INSTITUTE FOR GLOBAL PROSPERITY

Towards Transformative Climate Change Education: A Qualitative Study of Teachers' and Pupils' Experiences in a UK Grassroots Initiative

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Abstract

This dissertation explores the implementation of Climate Change Education (CCE), from the perspectives of pupils and teachers in seven UK schools, focusing on primary school contexts. It is a co-designed research project conducted using six teacher interviews which have been triangulated and analysed using secondary data from four pupil focus groups. The findings identify several barriers to implementation. These are predominantly structural, relating to a lack of accessibility among diverse populations. In response to these barriers the findings showcase the value of “community as curriculum” and context to improve accessibility and implementation. The difference between positive and negative engagement among pupils is stressed, in which "response-able" pedagogies that are inclusive, empowering and practically mobilising are advocated for. The research also addresses the absence of outdoor learning, arguing that it should form a central component for early CCE implementation.

A list of Abbreviations

CCE	Climate Change Education
FSM	Free School Meals
EAL	English as an Additional Language
GSP	Green Schools Project

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Chapter One: Introduction

Climate Change is a pressing global crisis, one which if not urgently addressed will result in the finding of ecological tipping points (IPCC, 2023; Richardson et al., 2023). Despite scientific consensus, climate change education (CCE) is missing from curriculums across the globe and continues to be presented as a contentious topic. In the United Kingdom, research has shown both teachers and pupils believe CCE should be engaged across various disciplines and age groups (Howard-Jones, Sands, Dillon, & Fenton-Jones, 2021; Rushton, Dunlop, & Atkinson, 2024). However, CCE is absent from the national curriculum until ages 11-14. Addressing the climate crisis, in all its dimensions, (Baldwin-Cantello et al., 2023; Bleazby, Thornton, Burgh, & Graham, 2023; Oberman & Sainz, 2021; Sharma, 2021), is a time-sensitive task and interventions need to be occurring on all levels of society. Research has shown, that it is not just the presence of CCE that matters, but the kind of CCE (Clayton et al., 2015), with emphasis on practical, participatory, and empowering pedagogies (Hooks, 1994; Oberman & Sainz, 2021; Perkins et al., 2018; Sharma, 2021). Research also points to the value of socially situated CCE (Baldwin-Cantello et al., 2023; Bleazby et al., 2023; Oberman & Sainz, 2021; Sharma, 2021). This research is about implementing CCE, but more broadly it is about the role of education in systemic transformation. This research argues that the basis of CCE should educate pupils about the world of which they are a part, showing them that they have a voice which is worth listening to, a community to collaborate with and practical tools to respond to injustice.

Research Focus

This dissertation explores climate change education (CCE), from the perspectives of pupils and teachers in UK schools. It is co-designed with an educational initiative seeking to embed CCE in schools' curriculums. Primary research was conducted using teacher interviews and then triangulated and analysed using secondary data from pupil focus groups. The research was conducted with both primary and secondary schools; however, this research and discussion focuses on primary school implementation. It examines current practices in CCE and makes recommendations for future implementation.

Several primary research questions are explored.

1. What are the barriers to implementation?
2. What pedagogical practices improve engagement?
3. What are the outcomes of CCE?

The primary themes that have emerged include the prevalence of structural barriers, the value of ‘community as curriculum’, the connection between approach and pupil

wellbeing and the lack of nature-based education. These themes coalesce in a discussion of what is possible for CCE if we move beyond some of the limiting assumptions and structures informing mainstream approaches and measurements of educational success.

Background

Climate Change Awareness

In 1998 John Hansen addressed the US Senate about anthropogenic climate change. This intervention is recognised as the beginning of public 'climate change awareness' (Dunlap & Brulle, 2020). Since then climate change and its causes have been debated, justified, and denied (Cook, 2020). Today although climate change has scientific consensus, it remains contentious, evidenced in a surge in climate denial and scepticism. Accordingly, the research of Cook, Brulle and Dunlap provides valuable insights about the key players; corporate lobbying groups, conservative think tanks, the fossil fuel industry and media outlets (Begley, Conant, Stein, Clift, & Philips, 2007; Cook, 2020; Dunlap & Brulle, 2020). When working together, these entities have been described as the 'denial machine', with implications for how responsibility is distributed, how knowledge is shared and what actions are taken (Begley et al., 2007). This has impacted the development of CCE curriculums and their implementation. Responsibility is wielded as a key strategy used by fossil fuel companies and other polluters (Cook, 2020; Dunlap & Brulle, 2020). Movements that misplace the burden on individual consumers are an example of this (Shreedhar, Moran, & Mills, 2024). However, conversely, there are consequences when agency is offered up because there seems to be no opportunity for change among the public. A clear distinction is made between responsibility and 'response-ability', in which the latter, is both a critique and a commitment to action. These ideas will be explored further in the literature review.

CCE in the UK National Curriculum

A press release from 2013 made by the Department of Education, outlined CCE in the national curriculum for students aged 11-14 as addressing the following;

> "The composition of the Earth and the atmosphere, Changes to the Earth's atmosphere since its formation, The production of carbon dioxide by human activity and the impact on climate – this is a key causal mechanism for climate change and the efficacy of recycling" (D. f. Education, 2013).

Since 2013, the Department of Education has made no significant changes to the curriculum, despite growing international awareness of the climate crisis (D. f. Education & MP, 2022). Research done with 626 English teachers found that the vast

majority believed climate change is an educational priority and more resources should be allocated to CCE (Howard-Jones et al., 2021). 73.7 % of these teachers said they try and incorporate CCE as much as they can, but this is done without support (Howard-Jones et al., 2021). Most teachers believed CCE should be cross-curricular, and socially and politically framed (Howard-Jones et al., 2021), which is not reflected in the current and limited engagement in geography and science classes.

In December of 2023, a policy paper advocating for the interdisciplinary inclusion of CCE was published by the Department of Education (D. o. Education, 2023). While this was the most comprehensive discussion to date, it was not a bill. It gives an obligatory nod to economic and social dimensions, but these are not reflected in the learning content, which remains purely scientific (D. o. Education, 2023). Yet, no material interventions have emerged. This lack of critical engagement is reflected in the reported experiences of youth. CCE is described as an abstract scientific concept which is hard to integrate into everyday reality (Oberman & Sainz, 2021), research exploring teachers' perspectives echoes this (Neas, 2023). This is not unique to the UK, it is occurring globally in high-emission countries (Kwauk, 2023).

Commitments where made at the Paris Agreement to CCE, however a report by Kwauk found that these promises have not been met (Kwauk, 2023). Education International, published criteria to measure the success of policy and intervention, these included measurements of inclusivity, interdisciplinary, ambition and justice (Kwauk, 2023). Interestingly, the countries that are succeeding on most of these metrics are global south countries, highlighting socially situated, justice-based and inclusive approaches (Kwauk, 2023).

Rational

Addressing the climate crisis is a matter of urgency. Misinformation is affecting public perception and governance. Despite international commitments, meaningful climate change education (CCE) is still absent in national curriculums. Understanding how a community organization implements CCE can help create practical guidelines to improve the accessibility and reach of CCE, whilst generating more insight into the barriers and challenges that must be overcome.

Conclusion

We[1] are at a critical juncture, a 'tipping point'[2], about to 'cross planetary boundaries', 'stuck in feedback loops', facing extinction and biodiversity loss (IPCC, 2023; Jorgenson et al., 2019; Richardson et al., 2023), these familiar phrases tell us time is ticking. Given the current gaps in the curriculum and the overemphasis on climate science, impactful and empowering CCE is urgently needed. This research explores the challenges of implementation, the pedagogies that are impactful and the ideal aims and outcomes for primary school-aged children. The relevant literature will be discussed, the methodology used will be outlined, the findings will be presented. The paper culminates in a discussion about the future of CCE.

[1] A note must be made about the presence of a collective "we". This 'we' is prolific and is one that assumes a collective identity and responsibility. Yet no such 'we' exists. The 'we' invoked in this research represents those who live in high emission societies, where wants are felt as needs, and connection to 'more than human' worlds that hangs by a thread. It does not refer to those not complicit, whose vulnerability is on the rise.

[2] These concepts, refer to the thresholds that if crossed, fundamentally changes how climate systems function. These changes are thought to be irreversible.

Chapter Two: Literature Review

The following literature review examines various theoretical frameworks and bodies of research that have influenced this research, some of which will be used to analyse and discuss the findings. Firstly, the socio-environmental nature of the climate crisis will be explored, as this orientation is vital for how this research has been situated. This includes critiques made about climate change, power, economics, culture, ideology and history. Secondly, current practices in CCE will be examined, and best practices and challenges will be summarised. Thirdly, critical pedagogy will be discussed, which includes response-able pedagogy and pedagogy for hope. Finally, theory regarding youth and their involvement will be explored, discussing youth-led movements, debates around agency and the prevalence of eco-emotions.

Climate Change as a Socio-Environmental Crisis

Although climate change is an environmental process (Ritchie, Roser, & Rosado, 2020), its drivers are anthropogenic and are intrinsically linked to social, economic and historical contexts (Jorgenson et al., 2019). It is widely acknowledged among social and environmental scientists that climate change is also a social crisis (Baldwin-Cantello et al., 2023; IPCC, 2023; Jorgenson et al., 2019). There has been considerable academic attention given to this, with terms like socio-environmental (Baldwin-Cantello et al., 2023), and socio-scientific (Oberman & Sainz, 2021) being used to foreground the importance of interdisciplinary engagement. The Intergovernmental Panel for Climate Change (IPCC) has stated the imperative of addressing social drivers of anthropogenic climate change (IPCC, 2023). I have drawn on theory from the following thinkers, activists and researchers to deepen this social approach to climate change; Mary Louise Pratt, Rob Nixon, Kyle Whyte, Wangari Maathai, Vandana Shiva and Naomi Klein.

Climate Change, Colonialism and Capitalism

A socially situated approach to climate change attends to root causes. It aims to understand the vision of life that has motivated this continuing crisis and explores what makes changing the trajectory feel impossible. Mary Louise Pratt writes in her book Imperial Eyes: Travel Writing and Transculturation, about the role that travel writing had in establishing a world order from the perspective of Western powers, in which ideals of ‘progress’ and ‘civilisation’ were spread around the world (Pratt, 2007). These early colonial contact zones[3], as Pratt calls them, produced a blueprint that continues to define international relations and the movement of resources and people; centralising power, and imprinting a value system onto land (Pratt, 2007). This colonial

[3] Pratt describes contact zones as spaces where cultures come into contact in which there are asymmetrical power dynamics that dictate the creation of knowledge and negotiation of space

and imperial history, which began with travel writing and early colonial encounters, is inseparable from the climate crisis. Pratt discusses the Linnaean system of classification which created hierarchal representations of the world, this acted both as justification for colonisation but also as a mapping of 'man's place above, and outside, of nature (Pratt, 2007). This framing of land, as a resource to utilise, not a relationship to nurture has been culturally inscribed (Pratt, 2007; Shiva, 2018; Whyte, 2017). Pratt's concept of 'cultural imperialism' is useful when considering the genealogy of high-emission societies (Pratt, 2007).

In the paper, Indigenous climate change studies: Indigenizing futures, decolonizing the Anthropocene, Kyle Whyte frames climate change as intensified colonialism (Whyte, 2017). He argues that colonialism created the foundation of carbon-intensive economies, from which capitalism propelled the acceleration of extractive industries (Whyte, 2017). This foreign control of resources meant that the violence and environmental impact could occur far out of sight of those who reaped the benefits (Whyte, 2017). This dynamic continues, as those living in resource-rich, but deprived regions of the world continue to pay the price for 'progress' that passes them by (Klein, 2015; Maathai, 2005; Nixon, 2011; Shiva, 2018; Whyte, 2017).

This leads to the central theme of unequal impact that characterises the climate crisis, and why terms like 'neo-colonialism', 'eco-imperialism',(Shiva, 2008), or 'green colonialism' are prevalent (Shiva, 2018; Whyte, 2017). Research done by the IPPCC found that those most affected by the climate crisis are Indigenous people, with the impact being experienced earlier and more intensely (Whyte, 2017). This argument is one of the key reasons climate activists and social researchers are calling for environmental justice. In his book, Slow Violence and the Environmentalism of the Poor, Rob Nixon explores these dynamics in detail (Nixon, 2011). His theory of slow violence has influenced the framing of the climate crisis within this research (Nixon, 2011). In the introduction, Nixon defines slow violence as,

> "a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all."

Nixon argues that this violence is linked to power and its casualties are not likely "to be seen" or "counted" (Nixon, 2011). While narratives of climate change being a rich person's problem persist, Nixon supports the argument made by Whyte, that those most impacted are those least responsible (Nixon, 2011). This is seen in a growing body of literature on climate vulnerability and the new phenomenon of climate refugees (Abrams, Carden, Teta, & Wågsæther, 2021; Birkmann et al., 2022; Long & Ziervogel, 2020; Thiault et al., 2018). This theorisation emphasises the importance of seeing

climate change as a justice issue, in which understanding the patterns of cause and effect is essential to correctly targeting an intervention.

Other useful framings include specific critiques of capitalism. Naomi Klein argues in her book, This Changes Everything: Capitalism vs. The Climate, that capitalism and its dependence on growth has us "locked in, politically, physically and culturally" (Klein, 2015). She presents climate change as a systemic issue, one which must be 'designed out', this requires people to be able to think outside of the normalised 'progress' paradigm (Klein, 2015). It is, therefore, an argument that climate change needs to be framed socially and reflexively but also approached as a part of the system that the Western world has designed (Klein, 2015; Maathai, 2005; Nixon, 2011; Shiva, 2018; Whyte, 2017). While these theorists may have slightly different orientations, the conclusion is that meaningful responses to climate change need to target it as a historically entrenched value system that is institutionally maintained. Solutions need to be targeted at more than just lowering emissions, which has not been effective yet. This has implications for the curricular approach and implementation of CCE.

Climate Change and Activism

Activism is a central component of this discourse, and many people are dedicated to overthrowing systems of domination; these are inclusive, community-based, and transformative movements (Maathai, 2005; Shiva, 2018; Whyte, 2017). This provides insight into what CCE could be for young people, not just a way to deposit knowledge but to nurture an active ability to transform the world around them.

In 1997, the Nobel prize-winning Kenyan activist, Wangari Maathai, founded The Green Belt Movement, which has planted over 51 million trees in Kenya (Maathai, 2005). Maathai's activism speaks to the interconnections between power, extraction, land, gender, culture, community and education (Maathai, 2005). Maathai has significantly impacted eco-feminist and environmental justice movements. Her legacy highlights the importance of engaged and empowering interventions. This relationship between education, justice and activism is key to this research.

Another scholar and activist who has been influential is Vandana Shiva, contributing enormously to environmental and social justice movements. As an activist she has led grassroots movements in her home country of India, working with people from various backgrounds. She argues that solutions must target all aspects of human life, pointing to what she terms the triple crisis; dehumanisation, economic inequality and ecological catastrophe (Shiva, 2008). Shiva critiques the imposition of Cartesian Dualism [4]and argues that responding to the climate crisis is also a matter of redefining humans'

[4] This refers Descartes philosophical concept that argues that the mind and the body are separate entities, relating to the proposed separation and nature and culture.

place within earth systems, that we need to reconcile how we see the world and ourselves in it (Shiva, 2018). This viewpoint is often seen as too esoteric to co-exist within the scientific discourse, in which one is forced to accept one perspective or the other. However, Shiva began her career with a PhD in physics, so it is not a lack of respect for scientific exploration but a belief in permeability. She writes.

> "I believe that every wrong action with respect to the land is a wrong action with respect to biodiversity, is a wrong action that leads to consequences for our health, is a wrong action that creates conflicts and the end of peace, and is a wrong action that leads to more emissions. Land degradation, biodiversity, erosion, public health, women's situations, climate change, are not separate." Page 7 (Shiva, 2018)

Through the work of these thinkers, environmental justice becomes a central component of the climate crisis. It is not just about a scientific process of rising temperatures and feedback loops, it is about what enables these things to continue to happen long after we know that they must stop. The call for transformative activism is central to this. The framework outlined above points to the need for CCE, but it also points to some of the key reasons why there is inaction, and why the trends in denial and misinformation proliferate. Thinking in these terms raises questions about what an education for the climate crisis should look to include and address. This becomes very relevant when exploring the findings.

Practices in Climate Change Education

The justification for the importance of CCE is that youth face the greatest risks and should be equipped to address the challenges they have inherited. It is too late for preventative education, CCE must inspire action and engagement (Bleazby et al., 2023; Howard-Jones et al., 2021; Kessler, 2023; Monroe, Plate, Oxarart, Bowers, & Chaves, 2019; Nepraš, Strejčková, & Kroufek, 2022; Oberman & Sainz, 2021; Perkins et al., 2018; Rousell & Cutter-Mackenzie-Knowles, 2020; Sharma, 2021). However, CCE is limited, often missing from national curriculums and teaching is apolitical and asocial, focusing primarily on the quantifiable facts of climate change (Bleazby et al., 2023; Oberman & Sainz, 2021). Research has also shown that pupils demonstrate a limited understanding of climate science, and misinformation is common (Nepraš et al., 2022).

Best Practices

One of the biggest takeaways from the literature is that it is not just the presence of CCE that matters, to have an impact, it must utilise the engaged and critical approaches (Clayton et al., 2015; O'brien, Selboe, & Hayward, 2018; Oberman & Sainz, 2021; Rousell & Cutter-Mackenzie-Knowles, 2020; Tayne, Littrell, Okochi, Gold,

& Leckey, 2021). Although phrased differently, research reviewing and advocating for CCE demonstrates high levels of consensus (Bleazby et al., 2023; Howard-Jones et al., 2021; Kessler, 2023; Monroe et al., 2019; Nepraš et al., 2022; Oberman & Sainz, 2021; Perkins et al., 2018; Rousell & Cutter-Mackenzie-Knowles, 2020; Sharma, 2021). A literature review of 49 studies, up until 2015, found that the most important factors for successful implementation were:

1. Personally relevant content
2. Engaging teaching methods
3. Encouragement of critical thinking
4. Creation of collaborative spaces
5. Visual tools to make the topic less abstract
6. Transdisciplinary learning outside the classroom (Monroe et al., 2019).

Another review spoke about community and place-based learning and transdisciplinary pedagogies for long-term impact, all of which fall under the six factors presented above (Nepraš et al., 2022). Other literature advocates for socially situated CCE (Oberman & Sainz, 2021; Perkins et al., 2018). Educational movements, like social justice education (SJE) and education for sustainable development (ESD), have been seen to utilise some of these pedagogies. In addition to the above, the findings suggested the importance of hope (Nepraš et al., 2022). The cultivation of hope can be achieved through the successful implementation of impactful pedagogy, but more work needs to be done to identify how to cultivate hope as a primary outcome.

Barriers

The research identifies common barriers to include, frequent misconceptions and lack of knowledge, educators influencing outcomes, fear of parental response, educators not being equipped to teach the topic, and fear of political and social backlash (Monroe et al., 2019). Material and structural barriers are also evident (Rousell & Cutter-Mackenzie-Knowles, 2020).

Green Space

Despite all the positive connections between nature-based activity and environmental and social well-being, in mainstream education, CCE does not utilise outdoor spaces as part of the curriculum. Approaches to environmental education such as forest schools[5], indicate the potential to change how change climate change is taught, however, this is not yet the norm (Mycock, 2020).

[5] Forest schools are outdoor learning experiences that aim to connect young people to the world but are mostly implemented as an extra-curricular activity.

Research carried out over the last 60 years has shown the importance of green space for the well-being and development of children (Barrera-Hernández, Sotelo-Castillo, Echeverría-Castro, & Tapia-Fonllem, 2020; Chawla, 2015; Tillmann, Tobin, Avison, & Gilliland, 2018). The field of environmental psychology has explored how connection and exposure to nature impact well-being and pro-climate action (Barrera-Hernández et al., 2020). Research done with adult populations found that increased connectivity to nature leads to improved well-being, happiness, health and meaning in life (Barrera-Hernández et al., 2020). Research has found the same to be true for children (Barrera-Hernández et al., 2020; Chawla, 2015; Tillmann et al., 2018). A study done with 296 pupils aged 9-12 from a northwestern Mexican city found that a connection to nature leads to more sustainable habits, in turn increasing happiness (Barrera-Hernández et al., 2020). These findings are very relevant when thinking about CCE at different developmental stages. Nature-based learning demonstrates the potential to increase awareness and pro-environmental action whilst enriching pupil well-being.

Critical Pedagogy

Across the literature, it is evident that engaged and critical pedagogy is essential for impactful and meaningful education (Bleazby et al., 2023; Kessler, 2023; Monroe et al., 2019; Oberman & Sainz, 2021; Perkins et al., 2018; Sharma, 2021). One of the key thinkers in this field is Paulo Freire. Freire's seminal work, Pedagogy of the Oppressed, published in 1968, theorises education and its role in society (Paolo Freire, 1970). These critiques, which include framing mainstream education as a banking system (Paolo Freire, 1970), have informed how I have engaged with the status quo of climate education. Freire argues that populations are controlled and kept in a state of mental oppression, critical thinking poses a threat to systems of dominance (Paolo Freire, 1970; Paulo Freire, 1985). This provides a framework with which to analyse the structural barriers to CCE. Concepts of praxis[6], dialogical[7] education and conscientization[8] are prominent features in the research data and have been linked to better engagement and more positive and empowering experiences (Bleazby et al., 2023; Howard-Jones et al., 2021; Kessler, 2023; Oberman & Sainz, 2021; Perkins et al., 2018; Rushton et al., 2024).

Theories in critical pedagogy have been revised and deepened by other theorists in a true dialogical style. An example of this is bell hooks, who simultaneously admires and critiques Freire's work. In her book, Teaching to transgress: education as the practice

[6] Praxis is defined by Freire as "reflection and action upon the world in order to transform it", it argues for the importance of active engagement.

[7] Dialogical approaches emphasize reciprocal learning, in which education is a process negotiated by multiple parties, the opposite of the banking system of education.

[8] Conscientization is the process of developing awareness of one's social realities through critique and action.

of freedom, hooks provides a black feminist critique, building on earlier work by Freire, to examine the relationship between intersectional identities, power and the politics of education (Hooks, 1994). Both hooks and Freire provide insight into the importance of education in deprived and diverse contexts (Paolo Freire, 1970; Hooks, 1994), but hooks brings more nuance to this due to her positionality. Questions of justice, access, inequality and oppression are pertinent (Nixon, 2011). When looking at the differential impact of climate change, and the disproportionate rise of climate vulnerability, it becomes essential that CCE is accessible to all, especially those more likely to be affected (Nixon, 2011).

"Response-Able" Pedagogy

Building on the critical pedagogy framework presented above, is 'Response-Able' pedagogy (Bozalek & Zembylas, 2017; D. J. Haraway, 2020). This brings together practices presented in critical pedagogy, with relational ontologies that promote values of connectivity, compassion, action and radical transformation (Bozalek & Zembylas, 2017; D. J. Haraway, 2020). Donna Haraway is one of the key theorists who has developed the approach of "response-ability" (D. J. Haraway, 2020). She writes about people as permeable, as cyborgs that are an amalgamation of technology, 'nature', and history (D. Haraway, 2013). She points to the co-evolution of animals, people and plants, advocating for more than human worlds, in a movement often referred to as feminist new materialisms (Bozalek & Zembylas, 2017). 'Response-able' pedagogy is informed by values of relationality, complexity, 'more than human worlds', active responsibility and ethical pedagogy (Bozalek & Zembylas, 2017; D. J. Haraway, 2020). In this research, it represents an amalgamation of the literature on critical pedagogy and the literature about climate change as a social crisis. It has implications for both approach and content, exploring how knowledge is produced in the Anthropocene, and what that knowledge is (Bozalek & Zembylas, 2017; D. J. Haraway, 2020; Shiva, 2018). Most significantly, it pivots around the need to respond, to act, to transform without embodying the burden of responsibility.

Positive Envisioning: Pedagogy for Hope

This research proposes the importance of positive visioning or a 'Pedagogy of hope' (Bourn & Tarozzi, 2023). Hope can be theorised as passive, but this is a critical hope, a hope that is alive to reality and its limitations. This framework is about equipping young people with the ability to imagine a better world and to build an alternative (Hayward & Tolbert, 2022). In Rob Hopkin's book, From What is to What If, is a call to transform through creativity, community and nature-based solutions (Hopkins, 2019). Hopkins work is about changing the every day, not just for survival, but for meaning and value (Hopkins, 2019). Purely focusing on the critique shows everything that is lacking, but it can leave one feeling apathetic, hopeless and anxious (Clayton, 2020). Hopkins argues that young people are great teachers in this, with easier access to

their imaginations and creativity. This is particularly valuable when navigating the negative impact CCE can have on young people. Considering the urgent need for change, and the immobilising impact climate change is having on well-being, people need to be able to work towards something better (Hopkins, 2019). This research will make the argument that response-able pedagogies should include world-building skills, in which curiosity and imagination need to be cultivated (Hopkins, 2019).

Youth and Educational Outcomes

Children are disproportionately affected in times of crisis (Field, 2017; Sanson & Burke, 2020; Zhou, Kori, Sibanda, & Nhundu, 2022). Accordingly, the unequal impact of environmental degradation, as discussed earlier in this review (Maathai, 2005; Nixon, 2011; Shiva, 2018; Whyte, 2017), is magnified among populations of children, with children living in deprived conditions being the most at-risk group in the world (Sanson & Burke, 2020). This vulnerability may lead to the view of children as passive victims, in need of protection. This introduces a point of tension, that can be seen in my findings. Children have already shown, through growing activism that they are not passive (Tayne et al., 2021; Zhanda, Dzvimbo, & Chitongo, 2021).

The Rise of Youth-Led Movements

The boom of youth-led activism presents questions about the role of children as agents to mobilise change. Children move between educational spaces, social spaces, familial spaces and community spaces in ways that adults do not. Of course, it must be considered that children move differently in different cultural settings, but they are bringing new information into these spaces at a different rate to adults. Traditionally their ascribed purpose has been to learn; but not to teach (Paolo Freire, 1970; Hooks, 1994). The surge in youth-led activism challenges this, and so do the pedagogical theories which advocate for reciprocal learning (Paolo Freire, 1970; Hooks, 1994), in which all players have the potential both to learn and to teach.

Structure and Agency

A common theme throughout the literature is cultivating agency (Bleazby et al., 2023; Howard-Jones et al., 2021; Kessler, 2023; Monroe et al., 2019; Oberman & Sainz, 2021; Perkins et al., 2018; Rousell & Cutter-Mackenzie-Knowles, 2020; Rushton et al., 2024). In the big sociological debate on structure versus agency, three possibilities are presented. Firstly, people are a product of structures, which organise life. Secondly, individual agency is responsible for the structuring of institutions and therefore people are primary drivers. Thirdly, individual agency exists within the limits of powerful structures that hinder or encourage the expression of agency, depending on the context (Tan, 2011). Taking this further, theories of feminist new materialism, discussed above, which problematise these dualisms, suggest a more complex and relational interaction (Bozalek & Zembylas, 2017). This research is interested in the

empowerment of youth, and the instilling of agency to change the world, yet it also pays very close attention to the barriers which make change difficult as well as the agents that exist outside of normative classifications. This connects back to the idea of response-able pedagogies in which response-ability, more than agency, reflects how individuals or communities can provoke change within complex and interdependent systems.

Eco-emotions

A recent phenomenon has been the emergence and rise of negative eco-emotions, which are feelings of hopelessness, anxiety, depression and anger about the state of the world (Clayton, 2020; Contreras, Blanchard, Mouguiama-Daouda, & Heeren, 2023; Ogunbode et al., 2022; Pihkala, 2022). Eco-emotions are impacting the well-being of children and adults alike. Understanding the complexity of these emotions and what is thought to drive or reduce them is vital to understanding best practices for education. Understanding the range of negative eco-emotions has also helped me identify various forms of emotions expressed by participants, in which various emotions have different causes and implications for pro-climate action and well-being (Contreras et al., 2023; Pihkala, 2022). For instance, in Contreras et al.'s article published in the Journal of Anxiety Disorders, they argue that those experiencing anger were more likely to engage in activism than those feeling hopeless (Contreras et al., 2023).

Much of the literature on eco-emotions and on pedagogy for CCE emphasises the importance of practical and empowering strategies of communication which encourage community participation and dialogue (Bleazby et al., 2023; Clayton, 2020; Contreras et al., 2023; Kessler, 2023; Oberman & Sainz, 2021; Ogunbode et al., 2022; Perkins et al., 2018; Pihkala, 2022; Sharma, 2021). This indicates the importance of pedagogical approaches to respond to the challenges of eco-emotions. This body of literature connects interestingly to the findings on the potential of nature-based activity to boost well-being and pro-climate activity.

There is surprisingly, a gap in the literature when it comes to CCE and different stages of childhood development. This would provide insight into the implications of eco-emotions and how to avoid them. However, research on childhood development highlights the impact of early education (Joshi & Shukla, 2019), emphasising the importance of CCE that empowering not burdening.

Conclusion

The framework above, situates the research within broader theoretical and ethical questions, acting as a source for reflection and discussion throughout. It has examined the field of climate change discourse and some of the forces that shape it, and various

critical theories of socio-environmental approaches have been explored. It has given insight into the current practices of CCE and documented the pedagogical approaches that have been impactful. It also outlines various approaches in critical pedagogy that have been useful. The role of youth has been explored, with reflections on agency, structure, eco-emotions and the potential of positive visioning. The following methodology chapter will outline the research design.

Chapter Three: Methodology

In this methods chapter, I will discuss the overall design and implementation of the research study. This includes details on the co-design research approach, researcher positionality, participant selection, data collection methods, and the process of data analysis. Additionally, I will address the limitations encountered.

Research Design

The research design is partially a result of a co-design process (Baptista et al., 2024; Iversen, Halskov, & Leong, 2012). Whilst my focus is self-determined my research has been informed by collaboration with my research partner, the Green Schools Project (GSP). The GSP are a community organisation that have developed a CCE curriculum in response to the absence of CCE in the national curriculum. They provide teacher training and resources, free of charge, to help schools embed CCE. Their programs are aimed primary schools and intended to be run on a weekly basis during class time, however, they adapt to meet the needs of secondary schools and schools that cannot fit the lessons into class time. In these cases, it becomes an extracurricular activity.

This research benefits GSP by providing them data, which they do not have the time to analyse, this will be used to improve their offering and further their understanding to increase the availability of CCE in schools. From my perspective the research tries to connect the academic theory will the practical implications of implementation. Working with the GSP meant that I was given access to their network and resources, which has greatly benefited my research and it has enabled me to use this research in a practical and impactful way.

The study design was almost entirely co-created, from the initial outreach emails, ethics and information sheets to the questions for the teachers and focus groups. We had ongoing communication, and this process of co-creation gave me a better understanding of some of the practical considerations of this research which also seemed fitting given that the research on this topic emphasises a need for collaboration, co-creation and the bringing together of various viewpoints (Iversen et al., 2012). As an exploratory research project, qualitative methods provided the best opportunity for in-depth engagement and semi-structured teacher interviews and focus groups with pupils were used. It is important to emphasise that although the study has been co-created, through shared resources and collaborative design, this research project is independent of the GSP and is not a representation of their organisation or beliefs. Therefore, after the initial design process the coding, analysis and discussion are entirely independent from the GSP, although the findings will be utilised by their team. Additionally, because the programme is highly flexible, teachers adapt the

content as they go therefore what is discussed by teachers does not necessarily reflect the GSP curriculum.

Participants

Below is a table documenting the codes for the teacher interviews, T1-6, (numbered based on the interviewing schedule), the pupil focus groups, (P3-5 and P7) and the schools represented S1-6.

Table 1: Teacher Interview Codes

Teacher ID	School ID	Pupil group ID and number of participants
T1	S1	N/A
T2	S2	N/A
T3	S3	P3 = 2
T4	S4	P4 = 6
T5	S5	P5 = 6
T6	S6	N/A
N/A	N/A	P7 = 6

Participants for both the interviews and focus groups were sourced by the GSP within their network of participating schools. There were elements of co-design in the discussion about how to select the specific schools to reach out to. Factors such as location, their level of engagement and socio-economic profiles of schools were considered (Iversen et al., 2012). However, due to limited availability it was largely a matter of who responded.

Teacher interviews

The inclusion criteria for the teachers, was that they need to be registered with the GSP and have been formally delivering the GSP curriculum. Beyond this the goal was to reach out to a range of potential participants. Six teachers were interviewed.

Table 2: Teacher Participant Information

Participant ID	Gender	Race	Age group	Programme	Background
T1	Female	White	Year five	Embedded	Class teacher

T2	Female	White	Eco team/mixed primary	Extra-curricular	Early years care giver
T3	Female	White	Eco team/mixed secondary	Extra-curricular	Geography teacher
T4	Male	White	Year five	Embedded	Class teacher
T5	Female	Person of colour	Year five	Embedded	Class teacher
T6	Female	White	Eco team/mixed secondary	Extra-curricula	Geography teacher

Demographic information for schools

Demographic information was sourced on Gov.uk, using postcodes to collect information regarding the socio-economic factors of the area the schools are located. Additionally, Gov.uk was used to source demographic information about the student populations.

Table 3: Demographic Information of Student Population and School

School ID	Age Group	Index of Multiple Deprivation of Area Decile	% Pupils with English as an additional language (EAL)	% Pupils eligible for free schools meals (FSM)
S1	Primary	3	72.2	31.6
S2	Primary	2	4	73.2
S3	Secondary	7	29.7	40.7
S4	Primary	2	62.1	38.3
S5	Primary	4	92.8	30.1
S6	Secondary	2	62	43.3
National Average	N/A		20.8%	24.6%

As seen in table 3, although the data showing the deprivation of the areas surrounding the schools, ranging from extremely deprived (S2) to better off (S3), when contextualised within the data directly related to student populations, all these schools have student populations facing more depravation than the national average (seen in percentage of pupils eligible for free school meals). The schools also have far higher numbers of children whose first language is not English, apart from S2 which is far below the national average. It is assumed that students in these schools may face additional challenges related to accessibility.

Focus Groups

The inclusion criteria for the focus groups, was that there was also availability from the side of the pupils. As a result of this there were only four focus groups done, ranging from 2- 6 children per group[9], with a total of 20 pupils taking part. These were run between July third and July 15th. Focus group P7, stood alone, without a corresponding teacher interview. It was included, as it still provided valuable insight from a pupil perspective. I was not involved in any communication regarding the organisation of focus groups, as working with children, did not align with ethics requirements for this project.

Data Collection Methods

Semi-structure interviews

The primary method were semi-structured interviews with teachers from six schools across the UK. Interviewing allowed for exploration and deep engagement (Arksey & Knight, 1999). The choice of semi-structured interviews was made because it fulfils the co-design requirements of GSP by collecting relevant feedback on specific aspects of their program, whilst providing space to explore teachers' perceptions in more depth (Arksey & Knight, 1999). The interview questions developed through dialogue and after the first interview the questions were revised. Some of the questions asked were covered in the surveys that the GSP was sending out, and it was decided the most valuable use of this time would be to gather the kind of information a survey could not attain.

Research has shown how critical teachers are in the success of implementation, understanding how it is experienced by them provides insight that could be useful for the GSP during ideation processes (Rushton et al., 2024). This takes this research out

[9] I attempted to retrieve demographic information on the pupils in the focus groups but unfortunately this was not possible.

of the realm of best practice proposals and into the complex territory of negotiations of implementation.

All participants were given informed consent forms prior to the interview with all relevant information about the intended outcomes of the study (Arksey & Knight, 1999; Reich, 2021). The interviews were between 30 and 45 minutes, and due to an unforeseen injury were all, bar one, carried out via zoom. With consent, the interviews were audio-recorded for transcription purposes. Automatic recordings were made with the zoom recordings and the audio files were transcribed using Microsoft word transcription and then manually checked and corrected.

Focus group interviews

Data from a focus group with pupils was collected by the GSP. The interview questions for the focus group also followed a semi-structured approach, but as the majority of the groups had six participants aged approximately 10-year-olds, the discussion was a little less structures, which is to be expected (George, 2013). All these interviews were conducted in person at the respective schools by my research partner at the GSP.

Researcher Positionality

Bias is an inevitable part of research, which if unacknowledged has real ethical implications (Reich, 2021). Accordingly, it felt appropriate to give insight into what I bring to this topic (Reich, 2021). This is particularly relevant to qualitative research, and thematic analysis, because bias can be easily disguised (Braun & Clarke, 2006; Reich, 2021). With regards to CCE, I recognise that my own formative schooling has shaped, not just how I have approached this research but the ideas I am drawn to and the educational possibilities I believe to exist. This also cannot be separated from my positionality as white women, from a family where both my parent's attended university, and in which I was given unusual freedom of expression. The following reflection is an attempt to make visible some of the assumptions that I am working with in writing this dissertation, with the goal that it will remind me to examine my thinking and question my analysis. But in addition to this, it is also to voice my core belief that, under the right circumstances with the necessary support, formative education can teach a way of seeing and being that, in my experience, surpasses any fact or figure.

From age three to 13, I attended a Waldorf school [10]. Through this approach education is seen as a benefit both to the individual and society. Spending time outside was a priority. We learnt to garden, grow food, kept nature diaries and as a school, we celebrated the change of seasons. I was taught to be mindful and observant, aware of

[10] A holistic approach to education and following principles of child development

the balance of give and take that all systems rely on. The idea that children have agency, is a given to me, I was educated and raised with this as truth. As a child I learnt the difference, between being told what to think and being given the tools to explore. I know what it means to have care and kindness as central tenants of education, to have curiosity and play to be as important science. I do not remember learning about climate change, but the social and economic realities it arises from were strongly critiqued in all aspects of the education and I understood what sustainability was as a value, not as a concept or a catchphrase. My formative education taught me that I was a part of the world; I had a duty to it, and it had a duty to me. These things were naturalised for me, but when I entered a mainstream system, I found that they were not common-sense values for most.

The relevance of this to the research is that I know what is possible, and I know this is a point of privilege. When conducting this research, I can feel my pull to the radical, to the feelings that things could be so different if we offered children more than information. I also know this orientation has developed within a context of privilege, and things are not so simple, which in many ways is why I am interested in the complexity of implementation. This reflection stands as a record of my personal experience of the possibilities and perhaps, at times, my tendency to underestimate the depth of the barriers.

Data Analysis

Inductive Thematic Analysis

Although this research examined CCE in the context of both primary and secondary schools, the analysis focuses on early educational practices and outcomes. This is in part because there was more data collected for primary schools, with 18 children as part of the focus groups compared to two for the secondary schools, but also because CCE is most underrepresented in early education.

The transcribed interviews were analysed for key themes and patterns. This was done using inductive thematic analysis, and was data driven rather than reliant on predetermined theoretical framework (Braun & Clarke, 2006). This method was chosen as it was well suited to the exploratory nature of this research. It provided the flexibility needed for co-design process, in which a predetermined framework was not as suitable (Braun & Clarke, 2006; Durose, Perry, & Richardson).

Coding

During the initial read through I highlighted the interviews and made notes about emerging points of interest and reoccurring themes (Braun & Clarke, 2006). The final transcriptions were imported to NVivo 14, to code and analyse the findings (Allsop,

Chelladurai, Kimball, Marks, & Hendricks, 2022). The coding process was carried out one transcript at a time, first the teacher and then pupil transcripts. Separate codes were used for the teachers and the pupils, to analyse the data as separate sources, each providing a unique perspective.

The coding process followed an inductive approach and the initial codes created were semantic codes (Braun & Clarke, 2006). The teacher codes were divided into five major categories; Barriers (5 subcodes), Engagement (6 subcodes), General qualities in data (4 subcodes)- this was included to catch anything that may not be easily codable but still felt relevant, Family and community (2 subcodes) and outcomes (6 subcodes).

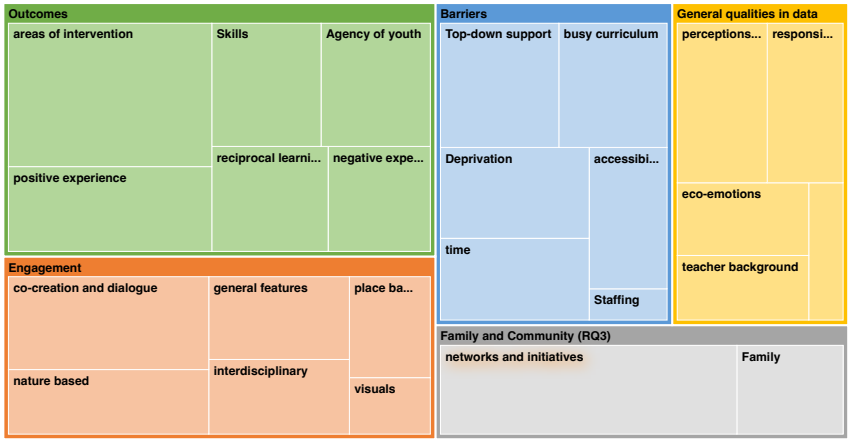


Figure 1: Initial Codes for Teacher Interviews

For coding the focus groups, I kept all codes under one main code, Pupils responses which consisted of 10 subcodes; which included negative feelings, imagery, nature-based, collaboration and community and perceptions of climate change.

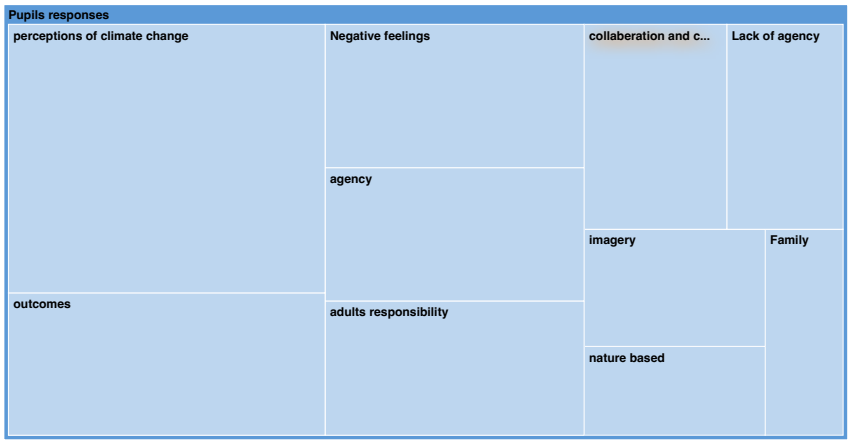


Figure 2: Initial Codes for Pupil Focus Groups

The initial coding was semantic, but during the later coding stages, once themes were identified, I integrated a latent coding approach. For example, during the sematic coding phase, data would be coded for ‘eco-emotions’ if they mentioned anything related to emotion. However, when organising and refining the codes into themes, some of the codes got reallocated. I didn’t restrict the number of times a data was coded, if it was relevant to more than one code.

Themes

Four themes were identified. These were; Theme one: structural barriers to implementation, theme two: community as curriculum, theme three: awareness, critical pedagogy, and pupil well-being, and theme four: nature-based learning. These themes were the result of deep examination of the data in which pupil and teacher perspective were put into conversation.

Visual Methods

This exploratory research was varied, accordingly visual representations of the findings were used to communicate findings in an impactful and concise way (Pink, 2004). This had the added benefit of highlighting the pupil feedback and centring youth voice. Visual methods can introduce ethical challenges, if meaning is manipulated or a universal interpretation is assumed, but the visuals included are simple, without the use of symbolism (Pink, 2004). I created comic-like images, using simple sketches based on the data. These initial sketches were scanned and then worked on digitally using a free drawing software Sketchpad. The text was taken from the pupil data and was adjusted for easy reading, however no fundamental changes have been made to the meaning or the words used. For example, if a pupil was describing a scene, instead of quoting this I have visualised it. A script of all the original quotes used for these images has been included in the appendix (item one).

Limitations

Collaboration Challenges

Working in collaboration is certainly not a limitation, but some elements introduced complexity and required balancing my own research goals with the requirements of the partnership. The GSP sourced participants within their network, therefore, it is likely that those who participated felt more positively about the programme and about the importance of CCE and therefore were happy to put time into feedback. They may have also been less inclined to provide critical feedback, although we hoped that my degree of separation from the organisation minimized this bias. I also made a conscious effort to create space for critical opinions during interviews. Another limitation is that I did not run the focus groups, which meant that there was not a consistent interview style across teacher interviews and pupil focus groups.

Accordingly, co-design introduced complexity, but no more than the value of being able to work with the GSP and to draw on their network.

Timing Issues

Data collection was planned for the first week of July but was only completed by the 16th. This pushed everything back, and there were two no-shows, which meant we ended up with six instead of eight teacher interviews. Additionally working in collaboration increased the administrative workload, sometimes slowing progress and applying more pressure.

Sample size

The scope of a master's dissertation meant working with a small sample size. Whilst this limits the generalisability of findings, it does not reduce their value to identify key themes that require further research. Additionally, when framing the research within the literature the coherence supports the findings. Despite these limitations, the value of the research is not diminished as it intends to explore the topic rather than provide generalisable findings. As far as possible the limitations mentioned have been factored in and accounted for.

Conclusion

This methods chapter has outlined the collaborative approach used to explore the implementation of CCE within a selection of schools in the UK. Using qualitative research methods, including semi-structured interviews and focus groups, this study has provided in-depth insights into the perspectives of teachers and pupils on climate change education (CCE). Data was coded and analysed using inductive thematic analysis on Nvivo 14. Four primary themes were selected for discussion and visual methods were used to showcase this data in a variety of ways. The methods selected for this research, as well as the overall collaborative approach, align with the core pedagogical arguments made.

Chapter Four: Findings

The following chapter represents the key findings, drawing upon teacher interviews and pupil focus groups. By triangulating the pupil and teacher data, four overarching themes, consisting of various codes and subthemes, were identified. These themes include the prevalence of structural barriers, the value of 'community as curriculum', the importance of 'response-able pedagogies' and emotional awareness to ensure pupil well-being, and the value of nature-based learning.

Theme One: Structural barriers to implementation

Out of the six subcodes for barriers, four (lack of top-down support, busy curriculum, slow rate of change, and staffing issues) can all be discussed under structural barriers. These barriers showcase the limited national support and the constant struggle to fit CCE into the curriculum. This inaction is also felt by pupils, who express frustration. Teachers and pupils are ready for change, but the structures do not provide the tools for real transformation. This impacts the rate of implementation, the quality of the output and the burden felt by engaged teachers and pupils.

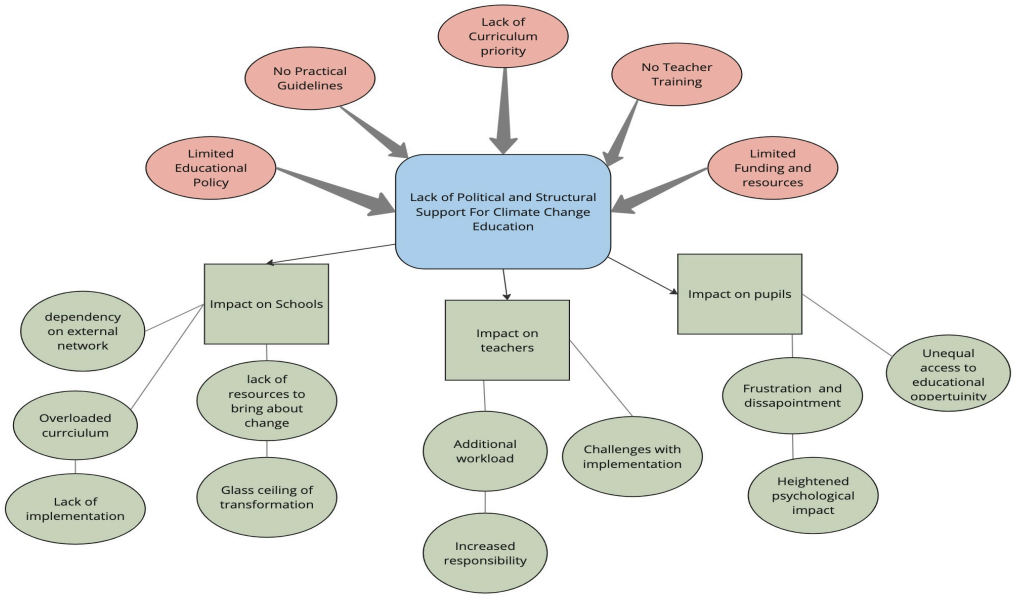


Figure 3: Map of the lack of structural support and its knock-on effects

Governmental Support

Despite CCE being acknowledged at a national level (D. o. Education, 2023), support and guidance for implementation are inadequate and most teachers in this research

addressed this. This impacted the implementation of CCE but also reaching zero carbon goals. One teacher said it wasn't "feasible", because "change needs to come on a national scale before it comes to schools." (T3). There is a limit to what schools can achieve independently. In response to a question about the Department of Education, another teacher said.

> "I don't think there is a lot of support coming from them, especially when you look at the national curriculum as well, and there's not a lot of awareness being brought to carbon emissions and how to stay green." (T5).

The most cited barrier for implementation was a busy curriculum, which directly reflects a curriculum that has not made space for CCE. Whilst many promises have been made by the Department of Education (D. f. Education, 2013; D. f. Education & MP, 2022), these have not translated into actual outputs and CCE remains under-implemented. For half of the schools (S2, S6 and S3) the only availability to run the programme was after school or during break. Accordingly, participation was limited, because attending meant the pupils would have to give up their free time. Participation ranged from two to 10 pupils. One teacher spoke about the considerable effort needed to incentivise and recruit participants, "Only two people turned up. I kept on asking them what we needed to do to get more people coming." (T6). Accordingly, individual teachers and schools pay the price for the lack of structural support, fighting to fit CCE into already busy curriculums, taking on additional workloads and driving implementation. In the context of limited resources and support, teachers go to great lengths to provide CCE and incorporate sustainable practices into their schools. Additionally, it is important to note that all the schools in this study had someone in senior management supporting the implementation of CCE through the GSP.

Perceptions of pupils

The pupil data showed both a recognition that those with power play an essential role in determining our trajectory, but also a strong sense of disappointment in the lack of leadership and change. One pupil said, "I think the greatest thing is that more governments are starting to take action against climate change." (P4).

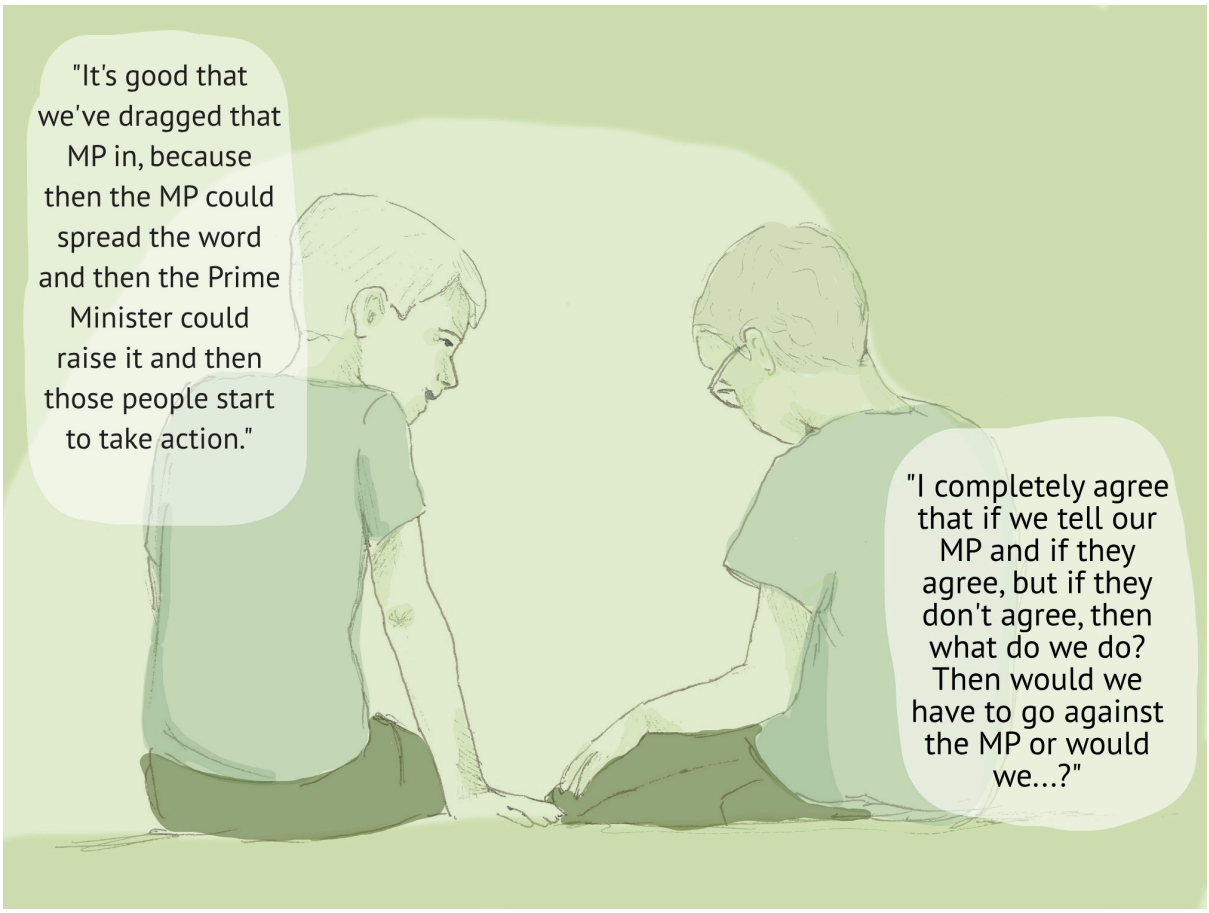


Figure 4: What if Our MP Does Not Agree? (P4)

The above illustration showcases a point of tension. Many other pupils expressed their excitement about contacting MPs, they made associations with ‘awareness’, ‘spreading the word’ and ‘doing something’. However, MPs are very aware of the climate crisis. Alongside the expressions of hope was anxiety (P4) and in some cases frustration at a perceived lack of care (P5 and P7). One pupil identified the problem, not as a lack of understanding, but rather a lack of will, “people know what’s going on around the world with climate change, but they aren’t raising their voices or doing anything because they aren’t bothered and apparently are too busy.” (P5). Inadequate structural support means that children feel heightened responsibility, “I feel like I need to do something about it because people with more power over us aren’t doing anything.” (P5). This also led to distress from several pupils who felt like it was already too late. Accordingly, structural barriers also have implications for pupil well-being.

Conclusion

The data points to a glass ceiling of CCE implementation. Although, the schools all found ways to implement the programme, the lack of government support meant that they had to resource themselves, taking on additional curricular content. While they achieved varying levels of integration, the results were heavily impacted by immovable obstacles which limited the possibilities for implementation. This affected both

teachers and pupils. An additional finding was that in the face of these obstacles schools made use of their networks and other initiatives to deliver CCE, which is how they found the GSP. This leads to the next theme.

Theme Two: Community as Curriculum: Approaches to Overcome Implementation Barriers

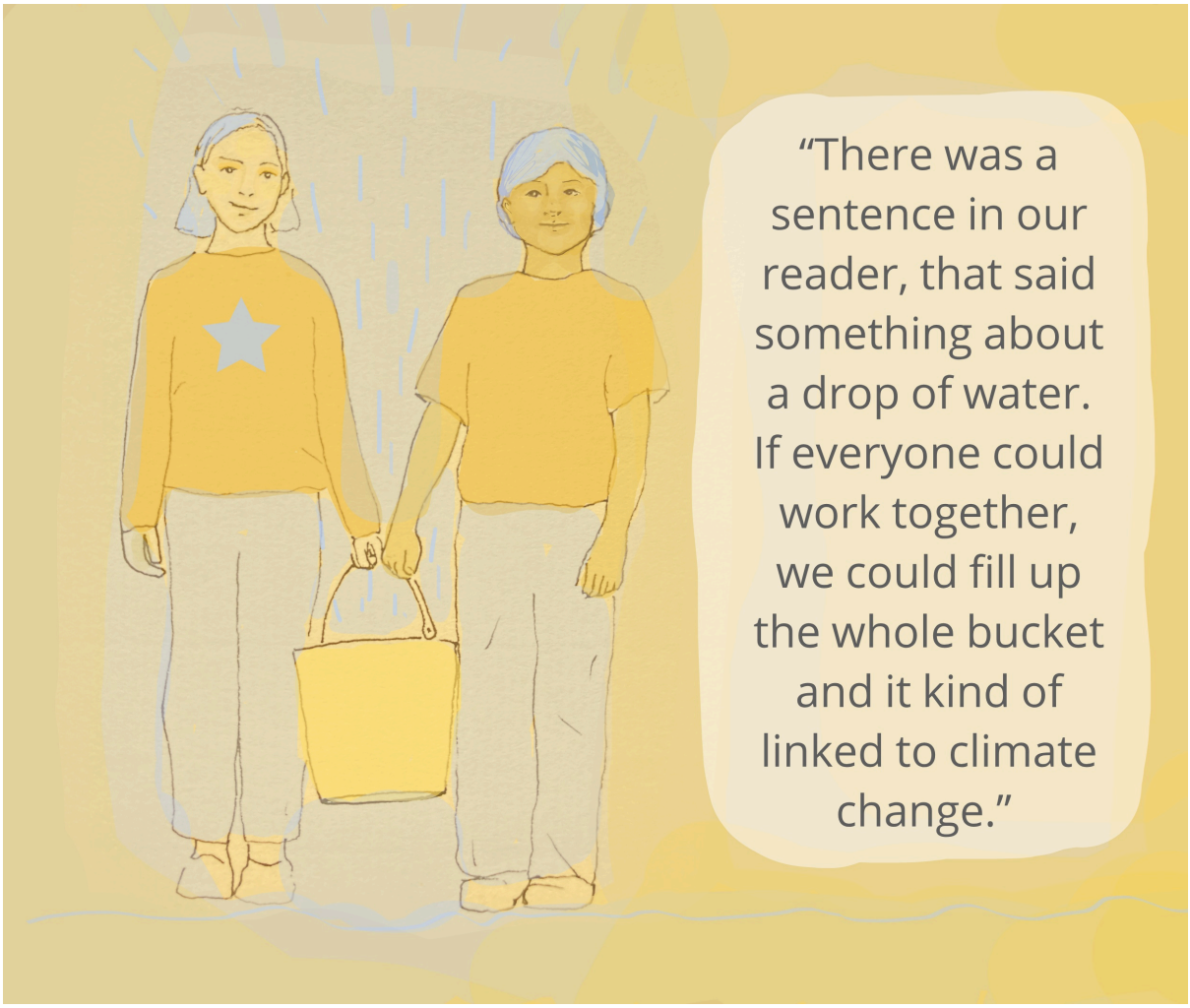


Figure 5 Working Together (P7)

The findings suggest that utilising "community as curriculum" is key for improving engagement, relatability and accessibility for pupils with diverse needs, backgrounds and life experiences. This calls for contextualised, place-based educational approaches that develop transdisciplinary learning communities and make CCE relevant to pupils' lives.

The Challenges of Deprivation and Accessibility

Most of the teachers mentioned the challenge of teaching in deprived contexts, having not used demographic data to select participants the prevalence of this theme was a surprise. All the schools in this study[11], represented by teacher interviews (T1-T6), had higher levels of deprivation than the national average, measured primarily by the percentage of pupils eligible for free school meals (FSM). The school in this study ranged from 30% to 73.2% of pupils receiving FSM, compared to a national average of 24.6%. Additionally, data on pupils with English as an additional language (EAL) provided further insights. Although higher levels of EAL did not directly correlate with higher rates of deprivation, pupils are assumed to navigate additional challenges related to accessibility. The prevalence of deprivation was surprising, as research has shown that schools implementing CCE are often better resourced (Nepraš et al., 2022), however, given that this programme can be accessed for free, it potentially attracts schools who are reliant on community organisations to counteract the lack of structural support (T3).

Education in Context

Within contexts of social inequality, limited resources or marginalisation, CCE can be harder to implement as it can feel abstract, or not a priority, with one teacher explaining, “It’s not always at the top of everybody’s agenda.” (T4, FSM = 38. 3% and EAL = 62.1%). The teachers reflected that climate change sometimes felt irrelevant to pupils, this is supported by other research findings (Bleazby et al., 2023; Howard-Jones et al., 2021; Kessler, 2023; Monroe et al., 2019; Nepraš et al., 2022; Oberman & Sainz, 2021; Perkins et al., 2018; Rousell & Cutter-Mackenzie-Knowles, 2020). Teachers responded to this differently, some expressing frustration, whilst others factoring it into their approach. Those who actively factored it in adopted approaches that embody qualities of critical pedagogy. For example, T3 spoke about how she was working with broader socio-economic contexts to improve accessibility, “How can we reduce social inequality particularly in lower-income family’s perspective through teaching climate change conscientiously.” (T3, FSM = 40.7% and EAL = 29.7%).

For teachers that showed more awareness engagement was improved by utilising pedagogical approaches that created space for pupils to contribute based on their lived experiences, and the experiences of their families. A session that forms part of the programme, called “In Your Shoes”, was seen as a good example of an activity that helped boost inclusivity.

> So, when we had to do “In Your Shoes,” … it was about thinking about and trying to make it more relatable to them by thinking back to their country, what

[11] The focus group for P7 is not included as no teacher interview was conducted.

> they see, what they do, and what they notice. (T5, FSM = 30.1%, EAL = 92.8 %).

The above quote, from a teacher working in a school where 92.8 % of pupils do not speak English at home, shows the importance of paying attention to pupils' backgrounds, recognising barriers to participation and actively responding to these. This teacher seemed very attuned to the accessibility challenges and was the only teacher of colour interviewed, she seemed to focus on inclusion and diversity, making note of the experiences of pupils who were "new to country children" and those with special education needs (T5).

The teacher from the school with the highest levels of deprivation spoke about how impactful it was to be able to work with other schools and learn about how children responded (T2). This teacher also shared several anecdotes in which she reported conversations with parents who were learning about climate change through their children. In one interaction a parent called her saying, "Can I just ask something about the footprint?", and another where she was asked about meat substitutes because a child had gone home and asked if they could eat less meat (T2). This demonstrates the positive outcomes possible if family and community are brought into the educational context, in which approaches factor in socio-economic and cultural dynamics.

Contrastingly the one teacher who felt the most frustrated by pupils' lack of awareness pointed towards the families as not educating their children enough.

> "It appears to me that if we are teaching in a community that is as diverse as ours, we are almost taking for granted or assuming that the parents have introduced the topic of recycling … They just throw everything in the black bin because it's less confusing. The local families just either don't understand it or don't understand the point of it. (T6: white, female, S6: FSM = 43.3 % and EAL = 62 %)

There seems to be an oppositional dynamic between the teacher and the school's community, which is not conducive to making pupils feel included, or the creation of learning communities. She described students as, "very apathetic towards their studying, their contribution to their community, and climate change is just one of those abstract topics that doesn't really affect them." (T6). Additionally, this teacher wasn't enthusiastic about collaborating with different schools, saying that it, "didn't really make any difference to my projects…" (T6). In contrast with the approaches shown above, these findings suggest that working with, and in community, is more impactful than working in opposition.

What seems noteworthy about these findings is that T5 and T2 were able to connect to the wider community and engage with pupils and their families. Demographically speaking, both T5 and T2 more closely reflect the communities in which they teach. This raises questions about how inclusion and awareness are impacted by teachers' personal identifiers, and how the potential for bias can be counteracted.

Creation of Learning Communities

The findings suggest the potential to maximise resources, simultaneously making education more engaging and accessible by drawing on community organisations and creating networks outside of traditional educational spheres. One of the teachers discussed how, out of necessity, she has relied on community organisations and grassroots initiatives because the department of education has not provided support for implementing CCE across subjects.

> "If you want any support with that you have to look towards charities or just discuss with other teachers in the community. I don't think there is a government-funded effort that is supporting that on the scale that it is needed." (S3, FSM = 40.7%, EAL = 29.7%)

The utilisation of networks and community projects meant that in many instances limited resources were overcome by community engagement and collaboration, with the implementation of GSP's curriculum being indicative of this, as a grassroots educational initiative which is free to access. One teacher said, "I think it's really good that the programme is free for schools, which really helped us get a kick start on it." (T5, S5, FSM = 30.1%, EAL = 92.8 %).

In addition to working with the GSP, the schools drew on numerous other community organisations and environmental initiatives, even if in a relatively small way. These included a local university (T1), community centres (T2), community gardens and businesses (T3) the local council (T4) knowledge-share events for educational practitioners and local charities (T5) and various sustainable volunteering projects (T2, T3, T6).

Conclusion

Although utilisation of community, may have been a product of necessity, it seems to have numerous benefits. It has the potential to create a more meaningful and relevant educational experience for a diverse pupil population, but also to improve implementation in resource-scarce contexts. Teaching in a place-based and community-centred way means socio-economic context is actively engaged within the curriculum, in a way that may help balance potential bias of teachers. These findings indicate that a community engaged approach increases accessibility and helps

address some of the barriers introduced when implementing CCE in contexts of deprivation, where climate change may seem like an abstract danger or not a priority given the everyday challenges faced by pupils and their families. These findings suggest that community as curriculum could help improve engagement and respond to barriers if further utilised.

Theme Three: Awareness, Pedagogical Approach and Pupil well-being

The findings from the teacher interviews were triangulated with the focus groups to explore the connection between approach and outcome with pupil wellbeing. According to all teachers, the pupils were engaged and responded positively to the content, however when comparing the pupils' responses it was evident that some felt more burdened than others. When triangulating findings, it appeared that the teacher approach impacts the well-being and perceptions of pupils, and a clear distinction was seen between positive and negative engagement. This theme is based on the data from the primary school pupils and teachers and found that pupils taught by T5 demonstrated higher levels of positive engagement, even if their Climate Change knowledge wasn't entirely accurate. Conversely, pupils taught by T4 seemed to have the most accurate knowledge of climate change but demonstrated the highest levels of negative engagement. While distress is to be expected, these preliminary findings would urge rethinking what type of engagement elicited. These findings complicate some of the clear-cut advocacy for CCE being purely empowering, instead showing a complex negotiation.

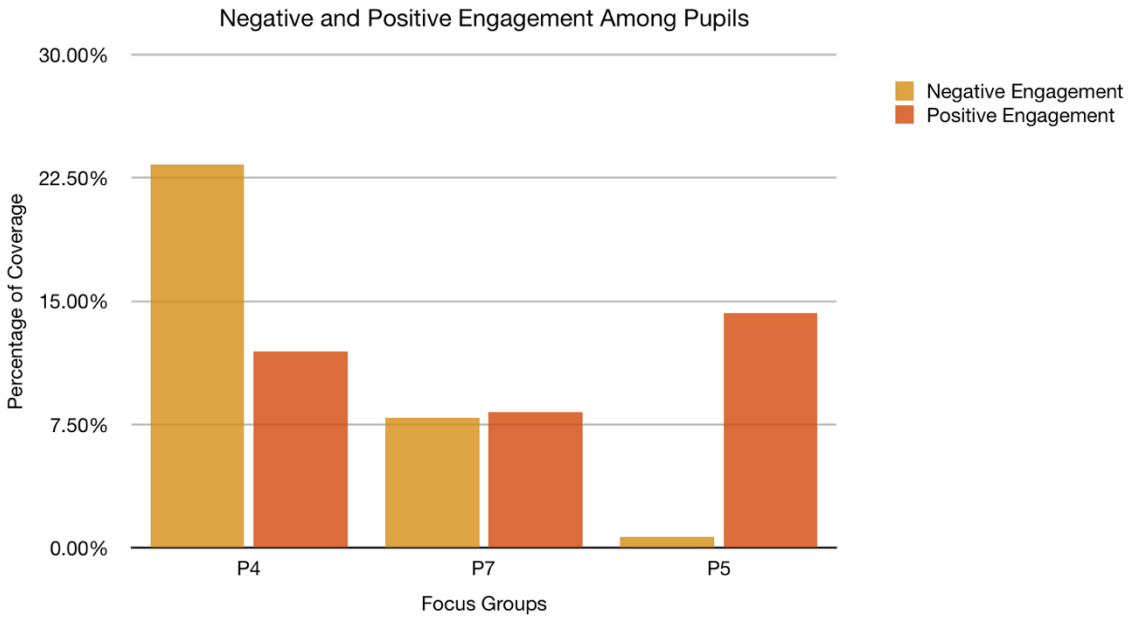
Positive and Negative Engagement

Improving engagement is one of the key aims of implementation. The teachers reported that sections of this programme that were predominantly theoretical or science-based, saw the least engagement from both the perspective of pupils and teachers. To boost engagement the GSP, designed the curriculum to include a variety of tasks and activities, most notably a pupil-led project. Despite engagement being a goal, the findings demonstrate that not all engagement is good, and it can be broadly organised into negative and positive engagement.

The ideal outcome is positive engagement, such as what one pupil said in response to an initiative, they implemented to tackle food waste "We were so happy. We were so proud. We felt like a part of the school, you know, like we had an impact. We felt like role models in the school." (P5). The practical, collaborative, nature-based or creative sessions, received positive feedback. Contrastingly, there is negative engagement, which is seen to lead to anxiety, as seen in one pupil's response "Finding out that our world was sort of dying in a way. That just made me shocked cause not none of us in here actually kind of knew about that." (P4). The imagery of the climate

crisis has an enormous impact on young people. Sessions [12]on the Solomon Islands, natural disasters, species extinction, and microplastics, negatively stuck with pupils. When watching the video that was shown in class (see appendix item two), on the Solomon Islands, it appeared to be inclusive content, however, if the framing or the emphasis was misplaced, it could be highly distressing.

For focus group P4, microplastic in the ocean came up often, as their teacher had done an assembly on it. One pupil said he felt guilty about climate change and when asked why he responded, “From all of the fish eating microplastics to the world being destroyed by climate change and making it heat up and with all of the water rising also making the Solomon Islands at risk of going underwater.” (P4).



The graph above showcases the percentage of coverage of negative feelings and positive feelings across the three primary school focus groups. This shows a discrepancy between groups despite being the approximately the same age and following the same core curriculum. This initial exploration suggests that the approach taken by the teacher impacts the pupil’s well-being.

When doing a word search for ‘feel’ among the pupil transcripts, it was found that although all the pupils from the three primary schools had almost the same number of

[12] Important to note that many teachers create session with their own content that doesn’t reflect the GSP, reference to microplastics is not made in their curriculum.

references (P4: 13, P5:12, P7:12) this did not correspond to the same level of negative emotions.

Negative eco-emotions seemed to correspond to a sense of personal guilt. This was seen in how pupils engaged their families on the topic, and whether they took on responsibility versus pointing out the failures of those with power. This also suggests that caution should be taken when finding the balance between providing CCE that shows pupils what changes they can make, without hyper-focusing on personal responsibility. Figure 6, seen below, is an example of this. This pupil from focus group P4 was relating their electricity use at home, for something like the TV with a negative environmental impact, and while saving resources is something to encourage, this should be approached within broader conversations of responsibility. Another pupil from the same group also spoke about his “guilt” about his family needing to “rely” on electricity (P4).

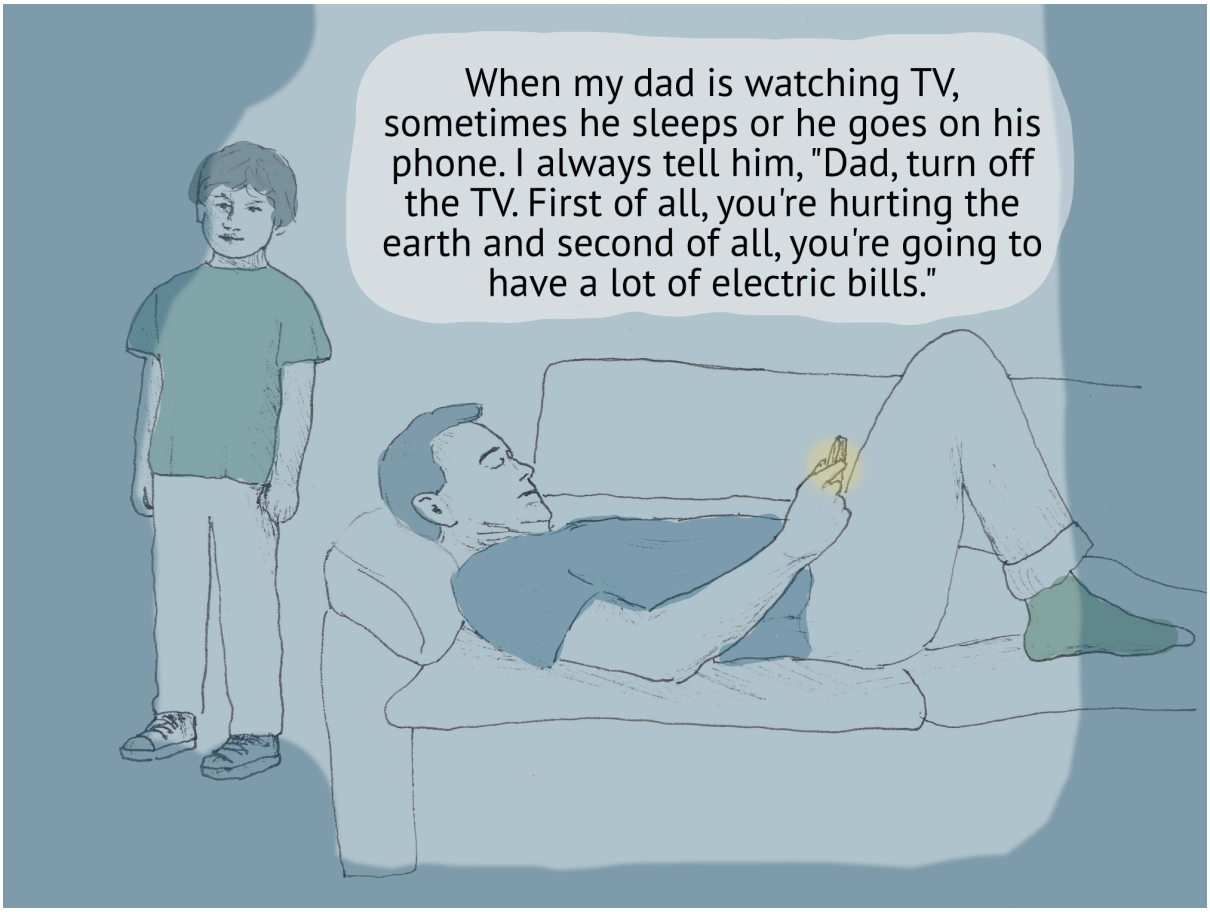


Figure 6: You Are Hurting the Earth (P5)

Awareness of Eco-Emotions

Teachers demonstrated various levels of awareness and concern about eco-emotions. These differing approaches were found to correlate to the well-being of pupils. One teacher, who didn't have a corresponding focus group, expressed her concern about not burdening her pupils, knowing that it is "out of their control" and that they "feel upset and frustrated about it, particularly when it comes to animals." (T1). Another teacher said that although she hadn't witnessed eco-emotions in class, she was aware and tried to make her classes solution-based and empowering (T5). This teacher intended to instil mindfulness, and an ability to pay attention to 'the small things'. These pupils demonstrated the highest levels of positive engagement and the lowest negative engagement.

The teacher who showed the least awareness about eco-emotions had the highest rates of negative eco-emotions in the pupil focus group. When asked, "did you observe pupils experiencing of sort of eco-anxiety or any negative emotions related to the process?" he responded,

> "There was a little bit when we were talking about like I said, it was the case study around the Solomon Islands…You know the threat looming to those islands is, very, very significant. And I think the penny had dropped then. That's why a lot of them talk about it... That's a hook that I can use with any other, any other lessons as well." (T4, white, male).

This demonstrated an inability to differentiate between positive and negative engagement, in which the teacher used the pupil's distress to boost engagement.

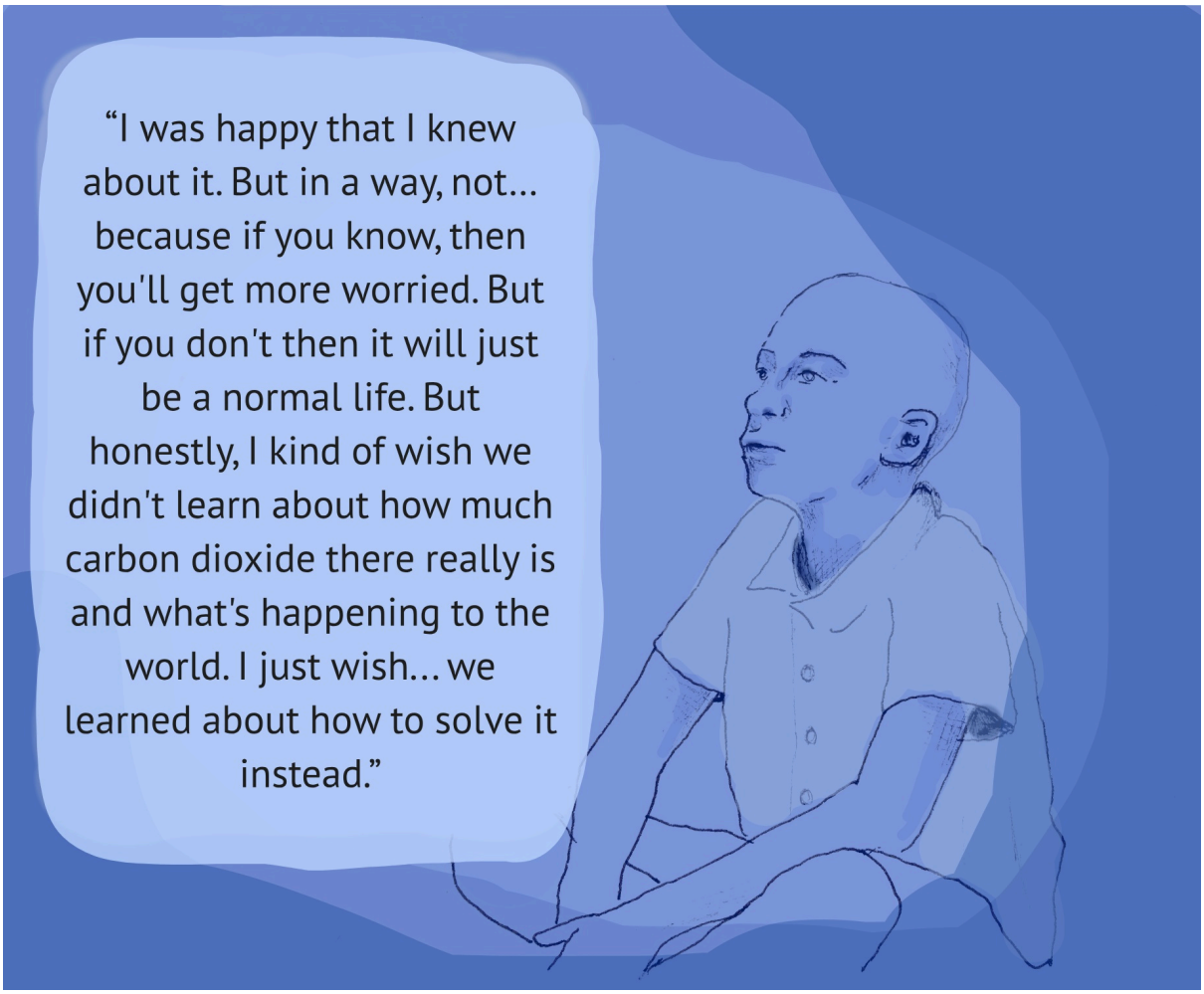


Figure 7: I Wish We Learned How to Solve It Instead (P4)

Figure 7 highlights this impact. This pupil’s response synthesises the findings of this theme. The desire to have practical tools is evident. This sheds light on the limitations of a science-focused approach for this age group. This quote was extracted from a larger discussion, which has been included in the appendices (item one, figure 7). In response to the pupil above, another pupil said he agreed, “You would feel a bit worried because it’s kind of scary that the earth is just warming up all of a sudden and the ice is melting and then loads of homes are getting destroyed.” (P4). The pupils who felt knowing was better argued that without the knowledge, they would not be able to act and then it would be too late.

When triangulating these findings with their teacher’s approach, there was insight into this reaction from pupils. T4 referenced the importance of visuals, saying “We talk a lot about 1 tonne of carbon dioxide being the equivalent of like the size of a small house, essentially”. This teaching tool was impactful as one of the pupils in his class said, “I felt surprised because I didn’t know that a tonne of carbon dioxide, 206 tonnes, is equal to a small house.” Another pupil interjected saying, “like a small village how much carbon dioxide a school uses”. Whilst this strategy is clearly engaging and is

improving pupils' technical knowledge and their ability to visualise the scale of the problem, it may be impactful in an unhelpful way. These exchanges are valuable as they indicate the complexity of CCE implementation and highlight the importance of approach.

Implementation of Critical Pedagogy

The literature outlines the recommended pedagogical approaches shown to produce the best results. These findings suggest that not only do they improve engagement, but they also reduce the prevalence of eco-emotions, demonstrating a connection between the adoption of critical pedagogy and the type of engagement generated. At its core, the GSP curriculum is practically focused, designed around student-led group projects, which teachers described as helping limit negative emotion and boosting engagement (T1, T2 and T5). Practices of transdisciplinary learning, place-based and contextualised curriculums, practical implementation through projects, nature-based sessions and critical frameworks were all shown to be impactful.

In addition to this, critical pedagogy is about examining power and becoming aware of social structures that influence society. T5 seemed to implement a more critically engaged education to her pupils as they expressed frustration and anger towards authority figures, these pupils were explicit in their frustration with other teachers who they said are, "not making it a priority" and "don't care" (P5). However, they also showcased an awareness of those with power, being responsible but inactive, "I'm really happy because now I know that we can't do everything, but we can still try. People with more power over us didn't do anything, but we did something and now there's a good impact." (P5). This group showcased the highest level of perceived lack of agency.

This seems counterintuitive because one of the primary intended outcomes of CCE is to boost agency. However, these findings indicate that perhaps feeling a lack of agency may have the unexpected benefit of preventing pupils from feeling responsible, instead enabling them to critique those with authority. This finding is interesting in the context of research that has shown eco-anger to be a more proactive emotion than eco-anxiety (Contreras et al., 2023), suggesting that allowing pupils to be angry may be more conducive. But also, with regards to calls for justice based interventions.

Contrastingly, the pupils with the highest level of eco-emotions were those whose teachers utilised the least critical pedagogical approaches (T4, P4). In terms of content, T4 focused on climate science and awareness, this was seen in the fact that his pupils demonstrated a more accurate understanding of the science. He also didn't implement any nature-based sessions, which according to all the other teachers and pupils were the sessions pupils found the most rewarding. This class had the least practical student-led group project. They raised awareness about greener forms of

transport, something the pupils had no control over the outcome. The findings suggest that for the pupils in other schools, the most rewarding part is witnessing the positive impact the project has on the school, even if that impact is small. This also points back to the importance of response-able pedagogies.

Conclusion

The combination of a lack of awareness about eco-emotions and a lack of practical and empowering pedagogy may result in negative outcomes for the pupils. By taking a more collaborative and solution-focused approach, positive engagement is boosted, reducing the inevitable impact of the more distressing content, such as the Solomon Island case study. Findings also suggest, that for this age group, although important, climate science should not be the primary focus. Additionally, the findings indicate the potential impact of teaching about themes of power in CCE, as this may enable pupils to avoid feeling personally responsible and guilty. These findings raise questions about the content and pedagogy used to teach CCE.

Theme Four: Nature-Based Learning

Currently, one of the gaps in the literature on CCE is the inclusion of outdoor education (Hayward & Tolbert, 2022; Mycock, 2020). The data from pupils called for more outdoor and nature-based classes. The teachers also addressed this, with only one teacher (P4) not implementing outdoor sessions. The finding suggests centralising nature-based approaches is key to positive engagement.

Lack of Green Space

It is not just a lack of outdoor education that's evident, but also a lack of access to green space. Figure 8, below, shows an activity used in one of the outdoor sessions that was designed to connect the pupils to nature. However, no nature sounds were heard.

Figure 8: City Senses (P7)

Unequal access to green space has been documented in the literature (Robinson, Robertson, Curtis, Darko, & Jones, 2022). This was reflected in the findings. There were several references to concrete 'urban schools' and 'inner-city schools' as having less opportunity for outdoor activity (T3, T5 and T6). One teacher also mentioned that "we don't do enough outdoor sessions.", noting how important it is to help pupils "appreciate nature" and "get children involved and sort of love the little things that they see" (T5).

In response to a lack of outdoor space in the schools, particularly the urban ones, classes went on trips to farms, allotments and forests. These proved to be some of the major highlights for the pupils. Conversations with my research partner at the GSP highlighted how limited access has impacted their curriculum. Accordingly, the programme only has three sessions dedicated to outdoor activity. Most pupils said the outdoor sessions were their favourite. Even the high school pupils were enthusiastic about the outdoor sessions, describing them as rewarding (P3). Several pupils who tried gardening, vocalised their intention to continue, "I've been planting way more plants, flowers, and cabbages because I just want to make my own garden" (P5). They also expressed their wish for more outdoor sessions, saying that normally it is just PE

that's outside (P7). The findings here were conclusive, pupils love the outdoor sessions and feel they do not get enough time outdoors.

Figure 9: I cannot Experience Climate Change Inside (P5 and P7)

Figure 9 showcases the contributions from pupils from focus groups P5 and P7. Although in different groups, they expressed the same sentiment. This synthesises this theme. There is a desire to have a greater connection to the rest of nature, yet CCE continues to be taught indoors. These findings suggest that the lack of green space in schools, the lack of priority given to exploring the environment, and the focus on climate science before cultivating a connection with 'more than human worlds' creates a disconnect. This points to an inability to utilise the impactful and long-term learning opportunities of nature-based education (Barrera-Hernández et al., 2020; Tillmann et al., 2018).

Conclusion

The findings show that while schools are motivated to include CCE, structural barriers, particularly a lack of governmental support and a congested curriculum, significantly hinder progress. In response to these limitations, schools rely on community resources

and networks to bridge the gap. This demonstrates the positive impact of contextualized, community approaches to education, which not only improves engagement but also make the curriculum more accessible in deprived and diverse contexts. Additionally, the findings emphasize the necessity of critical pedagogy and awareness of eco-emotions to ensure positive engagement and protect pupil well-being. Finally, there is a strong call for the inclusion of nature-based education, enhancing engagement and fostering a deeper connection with the natural world. The following and final chapter will discuss these findings in relation to the literature and the research questions.

Chapter Five: Discussion and Conclusion

The following discussion connects the findings to the literature, to answer the three primary research questions; what the barriers to implementation are, what pedagogical practices increase engagement, and what the outcomes of CCE are. These questions will be briefly answered, as the data has already been provided in the findings, and the discussion will continue to explore what transformative education might look like in the context of CCE for primary school pupils. Finally, recommendations for future research will be outlined.

Research Questions

What are some of the barriers faced when implementing CCE?

The teacher interviews showcased that structural barriers (lack of top-down support, busy curriculums, slow rate of change and staffing issues) and challenges of accessibility (lack of resources, high levels of deprivation, Special Educational Needs, lack of green space) were impactful. The focus group highlighted the prevalence of negative eco-emotions among some pupils. The findings weave into all the other findings, each argument relating to another, an example of deep interdependence and the systemic nature of climate change as a wicked problem[13].

What pedagogical practices improved engagement?

Various pedagogical approaches have been advocated for in the literature and correlate to the positive feedback received from pupils and teachers. There was consensus that CCE must follow pedagogical and conceptual guidelines that ensure it is taught in a way that connects the climate crisis to everyday life, whilst equipping learners with the tools to engage practically and critically. A significant theme was utilising community as curriculum, which even when unintentionally made learning feel more relevant and exciting to pupils. Outdoor learning was well-received by pupils and literature highlights the positive impact it has on well-being, educational outcomes and long-term sustainable practices. The findings differentiated between positive and negative engagement and identified the above practices as helping to boost positive engagement. Contrastingly, an overemphasis on evocative imagery about the impacts of climate change and in the absence of practical activities were seen to increase negative engagement.

[13] Wicked problem, is one that involves multiple stakeholders, is characterized by interdependency and complexity requiring multilevel interventions

What are the outcomes of CCE?

The results of research question three were influenced by the specific approaches taken by teachers, which in part is a result of a flexible curriculum (which allows the GSP to meet one of its core aims, to increase accessibility and reach). Accordingly, the outcomes are hard to neatly categorise, but so are the aims. Each teacher had a slightly different personal aim. Whether that was to improve mindfulness (T5), raise 'awareness' of climate impacts (T4), or to try and get pupils to have basic knowledge thought to be lacking (T6).

When exploring the various outcomes for the different teachers it would be easy to dismiss the teacher (T4), whose pupils were the most distressed, as being negligent. While more awareness of eco-emotions, is needed, his approach is not out of the ordinary. He implemented a science-focused approach to try and instil an accurate understanding. His pupils spoke positively about him. Despite being in line with traditional educational outcomes, his approach, which helped pupils visualise the extent of the crisis, seemed to overwhelm them. This approach is not controversial, which makes it more important to explore what the intended outcomes for primary school CCE should be. These questions of outcome and aims will be discussed in more detail throughout this discussion.

Education for Transgression

Findings on structural barriers highlight the glass ceiling of transformation. Systems of governance are not prioritising decarbonising the economy, or actively implementing CCE, let alone calling for environmental justice. The critiques by Klein, Shiva, Nixon and Whyte, provide insight into the reasons this structural support is lacking, speaking to climate change as a justice issue, one that is systemically inscribed (Maathai, 2005; Nixon, 2011; Shiva, 2008; Whyte, 2017). Even in this small study, the lack of support is evident (Klein, 2015; Shiva, 2008; Whyte, 2017). Education is supposed to be outside of politics, however, discourse surrounding CCE and the failure to implement it nationally indicates this is not the case (Kwauk, 2023). This showcases a divergence between politics and the wishes of the public, seen in the disconnect between teachers' and pupils' desire for CCE and the governments unwillingness to implement it (Majid, Marston, Reed Johnson, & Happle, 2023; Rushton et al., 2024). This is not unique to the UK, all around the world governments are failing to meet their education commitments to CCE (Kwauk, 2023).

Accordingly, the agency of teachers and pupils is limited by these structures[14], stuck in a bureaucratic deadlock. The resulting slow rate of change is something we do not have the luxury of (IPCC, 2023). This has led to the emergence of educational initiatives

[14] Let alone the implications it has for the available consumer choice

such as the Green Schools Project, and mass mobilisation, often led by youth, with the hopes of transformation (Cloughton, 2021; O'brien et al., 2018; Zhanda et al., 2021). This points to a tension in findings, the literature, and global discourse.

Figure 4 is an apt depiction of this tension. The high-level policy, which we need for large-scale change, is delayed and deprioritised because of political and economic incentives (Dunlap & Brulle, 2020; Klein, 2015; Whyte, 2017). The top-down approach is not investigating power, the power is their own (Whyte, 2017). It is not considering systemic change, because it would see its systems dismantled (Nixon, 2011). Based on Klein's, argument the climate crisis needs to be 'designed out' (Klein, 2015). Yet the small scale is often invalidated, and community engagement is undermined. When community is undermined, agency is denied.

This is a strong argument for why grassroots initiatives such as the GSP are so important. Mass social change begins at the grassroots level and social justice movements begin with communities (Bleazby et al., 2023; Paolo Freire, 1970; Hooks, 1994; Hopkins, 2019; Maathai, 2005; Shiva, 2008). The findings for research question two demonstrate that one of the most successful ways of improving access, engagement and relatability and increasing resources is to use pedagogical approaches of community as curriculum (Paolo Freire, 1970; Hooks, 1994; Monroe et al., 2019; Nepraš et al., 2022).

Improving Accessibility: Towards Inclusive Education

Various barriers to access were also evident. This has significance for the prevalence of structural barriers which produce environments that are exclusionary and inequitable. The limits to agency imposed at a structural level can be challenged by curriculums that have aims of inclusion. Research has highlighted the importance of delivering CCE that is inclusive and relatable (Bleazby et al., 2023; Bourn & Tarozzi, 2023; Oberman & Sainz, 2021), doing this means getting to the core of issues of accessibility.

The findings suggest that teachers' ability to relate and engage with pupils and their communities has an impact on the success of implementation. The more that teachers can connect to the community the pupils come from, the better they understand and respond to their needs and adjust the curriculum. The argument is not that teachers' demographic and background must reflect pupils, but rather suggests that an understanding of the communities the pupils come from, and the variety of life experiences and daily concerns, is needed to increase accessibility and relatability. This can be encouraged through the design of a curriculum that is actively inclusive, building in pupil participation and values of diversity (Bleazby et al., 2023; Oberman & Sainz, 2021).

Responsibility versus Response-ability

Much attention has been given to negative eco-emotions. Whilst important, some level of concern is unavoidable. Children cannot be sheltered from a reality in which they are so heavily implicated. The presence of negative emotion is not the challenge, but rather the inability to do anything with it. Figure 7, which shows a pupil reflecting on learning about the climate crisis, could be seen as an argument against CCE. The pupil is saying he might be happier if he did not know about the climate crisis. However, a sheltered childhood is not possible, what this pupil is asking for are solutions and the ability to respond to what he was learning. When analysed in conjunction with his teacher's approach, who was focusing on climate science, it demonstrates the importance of rethinking the educational aims.

Findings related to positive and negative engagement, showcase how concern can be expressed in a proactive way, or in an overwhelming way. Pupils can be thinking deeply about climate change, but if this is leaving them anxious, scared, or guilty, something is not right. No child should feel guilty about the climate crisis. When pupils are trying to micromanage their parents' electricity usage (Figure 6) not only is it an unfair burden, but it is also ineffective. Accordingly, it is not just that they care, but how they care.

Research has highlighted a range of 'negative' emotions related to climate change (Pihkala, 2022), with some findings demonstrating that eco-anger can be a mobiliser whereas eco-anxiety or eco-sadness are debilitating (Contreras et al., 2023). It seems taboo to encourage children to be angry, but perhaps this needs to be explored further (Contreras et al., 2023). The pupils who called out those more powerful than them may have expressed feelings of lack of agency, but they also exhibited lower levels of eco-anxiety and sadness, they did not feel personally responsible, and there was not one expression of guilt.

The findings showed that despite exposure to the same content, some pupils processed this information better than others. This research, supported by findings from the literature both on eco-emotions and CCE (Contreras et al., 2023; Monroe et al., 2019; Ogunbode et al., 2022), argues that approaches that are practical and solution-focused help pupils process distress and build agency. This relates both to their perceptions of responsibility, and their ability to act. Knowledge without the ability to act, without the ability to reimagine, reform, and replace, is not helpful to young people. Accordingly, the approach of response-able pedagogies is powerful. It is relevant to climate discourse, where blame is shifted onto parties not responsible (Shreedhar et al., 2024), and it encapsulates the teachings of other critical pedagogies (Paolo Freire, 1970), it incorporates positive visioning (Hopkins, 2019), whilst also addressing our permeability and interdependence (Bozalek & Zembylas, 2017; D. J. Haraway, 2020).

Outdoor Education

Children at primary school age are at a very important point of development (Nepraš et al., 2022). Research done on the long-term outcomes of nature-based education shows that those under the age of 11, retain a connection to nature for longer (Liefländer, Fröhlich, Bogner, & Schultz, 2013). Connection to nature is beneficial for mental and physical health, sustainable behaviours and learning outcomes (Barrera-Hernández et al., 2020; Chawla, 2015; Tillmann et al., 2018). Research in this area is increasing, and positive outcomes of time spent outdoors are evident. However, there seems to be a disconnect between these findings and approaches to CCE, in which nature-based education is thought to be something separate from learning about climate change. Schools are not designed to include green space, or they are in urban areas of high population, with environments dominated by concrete. Accordingly, most pupils will spend almost no time in nature, unless their parents choose to spend their weekends outdoors. One survey showed that approximately three-quarters of British youth spend less time outdoors than prison inmates (Carrington, 2016).

The fact that all the pupils who had outdoor sessions loved them and didn't feel they have enough nature-based activities is significant. In many ways, it seems obvious. We have a problem with eco-emotions and other mental health crises that are on the rise (Clayton, 2020), and being outdoors improves well-being (Tillmann et al., 2018); we live in a culture that values consumerism more than nature, and being in nature improves sustainable habits and increases feelings of connection (Barrera-Hernández et al., 2020). The UK is one of the most nature-depleted countries in the world (nature, 2023), and young people are spending less and less time outside (Carrington, 2016; Robinson et al., 2022). This is reflective of a system which does not value nature or see it as an integral part of human life (D. Haraway, 2008; Klein, 2015; Shiva, 2008).

Figure 8 shows two pupils, in different focus groups, pointing to the irony of learning about the environment without experiencing it. Nature-based learning is not part of CCE curriculums to the extent it needs to be, not to mention the rest of the curriculum. Barriers of accessibility and deprivation are partly responsible; however, it is also indicative of a society that does not value nature, and an education system dictated by the need for measurable outcomes (Hayward & Tolbert, 2022).

There are educational alternatives, such as my education, or movements like forest schools, but to most pupils these are not accessible yet (Mycock, 2020). This results in further inequality, which brings the topic of climate change and CCE back to questions of justice (Maathai, 2005; Nixon, 2011; Shiva, 2008, 2018; Whyte, 2017). Learning about protecting the environment in such a far-removed way, may help learn key facts but does it develop a true sense of awareness and connection? Shiva's work Soil not Oil, (Shiva, 2008), and the arguments made by feminist new materialist scholars (D. Haraway, 2008, 2013; D. J. Haraway, 2020), ask this question. So too,

do movements of indigenous activism around the world. These ideologies are not purely about a need to survive, they are also about what it means to live in this world. Considering this within the context of the findings, that show an entirely positive reaction to the outdoor sessions, the potential to boost positive engagement seems evident. This provides an impactful opportunity to motivate pupils through appreciation and enjoyment rather than fear.

Reimagining Educational Aims; A fact, a Value, a Way of Seeing

Part of this research is exploring not just a critical restructuring of how we approach knowledge exchange, but also to advocate for an examination of the very knowledge we think to be most important (Hayward & Tolbert, 2022). Given the time-sensitivity of climate change and the implications for young people, there need to be outcomes that are transformative. Young people will face the inevitable challenges of a changing world, and they need the skills to do this. These skills should help young people to value the natural world, think critically, look after themselves amid times of uncertainty, hold others accountable, put collective needs over individual wants and to realise that we live on a planet with finite resources. It would teach a way of being that was sustainable and an outlook radical enough to make the world anew (Hopkins, 2019). It cannot just be about teaching the science, or how to lower emissions, these things are part of it, but if teaching for outcome, there needs to be a vision to replace the one we currently have (Hopkins, 2019). If children cannot imagine an alternative, and do not have outlets, then they are left with the terror of a world, that in their words, ‘is dying’ (P4).

Revisiting the question of intended outcomes, this research argues for a reimagining of educational aims for primary school pupils. This is not an anti-science argument. The science of climate change is important for combating denialism (Cook, 2020), but it will not help young people to change the systems that need changing. Key values of connectivity, interdependency, community, sustainability, mindfulness and compassion, are more transformative than fact (Bleazby et al., 2023; Bourn & Tarozzi, 2023; Hopkins, 2019; Kessler, 2023). Given the developmental significance of this age (Joshi & Shukla, 2019), and the research findings, supported by the literature, it seems that traditional measurable outcomes should not be the aims of CCE implementation for this age group. If CCE is embedded throughout education and across curriculums, then there will be time to develop pupils’ scientific understanding.

Future research

The research on pedagogy and approach is robust and demonstrates high levels of coherence. However, having surveyed the literature on CCE and relevant fields, several areas require further research. Importantly, more research on childhood

development and CCE would help ascertain the best interventions for different age groups, to empower and protect well-being. In relation to this, exploring the implementation of a socially situated, and justice-based curriculum would require a practical understanding to avoid further burdening pupils. More research examining the impacts of disparity and inequality in the implementation and accessibility of CCE is vital. Additionally, there is a great need for more longitudinal studies, that give insight into behaviour change. And far more research needs to be done on the role of nature-based education and its impact on pro-climate behaviour. Experimental research that studies what implementations may look like in practical terms is also needed, so that curriculums can be developed and shared globally.

Conclusion

Extreme weather events are increasing and for some people more than others. Earth's systems are shifting before our eyes, the blip of human life coalescing with the vast cycles of the natural world. In a time requiring radical transformation, success is contingent on our ability to reimagine the world. Education plays an important role in this. This research has explored the realities and possibilities for the implementation of CCE in UK schools, with a particular focus on primary schools. The findings have reflected those found in the literature, and advocate for pedagogies that are inclusive, practical and empowering. While structural barriers remain, working with community organisations to develop place-based curriculums can increase accessibility whilst responding to these limitations. An argument is made for nature-based learning constituting part of the foundation for early CCE education, to create a connection to the natural world which can provide lifelong benefits to pupil's well-beings as well as generate long-term sustainable awareness. The findings point to the importance of balancing climate-science with practical engagement to protect pupil well-being and nurture response-ability in young people. In response to these findings, this research suggests that for primary school children, the intended outcomes of CCE should be reimagined. The early stages of CCE could instead be about sharing a value system and a way of seeing, that challenges the status quo of inequitable and unsustainable high-emission societies, providing a strong foundation for long-term impact and behaviour change.

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Appendix

Item one : Full quotes used for illustrations

Figure 4: What if Our MP Does Not Agree? (P4)

> Pupil 1: I like that we got that we dragged our MP into all of this, which is a good thing, because if you're just If you're if it's good that you've dragged that MP in, because then the MP could spread the word and then the Prime Minister could, then it could be brought up in the thing that they do and then the Prime Minister could raise it and then those people start to take action.
>
> Pupil 2: I completely agree saying that if you if we tell our MP and if they agree, but if they don't agree, then what would you be do? Because if they don't agree with the statement that we have, then what would we have to do like do we have to go against the MP or would we?

Figure 5: Working Together (P7)

Figure 6: You Are Hurting the Earth (P4)

> Pupil 1: When my dad he's watching TV, sometimes he watches TV or like he sleeps or like he goes on his phone. So I always tell him, Dad, turn off the TV or like if he's sleeping, I just turn off the TV automatically. The TV? Ohh he I thought. I thought you said why, why and I. First of all, you're hurting. You're hurting the earth and second of all, you're going to have a lot of, you know, electric bills. So I told him that. And he said, you're right. You're right. So let me turn it off." (P4)

> Pupil 2: When I feel quite guilty, cause our family kind of rely on electricity, but I have talked to my mum and that we are reducing the amount of electricity that we're using. For example, sometimes when the lights are on, my mum's really nagging me, nagging me, nagging me to turn the lights off, and I am very guilty because I'm on my PlayStation a lot, but I'm getting more outside. And trying to reduce the amount of electricity that I'm using in the house and I've told everyone in the house that we are trying to stop using this much electricity because the bills gonna go up. Plus we're pushing more to climate change and we need to stop. (P4)

Figure 7: I Wish We Learned How to Solve It Instead (P4)

Pupil 1: I was happy that I knew about it. But in a way, not because when you when, because if you know about it, then you'll get more worried about it. But if you don't know about it, then it will just be a normal life. But honestly, I kind of wish we didn't really learn about how much carbon dioxide there really is and what's happening to the world. I just wish we knew we learned about how to solve it instead.

Pupil 2: I agree because if you didn't know if that was going around, you wouldn't worry as much. You'd know that there's littering and you'd notice the change in the weather and stuff, but if you knew about it, you would feel a bit a bit worried because it's a bit, it kind of scary that the earth is just warming up all of a sudden and the ice is melting and then loads of homes are getting destroyed.

Pupil 3: I disagree because if you do not know about it, and not many people take action against it, so we'll just keep getting worse. And then when you start to get know about it, it'll already be too late because you didn't already know about it. But if you learn about it now, then maybe in the future it can get better because we started it very soon. And we need to take action because if you don't take action and just get worse and worse and worse and worse."

Figure 8: City Senses (P7)

"we went outside and we looked at some like different types of nature and we like describe so many. And we looked and heard so many sounds she told us to close our eyes, eyes. So we heard lots of stuff, like the helicopters, children laughing and lots of people down the road and cars passing by."

Figure 9: I cannot Experience Climate Change Inside (P7 and P5)

"I feel like one of the things we need to improve on is maybe since we're trying to save with nature as well, I feel like we need to be more outgoing. We're usually inside talking about the climate. We looked at people who tried to stop the carbon emissions, but I think mainly we need to focus on going outside more." (P5)

"I like the outdoor sessions, because climate change is based on outside and not inside, we usually do the lessons inside and I think outside is a really good opportunity to like see what you're really learning about. And I cannot experience climate change inside but going outside." (P7)

Item two : link to the Solomon Islands video

https://www.youtube.com/watch?v=faQvTuXq2dQ