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RESEARCH ARTICLE

Interdisciplinary and Transdisciplinary Research to Improve Treescapes for the Benefit of People and Nature

How can children and young people have a voice in urban treescapes?

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Abstract

1. Scientific understanding of climate change has, to date, failed to result in sufficient action. This paper proposes that a deficit model of top-down learning and dissemination in relation to public engagement with science may be part of the problem, particularly when considering the attitudes, values and empowerment of children and young people.
2. Drawing on two cross-university projects funded by the *Future of UK Treescapes* programme, in which children and young people took the lead in developing ideas about future treescapes, we interrogate assumptions and practices underpinning why and how scientists engage children and young people. Whilst there is widespread recognition that children and young people have a fundamental role to play in climate change responses, there is no clear framework that codifies best practice in enabling this.
3. Adopting a transdisciplinary approach, drawing together scientists with social scientists and humanities researchers with expertise on researching with children, our research provides a critical lens in relation to what 'research' with children could or should look like.
4. We present examples from our empirical work with a range of children and young people of different ages to highlight the contribution of ethnographic, situated, arts-based and practice-based approaches for disrupting power imbalances and enabling researchers to 'listen' to children in a different way. This expansive reconceptualisation of 'listening' involves sound, movement, relations and the more-than-human.

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5. Too much work on climate change communication engagement remains situated within disciplinary silos. This paper advocates for a transdisciplinary approach suitable for responding more effectively to challenges of climate change and making space for children's voice in relation to this. We offer six guiding principles to inform best practice in gathering and embedding authentic voices of children and young people in development and consultation for environmental policymaking, planning and implementation purposes.

KEYWORDS
children and trees, environmental policy and planning, ethnography, public engagement with science, transdiciplinary approach to climate change, treescapes

1 | INTRODUCTION

Despite considerable advances in our scientific understanding of the causes, consequences and solutions to the challenge of climate change, society appears no closer to agreeing and implementing solutions at individual to global scales (Cologna & Oreskes, 2022; Cottey, 2022; Dupont et al., 2024; Facer et al., 2021; Glavovic et al., 2022). The global scale of climate change and its perceived 'wicked' nature (Lorenzoni et al., 2007) have generated climate scientist-led narratives dominated by terms such as climate 'crisis', 'collapse' and 'emergency' (McHugh et al., 2021; Ripple et al., 2017, 2021, 2024), with fear seen as a strong motivating emotion in response to perceived threats by some (Brosch, 2021; Witte, 2008) but counterproductive (Marlon et al., 2019; O'Neill & Nicholson-Cole, 2009) in others.

The dominant global narrative positions climate change as a complex scientific and social challenge led by expert opinion, resulting in a 'spectacularization' (Ribeiro & Soromenho-Marques, 2022) that privileges scientific and technological knowledge and reinforces a deficit model of science communication (Andersen et al., 2021; Cottey, 2022; Hartz, 2024; Levin et al., 2012; Lorenzoni et al., 2007; Moser, 2016). This deficit approach often lacks clearly articulated frameworks placing knowledge in the diverse social and cultural contexts of real people, particularly those that do not think similar to those reporting this research (Hackett et al., 2024; Moser, 2016). Consequently, as most dramatically expressed by Glavovic et al. (2022), it has been suggested that the science-society contract, the implication that public investment in science will lead to an improved knowledge of our world that helps deliver beneficial outcomes to society (Lubchenco, 1998), has been broken. Cologna and Oreskes (2022) contest this break reflects misrepresentation and miscommunication of science by actors with vested interests rather than the science itself, but recognise that existing hierarchies, power structures and social norms stand in the way of effective climate action. Ribeiro and Soromenho-Marques (2022) further explore this by suggesting that the main challenge of the climate crisis for policymakers, businesses and individuals is not so much what should be done, but rather how to use the toolkit of already known changes that are required.

Photosynthetic carbon capture and storage by trees and forests is one such tool, considered to be an effective nature-based method of climate mitigation (Bastin et al., 2019; Bateman et al., 2023; MacKenzie et al., 2023). There are widespread tree planting strategies and ambitions in the United Kingdom and internationally (e.g. The England Trees Action Plan 2021–2024, MacKenzie et al., 2023), but as Priestley and Sutherland (2016) note for the United Kingdom, there has been a consistent gap between policy aspirations and actual tree planting (also see UK Climate Change Committee, 2023). Alongside Bateman et al. (2023) they raise the uncomfortable question of how and where rapid expansion in UK tree cover may be achieved. In a crowded nation with restricted space for substantial tree planting, decisions for UK tree planting not only need to be based on strong ecological and economic principles (MacKenzie et al., 2023) but also need to attend to social and political dimensions of such initiatives (Elias et al., 2021, 2022; Gifford et al., 2024). Who gets their say, and how they are listened to in decision-making over timescales of decades is essential within this context.

In this paper, we focus upon perhaps the most important constituency within the public arena: Children and young people today will be witnesses of the changes forecast by the IPCC for 2100 and beyond, and will judge how individuals and societies have responded to the challenge. Despite being disproportionately more cognitively and emotively engaged than other sections of society (Crandon et al., 2022; Lee et al., 2020; O'Brien et al., 2018; Ojala et al., 2021), to what extent have the voices and values of children and young people been properly heard, understood and acted upon? Central to this problem are assumptions and practices underpinning *why* and *how* scientists engage children and young people. This is a pragmatic ('what approaches are most successful in relation to engaging different groups of children and young people'?) but also an ontological question. By this, we mean practices for working with and listening to children are often shaped by assumptions we, as adults and society as a whole, carry about children and childhood. It is these assumptions that need interrogating to address the question of how and why to engage children and young people in the science and politics behind climate change.

We propose some answers to both pragmatic and ontological aspects of this question, drawing on our experiences of a

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three-year project, *Voices of the Future*, and a related one-year knowledge exchange project (*Digital Voices of the Future*) in which children and young people across the age ranges explored the nature of urban treescapes, taking the lead in developing ideas about future treescapes. Central to both projects was the idea of exploring children's relational experience of trees and the complexity of children and young people's experience of treescapes in order to understand this more fully from children and young people's perspectives. Our aim was to develop a 'lexicon of experience' from children's perspectives, of their relation to treescapes. We did this through asking children to video and document their encounters whilst working across disciplines, on site and taking fieldnotes as a team. We were particularly interested in voices that are under-represented within environmental education, including children from transnational, multilingual and refugee backgrounds. Importantly for this paper, the *Voices of the Future* team was transdisciplinary (Figure 1), linking scientists with social scientists, arts and humanities researchers with expertise on researching with children and project partners operating in local to national policy and practice arenas. As such, our team is crucially interested in urban treescapes, both from the point of view of children and of tree ecology.

2 | CHILDREN AND YOUNG PEOPLE IN ENVIRONMENTAL PLANNING: WHY AND HOW?

Within research concerned with responses to climate change, there are growing calls for involving young people and the importance of children 'having a voice' (c.f. Rousell & Cutter-Mackenzie-Knowles, 2020). We suggest that in environmental sciences, the *why* of working with children is often more clearly developed than the *how*. For example, environmental scientists are often keen to engage children and young people in order to improve their nature-connectedness, to increase public engagement and potentially to create future conservators and activists (Donnelly et al., 2014; Eastwood et al., 2021; Friedman et al., 2015; The Royal Society, 1985). This dominant rationale for *why* is neatly summarised by Larson et al. (2021) when they write,

> "Not only does connection with nature support their development and well-being, but it also supports ongoing efforts by humans to sustain the natural world."
> (p. 53)

Some scientists adopt the concept of 'citizen science' to acknowledge children as researchers in their own right as a model of *how* to work with children. Citizen science provides a rational-sounding mechanism for data collection through the involvement of children and young people in collecting data, for example through the app Treezilla (www.treezilla.org). However, Rautio et al. (2022) warn about a reluctance to engage critically with the tensions around citizen science as a mode of co-producing with young people. For example, citizen science, rooted ultimately in replicable methods developed within the natural science paradigm, invites young people to participate within pre-existing, fixed frameworks, limiting how and when young people can participate in the production of knowledge. Additionally, participants are selected based on their ability to work within those frameworks, with implications for engagement and inclusion. 'The question' Rautio et al. (2022, p. 766) write 'of what is meant by participation is thus crucial'. Rautio et al. (2022) argue (and we broadly agree) for a more inclusive community of practice in relation to different methodological approaches with a focus on children's voice and modes of engagement (Ambreen et al., 2025a). In order to respond to this call in the context of *Voices of the Future*, we turn to childhood studies to consider ontological questions about the nature of children and childhood, and its implications for the 'why' and 'how' of engaging children in climate change research.

Childhood studies have recently taken a turn to focus more on what lies 'after' childhood, exploring ways in which childhood is entangled and contingent on socio-cultural, bio-social and geo-political factors (Kraftl, 2020). It has also benefited from critiques who caution against an extractive approach to children and childhood research (Nxumalo, 2016; Spyrou, 2023). Responding to long-standing debates within childhood studies about the extent to which adults can understand or interpret the perspectives of children, Spyrou's (2023, p. 1) proposal for 'an ethics of reciprocity and mutuality in empirical childhood research' shifts the emphasis from the accuracy and reliability of fixed childhood subject positions being represented in research to forms of ongoing, mutually transformative 'knowing-with rather than knowing-about' (Santos, 2018 in Spyrou, 2023, p. 4). Instead of asking whether we correctly understand child-as-research-subject, it prompts the researcher to ask themselves—how has this encounter shifted or unsettled my own subjectivities and investments?

Central to these perspectives is an appreciation of methods that do not extract data from children, or humans from their worlds, but learn 'with' young people and the more-than-human (Osgood & Robinson, 2019). Arts-based and experiential scholarship does not privilege technocratic solutions, but offers alternative 'ways in' to learning with children and their worlds (c.f. Hackett et al., 2025; Hickey Moody et al., 2021; Nxumalo & Montes, 2023; Reynolds & Murris, 2024; Yamada Rice & Dare, 2025). For example, Hohti and Tammi (2023) collected small stories of everyday moments between children, animals and places, describing a methodology of 'composting' or 'archiving' the stories, with an emphasis on opening the reader up to new questions and emotions. For Millei and Lappalainen (2023), children's drawings provided a starting point for tracing connections with global geopolitics and their own personal stories and prompts for thought (thinking 'with' the children, not just 'about' them). This scholarship provides a critical lens in relation to what 'research' could or should look like when it is more open-ended in its engagement with participants and the kinds of researcher/participant relationships it sets up. These approaches to knowledge production make important contributions in terms of disrupting power

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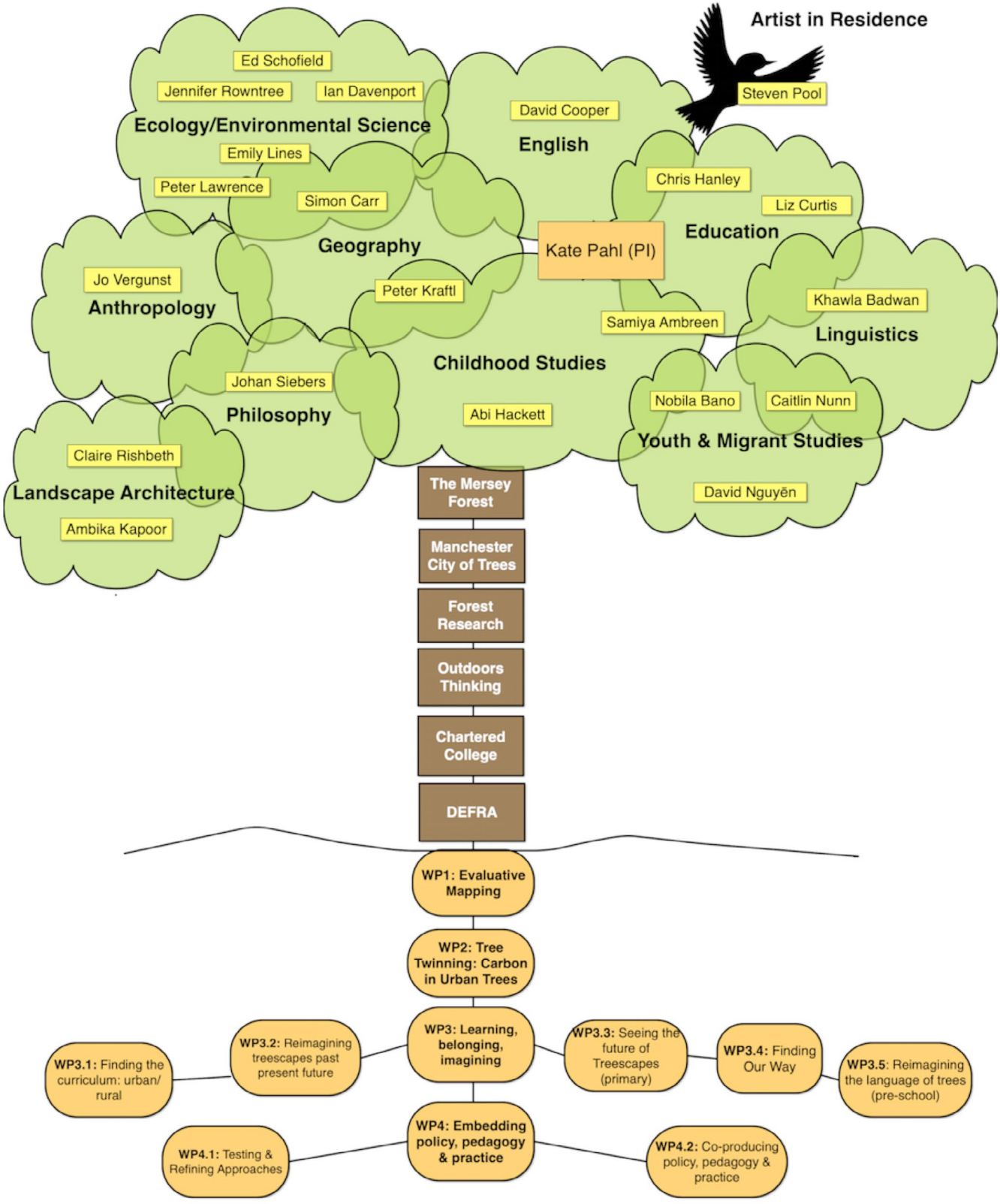

FIGURE 1 Transdisciplinary tree of the *Voices of the Future* project. A range of complementary, sometimes overlapping academic disciplines was required to deliver this project. The academic team was reliant upon close working relationships with organisations that develop and implement policy and practice at local to national scales in the UK to deliver the four project work-packages.

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imbalances and creating space for children to reshape the agenda and modes of engagement.

For our team, the focus was on methodologies that surfaced children's own perceptions and modes of engagement. Arts methods and participatory methods have a strong role to play in creating spaces for young people to have a say in how they would like to be heard (Ambreen et al., 2025a). We developed methodologies focussed on children's own modes of engagement and exploration as a research process, leading us to new shared understandings *with* children about how to see the world. For example, an unstructured activity in a thicket offered key moments where children explored and investigated on their own terms. Observing this experience offered a richer understanding of the children's relationship with trees than was gained from the originally intended structured quantitative measurement of trees using terrestrial laser scanning and laser sighting. Much of this rests on diverse methodologies that open up ways of knowing and thinking with children (Ambreen et al., 2025b; Pahl et al., 2025; Yoon & Templeton, 2019) by expanding the definition of listening itself, beyond words spoken, to include human and more-than-human sounds, gestures, movements and also that which goes unspoken—shared senses of connection and, as Davies (2014) puts it, 'encounters with difference' (see Hackett et al., 2026). This 'emergent listening' (Davies, 2014) extends far beyond the exchange of information or neat subject positions; for this reason, it unsettles established hierarchies of (scientific) knowledge and the power relations that accompany those hierarchies. Below, we work through some of the stances that we drew on in our research to create such approaches and highlight how they differ from approaches more commonly used in environmental (citizen) science.

Due to the sensitive nature of research with children and young people, this work was undertaken within a detailed ethics approval process led by Manchester Metropolitan University for *Voices of the Future* (Faculty of Health and Education Ethics Committee approval no. 48088) and University of Cumbria for *Digital Voices of the Future* (University of Cumbria Research Ethics Committee approval no. 23/07), with additional ethics approval from Aberdeen City Council (Research Governance Approval 13 March 2023), Sheffield Hallam University (College of Arts and Social Science Ethics Committee approval ER44717376) and University of Sheffield (School of Architecture and Landscape Ethics Committee approval no. 049701). Ethics, informed consent and the UN Rights of the Child were concepts repeatedly discussed with the children and young people throughout both projects, and during each activity or encounter, participants were invited to reconsider, renew or withdraw their consent to be involved, observed or recorded.

3 | WHO ARE CHILDREN?

Whilst empirical work and effective methodologies for better foregrounding the perspectives of children in research are emergent, 'childhood' as a trope is often drawn upon to galvanise arguments for action in relation to climate change; 'think of the children!' (Lee, 2013; Sheldon, 2016). This distinction between children themselves shaping research and notions of 'childhood as future' is an important one.

The idea of childhood is socially constructed (James & Prout, 2015); what childhood means is shaped by what society considers childhood to mean, how children are treated, and what is expected of them. This in turn shapes the experiences, capacities and even bio-social development of children themselves. Dominant conceptualisations of childhood often rest on Western ideologies that position Western middle-class childhoods as neutral, natural or universal. This perspective has been challenged by critical childhood studies scholars who have excavated the relationship between what children and young people actually do and the constructions adults made about their lives (e.g. Blum, 2016; Cannella & Viruru, 2012; Kromidas, 2019). Continually checking our biases and assumptions is critical, particularly in a context where science itself tends to be dominated by the same populations (White, western, educated, etc.). One of our realisations as a project team was that the conceptualisations of childhood rested often on the researchers' own children and their experience (c.f. Larson et al., 2021). Scientists often uncritically supposed that 'childhood' in general mapped on to these particular (often privileged) experiences.

More critical is an assumption of deficit within communities that are less visible or familiar to the mainstream science community; such communities are sometimes positioned as 'other', assumed not to be interested in nature and less connected to it, exemplified by the notion of 'nature deficit disorder' and its frequent operationalization within funding bids and policy briefings. Tuck (2009) has described these as 'damage-centred narratives' about communities, in which a 'problem' must be constructed, for which there is a 'solution' that research or policy can provide. From this perspective, assumptions about children or communities being disinterested in trees or lacking 'nature connection' can be viewed alongside assumptions about 'lack' for which 'straightforward solutions' are seemingly available; dominant 'lacks' common in the field of childhood policymaking include lack of books in home/lack of words spoken to babies/lack of screen-free time/lack of healthy snacks, the list goes on, and all these 'lacks' are constructed and assumed by those who are outside of the communities considered 'lacking' (Gillies et al., 2017). As a team, we observed that widespread folk beliefs about deficit communities pervaded the frames of practitioners and policymakers in forestry, woodland and urban tree management. In this world there are 'good' research children and less good ones, with 'good' often being defined according to parameters that accord to researchers' own values and investments (Hackett et al., 2024). In order to resist this, it is vitally important for research to listen carefully to less heard communities.

Whilst engaging children and young people in conversations about climate change is core to environmental science as a discipline focussing on global challenges and futures, childhood itself is not a central focus of the discipline. Scientists are not routinely taught about the contested nature of childhood as a concept and are prone to regarding children as a homogeneous demographic

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group (Ojala, 2021; Valentine et al., 1998). 'Childhood', then, is often taken as unproblematic and self-explanatory by people who work outside childhood-focussed disciplines such as education, sociology and childhood studies. This has important implications for *how* and *why* we engage children in conversations about climate change, and importantly, who gets included and valued in these conversations.

In *Voices of the Future*, we have examined relationships between children and trees to explore processes of relationality and 'howness'. Starting with *how*, we examine the ontological assumptions about childhood that underpin *how*, disrupt and complicate the *why*, in important ways. Our methods tended to follow the children's lead, with planned activities often dissolving or becoming disrupted as children-as-researchers explored and played around trees (Pahl et al., 2025). We adopt a mode of research with children which focuses on 'knowing-with rather than knowing-about'. This involves a shift from the deficit modes of knowledge transmission outlined above, to a mutual '*conversation with children* trying to get educated about life and its possibilities' (Spyrou, 2023, p. 7), in which adults and children experience and learn together, as part of a two-way dialogue.

Below, we offer vignettes that explore concepts underpinning much of *Voices* and *Digital Voices of the Future*. Focussing initially on ideas of children as *leaders and explorers*, we then present examples of children and young people just being *immersed* in woodlands. Rather than focussing on the 'good research child' who produces the 'right' things (Hackett et al., 2024), we focus on the 'what is going on here' in the data (Heath & Street, 2008). We then illustrate how we can *re-imagine knowledge* through that process, before finally exploring *diversity* as a mode of thinking. These examples underscore the complex nature of children and childhood when thinking about future treescapes and interdisciplinary research.

4 | CHILDREN AS LEADERS/EXPLORERS

4.1 | Woodland leadership practices

Practices of children as leaders tend to rely on adult-infused models of leadership, and the concept of student 'voice' has been widely critiqued as a fairly shallow approach resting on mechanistic principles of consultation (Thomson & Gunter, 2006). Here, the aim was to create the conditions for a small group of children, aged between 12 and 13, who were identified as having Special Educational Needs (SEND) in a secondary school in the North West of England to lead encounters with the woodland. Unlike within 'Forest School' contexts (e.g. Wait and Goodenough, 2018), we were not looking to focus on the pedagogies of this, but more on ways in which adults can learn from children's relational engagements with woodland. An artist, a community forester, an ethnographer and an educationalist worked with 12 children. We carried out an initial session where we 'met' the woodland. The woodland was a strip of land adjacent to the school, left for many years, but had recently been fenced, a path laid and a log circle in the middle. Belonging originally to a country house, the school now proposed to work with it, but were not sure how to go about doing this. We introduced the group of children to the woodland through an immersive experience conducted over 2 days in the early spring of 2024. The artist planned a series of activities including den-building, leaf rubbing and bark rubbing, and the forester prepared bug hunts and identification tools. However, we came to realise that the young people themselves were, over time, able to construct the space to explore the woodland in their own terms. Each of the team wrote fieldnotes at the end of each day. From our fieldnote extracts, the community forester reflected on a process of engagement:

> I had some time to reflect upon the day. I was relieved that it had gone well and that the pupils had not become bored, in fact quite the opposite and they seemed to have grown in confidence in the woodland area and were happy to explore the area largely unsupervised for no other reason than enjoyment. I did wonder what would it be like to simply offer a space like this to pupils and leave the supervision and tuition out of the day, how would the students have managed themselves.
>
> [Community Forester, ethnographic March 2024:]

> The children were laying out the large twigs in triangles and I was interested to see how quickly they came together in the form of a den. At this stage, I wasn't sure how things would work out—the den building was nice but there was an indeterminate feel to everything. The children then wandered off—I noticed that a few children were keen to just go into the woodland and wander off and come back—this seemed to be a form of movement that they liked.
>
> [Ethnographer field notes March 2024]

Below, the artist who was delivering the activities described the process from their perspective,

> The children started marking a den. I would say this was an exploratory form of learning, where the children were engaged in exploring, watching, observing and in doing. ...Some of the children leaving the den making activity and wondering around the woodland... kicking twigs with their feet and playing a foot ball game, tucking in a piece of wood in mud and making a tower of sticks, fresh grass and flowers, walking in the woods, walking around the trees and grass... going far away from the crowd and

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> exploring the woodland on their own quietly. ...It was a good memorable day and my lasting thought was that the woodland could be a place for unstructured hanging out.
>
> [Artist field notes, March 2024]

This example illustrates an emergent concept of leadership, which challenges or resists hierarchical models of leadership that adults typically recognise. By emergent leadership, we mean an open-ended mode of being which could lead to new activity. The emphasis is on indeterminacy and encounters with difference. This way of working is counter to the more explicit pedagogical guidelines that lie within schooling—and also that frame much of both scientific and environmental educational thinking. Whilst this mode of working with children has affinities with work in the Forest School movement, in that it focusses on children's play and choice in the woodlands (Waite & Goodenough, 2018), as a research team, we moved our lens outside that of pedagogy, and explored the fractured nature of the relations and possibilities between children and trees (Hackett et al., 2025), rather than what such encounters could produce educationally. As such, our stance was ethnographic rather than pedagogical, with a focus on 'what is going on here' (Pahl et al., 2020).

4.2 | Young people lead in nature and climate action

Another strand of our research sought to identify national examples of young people's involvement in nature and climate action. A landscape architect and a childhood studies scholar from our team explored with young people their engagement in diverse organisational settings operating at different scales (e.g. national park youth board, youth-led activist organisations, community garden and environmental leadership focussed organisations). We explored their views to understand their experiences and interactions with the organisations, and the range of ways in which they described their activism and action. During one discussion around young people's representation in climate-related decisions and action, the young people shared their experience of representing the youth group at an environmental organisation board:

A: Board member (meeting) did not happen as we had imagined... We weren't welcome in the meetings we attended. Only [name, youth coordinator] was on our side.

B: It feels like you've been given a seat on the table but can't eat. [Youth Members, National Park Youth Board]

Young people wanted their voices to be heard in shaping strategies for nature and climate action. They highlight that often these efforts of including young people in climate and nature discussions have been tokenistic. The struggle to not be seen as a homogenous group and establish their individual and collective identity is reflected in this quote:

> Adults in environmental spaces, they group young people's opinion together. They see us as youth climate activist and that's it. They don't see all the different perspectives and range of political opinions we have.
>
> [Youth Member, Protest Group]

Where they have been able to carve out spaces for themselves, young people's leadership in the environment sector rejects traditional top-down approaches to leadership and is instead reflective, non-hierarchical, working towards being sustainable. Youth-led organisations were also attentive to processes and structures, power imbalances within their groups and consciously worked towards inclusion. There is a wide range of caring practices embedded into how young people work together as a group including—check-ins, taking breaks, talking to each other about how they are feeling and spending time together outside in the spaces they represent (Kapoor & Rishbeth, 2024). Many young people in environmental organisations are also keen on being supported by adults; they appreciated and valued the support of their coordinator. They recognise their multiple commitments and life's busy-ness, and want adults to be allies. They are reflective and in their approach to working towards environment action:

> The action we do now are less focus on protest, we do more public events, more grassroots and community focussed. Rather than doing big protests with unfamiliar faces we have shifted the focus of our energy. Now do actions which represent changes we like to see on a bigger scale by doing small action that seem more achievable.
>
> [Youth Member, Protest Group]

Young people's leadership vision in the climate sector is intersectional as they recognise lack of diversity in the environment sector and wish for better representation:

> "It's not a diverse sector, [...] I think it is unfortunate. Because it's really important to have diverse people, because diverse people have diverse opinions and perspectives and valuable insights that could bring a lot of value".
>
> [Graduates of an environmental leadership program]

Our findings suggest that young people are well-informed, nuanced and committed to connecting social and environmental justice (Kapoor & Rishbeth, 2024). Throughout the research, many young people highlight that the environment sector is the second least diverse sector in the United Kingdom (The Policy Exchange, 2017). Youth-led groups were reflective and explored practical steps to both diversify their group and ally with other organisations and people in meaningful ways both within and beyond the Global North.

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5 | RE-IMAGINING KNOWLEDGE

The following examples explore, in a more situated way, child-led engagements with trees, in which bodily knowing, play and art come to the fore as modes of engagement with trees and treescapes.

5.1 | Embodied knowledge in north-east Scotland

Whilst exploring trees and treescapes with children and teachers in north-east Scotland, an educationalist, an anthropologist and a geographer explored ways for children to channel their curiosity and develop their understanding of trees. The following examples of different activities focused children's curiosity, observation and recording skills and formed the basis of child-led conversations about the lifecycle of trees.

> While sitting in the classroom discussing a PPt of photos taken during Treescapes activities with a class of 10-year-olds, an image of tree pops up with children all around it mirroring its shape with their arms legs and bodies, a child calls out 'Leonardo!'
>
> [Educationalist fieldnotes, June 2023]

This prompted the class to remember being asked the previous autumn to go and choose a tree they liked the look of and to use their senses to explore its size, its textures, its smell, the sounds of its leaves in the wind….and then to imagine their tree was a person, how old would it be, what kind of character would it be, what would its name be?

Through the conversations stemming from children's direct experiences, they identified different kinds and ages of trees at different stages of their lifecycles. Over the duration of the project, this has prompted child-initiated conversations about how the availability of light and the prevailing wind affect the size and shape of trees, and questions about how trees know when to open up their new leaves.

Drawing sits very close to embodied learning. We developed a range of ways for children to create a visual record of learning with trees, at different scales. Using charcoal to create large-scale drawings of trees outdoors provided an open-ended activity in which children were invited to fill the paper with an aspect of a tree that interested them. They were intrigued by using the product of a tree to draw a tree and enjoyed the fact that they could smudge it.

Smaller scale drawings supported in-depth explorations and observations of trees as a lifeworld. Magnifiers and bug boxes engaged children in a microscopic world of insects, the veins of leaves and miniature holes left behind by beetles. Supporting children to lead their explorations, each group was given a choice of different ways to record what they found: a structured booklet with invitations to 'draw what you see here' or a sheet with two large images of a magnifying glass, or a blank booklet of paper. The following extract from fieldnotes demonstrates the ways in which the act of drawing punctuated children's perambulatory explorations of trees.

> 'I am with a group of 5 children aged between six and seven, 2 girls and 3 boys. It is a sunny day and they are exploring a small group of trees with magnifiers and bug boxes, I sit on the grass with the bag of pencils, crayons and things to draw on. The children have chosen a combination of structured and blank booklets to record what they find. One girl sat down to draw and focused on a single tree, another did a bit of a drawing and then found a big tree to sit under and stayed there to draw instead. One of the boys began drawing a tree, on being encouraged to look more closely at how the leaves attached to the branches he went on to draw another more detailed drawing, and then finally drew the hawthorn, another boy focused on bug boxes and looking for insects whilst the third boy preferred a mobile approach to exploration and used a scavenger hunt for leaf shape, size and colour and chose not to draw at all finding spiders and small insects which he brought to me to look at.'
>
> [Anthropologist fieldnotes, May 2023]

A year later, following a similar set of experiences with a new class of children, the impacts of the children's freedom to explore with their bodies, to draw or not at different scales, to be still or perambulatory learners as guided by their curiosity is reflected in their knowledge of trees. Since the previous sessions, we focused more specifically on the impact of choosing different approaches to framing children's encounters with trees. By giving children the opportunity to 'look' with their whole bodies, to create the shapes of whole trees and to draw we have noticed that this provides space for children to take-in the developing conversations about the life cycles of trees from what they notice rather than from what an educator thinks is important. Below, we explore this idea more fully in a second example.

5.2 | Bodily walking with very young children in the north of England

An educationalist, a geographer, an artist and an ethnographer worked with families across an urban community in northern England, facilitating play-based experiences for children aged under 5 years. The aim of the sessions was to create opportunities for families and very young children to playfully be in the vicinity of trees—including through scavenger hunts, teddy bears' picnics, art activities and woodland walks (Figure 2). The pace of these activities was deliberately slow and invitational—we spread picnic blankets under the trees, provided snacks and if families wanted to spend the session just sitting and chatting, that was fine. Our orienting question was 'what can happen between young children and trees?'

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FIGURE 2 U and her grown up with the grass, trees and sky. Invitational, playful activities to explore what can happen between young children and trees offer tiny, rich moments that can build a sense of kinship between the child and the tree.

Because of the ages of the children, the sessions we ran were necessarily loosely structured and child-led, which became a benefit for the research strand in terms of what we learnt from the children. We term the practice of running the sessions loosely and allowing time, space and encouragement for children to respond as they wished, as 'holding the space' (Hackett et al., 2025). Adults will always hold the power, but by allowing time and resisting jumping in to guide, shape or advise children, we hold open a space for something different to emerge. Frequently, what emerged were child-initiated bodily interactions with trees and outside spaces. Here are some examples from our fieldnotes;

> A runs his hand in an elegant sweep over a snow-covered fallen log. He brushes some of the snow down onto the floor, coating his woollen gloves in snow in the process.

> Baby L's mum tells me he likes the breeze. She carries him to a nearby sycamore tree and holds him upwards where the branches hang lower and move in the wind. He reaches his arms up towards the leaves.

> I see U standing alone in the wide grass. Her gaze follows a curve upwards as she watches a bird fly across the blue sky. She walks to the edge of the grass where the trees are clustered and again her gaze seems to cohere with the movement of the world, moving with the tree branches as they sway.

These moments are characterised by their tiny-ness; how easy it would be to overlook them, which is why we have chosen to describe them here. They also do not fit the dominant model of environmental education, in that they are not 'productive', do not involve adult expertise, and are not designed to convey to children why trees are important for 'helping' humans. Over time, these repeated and intensely felt bodily experiences, we argue, came to generate a sense of what could be named as 'kinship' between children and trees. Kinship is about learning, playing, experimenting and growing *with* the more-than-human world (Taylor & Pacini-Ketchabaw, 2019). This contrasts with learning 'in' nature (nature is a backdrop to the action), 'about' nature (facts and names) or 'for' nature (environmental education aimed solely at creating children willing to 'save' nature). Based on our experiences and

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observations during this research, we argue that what happens between children and trees is most exciting, expansive and transformative when deep relationships are able to develop between young children and trees *over time*, often initiated through the body (rather than words).

5.3 | In the thicket with secondary school children in Northwest England

This example is drawn from *Digital Voices of the Future*, distilling much of the learning in *Voices of the Future*, but it explores how co-design of videogames can reveal the relationships between children and urban treescapes. Game design centred around multiple encounters, whereby children built models of game worlds, created masks to generate role-play and game ideas, through which the research team listened to the emergent narratives and stories. Further encounters opened up the connections between what children had done within the game development and their own relationships with urban treescapes.

In May 2024, an encounter with 15 children in Years 7–8 (11–13 years) at a secondary school in NW England included tree measuring and sensing activities. Working in an area of trees within the school grounds, we used a terrestrial laser scanner to image and measure the trees, to estimate above-ground biomass and carbon stocks within urban trees. Throughout both projects, we observed that the opportunity to use such technologies encouraged the 'good research children' (Hackett et al., 2024) to come to the fore, reinforcing the sense that technology provides the solutions (Ribeiro & Soromenho-Marques, 2022), but that this activity tended to marginalise those for whom scientific approaches were of less interest (the 'non-good research children'?). The tree sensing activity initially asked fairly conventional 'survey' questions.

> First we discussed whether or not they liked trees. Standard response was neither like/dislike- "trees are just there". If pushed, they liked them because "they provide oxygen", something they are taught as part of the curriculum.
>
> [Researcher field notes, May 2024]

Here, we see acquiescence bias (Kooijmans et al., 2022), whereby children reflect the position of the adult asking the question; they are providing us information they think we want to hear. We gain little insight in this way. However, the focus of the planned activity shifted to something less instrumental. The children were invited to spend 5 min experiencing a cluster of pine trees in a grassy area in front of the school buildings, not speaking, but using their senses to identify what they notice: see, hear, touch, smell. The children, after initial hesitation, engaged well with the activity, reporting back that they felt calmer, more peaceful and happier, and had focused on small things, such as the shapes of needles, texture and smell of bark in ways that were quite new to them. But the key element within this activity followed: just across the school drive was a small thicket of broadleaved trees we had considered when preparing the session but had rejected as it seemed inaccessible (Figure 3). After the tree sensing activity, some time remained before the groups switched around:

> One of the boys asked if they could go into it [the thicket]. I had reccied it before and didn't think there was a way in, but he had found one. So 5 of us went in together. There were no obvious footpaths through the thicket, we were surrounded by trees and undergrowth including ivy and some wild garlic, and I could hear birds singing.
>
> The children instantly became more lively, started commenting and noticing light and shade and different plants growing. They adventured through the thicket and came out the other side with enthusiasm: "That was fun" "I feel enlightened by nature" "can we go through again". Seemed enlivened from immersion in very small space for very short duration. On questioning, they had never been into that space before, they assumed they wouldn't be allowed to go in, they couldn't remember having ever gone into a space like that before.
>
> [Researcher field notes, May 2024]

This impromptu activity was repeated with the other groups to similar effect. As with the very youngest children, a relationship with the thicket emerges as an embodied experience, and that just holding the space and observing the children interacting with and within the thicket offers a richer picture of how they value urban treescapes than that extracted through a survey (Pahl et al., 2025). It illustrates that small, informal treescapes hold similar value as parks or woods, and that not having set paths facilitates discovery and exploration. Multiple targets and standards exist around access to green space (Woodland Trust, 2014; DEFRA, 2024), yet these do not consider green spaces or woodlands below 2 ha^{-1}. The thicket that offered such a rich experience in this example is ~1% of this size. A genuine experience drew out strong emotional responses, of caring for the thicket, and provides an anchor grounding what is learned within a formal, didactic curriculum. Finally, it tells us that within our urban spaces we need find ways to encourage children into these spaces and overcome the barriers that prevent this embodied exploration.

6 | CONNECTIVITY AND DIVERSITY

Here, we explore how children's transnational connections and experiences play a significant role in research about trees, climate change and their impacts on young lives. This approach offers a different perspective on children's engagement with trees, as highlighted by Nxumalo and Montes (2023), challenging traditional

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FIGURE 3 'The Thicket', a small clump of broadleaved trees and undergrowth within the school grounds. Similar informal urban treespaces such as this are widespread, but their value is often overlooked. Impromptu exploration by secondary school children of the thicket during a project activity within *Digital Voices of the Future* yielded one of the most powerful and informative moments within the two projects.

Euro-centric views. Instead of seeing these interactions as lacking (Nxumalo, 2016), it celebrates the diversity and uniqueness of children's relationships with trees. We also discuss an example of research engagement with children, explaining how they broaden the concept of treescape by including examples from their fantasy worlds, challenging the adult-centric view of research.

In one of the project's primary schools situated in Manchester, a group of culturally diverse children aged 7–9 years participated in a story listening and story sharing session. The researchers introduced the storybook 'The Tree of Hope' by Kehkashan Basu (Basu et al., 2017) as part of the activity. This story, set in a scorching desert, depicted how a single tree could bring hope and change to the lives of children enduring the harsh heat of the desert. This story was chosen to challenge colonial and anthropocentric views in environmental literature (Truman, 2023). As the story unfolded, the children began sharing their own stories about trees, sharing their direct and indirect experiences from various parts of the world and other aspects of their lives. These stories narrated a transnational sense of belonging and connections between the children and the trees. For example, a child of South Asian (Chinese) heritage talked about tree planting with his grandfather in China, whilst another child of African-Caribbean heritage discussed how children in Zimbabwe have fewer trees and less water (Ambreen et al., 2025b). In these stories, the concept of trees and treescapes was imagined differently, incorporating the engagement of trees with extended family members in transnational contexts and framing the connections between people and nature from an anti-colonial perspective.

Another story from the session tells of a child who wanted to see a character called Mr. Rocket become a tree. One child, inspired by the storybook, shared his own story about a tree named 'Mr. Rocket'. With a voice recorder capturing his words, he began:

> 00:13: "once upon a time, there lived a tree called Mr. Rocket."
>
> 00:13-00:21: "Rocket trees are a rare type of tree that can blast up into space."
>
> 00:24: "Mr. Rocket has one mission…".
>
> 00:27: "Ta ta ta ta".

The story shows how characters, such as rockets in this example, became part of the tree stories. Originally meant to be about children and trees, the story includes imaginative elements, such as a tree being a rocket with the unique ability to blast into space. The rocket tree appears to be embarked on an adventurous mission, and the story concludes with the playful tone of a child saying 'ta ta ta' adding an element of excitement.

The session, originally intended for quiet listening, became a dynamic exchange of stories and ideas. Far from passive listeners, the children's actions, interactions and conversations captured in audio recordings indicated that the children were not just attentively listening to the story but preferred to engage in various other

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activities (Lang & Shelley, 2021). Some of these activities were recorded and became part of the research data, whilst others went unnoticed, unheard, and unrecorded, yet all were integral to the research. This vignette highlights the unique and diverse ways children connect with nature. It highlights the richness in the experiences of culturally diverse children about/with trees and nature (Nxumalo, 2016), also challenging traditional academic perspectives (Yoon & Templeton, 2019) and notions of a good research child (Hackett et al., 2024) in research about nature and the environment.

7 | DISCUSSION

Throughout *Voices* and *Digital Voices of the Future*, project team members experienced situations whereby organisations involved with planning and planting trees, operating at multiple scales in the United Kingdom, explained they had consulted children [as a largely homogeneous group] using a questionnaire or survey, and their findings confirmed the organisation's pre-existing view. The role of acquiescence bias in children and young people (Kooijmans et al., 2022) fundamentally undermines the value of traditional 'systematic' science communication or quantitative social science data collection methods, especially for exploring values and views. Moreover, the more tightly the mode and parameters of engagement for children's voice in relation to climate action research are defined by adults, the less likely we are to uncover perspectives, experiences and modes of being in the world that we, as adults, did not already anticipate. By contrast, the approach demonstrated through the vignettes illustrates how a far richer, authentic and more nuanced understanding of how children value and relate to treescapes can emerge.

Our work considers ways in which we can knit together our thinking to produce something that crosses the different disciplinary parameters. Our approach was anticipatory and, as we have outlined above, rested on concepts of emergence and the 'not yet'. Nested within both projects was a focus on hopeful futures. Drawing on this orientation, we can conceptualise participatory child-led research as a way of knowing that gives a voice to this future in environmental debate and decision-making. In discovering the importance of deep relations, shaped in concrete, embodied interactions, for this dimension of hope as a creative practice, we became aware of the connection between community and anticipation, or in terms of Levitas' reception of Ernst Bloch's utopian philosophy, of the 'not-yet-ness' that pervades relational being, which is always oriented towards new possibilities that might be brought about (Levitas, 2013). It is a subtle and, in a way, vulnerable insight: the survival and thriving of humanity, in interdependence with the rest of nature, requires that we become sensitive precisely to this relational dimension as something that can be nurtured, but hardly organised, produced or managed in a controlling way. We rediscovered that we cannot control our way out of the catastrophic sides of the human tendency to control and dominate nature. But we also discovered that child-led research can show us an alternative.

It is not simply that both projects engaged in imagining alternative environmental futures; they also discovered the central role of imagination in our relationships with the natural world. This imaginative side of interactions with trees that the children engaged in became an embodied and enacted conduit for the reciprocal, respectful curiosity that provides the basis for the child-tree relationship. In identifying this and showing it at work in the detailed, small, sometimes innocuous words, gestures, actions and encounters, we identified a critical moment, a criterion, for any future shaping of a broad, social, environmental policy: If it does not allow for such interactions, it will not bring about the interdependent world the planet needs.

The vignettes presented emerge from a practice that might not look like climate, environmental or quantitative social science, but instead rests upon interdisciplinary modes of engagement: listening, ethnography, arts practice and a focus on children leading the way in relation to the modes in which the work unfolded (Gallacher & Gallagher, 2008). They offer nuanced detail on the relationships between young people and trees that reveal the complexity of ways in which trees and treescapes are valued. The vignettes articulate some of the limitations of approaches that can perhaps be labelled as traditional 'public engagement with science' as defined by The Royal Society (1985), reflecting shortcomings of reliance on didactic approaches to climate change education in formal educational and wider informal learning contexts (Moser, 2016; Rousell & Cutter-Mackenzie-Knowles, 2020).

Lorenzoni et al. (2007) define engagement within a climate change context as an individual's *state*, comprising cognitive, affective and behavioural elements, with implicit sequencing between each element. This framework underpins the science-led, information-based approach to climate change that still dominates formal and informal learning. However, emotion and affect are key to shaping an individual's perception (Brosch, 2021; Moser, 2016). The informal, embodied and immersive experiences outlined above, where the 'expert' role is primarily to 'hold the space' thus enable children to explore and build their knowledge based on where their own curiosity takes them. From such exploration, a diversity of value-based relationships between the child and the treescapes they experience emerges. Our observation of these developing relationships and dialogic learning between the research team and the many children within the project forms the core datasets of *Voices* and *Digital Voices of the Future*. Quantitative, scientific data gathering, such as tree measuring or terrestrial laser scanning, becomes the backdrop informing a wider exploration, rather than the primary purpose of the activity. This is a reversal of the logic of traditional citizen science whereby children are the data gatherers and not the thinkers. By offering this reversal, our approach offers agency for children to affectively define and articulate their own positions of how they relate to treescapes, from which they build their cognition through curiosity about how their actions will influence climate futures in their own lives. This, we believe, leads into a more hopeful space of thinking about what might cumulatively result from small, yet collective actions.

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For organisations involved in the planning, planting and maintenance of urban treescapes, such as England's 15 Community Forests, being sensitive to, and acting upon the voices of children and young people can have a direct impact on the outcomes of tree planting projects. Mortality rates for urban tree planting projects through loss and damage are high, typically exceeding 50% of planned trees (Brasington, 2025; Butfoy, 2024). We find that where tree planning and planting have attuned to hearing children and young people's voices and values, and facilitating emergent ideas for planting urban treescapes, tree survival after planting is considerably higher (60–90%), including sports field margins where damage through trampling would be expected during tree establishment. Further, at one of our partner Community Forests, our approach has fundamentally changed their practice in public consultation for present and future projects. Improving the survival rates of urban treescape planting offers both cost and environmental benefits, and we believe our approach can enhance community buy-in for increasing urban tree cover in line with policy ambitions.

Operating in this manner has required the *Voices/Digital Voices of the Future* teams to take often uncomfortable steps away from their disciplinary silos. The process of undertaking the project, whether planting trees, tree measuring and survey activities or undertaking tree care, also required attention to both shared and different processes and practices of research. Despite considerable advances in the 21st century (Moser, 2016), too much work on climate change communication, engagement and action remains situated within disciplinary silos, where complementary research strands run parallel but are largely separated from one another. Continuing to privilege and separate climate science from climate policy and the social and cultural implications of choices at individual to global scales reinforces the tragedy of climate change and the break between science and society (Glavovic et al., 2022). The approach advocated within *Voices* and *Digital Voices of the Future* focusses more on intertwining those strands into a rope whereby the scientific disciplines are not privileged or separated from the entirety, and as a result, the rope is far stronger. This inter- or even transdisciplinary approach is what is needed in responding to the challenges of climate change, especially to dream of and implement the radical interventions to both the Earth system and human society that Morrison et al. (2022) advocate for.

8 | CONCLUSIONS

There is widespread recognition that children and young people have a fundamental role in the planning, planting and care of urban treescapes, but there is no clear structure or framework that codifies best practice in enabling this. This is because children and young people do not conform to an adult-centric perception of a homogeneous group whose views can be elicited through a structured, systematic survey approach. This undermines the long-term perspectives in public audiences required to understand and value the contribution of tree planting at local to global scales.

We identify key principles that can inform attempts to elicit authentic views and values of children and young people on urban treescapes specifically, but more broadly on their relationality with their local to global environment. These can provide a way in to working with children and young people that recognise child-led approaches, do not deficit children's knowledge, and recognise that research with children is complex and is of itself a field of practice (Kraftl, 2020).

- *Holding the space*: When we explored 'leadership' within woodland contexts, we considered ways in which adults could withdraw and the space of the woodland become the teaching vehicle. We broadly called this process 'woodland methodologies' in which the thicket or trees provide the context for learning. This is distinct from Forest School methodologies in that it opens out spaces for children-as-researchers to explore woodlands.
- *Informal learning*: incidental learning in the thicket: It is important to avoid framing encounters as always purposeful and connected to learning results in missing important modes of interaction and exploration that might themselves be seen as 'messing about' (Pahl & Pool, 2011). These modes of being and doing also spark curiosity.
- *Curiosity and exploration*: Our examples question 'schooled' concepts of leadership and instead concentrate on what children actually do in the woodlands. This exploratory mode echoes modes of 'learning from' within anthropology (Ingold, 2021).
- *Emergent leadership*: We would rather talk about leadership as emergent, and contingent on materiality—the trees can lead the way and the children can follow. This approach adopts insights from new materialism about the vibrancy of matter (Bennett, 2010) and the ways in which the materiality of the tree creates opportunities to climb, circle, feel, talk, sense, listen and learn from trees.
- *Tiny moments can carry a lot of meaning and value*: Close attention to 'what is going on here' can yield unexpected results. Anthropology can provide a lens to explore the unfolding nature of things, and a focus within childhood studies on child as emergent and linked to matter (Kraftl, 2020) can open up this focus further.
- *Avoiding tokenism*: Children are not 'ready adults' willing to engage with science and trees on their terms. We have described a much more complex reading of the relationship between children and young people and trees. Rather than relying on children to do the work of adults, maybe adults need to learn from children, and do their work.

We have outlined an approach to working with children that explores emergence and relationality. We find that adopting this approach with urban tree planning and planting yields improved tree survival rates, and greater connection between local communities and these spaces. Our approach rests often within the arts and humanities, where the focus can be on what is unseen, or 'not yet' (Pahl et al., 2023). Our work as an interdisciplinary team was to situate our thinking outside the strands of our disciplines and work together exploring children and young people's experience of treescapes. In doing so, we have opened

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up some disciplinary fissures, but also developed new and important work that is anchored across disciplines and entwined into a new rope of thinking.

AUTHOR CONTRIBUTIONS

Simon Carr, Abi Hackett, Kate Pahl and Johan Siebers conceived the ideas and designed the overall structure of the research presented in this paper; all authors collected the data; all authors analysed the data; Simon Carr, Abi Hackett and Kate Pahl led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

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CONFLICT OF INTEREST STATEMENT

None identified.

DATA AVAILABILITY STATEMENT

Project data from Voices of the Future is administered via the NERC Environmental Information Data Centre (DMP-NE/V021370/1: *Voices of the Future*; DMP-NE/Y0045159/1: *Digital Voices of the Future*). Individual datasets are archived within the NERC Environmental Information Data Centre and the ESRC UK Data Service.

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