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Reflections on co-productive research in a youth-focused climate education project

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Abstract

The 1989 UN Convention on the Rights of the Child emphasises the value of listening to young people's voices. Since its inception, there have been significant moves to involve young people in research that concerns their lives in a time of environmental emergency. Drawing on critical analysis of our work with Youth Action Partnerships (YAPs), this article explores how co-production with young people can effectively be achieved and offers meaningful ways for young people to share their stories in a time of climate crisis. We draw on rich insights from our experience of working in partnership with young people and explore how they have been supported to shape and influence the research process. Our findings enable us to build on Hickey's five principles for co-production with adults in a health and social care context. We show that, in addition to those, there is need to consider three other principles when co-working with youth. We embed the eight principles for co-production in a new model for effective co-production with young people to support researchers to successfully prepare for, and implement, such co-production processes in other work.

KEYWORDS
agency, climate education, co-production principles, participation, research, youth voices

1 | INTRODUCTION

We are living in a time of global environmental and climate crisis (Gills & Morgan, 2019; Ripple et al., 2020; Steffen et al., 2018). During the twenty-first century, many people's understanding of and awareness about this global issue have grown. As Flynn et al. (2021) show, most people recognise climate change as a

global challenge. Young people are grappling with overwhelming questions about their futures (Hickman et al., 2021; Ojala, 2011; Pandve et al., 2009; Watts & Campbell, 2020). Thus, as discussions about the extent to which young people's lives are shaped by crisis move to the fore of public and academic discourse, so too have calls for their meaningful involvement in research about their experiences and futures (Cutter-Mackenzie & Rousell, 2019; Schäfer, 2012; Skelton, 2007).

Acknowledging the importance of young people's voices in research is a well-established strand within contemporary human geography (see Horton & Kraftl, 2006; Robertson et al., 2018; Skelton, 2009; Tandy, 1999). Throughout the 1970s and 1980s, geographers explored diverse themes across children and young people's lives. These included exploring children's experience of built environments (Bunge, 1973), developing research agenda to understand children's geographical knowledge, and contextualising children's experiences of place in relation to other factors such as environmental and socialisation variables (Hart, 1984).

Early on, Matthews (1984) challenged psychological approaches to understanding children and young people as immature and needing adult guidance. Matthews' work (among others) became a catalyst for conceptualising research *with* rather than *on* young people and for seeing children as *more than* adults in waiting (Ansell, 2005; Skelton, 2007; Wyn et al., 2012). It advocated the need to recentre geographic research with a focus on young people's voices (Holloway & Valentine, 2004). On that basis, James (1990) has asked, is there a place for children in geography? In the more than 30 years since then, the answer is a comprehensive 'yes', although the degree of agency and power exercised by young people throughout the research process varies significantly. What has emerged, however, is a substantially important geographic subdiscipline engaging critical themes *with* young people and families.

Later, in a special issue of *Children's Geographies*, Porter et al. (2012) drew together diversely themed papers that explore opportunities for young people to be viewed in research as knowledge producers in their own right (Ansell et al., 2012 Walker et al., 2012,). The papers unequivocally argue the importance of qualitative, reciprocal, inclusive, and participatory methods, extending to co-production.

Beyond that collection, there is interest in participatory methodological approaches to involve children and young people in geographical research. For instance, the Young People's Geographies project enabled young people to "take an active role in the creation of the curriculum" (Firth & Biddulph, 2009, p. 33) by asking schools to facilitate conversations between students and teachers that explored young people's own geographies. Similarly, in a project examining young people's everyday climate crisis activism, Rushton

> **Key insights**
> Across three settings, we comprehensively examined how to undertake a process to work meaningfully and effectively with young people as co-producers of environmental and climate research. Here, using eight principles, we show how successful co-production with young people requires researchers to go above and beyond typical requirements. The resulting model has, we hope, wider applicability and democratising effects in research.

et al. (2021, p. 2) have shown the value of using participatory workshops to facilitate "co-production, community building, and developing constructive intergenerational dialogue."

More recently, in work exploring climate education, Cutter-Mackenzie and Rousell (2019, p. 94) have argued that methodologies involving young people need to go beyond simply listening to them and should position them instead as "researchers who directly influence the methodology, analysis, and outcomes of a given study."

In this article, we respond to this precise need, examining how to incorporate young people as members of research design processes in which they have opportunities to exercise power in telling their personal stories about their engagements and experiences of climate crisis and to shape how these stories are told (Kina, 2012; Moran et al., 2020). Specifically, we grounded our work to collaborate with 15-to-18-year-olds as part of a three-year international and interdisciplinary research project called Challenging the Climate Crisis: Children's Agency to Tackle Policy Underpinned by Learning for Transformation (CCC-CATAPULT). We examine a co-productive process in which the young people who took part formed Youth Action Partnerships (YAPs) and functioned as key influencers in developing, delivering, and disseminating a climate-focused project. We also show how YAP members drew on their personal engagements with climate crisis to aid project development at different stages.

Working with young people in such ways raises questions about the practicalities of co-productive methodologies and the ethical implications of operationalising such a participatory ethos. Ethical considerations affecting co-production emerge on two grounds: first, in relation to a well-documented disconnect between ethical expectations required by higher education organisations, and the real-world messiness of 'doing research' with young people (Horton, 2008; Thomas-Hughes, 2018); and second, in relation to the inherent power dynamics that present adult researchers at the apex of power. Addressing such

dynamics in partnerships with YAPs presented a novel way of doing research. The process was based on a view of young people as equal in research design and involved recognising the validity of their voices in data collection and analysis.

The central aim of this article, then, is to provide insight into the messy practicality of 'doing' co-production with young people at a time of climate crisis by drawing on reflections from YAPs gathered through interviews and surveys. We offer a model for future youth-focused co-production. We use these insights to build on five principles for co-production with adults in a health and social care context developed by Hickey et al. (2018). To those, we add three additional principles for researchers working with youth-focused co-productive processes. Those three centre around 'empowerment and capacity building,' 'extended opportunities,' and 'ongoing reflection and evaluation.' They help enthuse young people about their roles and support them to be confident in sharing stories and experiences. To some extent, the three principles are implied in work by Hickey et al. (2018), but we suggest that they are essential and should be included as principles rather than features of youth-focused co-production methods. In short, they should underpin the *entire* research process.

On that basis, we situate all eight principles within specific recommendations to develop such a process. To develop a model for co-production with young people that considers the stages, actors, and factors involved in a co-productive process, we draw on our reflections and established knowledge about participatory methods. Our insights and recommendations are represented in Figure 1. We consider this work to be a focused adaptation of a more general model proposed by Bell and Reed (2021), who developed a 'tree of participation' to represent how inclusive participatory decision-making processes can be successfully achieved across different contexts.

In our model, the sky represents influences researchers need to be mindful of when designing a co-productive process, such as cultural contexts within which projects occur, funding requirements and capacity, and project foci and suitability for co-production. In the context of developing climate research, researchers need to consider what types of climate-connected knowledge and experiences young people might have, what new knowledge and skills they might need or indeed hope to acquire from a project, and what support young people might need in engaging with challenging research topics. The Earth represents the preparation one must do ahead of the research process to ensure diverse engagement and safe spaces and remove barriers to co-production. The stem and leaves represent the people who need to be involved. The petals are key elements of the process—bringing together the core principles that underpin a

co-production process with young people. They are firmly held together at the flower's centre, which represents the need for ongoing evaluation and reflection. The sun represents post-project processes such as accountability and ongoing feedback.

Our argument is that researchers who pursue co-production with young people must prepare for its challenges and carefully consider how young people can be meaningfully supported and engaged in dialogue to genuinely influence the process. Including and honouring young people's voices and stories through co-production is not straightforward or easy but the value is immeasurable. And so, we contend that incorporating young people's narratives and perspectives is crucial to advance meaningful climate research and empower and foster agency among young people in a time of climate crisis. The balance of the paper elaborates on these foundations.

2 | SETTING THE SCENE: CONTEXT, VISION, AND METHODS

2.1 | The CCC-CATAPULT project

The CCC-CATAPULT project involves researchers from across the University of Tampere (Finland), the University of the West of England Bristol (UK), the University of Galway (Ireland), and the University of Genoa (Italy). Formed as an interdisciplinary team with researchers across geography, psychology, education, and engineering in the field of urban hydrology, the project has had a significant geographical focus. It works with young people, teachers, and other supporters of learning to develop knowledge about how young people in four city regions in Europe situate and make sense of their lives in relation to climate complexity.

The project has used a mixed-methods approach, including an international survey of young people; interviews with teachers and other supporters of young people's learning; focus groups with young people; and bespoke, socially-engaged narrative activities combining deep mapping and storyboarding techniques with young people (McEwen et al., 2020; Modeen & Biggs, 2021). Using these methods, we have explored two questions: How do young people, teachers, and other key actors shaping the learning of children, understand the value-action gap in tackling the climate emergency? Through their sense-making, what might legitimate transformation look like in relation to reducing this gap?

Central to CCC-CATAPULT is a commitment for the research design to be developed by and with young people, crossing generational boundaries to bring their experiences and perspectives into communication with work by adult researchers. In practice, this approach led us to recruit young people to form YAP groups in each location on the basis that each would collaborate

FIGURE 1 Modelling co-production with young people.
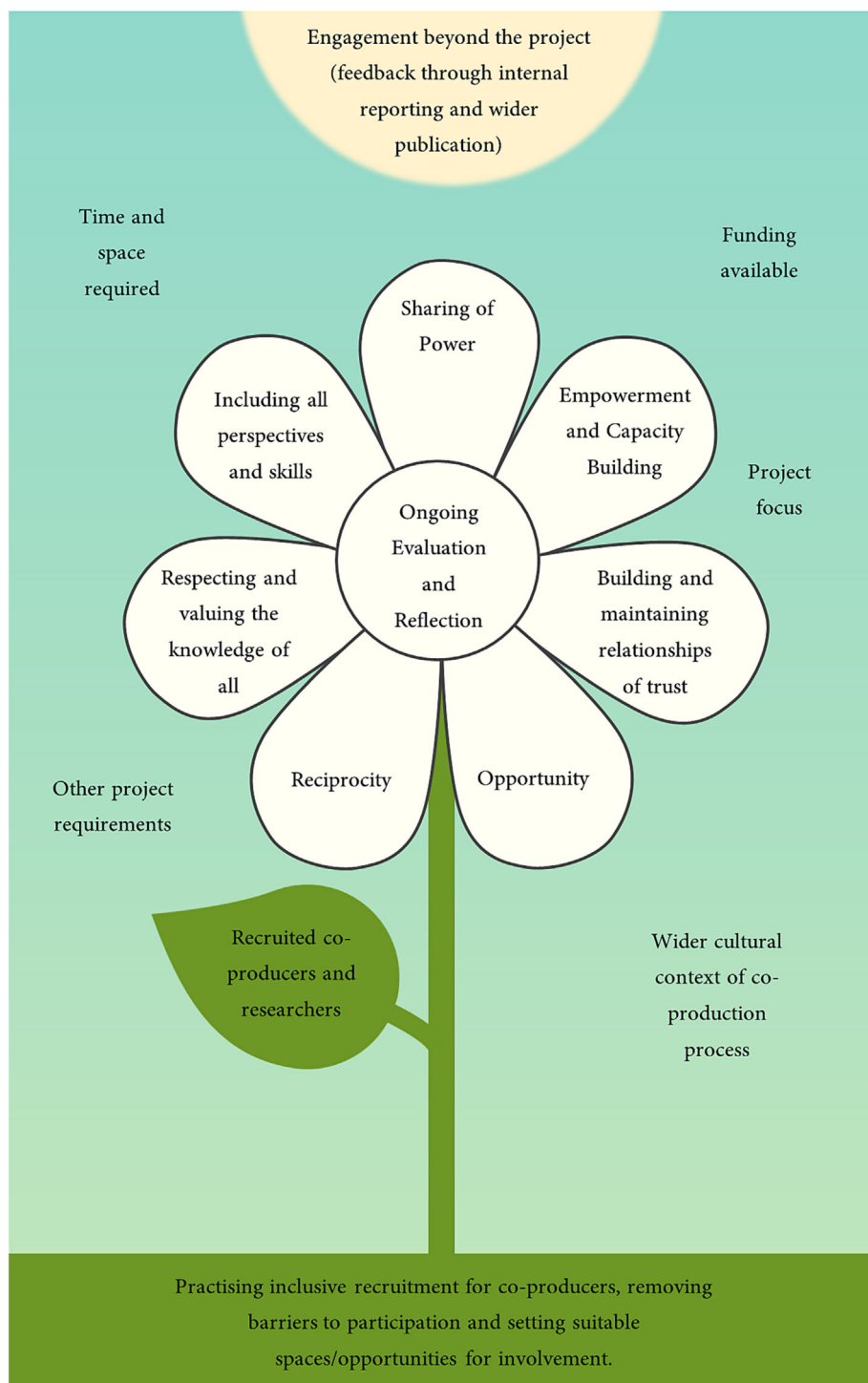
with us throughout to ensure research adequately captured their voices and stories. In the following subsections, we set out our vision for the co-productive YAP process, outline how we recruited and collaborated with YAPs, and describe the methods used to capture YAP reflections.

2.2 | The YAP process: approach and vision

Co-production is an increasingly common approach to research in health and social care (Realpe & Wallace, 2010), environmental management, the arts,

and education (see Briley et al., 2015; Davies, 2010; Dineen, 2012; Norström et al., 2020; Pavarini et al., 2019). The power of storytelling is at the heart of any co-productive process (Blazek & Hraňová, 2012; Heron & Steckley, 2018; Walker et al., 2012). Examining the literature, what emerges is an emphasis on how co-production brings together diverse communities to share perspectives and ideas to collaboratively develop relevant and impactful knowledge and create genuine change (Bovaird & Loeffler, 2013; Hickey et al., 2018; Moniz et al., 2023; Turnhout et al., 2020). In CCC-CATAPULT, stories emerged both formally, such as in facilitated discussions involving researcher and co-producers or in co-developed outputs, and informally, as prompted by other activities which stimulated relevant conversations and sharing processes.

In our co-production process, we sought to root the CCC-CATAPULT in young people's experiences and perspectives and decided to follow guidance provided by Hickey et al. (2018), which advocates adherence to five principles in the context of health research with adults: include all perspectives and skills; share power; respect and value the knowledge of all those working on the research; honour reciprocity; and build and maintain relationships. Hickey et al. (2018) suggest how such principles can be achieved by outlining key features of co-production: establish ground rules; engage in ongoing dialogue; have joint ownership of key decisions; commit to relationship building; take opportunities for personal growth and development; be flexible within project plans; continuously reflect on, and value and evaluate the impact of co-producing research. Our rationale for embedding these principles is twofold: first, they allow for innovation and flexibility; and second, they have been developed as a robust, collaborative, iterative process by members of an expert working group (Hickey et al., 2018, pp.16–18). The three principles we propose as additions were not recognised before we started the YAP process but were realised as a result of our engagement with youth co-production and collective, reflective learning.

2.3 | The YAP process: recruitment and involvement

YAP recruitment began in May 2021. We hoped to form groups that brought together diverse perspectives from schools and third-sector organisations. We recruited approximately 17 YAP members, although these numbers have slightly fluctuated over the past two years with new members joining and others leaving. YAPs based in different locations did not go through a standardised process, and there were variations in the activities they engaged with. As part of an international group, YAPs have nevertheless been connected by meaningful involvement with the project over more than two years.

Following the recruitment process in July 2021, YAPs met approximately once a month with researchers to take part in semi-structured meetings. During that time, YAPs advised on the development and delivery of all project research activities, including interviews with educators, an international survey, focus groups, and narrative, arts-based activities with young people. For example, YAPs evaluated survey questions and structures, writing notes on paper versions, and engaging in recorded discussions about how to develop the survey. They co-developed the interview and focus group questions by sharing their own experiences and ideas during meetings and then writing down topic ideas and questions. They piloted narrative activities by engaging with proposed deep mapping and storyboarding exercises before providing feedback to the researchers.

YAPs also contributed to analysis. For example, YAPs co-led interviews with educators, added to the analysis of narrative activities, reviewed key findings from the focus groups and interviews, and critically reflected on survey outputs. They are already involved in communicating and disseminating the research. For instance, in addition to contributing to writing, policy-focused workshops, and public events (such as conference presentations), YAPs have helped develop a youth climate café toolkit, and are co-producing a teacher toolkit for climate education. These toolkits contribute to a body of project resources that present accessible and research-informed strategies for climate education (see CCC-CATAPULT, 2024).

The reflections provided in preparing this article have been pre-emptive to the project's end date in November 2023 because, with many YAP members now leaving education, it was important to capture shared reflections now.

3 | METHODS: CAPTURING YAP REFLECTIONS

To begin this process of reflection, researchers who facilitated YAP meetings participated in three guided discussions about their experiences of developing and securing YAP members' ongoing involvement. The objective was to aid shared understanding of the process and identify significant features for researchers and young people. These discussions guided joint interpretation of stories and reflections YAP members would come to disclose. In December 2022 and January 2023, YAP members took part in group or individual interviews to reflect on their time working with the CCC-CATAPULT project and talk about their experiences. To support YAP members to talk openly and honestly, interviews were audio-recorded and led by team members who had not directly facilitated the YAP process. They filled out a survey that echoed the interview

questions, ensuring they had a chance to offer both shared and confidential personal reflections. These data were collectively and thematically analysed (Braun & Clarke, 2006) using eight codes that directly reflect the eight principles of co-production noted above. Finally, YAP members could then read through and comment on their reflective work. Those who took part are referred to using pseudonyms: Alfie, Max, Effy, and Rosie speak from the Bristol experience; Kim speaks from the Galway experience; and Usva, Siri, Frida, Sanni, and Aada speak from the Tampere experience.

4 | REFLECTIONS ON THE YAP PROCESS

4.1 | Including all perspectives and skills

Hickey et al. (2018, p. 7) have stated that co-production "requires a research team to ensure that all necessary views, experiences, skills and knowledge are included." In this instance, that requirement encompassed both the university-employed team members and the YAP members, who bring their own knowledge and expertise to the project. For Hickey et al. (2018), including all perspectives and skills means embracing diversity and identifying and removing barriers to ensure that research is safe and accessible for all. Developing an inclusive recruitment strategy and reaching out to and inviting all necessary individuals and communities to join the process are all critical in that process.

In the context of CCC-CATAPULT, we encountered two significant challenges in our recruitment process: first, we found it difficult to encourage young people to sign up for the commitment and keep engaged as ongoing YAP members. In part, that challenge existed because recruitment happened during the global pandemic and restricted opportunities to recruit at in-person events. We also struggled with diversity and that reflected the variety of settings we were working in. Additionally, the role was unpaid and could not be a replacement for part-time jobs. Most YAP members felt comfortable in university spaces, either because of personal or familial connections with university settings or because of their academic interests and aspirations.

Kim described how she was recruited through her links to a school in Galway, but was not sure it was effective:

> I found you on a flyer in my school … but I think most students would not really be interested in anything they find in school, because that would be like the connection to school and work, and not really something fun or anything they want to do in their spare time.

Conversely, the same technique of reaching out through schools appeared more successful in Tampere and Bristol. Some YAP members commented on the influence of a teacher, Sanni recalling that hers said it "could be a good thing, where you could go." Frida described how she was "interested in this topic … this 'young people as climate actors'," and she was intrigued about "the possibility to learn a little bit about the stages of the research." Usva said that they wanted to be "involved in influencing … environmental issues" and were "interested to be involved in some kind of research process." Alfie, in Bristol, likewise stated that their choice to be involved is related to their interest in influencing environmental issues and research. Alfie said it "sounded like a good way to get involved in something that would help the climate and a good chance to be involved in research. It helped that it was recommended by the teacher who ran my school eco team." Rosie said she wanted "to be involved in reacting to climate change," and Max "felt that the amplification of YPs' voices is one of the most important things … I felt this would be a good opportunity to help expand the accessibility of climate awareness." These comments clearly illustrate both the 'pull' of the focus on climate research and the ways it functioned to motivate young people already interested in climate action.

Growth in skills was also mentioned. Effy, for instance, said, "It's an important topic for me and I liked the idea of collaborating on a paper. It's also a good addition to my personal statement [for university]." A key reason for involvement concerns young people's ambitions, which an experience such as this can prove valuable in helping them achieve. Indeed, when considering recruitment strategies, Alfie suggested the need to "Make it very clear what the project means, show what type of thing people will do as part of it, lay out a roadmap."

We began our work with YAP members by setting ground rules to establish the meetings as a safe space for open dialogue and collaboration. In both Tampere and Bristol, we invited young people to share in a 'Timeout' experience (Alhanen & Kareinen, 2020). This Finnish methodological tool guides collaborative and productive group conversations. The method generates constructive discussions in instances where "a deeper understanding of the topic or an equal encounter is required—for instance, as a part of preparations, decision-making or bringing different people together" (Timeout Foundation, n.d.).

All researchers on the project had already engaged with this method for conversations and collectively had reflected on its importance to foster trust and collaborative thinking. The tools to set up and run a Timeout dialogue span from dialogic prompts and scripts to advice for finding suitable host spaces and gathering feedback, and are freely available on the Timeout website. We used the method to encourage YAP members to

engage in a guided conversation about what it is like to be a young person living through a time of climate emergency. That activity marked the first point in the project when YAP members were invited to share their experiences and stories with researchers. Participating in such discussion also gave members a chance to become familiar with the researchers, who shared in the storytelling and reflective process. Using the Time-out method allowed us to collaboratively consider and reach ground rules for discussions that centre on presence and respect, listening and relating to each other, sharing our own experiences, and talking honestly. We agreed to carry these principles forward through the YAP process. The format of the method "breeds a feeling of inclusion between the participants" (Timeout Foundation, n.d.) and levelled the ground, so researchers could relate and talk to young people as partners. It set the tone of the YAP process as one based on mutual respect for all perspectives and skills offered.

4.2 | Building and maintaining relationships

Building and maintaining relationships of trust enables the co-productive process. Hickey et al. (2018, p. 8) have suggested that the key to developing trust is for all team members to "reflect on the knowledge, assumptions, preconceptions and biases that they bring to a research project." Accordingly, during the first official YAP meeting in each setting, we facilitated an open discussion about our differences and on diverse knowledge and personal experiences we brought to CCC-CATAPULT. We continued to build in space for personal reflection, either during meetings or by encouraging post-meeting reflective diary writing for both YAP members and researchers (see Boswell et al., 2021). For example, a diary entry reflecting on a meeting held in September 2021 emphasised how one YAP member was keen to meet with YAPs living abroad, so we organised our first international meeting as soon as possible, in December 2021.

Overall, YAP members reflected positively on how, over the two years, they have come to trust in each other and the project researchers. Named project researchers in the YAP reflections include Sara Williams and Rosamund Portus in Bristol, UK, Anette Mansikka-Aho in Tampere, Finland, and Bronagh Dillon, in Galway, Ireland. In Finland, Aada described how "At the beginning I had difficulties coming to the meetings and I talked to Anette about it. It felt nice that she listened and encouraged me to participate." In Bristol, Effy reflected that they "felt comfortable sharing my thoughts as all the members knew each other well and [Rosamund] was easy to talk to" and that "Sara acted as someone who would help to develop ideas—she

would push you further for your opinions." Max further commented that "it always seemed that Rosamund and Sara worked well together, and we could talk to them both about whatever we needed." In Galway, Kim reflected how "at the beginning I didn't really know what to expect, and who Bronagh was, so I wasn't that confident at the beginning. But that changed quickly. I think." When asked if she felt comfortable talking to Bronagh about all sorts of topics, Kim said yes.

Partly because of recruitment and set role division, and partly through natural self-selection, all team members who collaborated *most* closely with YAP members were consistently involved with YAP meetings and were also researchers who have worked to develop their skills in interacting with young people by training as mentors and teachers. Having these skillsets is important in the context of climate crisis topics because youth co-producers engage in challenging conversations. Many young people voice worry about climate change, identifying feelings of sadness, anxiety, anger, powerlessness, helplessness, and guilt (Hickman et al., 2021). Researchers engaging young people as co-producers in a climate research context must, then, be prepared and supported to aid young people working in response to demanding and difficult subject areas. Even so, because of project logistics and limitations, YAP members said that they had limited familiarity with project researchers beyond those with whom they had immediate contact. For example, Usva spoke about meeting the Finnish project lead only "once remotely and on the panel itself." They recognised that the lead "has been important in the project but [has been] a bit more distant for us." Frida also said that there were some challenges in marrying expectations for YAPs involvement with what could be achieved:

> at one point Anette said she would love to involve us more, and tell us more about the research process. And so maybe [Anette] had had a different vision of the YAP process and what YAPs could do, but then those in the upper echelon had a different vision and this impacted upon the YAP group and what we could actually do.

On reflection, there would have been benefit from ensuring that every researcher had collaborated directly with YAP members more than once: our model was for a few researchers to lead the process with inputs from other researchers at points in the process. Accommodating more whole-team input would require greater time and energy, yet would have helped build YAP members' sense of trust in the project.

Another type of relationship noted by YAP members was with each other. Locally, YAPs became notably comfortable with—even close to—each other over the course of the process. Their common interest in climate

issues helped them connect over a shared 'purpose,' providing a starting point for new conversations. Internationally, YAPs became sporadically connected through social media in ways often facilitated by researchers. Siri expressed how, "over time, being together and doing things together becomes easier and more natural." This view was echoed by Frida, who said that "when you become familiar with people, it becomes more natural." Max thought "we have become closer as a team as time has gone on, and feel more able to talk freely with everyone." Likewise, Effy said, "we have become much better at building on each other's ideas rather than just bringing in new ones." Alfie thought relationships "have strengthened … I found out more about the views of other [YAPs], and was interested by their different perspectives." Rosie expressed a similar opinion, stating that "it's good to find others who want to be involved with this kind of thing and I've learnt a lot from them."

4.3 | Reciprocity

As with all forms of research engagement, the process must be reciprocal for *all* those involved. Hickey et al. (2018) have noted that reciprocity takes many forms, including access to new networks, financial rewards, or the development of new skills. Reciprocity might also be considered in a more systemic form, as the positive impacts that a person's involvement in co-production will have on the community they represent. To an extent, Aada recognised this form of reciprocity, saying that "these research results will generate discussion and through that … new thoughts and feelings will be awakened." Sanni said that the "results will probably provide some insights and may raise some new questions." However, when working with young people, reciprocity through community benefits is inadequate: indeed, the members' ages from 15 to 18 years means they will soon be moving out of the cohort and community on which the research focuses. Hence, other reciprocal benefits need to be considered.

Based on our experience of working with young people, we consider financial rewards a valuable way to show appreciation for their time. Financial benefits make a significant difference to people still in full-time study and could support the recruitment of young people who might otherwise need to spend time working. Unfortunately, in the context of CCC-CATAPULT, financial benefits for YAP members were not included in the original funding bid. Despite (or indeed because of) that limitation, we worked to provide members with other reciprocal offers. In Bristol, for instance, researchers successfully obtained additional funding to run a youth-focused climate café event in collaboration with YAP members. As part of our costing, we provided YAPs with retail vouchers.

Either way, the process of being involved had personal value for members. Alfie reflected that "none of us was really sure what it would look like, but it was quite cool to do, it was exciting to point to something and say, 'We did this,' and I think we definitely got a lot from it." Critically for this age group, we also provided an offer of support with academic or professional applications: for example, as well as offering references, we created a document outlining precisely what YAPs had achieved as co-producers.

4.4 | Respecting and valuing the knowledge of all those working together on the research

Experiential knowledge carries as much value as researcher expertise (Hickey et al., 2018). Positively, YAP members reflected that they were often able to share their perspectives and knowledge and that they felt confident in doing so. Max, for instance, said, "I think throughout I felt pretty confident. There was not a point where I was like, 'I don't know if I should say this'." Effy recalled a conversation where she spoke about eco-anxiety, reflecting that she felt comfortable opening up with both the other YAP members and Rosamund. Similarly, Sanni revealed how she never felt that she could not share her thoughts. Siri revealed how they trusted Anette to represent their experiences fairly, commenting that "Anette played a big and important role as a representative of us young people" and that "Anette sometimes asked us whether we feel that we are heard in this job and that whether we influence the process. And somehow, I hadn't previously thought that we wouldn't be heard, because Anette was always so receptive to our stories."

YAP members were able to pinpoint times when they felt their voices were heard and when the stories and ideas they shared had clear impacts. Kim felt that her greatest impact was on the development of the focus groups, as she helped choose topic areas and provided advice to Bronagh on how best to open up and maintain discussions with young people during the group activity. Frida felt she had impact "when we were allowed to comment on the CCC-CATAPULT questionnaire, and I remember that what came out was that the researchers did not originally include emotions that these issues evoke. Somehow, I had a feeling that I really had an impact." Frida was able to draw on personal experiences of climate emotions to focus the direction of the research gathered through CCC-CATAPULT. This outcome reveals how the co-production process made it possible for each step of the project to be framed so the research is relevant for young people today.

Despite recognising that their knowledge was respected and could benefit the project, YAP members were not always sure about the extent to which their

feedback was considered, highlighting the importance of *always* feeding back and ensuring accountability. Siri stated that while they felt they had had impact on the project during their work to help develop the survey, "in hindsight I don't know how much it was taken into account." Reflecting on their work contributing to a blog post for the CCC-CATAPULT website, Sanni said, "I don't know where the blog actually even ends up." Kim also revealed how she felt unfamiliar with the project findings, saying that she would "be interested in getting results and further papers, or what you're writing and to read them."

4.5 | Sharing of power

Sharing power in a co-productive process is about addressing power dynamics and ensuring responsibilities and decisions are shared. Hickey et al. (2018) suggest that sharing power is "the key principle and the one from which all others lead. Research becomes a shared responsibility rather than the preserve of researchers and practitioners."

Moving past a 'top-down' approach presents a challenge for any researcher working co-productively: often, the researcher is positioned in the role of 'specialist,' despite the foundations of co-production resting on recognising different forms of expertise. The positioning of power within a co-productive space is critical to address when working with young people, who are most likely to view adult researchers as being in authority. Although we felt we managed to support YAP members to develop a sense of ownership of the project, we struggled to cultivate an environment in which they felt *fully* able to share power. For instance, when reflecting on part of the project that involved designing a climate café in Bristol, Effy said, "I feel like we were supported; I knew that we could actually be listened to, and it wasn't just top-down and one-sided." Indeed, a major factor in developing the café event was Effy's capacity to share her climate emotions and suggest that more spaces were needed to support young people for such ends. However, Effy also said that:

> the academics … are consistently doing it and we have only got monthly meetings, [so] it's hard to feel equal to [them], but I definitely felt like when we were there, we had power … to get our opinions across and we were definitely heard and had power to shape things.

Max provided a similar opinion, stating that while he felt equal to his YAP peers, he did not feel like he was "on the same level as the academics of the project."

To share power, we also involved YAP members in planning processes. Yet, they expected there to be a more structured process: not necessarily with academics 'in charge,' but with more initial clarity about the projected timeline and clearer expectations about involvement. Sanni commented that "At first, I didn't really know what I was getting myself into and I wasn't sure what my role was," and Kim reflected on how "I thought it would be more, I don't know, more strict." Alfie imagined how, if they were to personally run a co-productive process based on their experience, "I [would] have a similar structure of semi-regular meetings, but have more clarity about what the whole project looks like."

4.6 | Empowerment and capacity building

In working with young people as co-producers, we came to understand the need to engage in a process of *active* empowerment, acknowledging power dynamics in the room and supporting YAP members to develop or refine skills and confidence to engage in the process as partners. This understanding recognises that young people will have had limited experience working in a research space and at a university level: the onus is on researchers to lead power sharing and welcome young people's growing sense of capacity as co-production processes develop. The understanding also led us to conceive the first new principle for collaborating with YAP members: empower and build capacity.

Recognising that YAP members may need support to develop capacities and confidence, we spent significant time considering their training needs. This work was approached with caution: as Fox (2013) has argued, participatory methods that focus on helping young people develop skills fail to break from assumptions about them being comparatively 'incompetent' and needing adult guidance. Yet, it is crucial to be cautious of placing too much responsibility and expectation on the shoulders of young people who, certainly in comparison with university researchers, are likely to have minimal experience working on research projects. Indeed, as we have voiced elsewhere, "without the relevant knowledge and tools to understand the requirements of a university-led research project, YAPs' capacity to confidently steer the project may remain limited" (Williams & Portus, 2022, p. 138).

Young people's involvement in research processes may also too easily slip from being one of partnership to more tokenistic forms of engagement (see Arnstein, 1969; Hart, 1992), and we consider 'empowerment and capacity building' as a crucial principle. Indeed, in early discussions with YAP members about their hopes and expectations, many expressed their

desire to develop research skills and acquire relevant knowledge to navigate their role on the CCC-CATAPULT project. To avoid a 'top-down' approach, we advocate a shared process of learning that makes space to reflect on what both university researchers and youth co-producers learn throughout a given project. For researchers, this process requires an open mindset, empathy, and humility regarding the knowledge and skills said researchers have and the same qualities in terms of what they are learning from, as well as in conjunction with, YAP members.

Across the different project settings, we combined early, formal research training sessions with significant and ongoing space to reflect on skills YAP members were developing. Reflecting on their learning, Effy remembered that "in some of the early meetings we were talking about how to communicate and make safe spaces for talking, and how to have forms of dialogue and engaging people." Thinking more about skills development, Effy considered how "I'm able to collect my ideas about a subject more quickly as the research has required debating." Discussing the value of her time on the project, Kim reflected on how one of the most important parts of the project was "getting to know how University research … works." Similarly, Rosie said that the project has "given me more knowledge and made me aware of all the different ways research is collected and the number of people involved" and Max suggested that "I have learnt quite a bit about research—for example about quantitative and qualitative data—and the involvement with things like surveys and focus groups was interesting." Aada discussed her climate knowledge, saying how the process "has deepened my knowledge about climate change and environmental issues. And then, well, just like [my] teamwork skills have developed, I guess, and everything." Indeed, the need to spend time supporting YAP members to deepen their climate knowledge and sense of agency in capacity was critical to honour, as it was voiced as being a central reason for their interest in the project.

Beyond skills development, YAP members thought the process influenced how they felt about their own sense of agency in the context of the climate crisis. Usva commented, "I've felt like I've become part of something important and learned something new and realised that I can do and influence things myself." Siri said, "I'd even like to say that I've grown as a person … I've learned those concrete things, but also gained self-confidence. I've also learned to deal with and listen to different kinds of people, when in everyday life you easily surround yourself with only certain kinds of people." Agency also reflected that the dialogic process has reshaped how YAP members understand climate issues more broadly. They had the opportunity to help design research that examines young people's experiences of climate crisis, expand their knowledge of

complex climate issues, and explore their thoughts and feelings in relation to climate crisis. Alfie said that he has "began to see the climate crisis in more nuanced ways, rather than one monolithic threat." Rosie considered how, at the start, "I generally felt more unsure about the climate; I knew there was a problem … but I think by getting involved with these things and helping others, it helped to see what's going on in research and how to mentally approach these big issues … there's no need to be totally pessimistic." Max suggested that "I think it's allowed me to reflect on how we understand things, and the range of lenses with which we approach epistemology, rather than a single type of framework, such as numerical." Thus, a focus on empowerment and capacity building provides young people with the knowledge and skills they need to engage with a research process and offers experiences in which they might develop their own necessary sense of agency as change-makers (Sanson et al., 2019).

4.7 | Extended opportunities

In envisioning the YAP process, we realised the necessity for this longitudinal process to be complemented by unique opportunities that would not be available to young people in other projects or settings. This is because we are competing with a host of other exciting opportunities which are available to many young people at this age, not to mention emerging social interests which develop as young people gain ever more independence. The three key forms of opportunity we built into the process centre around skills development, public engagement opportunities, and the development of international connections and networks.

4.7.1 | Skills development

Opportunities for skills development are crucial for strengthening young people's abilities and confidence as researchers. However, for young people participating in university-led research projects, access to training distinctive from those typically offered through formal education also represents a significant extended opportunity. For example, in Bristol, we worked with science communicators to facilitate a climate communications training event (see Laggan, 2022). Alfie commented on how this training "was quite good in having a sense of how to talk to people, but more broadly how to present ideas" and Effy said that they developed "skills that you don't really ever get to learn in another context, which was also quite good; it was really clear what we were doing and that we wouldn't really have enough opportunity to do it". In Finland, Siri reflected on how her skills as a researcher have developed beyond what could be offered in a school setting:

at the beginning you kind of knew what research was. In school we have done research and physics and chemistry and learnt about the different stages of research, hypotheses and so on. But this has been really different. It is not as simple as how it is in school … there is much more work and communication between researchers. And I could get much more from it.

4.7.2 | Engagement opportunities

Responding to YAP members' interest in engagement opportunities, we identified and supported them to get involved with relevant public-facing events. For example, linked to their work on the climate café project, YAP members in Bristol were nominated for a Bristol Young Heroes award: an opportunity that saw them sharing their work with figures of influence across the city. YAP members also engaged with academic opportunities, including helping as online delegates to co-present a talk at the Royal Geographical Society 2022 conference and, in Tampere, obtaining funding for, organising, and running an academic panel event for young people and educators. Usva reflected on their experience to co-develop this panel event, which brought together researchers to examine subjects across environmental and worldview education; it "was a really great experience." Sanni also said that she "got involved [towards the end of the planning for the panel]. So that was a good way to get involved with the YAP process because … after a small bit of panic, I had the opportunity to see it become something really successful and great."

4.7.3 | International connections and networks

International elements of the project were a key drawcard that offered a unique opportunity to collaborate with young people across countries in online meetings. In our first international meeting, YAP members were encouraged to introduce themselves and give short presentations on a climate issue of their choice. Alfie reflected on how "that was quite nerve wracking because we [had] to say a little bit about ourselves, but that was [also] really cool, you got to meet some of [them], we got to know them, and I still follow some of them on social media." Frida, when considering where they felt they most developed their individual capacity, commented, "I would probably say those international YAP meetings. There was an opportunity to widen your worldview and just [see] how other people experience those things. And then of course you get to have a discussion, and little by little you get self-

confidence, especially to express yourself in English." The legacy of such interaction is ongoing connection among members via social media and a WhatsApp group.

4.8 | Ongoing reflection and evaluation

Hickey et al. (2018) have documented how continuous reflection is of critical importance but do not define it as a key principle. In the context of working with young people over a significant time period, reflection and evaluation are critical for helping adult researchers keep abreast of young partners' needs and ensure a given project is evolving *as it takes place*. For that reason, we suggest these skills and qualities are a fundamental principle of youth co-production. Indeed, adopting "a critical and reflective attitude can increase researchers' capacity to engage youth in democratic and inclusive ways, and to produce research outputs that are aligned with the target audience's needs and priorities" (Pavarini et al., 2019, p. 743). Within CCC-CATAPULT specific space for reflection *with* YAP members was created at the end of, or after every meeting and in written and/or drawn reflections. Researchers facilitating the process also met regularly to reflect on how the process was working and accounted for feedback from members.

Based on the collective reflections, in myriad ways, we shifted our understandings about how the YAP process should be facilitated. For instance, we originally asked YAP members to keep reflective diaries. However, from researcher discussions, we recognised how members were struggling to keep the writing process going between meetings, and they requested more guidance than we initially anticipated about what to write. For that reason, we decided to dedicate more time in meetings to sharing reflections and writing down thoughts. Our choice to change the format and structure of the diary process, as opposed to stop it altogether, took into consideration how YAP members had praised this aspect of the project. For example, in a reflective testimonial provided for a conference presentation, Rosie spoke about the value of this exercise for helping her digest the knowledge she was acquiring during each meeting.

Despite continuous reflection, the project could have afforded to have a more structured evaluative process as well. Effy said:

> it would be good to have clear … well, obviously not fixed, because you want to be able to evolve as the project goes on, but definitely have a clear structure [or] set of goals, you know, a sense of direction and maybe a way to concretely evaluate what you have done, so when you get to the end

of the project, you can look back and say, 'What did we want to achieve when we set out to and have we actually done that?'

This point again suggests the need to balance flexibility and openness to change with a structure for research co-production that allows for a sense of purpose and goal achievement. As one of the proposed additional principles, we consider that ongoing evaluation and reflection should function as a *fundamental component* of co-production with young people, as opposed to being a contained or even optional feature of it.

5 | DISCUSSION AND CONCLUSION

Following in the footsteps of studies that draw attention to the complexity of co-production (Facer & Enright, 2016; Thomas-Hughes, 2018), our reflections speak to the richness, messiness, joys, and, importantly, challenges of working co-productively with young people. We argue that these reflections reinforce studies on participatory methodologies with young people (Fox, 2013; Pavarini et al., 2019) to show that co-production with young people will not work if it is merely 'tacked on' to a project and if researchers are not given the time, space, and resources to develop a process rooted in equity, respect, trust, opportunity, and reflection.

In the context of co-produced climate-focused research, researchers need to be prepared for and feel comfortable supporting young people to engage in and lead potentially challenging conversations about the impacts of climate crisis and about how that will shape future generations' lives. We encourage any researcher embarking on a journey of co-production with young people in the context of climate crisis research to first engage with work at the intersection of climate emotions, young people's voices and experiences, and intergenerational dialogue (Hayes et al., 2022; Hickman et al., 2021; Mayall & Hickman, 2022). Achieving 'best practice' requires researchers to break with traditional power dynamics and help young people guide the process and is an aspiration that requires substantial and ongoing reflection to achieve (Williams & Portus, 2022).

Beyond this broad offering, we have produced four key recommendations for any researcher planning to work co-productively with young people. These recommendations are partly formed from insights from our research, and partly from others' thinking about the steps required to achieve meaningful public participation (Bell & Reed, 2021).

First, researchers must envision and, following this, develop a process or processes that adhere to the key principles of co-production as they are outlined above. Striving to address these eight principles of co-production with young people sets up the process to be one that considers young people's needs, ensures their contributions are respected and valued, and inspires their continued engagement and motivation.

Second, any researcher planning to engage in a co-productive research design with young people must begin by asking themselves about the context within which the research will take place. What are the cultural contexts and foci of the research, and is it appropriate to involve young people in it? What expectations do young people have if they join the project as co-producers? Do they, as researchers, have time, money, and access to equipment and other resources to adequately support this process? Have they the capacity to be involved throughout the project, and move from processes of youth affirmation, consultation, and advice-giving, to true co-production (Sellars et al., 2021)?

Third, as with all co-productive processes (Makey et al., 2022; Ocloo, 2021), researchers need to identify barriers to participation and work to try and remove them. They need to employ an inclusive recruitment strategy, which means that relevant individuals have the best possible chance to participate. Once co-producers are recruited—or have, more rarely, first approached researchers—they need to shape and/or agree to clear expectations for involvement.

Fourth, when working with young people as co-producers, ongoing feedback and dialogue about how their contributions shape the process must be provided, giving young people the motivation to continue and ensuring that academic researchers are accountable for respecting and responding to the efforts of young people. Indeed, Boswell et al. (2021, p. 408) have stressed that adults engaged in a co-productive process with children and young people must always ensure they provide feedback "about what [they] did with their information, views, and ideas." Bringing together these processes will allow the co-productive process to develop effectively, and become a fruitful process that has meaning for all those involved and for research and project stakeholders more widely.

In the final analysis, this paper has offered a view into a deep process of engagement with young people in a co-productive process across multiple settings, with a focus on critical reflections from young people who engaged as co-producers and a consideration of how they inputted their stories and experiences into a research process. The project's ambitious aim means that neither the full richness of this experience nor distinctions across different European settings can be adequately or fully captured through these insights alone. Yet, by offering this window into the process of incorporating a co-productive methodology, we have built up a picture of the realities of working co-productively with young people, speaking to both the opportunities offered and challenges encountered. Combining these reflections with insights from other research on public participation in environmental decision-making we have developed a model for

working in meaningful and effective ways with young people as co-producers—one that recognises the varied actors, factors, and requirements involved. We stress how working with young people is necessarily distinct from working with (non-vulnerable) adult groups as co-producers because of inherent differences in maturity, skills, attitudes, and life stages.

Co-production offers meaningful ways for young people to tell their stories: inserting their stories into research processes, ensuring their experiences and perspectives shape that process, and deciding how their stories are framed and shared. Indeed, as we have shown in this article, during CCC-CATAPULT youth co-producers have offered expert insights into both their own and other young people's experiences of climate crisis and education to influence many aspects of the work, such as the questions we explored, methods we used, and events we have planned or participated in. A true process of co-production with young people requires researchers to adjust the priorities of the research process to account for the significant time, energy, and thought needed to engage youth partners meaningfully and equitably. Yet rather than detract from the research process, if co-production is achieved, the values it adds to a research project are unparalleled. It provides a unique opportunity to ensure young people can convey their stories in a time of environmental and climate crisis and can decide how those stories will be gathered, analysed, framed, and disseminated. This is a powerful and immediate way to ensure that research is genuinely meaningful and relevant for those it seeks to benefit. Equally as important, the approach helps young people who engage as youth co-producers to deepen their own climate knowledge and greatly expand their sense of agency in connection with climate issues. Our intention in sharing our process and developing this model is to help researchers feel confident to set up successful co-productive processes working with young people and to have a deeper understanding of the potential value of incorporating the youth voice through a considered co-productive methodology.

CONFLICT OF INTEREST STATEMENT

The authors declare no potential conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings are not currently available publicly. With project completion, they will be made available through an ESRC-approved data repository in line with funder's requirements.

ETHICS DETAILS

Ethics clearances were provided as follows: UK – University of the West of England Bristol Research Ethics Committee, approval reference number: FET.21.01.026; Ireland – Research Ethics Committee, University of Galway Ref: 2021.05.003; and the Finnish National Board on Research Integrity TENK guidelines advised that the project required no outside ethical review and the team followed Finnish ethical principles for research with human participants.

ETHICS DETAILS (CURRENTLY REDACTED FROM MAIN DOCUMENT)

In the UK, this project was given ethical approval by the University of the West of England Bristol Research Ethics Committee, approval reference number: FET.21.01.026. In Ireland, the Research Ethics Committee at the University of Galway granted ethical approval on the 11th May 2021 Ref: 2021.05.003. In Finland, according to the Finnish National Board on Research Integrity TENK guidelines, this project did not require an outside ethical review, but the project design obeyed their ethical principles for research with human participants. Ethics information for the Italian partners is not required, as data is not included from this project/university location in this manuscript.

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ENDNOTES

[1] While participatory research and co-production are often mentioned interchangeably, in work with autistic adults Stark et al. (2021, p. 189) have explained how participatory research involves individuals "taking part in a defined activity, such as adding to an agenda or design of research," whereas co-production entails "equal collaboration … [involving] joint decision-making on the goals, processes and outcomes."

[2] The young co-producers are in a category—being adolescents—distinctly different from children (Evans, 2008). Although the term children officially refers to people under the age of 18, young people closer to adulthood often feel this category no longer represents them (Skelton, 2007).

[3] This guidance has since been updated (see NIHR, 2021).

[4] In Italy, a YAP group was not formed until slightly later in the project. Yet, the participatory process with young people was still ensured from the earliest stages of the research through an alternative model. More recently, a newly formed YAP group of nine young people is supporting the later phases of the project. However, as this paper centres around the ongoing (longitudinal) involvement of young people, we do not include the Italian experience as part of the documented YAP process here. This omission is because it was only via careful development of these groups that we could meaningfully design a process that adheres to requirements of co-production as we outline them.

[5] In this instance, the initial sharing of stories was facilitated by a 'forced writing' exercise, in which YAP members wrote an imaginary account about discussing the climate crisis with older family members at the dinner table.

[6] The Timeout Foundation, which aims to develop and increase the dialogue across Finland, was established by The Jenny and Antti Wihuri Foundation, Sitra, the Finnish Cultural Foundation, and the Swedish Cultural Foundation in Finland.

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