of themes is occasionally shown vertically on the timeline, when the students talked about several themes simultaneously. The colour-coded samples (excerpts from STs' conversations; see Table 2) are represented on a timeline with increments of one minute.

Findings

Recurrently, the students placed their post-it notes quite close to each other on the scale during the statement game, which we interpreted as indicating a fairly large degree of unanimity in the groups (Figure 1). However, the STs used different justifications when explaining their post-it note positions. The analysis resulted in three main themes: 1) Contact and interactions with nature, 2) Bigger political things, and 3) We as teachers.

A) How did the student teachers relate to the claims in the statement game?

Participant use of pronouns and language

The use of subject-specific (natural sciences and physical education) concepts or words was scarce. Analysing the language throughout the discussions, we found different expressions of varying emotional commitment. When the STs explained and justified their own positions in these claims, they mainly used the first-person singular pronoun "I", as in *myself and my own experience and opinion*. They referred to themselves and what they could do individually, describing their experiences of being active or in contact with nature. The contents of the communication were mainly focused on concrete actions and the feelings connected to the experiences – like getting dirt on hands and clothes in childhood and getting "tired in a good way" after demanding activities in nature (sample 1, 2, 3 & 4), or about concrete sensory details as "the colour green" or city noises (sample 5 & 6). In the conversations prompted by claim B11 (Table 1), which also has "I" in the formulation, the STs often used the plural "we" (sample 7, 8 & 9). This was also found when the STs discussed claims B18 and B3 (Table 1) concerning "Bigger political things". The three groups recurrently used "we" and expressions like "us humans" or "we as humans". The contents of the communication were focused on

abstract thoughts, like “what destroys nature”, climate problems (sample 10 & 11) and broader topics like the recurrent “Bigger political things” and influences from big international companies.

In line with Yin et al. (2022), the participants’ use of “we” (inclusive) indicated that the message was directed to the speaker, the participants in the group and to all of humanity (sample 7). Everyone, without exception, had a responsibility to limit their use of global natural resources. We interpreted that the participant related to a shared perspective in the group. The participants’ use of “we” (exclusive) indicated that the message was directed to the speaker and people with real power to change global problems, like governments and big companies (sample 12). When using both abstract language and “we” (exclusive) (Yin et al., 2022), we interpreted that the participant reinforced the distance to the addressee. STs that viewed themselves as an individual against the big corporations seemed to have a bigger sense of hopelessness (sample 13). Conversely, STs that adopted a more hopeful attitude towards “Bigger political things” seemed to feel a stronger sense of agency when they were a part of a community or organisation, where they would have a greater chance to influence global issues (sample 10, 12, 14 & 15). When the STs were speaking about themselves as future teachers, they often used the pronoun “I” and concrete language, showing directedness. This is illustrated in sample 16, when the speaker presented an individual experience, and when other participants agreed with the opinion that children should be allowed to pick their own natural materials, in this case rocks, to promote learning in a geology class. Moreover, the ST showed directedness by using the pronouns “we”, and “you” and by further using concrete language. Examples were found in sample 17, when discussing “changing children’s mindsets”, and in sample 18, when referring to concrete matters like water resources and forest fires, indicating that the speaker presented a perspective that was shared within the group.

When talking about sustainability issues, the content of the communication was otherwise often abstract, the participants also used “we” (inclusive) and “you” (inclusive). This could relate to a shared perspective in the groups, as in sample 9 and 19. For example, the use of “you” in sample 10 could indicate that the opinion about the “need to teach about

sustainability in schools" was shared not only within the group but also throughout the whole community of teachers.

B) What did the student teachers talk about?

Contact and interaction with nature

Theme 1, Contact and interaction with nature, emerged mainly from the analysis of the students' discussion of the claims *Being in nature is important for me to feel good* (A22), *Being active in nature is important for me to feel good* (C23), *I enjoy digging in the earth and getting dirt on my hands* (C6), and *I enjoy being outdoors, even in unpleasant weather* (C1).

Experiences from their childhood, and the impact on their relation to nature were discussed in all three cases. Some of the STs had good memories from childhood and support from their families (sample 20). However, when they discussed claim C6, the STs had experiences of parents being restrictive while being in nature, commenting on keeping clothes clean and on activities perceived as risky. Furthermore, some of the STs reflected that it was not just parents and upbringing that mattered; schools and friends had also influenced their contact with nature.

Across the three cases, emotions connected to spending time in nature in adulthood were related to well-being, both mentally and physically (sample 2). They described the emotional aspect with words like: "feeling happy", "refreshing", "calms me", "just in peace […] like therapy", and "connection with yourself". These feelings were strongly connected to bodily and mental challenges, and mastering of these played a pivotal role in the STs' discussions of claims A22 and C23. Descriptions of good experiences in nature were prominent in all three cases. They mentioned activities such as hiking, going for a walk, cycling, climbing, downhill skiing, cross-country skiing, ice bathing and running. Especially when they justified their experiences of being active in nature (C23, recurrence in the reasoning were about self-confidence, achievement, mastering challenges and feeling powerful (sample 2, 3 & 21). STs' talked about the balance between city life and nature and that being in nature was just one way to "feel good" (sample 22). They liked the "city noise", as these were interpreted as signs of life (sample 6). The STs seemed to perceive nature as a free space, and they emphasised

how being or being active in nature might help disconnect from the busy world and connect to their own bodies and minds (sample 21 & 23).

Recurrently, the STs mentioned that the course had given new, essential physical experiences that positively influenced their relationship to nature. By being in nature, they learnt to observe it more closely. This resulted in new and useful knowledge of life in nature (sample 24). Moreover, the experiences and learning of skills for nature adventures strengthened the motivation to be outdoors regardless of weather conditions (sample 25). Despite positive nature experiences during the course, some of the STs reflected on whether they would visit nature as often when they returned to their home countries. Recurrently, the STs mentioned restricted access to nature due to living in cities as an obstacle (sample 26).

Bigger political things

Theme 2, Bigger political things, emerged mainly from analysis of discussion of the claims *Nothing I do will change problems in other places on the planet* (B11) and *Conservation is unnecessary because nature is strong enough to recover from any human impact* (B18).

The participants in case 3 explicitly used the expression “bigger political things” when they discussed who had the power to change global problems. In all three cases, when discussing societal and environmental issues, the positioning of post-it notes varied more along the continuum than for other claims. The STs emphasised specific environmental concerns, expressing worry for the global climate. Their reflections recurrently regarded how big international companies influenced environmental and climate-related problems (sample 12). Some STs argued that they were powerless against big international companies and governments (sample 13). Others had different arguments for how they could influence people with power. They argued that it was important to start talking to other people about environmental problems (sample 10 & 14) and engage in a community, a political organisation, or a movement like Fridays for Future (sample 14). If people worked together, “live in a democracy”, an individual could achieve enough power to make a change or influence politics (sample 12 & 15).

We as teachers

Theme 3, We as teachers, surfaced mainly from analysis of discussion of the claims *Nothing I do will change problems in other places on the planet* (B11), *Conservation is unnecessary because nature is strong enough to recover from any human impact* (B18) and *I enjoy digging in the earth and getting dirt on my hands* (C6) despite none of the claims explicitly including educational perspectives.

The participants emphasised the importance of teachers as role models to promote children's critical thinking, exploratory learning and concrete sensory experiences in nature situations (sample 16, 17 & 27). STs emphasised that it was important to listen to children's voices and to facilitate dialogue in the classroom. They presented ethical arguments related to the teacher's role. In one case, the teacher's role, regarding impact on children's mindset, was problematised (sample 17 & 28). Further, others mentioned that even if a ST personally had lost faith in changing environmental problems, as a teacher they had a special responsibility to motivate children to care for the environment and nature in the future (sample 18). The STs emphasised the teacher's responsibility to give children knowledge about environmental problems. Furthermore, STs argued that the knowledge children got in school could also be shared with their parents (sample 18).

Discussion

Thematic analysis of the ST group conversations resulted in three main themes, and analysis of the language showed that the STs expressed distance or closeness to the topics through the use of personal pronouns. These results were used to obtain a better understanding of the participants with regard to their perspectives, experiences and feelings towards nature at the end of a course that had provided a variety of SNS as part of the curriculum. STs' justifications of opinions and positioning in the discussions of the claims seemed supported by social and cultural personally rooted experiences and beliefs rather than dependent on references to subject-specific knowledge. This group of STs had a diverse social, cultural and academic background, which requires a culturally responsive teacher approach (Gay, 2010; Hamilton & O'Dwyer, 2018). This is not unlike their future classrooms when becoming teachers in schools and kindergartens. This diversity can be used as an asset if the teacher

creates an environment where the students feel that the curriculum is relevant for their frames of reference (Gay, 2010, p. 31). Below, we discuss the analysis of the conversations.

The data show that the STs had different experiences of nature contact and outdoor play in their childhoods both in school and with family. Previous studies have indicated that exposure to nature activities in childhood is essential to develop positive human–nature relations (Chawla, 2020; DeVille et al., 2021; Giusti et al., 2018; Savolainen, 2021). The STs discussed how regular visits and easy accessibility to a natural environment affected their relationship to nature as young adults. Further, our data support that providing SNS to young adults during teacher education can affect their individual HNC (Giusti et al., 2028). This could also affect their motivation to use the outdoors as a teaching arena with their future pupils. Furthermore, it is likely that this effect is intensified by a broad span of experiences and educational prerequisites (Hamilton & O'Dwyer, 2018). We believe that in a heterogeneous student group, students' cultural and social diversity is a resource to enrich educational work with natural sciences and physical education. Our investigation indicates that the STs impacted each other's HNC by working and supporting each other during structured co-learning opportunities during the course both indoors (e.g. the statement game) and outdoors (a variety of SNS).

The data showed that the STs engaged in ethical and political deliberations (Sterling, 2018)**,** which they recurrently referred to as "Bigger political things". When discussing these topics, a broader spectrum of opinions emerged. The participants reflected on societal and environmental problems and expressed worry for the global climate. The TS recurrently expressed less distance when talking about how they could work with ESD issues in the classroom, which we interpreted as having a stronger sense of agency when considering themselves as being part of the educational system. The STs seemed aware of their responsibility as a role model in ESD and touched upon several components of a critical emotional awareness approach (Ojala, 2022). The TS recurrently mentioned the necessity to promote critical thinking in their future classrooms and the need to create a safe space for young people to share their emotions and thoughts, even if these could be experienced as negative. The TS recurrently expressed unanimity when they discussed how children should be heard. The STs addressed different emotions, including the feeling of worry that often

emerges in ESD (Ojala, 2022), and acknowledged that this could be challenging in their future classrooms. We suggest that teacher education will benefit from including training in critical thinking and emotional awareness and that this is necessary to achieve culturally responsive teaching.

Final remarks

The overall purpose of our research was to contribute to the development of culturally responsive teaching in outdoor education. The study revealed that the STs had different nature-related perspectives, experiences and personal feelings regarding the topics they discussed. The STs showed a broad interest in ethical and political considerations, often expressing a sense of distance and worry about global climate and environmental issues. Despite this, they showed a stronger sense of agency when discussing these issues in the context of their future roles as teachers. It would be of further interest to study how co-learning opportunities in SNS affects ST motivation to teach outdoors.

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