Environmental Education in an English Primary School: A Case Study to Explore Year 5 Children's Experiences of 'Operation Buzz': a Bumblebee Conservation Project

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Abstract

The environment is almost irreversibly damaged by Anthropocene activity. Today's children will be the people most affected by the ongoing environmental crisis and their education is vital to long term sustainability. However, in mainstream schools in England, teachers of children of all ages are reluctant to integrate sustainability into their practice because it is not on the curriculum, and they lack training and resources. This research aimed to increase understanding of how sustainability education (more specifically environmental education (EE)) can be effectively included into mainstream education. The research centres around students' perspectives of their experiences during a school-based EE project. During April – July of 2019, a bumblebee conservation project was developed with a Year 5 class (9- and 10-year-old children) in a small, semi-rural primary school in a northern city in England. The project pedagogies drew on Dewey's theory of Experiential Learning and Freire's Critical Pedagogy. Qualitative data were collected throughout and analysed thematically.

Findings demonstrated the children's fear of bees (and other insects) reduced whilst their knowledge, understanding and positive affect towards bees and insects increased. Participating in the project increased the children's pro-environmental attitudes and behaviours; some children 'didn't really care but now… do'. Pedagogies of choice, questioning, researching, and hands-on activities increased individual empowerment. The children described sharing their learning with their families and encouraging pro-environmental behaviour at home. Recognising social and emotional aspects of learning supported the children to engage in positive learning and behaviour cycles. The children expressed how participation in the EE project resulted in them developing increasingly positive attitudes to learning more generally and how they felt 'more into doing …work' and 'not giving up'. Findings showed that EE is an adaptable, cross-curricula subject that can easily include curriculum requirements and can be woven throughout a school's daily activities. How EE and experiential learning pedagogies can be developed and made accessible to classroom teachers is a rich area for further research.

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Chapter 1: Introduction

1.1 Introduction

The purpose of this thesis is to increase understanding of the enactment of environmental education (EE) in English primary schools with the hope of increasing school engagement with EE. As there is a need to include children's voices in EE research (Rousell & Cutter-Mackenzie-Knowles, 2020) a qualitative case study, in a primary school in Yorkshire, England, explored the experiences of ten children taking part in a bumblebee conservation project. Findings were used to answer the question: **How do children experience an EE project in an English primary school?'**

The focus of the EE project was bumblebee conservation; and the reasons for this are explained in Chapter 2, section 2.7.6.3 and Chapter 4, section 4.2.6. Although I decided the focus of the EE project, it was important to include the children's voices in the development of the project activities and so during the first session, the children discussed what they would like to incorporate into the project. During this session the children explained they wanted to give the EE project a name and following a class discussion they voted to call the project 'Operation Buzz' (OB); a name suggested by one of the boys in the class.

This chapter now explains the rationale for the research and gives my positionality on the environment and education. The context of the research and the terminology surrounding sustainability and environmental education (EE) are then outlined. After highlighting the gap in the literature, the research questions and supplementary questions are stated. The theoretical grounding of the research and the fieldwork approach are then outlined, and the contribution of the research presented. Finally, the structure of the thesis given.

1.2 Rationale for the Research Study

The planet is almost irreversibly damaged (Orr, 2020). Climate change and biodiversity loss are believed to be pushing the Earth towards the sixth great extinction event (Ceballos & Ehrlich, 2018). Despite decades of international talks and agreements '[t]here has been no let-up in the net loss of nature' (State of Nature Report, 2019:6). Of us all, children, young people, and future generations will suffer the greatest impact of such catastrophic losses (State of Nature Report, 2019).

Children are one of the most important resources for climate restoration and on-going sustainability (Bessant, 2014). Not only will they be responsible for making the policy decisions in the future (Turtle, Convery & Convery, 2015), but they can be immediately effective partners in protecting and restoring our world (Turtle, Convery & Convery,

2015). Global movements such as the 'Friday for Future' protest marches indicate children increasingly want to take part in action for the environment (De Moor et al., 2020), however it is argued that before being asked to restore the environment, children should have opportunities to enjoy nature and develop an empathy for the natural world (Richardson & Sheffield, 2017).

Children have a fundamental human right to have access to nature (United Nations Convention on the Rights of the Child (UNCRC) 1991) and developing a connection to nature in childhood is important (Richardson & Sheffield, 2017). Unfortunately, although today's children are burdened with becoming 'the environmental stewards of the future' (Soga, Gaston et al., 2016:10) research demonstrates many children have little access to the natural world and have little to no connection with nature (Soga & Gaston, 2016) or their local environment (Ballouard, Brischoux & Bonnet, 2011). This 'extinction of experience' (Soga & Gaston, 2016:94) needs to be readdressed. Although many organisations (such as Wildlife Trusts, Conservation Trusts, and national societies such as the Royal Society for the Protection of Birds) provide opportunities for children to interact with the natural world, but for reasons outlined in Chapter 2, section 2.3.2, not every child can access these (Barratt Hacking, Barratt & Scott, 2007). As there is a vital need to engage children with nature and environmental education (EE), and this thesis argues school is a key place where this can occur (Ballouard et al., 2011; White, Eberstein & Scott, 2018).

1.3 Researcher Positionality

As research is influenced by the positionality of the researcher (Stake, 1995), my experiences of working within the English education system are outlined before my position in respect to the environment and education is outlined.

I have worked in the primary and secondary education sector in England, in both mainstream and in the alternative provisions of a charity (which supported secondary school-aged children who had been excluded from mainstream education) and a pupil referral unit (PRU) for children aged 5-16 years. A PRU is a government provision to 'teach children who aren't able to attend school and may not otherwise receive suitable education' (www.gov.uk, 2023). I usually worked with children individually or in small groups and regularly supported the children who had the label of 'SEND' (Special Educational Needs and Disabilities). I loved this role however I was often told to deliver the teaching in ways mandated by the organisations even though the prescriptive lessons regularly left the children confused and frustrated; I could see their confidence and self-esteem eroding before my eyes. Wanting to find more effective ways to increase understanding and learning, I would spend time talking with the children about how they understood their

worlds, their learning, and the activities we were doing. Instead of following set approaches to teaching and learning, I worked with the children to adapt the activities on offer.

However, although my lived experiences demonstrate the effectiveness of hands-on activities, following a child-led approach, and linking learning to lived experiences, throughout my time working in education, I was told that these approaches were not the way to teach. I regularly felt that neither the children nor I were being listened to. Eventually I felt overwhelmingly frustrated and demoralised and unsure as to if and whereabouts in the education system I would ever 'fit'. Ultimately, I decided that one way to support children's voices to be heard and to explore the use of different pedagogies in English education was to formally research children's experiences of learning. In this way, I hoped to 'legitimately' explore ways to increase engagement with teaching and learning both for children and adults. Having explained the path that led me to research children's experiences of their education, I now explain why the focus of my research is environmental education.

I believe the planet is being damaged by human activity and the prioritisation of economic growth has reduced care for the environment (Dryzek & Pickering, 2018). In line with McGregor (2013), I argue that the environment should not be viewed as a convenient resource for human wants and needs but instead, people should view themselves as part of a shared and holistic planetary system. I support the proposal for 'sustainable contraction' (Selby, 2007:249) in which people reduce consumerism and environmental damage whilst restoring the harm already done.

I argue that education is vital to ongoing sustainability. However, only sharing information is insufficient to prompt action to protect and restore the planet (Courtenay-Hall & Rogers, 2002). Education must also foster empathy for nature (Hauk et al., 2015), support creative and critical thinking skills (Freire, 1996), and facilitate the development of the practical skills needed to restore the environmental damage done. Unfortunately, in mainstream education in England, working within the remit of the statutory English National Curriculum, children are often seen as passive receivers of information (Stevenson, 2007) which they must reproduce in tests and assessments (Glassman & Patton, 2014). I agree with Reich, Garrison and Neubert (2016) however, who argue that the focus on assessments reduces opportunities for both teaching and learning. I maintain that children should have creative input into their own learning and development and be supported to develop a wider range of thinking and practical skills.

1.4 Research Context

Schools have the potential to increase children's access to nature and to support them to become partners in pro-environmental activities (Rafferty & Laird, 2013). However, sustainability and environmental education (EE) are not explicit curriculum requirements in primary (or secondary) education in mainstream schools in England and research indicates this effectively moderates school engagement with EE (Bridges & Searle, 2011).

It is suggested the lack of explicit EE in the curriculum is due to the influence of neoliberal politics on education (Payne, 2016). Neoliberalism proposes that individuals and society are best served through competitive markets. It argues that 'the individual is responsible for providing his or her own needs and it is through individuals working to fulfil those needs that society is created' (Hursh, Henderson & Greenwood, 2015:303). Thus, the collaborative nature of society is replaced with an individualistic, competitive, and market-focused approach (Hursh et al., 2015). This is incompatible with the liberal and democratic approaches promoted by EE (Pimlott-Wilson & Coates, 2019).

Alongside the philosophical incompatibility between neoliberalism and EE, neoliberal governments further influence education systems by developing curricula that maintain a narrative which promotes economic gain and diminishes the need for shared, pro-environmental action (Payne, 2016). The competitive, neoliberal culture of examination result 'league tables' (Mitchell & Stones, 2022:6) then ensures teaching conforms to these curricula. Pressure to produce prescriptive learning outcomes leaves teachers reluctant to spend time on activities that are not on the curriculum, cannot be easily mapped on to the curriculum, or are not explicitly assessed (Buchanan, 2012; Evans et al., 2017). Sadly, 'performativity and teaching to the test' (Mitchell & Stones, 2022:6) now dominates mainstream education (Glassman & Patton, 2014; Somwaru, 2016). Although, teachers report wanting to engage with EE in school (Kelley & Williams, 2013), they express feeling uncomfortable using the child-led, inquiry-based pedagogies promoted by EE because of lack of training and resources (Sherbine & Hara, 2022). Thus, not having EE as an assessed curriculum requirement creates further barriers to the inclusion of EE content and pedagogies into the school day (White, Eberstein & Scott, 2018). Currently, EE exists as a patchwork of approaches only engaged with by particularly interested parties (Glackin & King, 2020) and this has created uneven access to EE across schools.

1.4.1 Terminology Surrounding Sustainability and Environmental Education

Initially an ecological expression, the term 'sustainability' is now often viewed as having environmental, economic, and social aspects which are collectively known as 'the three

pillars of sustainability' (Purvis, Mao & Robinson, 2019). The political element of sustainability often remains neglected in the sustainability discourse (Orr, 2020). The term 'sustainable development' was introduced by The Brundtland Report (1987) (also known as 'Our Common Future') which was published by the World Commission on Environment and Development (WCED). This report concluded that overconsumption in the Global North alongside the extreme poverty of the Global South was resulting in global environmental damage. The Brundtland Report (1987) described sustainability as the need to 'meet the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland, WCED, 1987:42) and developed principles for combining human development with environmental needs. This approach became known as 'sustainable development'. However, although still widely used, the terminology and approach of 'sustainable development' has been criticised because of the human-centric focus (Drolet, 2015).

More recently, approaches to environmental action have begun to focus on sustainable contraction and environmental restoration rather than sustainable development (McGregor, 2013). Sustainable contraction (Selby, 2007) argues against the idea that ongoing 'development' can become sustainable through technical solutions. Instead, it promotes moving away from consumerism and over-consumption and instead advocates 'contraction which would lead to moderation, and ultimately, to [environmental] restitution and restoration' (McGregor, 2013:3566). Crucially, the focus of environmental restoration is for ecological (rather than human-centric) reasons; and these newer 'neo-sustainability' approaches are gaining support (Farley & Smith, 2020).

Education about and for the environment has also developed in different ways. Key approaches are 'Education for Sustainability' (EfS), 'Education for Sustainable Development' (ESD) and 'Environmental Education' (EE). These approaches are discussed in greater detail in Chapter 2, section 2.5, but it is important to note here that although all the approaches emphasise the need for knowledge-based action and the development of critical thinking skills, they differ in focus. Whilst EfS has a broad focus on the social, economic, and environmental elements of sustainability, ESD has a fundamentally human-centric focus. EE on the other hand has an ecological focus which promotes sensitivity and concern for the environment. This research follows an EE approach which aims to promote pro-environmental attitudes and behaviours using a restoration focus (i.e., a focus on both reducing and repairing damage to the environment).

1.5 Gap in the Literature

Although there is growing literature exploring EE, and increasing amounts of research that explores children's experiences of learning, there is less in the current literature which explores children's experiences of EE in school. There is a need 'for new ways of making climate change meaningful for children and young people through participatory […] modes of engagement' (Rousell & Cutter-Mackenzie-Knowles, 2020:203) and 'for research that gives young people both a hand and a voice in redressing the complex implications of climate change in their own communities and environments' (Rousell & Cutter-Mackenzie-Knowles, 2020:203). This research aims to add to the literature which explores how EE can be integrated into mainstream English education practice, and to the literature which includes children's voices in EE and EE research.

1.6 Research Questions

Following exploration of existing literature, the aim of the research was to conduct a case study to answer the research question: **How do children experience an environmental education project in an English primary school?** However, when using a qualitative case study approach 'the best research questions evolve during the study' (Stake, 1995:33) and Yin (2018) advocates for the development of questions throughout data collection.

In line with Stake and Yin, additional supplementary questions were developed throughout the fieldwork. Firstly, it was necessary to acknowledge whether the intervention project was a suitable approach to EE, and so the additional question was added: RQ1: How does the bumblebee conservation project fulfil the objectives of EE?

Secondly, using the framework of Dewey's Experiential Learning Theory (see Chapter 3 section 3.3.5.1) to analyse data from the pilot study demonstrated the effectiveness of using the concept of experience as multimodal to interrogate the findings. Therefore, for the main stage of the fieldwork, the supplementary questions were developed:

RQ2a: How do the children describe their **social** experiences of the EE project?

RQ2b: How do the children describe their **emotional** experiences of the EE project?

RQ2c: How do the children describe their **physical** experiences of the EE project?

Thirdly, the EE project facilitated the children to engage in pedagogies that were different from their typical school day, therefore after breaking down the exploration of experience into the three sub-questions, it was important to also ask: RQ2d: How do the children experience the EE project in comparison to a typical school day?

Finally, although the focus was the children's experiences, the research aimed to explore how EE can be integrated into the school day. Thus, it was important to explicitly ask the final supplementary question: RQ3: What are the implications of the findings for the enactment and inclusion of EE into the school day?

In this way, supplementary questions were developed which created a framework to answer the initial research question (How do children in an English primary school experience environmental education?) in a way that would support the enactment of EE policy and practise.

Thus, as the research developed the questions asked were:

RQ1: How does the bumblebee conservation project fulfil the objectives of EE?

RQ2a: How do the children describe their social experiences of the EE project?

RQ2b: How do the children describe their emotional experiences of the EE project?

RQ2c: How do the children describe their physical experiences of the EE project?

RQ2d: How do the children experience the EE project in comparison to a typical school day?

RQ3: What are the implications of the findings for the enactment and inclusion of EE into the school day?

1.7 Theoretical Framework and Approach to the Fieldwork

The theoretical grounding of this research is social constructivism which posits that individuals construct their own subjective knowledge and understanding by interacting with and interpreting their environment (Stake, 1995). Social constructivism explains that culture and power structures influence the subjective interpretation and idiosyncratic construction of knowledge (Vygotsky, 1978). The importance of experience on learning is emphasised in social constructivism (Bandura, 1977).

The development of the EE project used in the fieldwork was informed by Dewey's Experiential Learning Theory. This theory explains that teaching and learning is most effective when hands-on learning is related to life experiences which promote the development of meaningful connections, understanding and knowledge. The EE project also drew on Freire's Critical Pedagogy which questions the power structures and politics which promote certain 'knowledge' and maintain inequalities. Thus, critical pedagogies of empowerment, critical thinking and meta-cognition skills were woven throughout the project. Rather than aiming to teach right and wrong, the children were supported to make their own, informed decisions and the project approach was 'child learning' rather than 'adult

teaching'. Pedagogies included working indoors and outdoors, hands-on activities (such as making bug houses and gardening), independent questioning and research, and group work. Curriculum requirements were included throughout, for example, letter writing, poetry, and verbal presentations supported Literacy, whilst Numeracy was explicitly included through activities such as calculating perimeters and sizes of sections of the wildlife area.

1.8 Contribution of the Study

This thesis adds to theory by using Experiential Learning Theory and Critical Pedagogy to enact EE in a mainstream school setting. The findings of this research also contribute to literature which explores children's engagement with EE and research which includes children's voices in education. I recognise that the thematic analysis of the children's experiences is my subjective interpretation, nevertheless analysing the data through the lens of social constructivism develops an understanding of how the children's experiences of EE influenced their engagement with EE and learning more widely. By doing so this study aims to support educators to increase engagement with EE in mainstream primary education.

1.9 Structure of Thesis

Chapter 1: Introduction

The introductory chapter provides the purpose of the study, the rationale, and the context of the study. My researcher positionality and the gap in the literature are outlined. The research questions are then stated, and the theoretical framework summarised. Finally, an outline of each of the thesis chapters is given.

Chapter 2: Literature Review

The literature review explains the importance of children having access to EE and provides important context for this study. The politics surrounding EE and mainstream English education are then addressed. Approaches to EE are detailed and previous research and initiatives discussed. The importance of experience in learning is then considered alongside an examination of the difficulties surrounding understanding the experiences of others.

Chapter 3: Theory

This chapter provides more detail about my positionality and the theoretical foundation of the research. The pedagogical theories which influence the development of the fieldwork EE project are given.

Chapter 4: Research Design

Here the research design and the research environment are detailed. The fieldwork project and activities are outlined. Data collection methods are explained, and the data analysis process is described. Finally, the ethics surrounding the research are discussed.

Chapter 5: Findings

Structured around the framework of the themes identified throughout the data analysis, this chapter provides data extracts and analysis.

Chapter 6: Discussion

In this chapter, the findings are discussed in relation to theory and previous research.

Chapter 7: Conclusion

The concluding chapter returns to the research questions and highlights the contribution of this study to literature and the understanding of primary school children's engagement with EE in England. Reflections on the research process are shared. Limitations of the study are discussed and suggestions for future research are proposed.

Chapter 2: Literature Review

2.1 Introduction

After briefly explaining how the literature was searched, this chapter will address why it is important to research environmental education (EE) with children. Sustainability concepts and terminology are then outlined, and an overview of sustainability education (SE) is presented. The relationship between SE and EE is then outlined. Next, the influence of neoliberalism on the environment, education and environmental education is discussed before the English curriculum and the position of EE in English primary schools is examined. Following this, factors that influence the effectiveness of EE and research that explores school-led approaches to EE are discussed. The concept of experience, the importance of listening to children's experiences, and the complexities involved in understanding the experiences of others is then addressed. Finally, the research questions are presented.

2.2 Searching the Literature

Initially, a general scoping search of the University of Sheffield's StarPlus database using terms such as 'environmental education' and 'sustainability education' was conducted to map the development of research and ideas. The same terms were used in Google Scholar, and when a new piece of research came to light, it was accessed directly or via StarPlus. Specific journals available on the StarPlus. Grey literature and websites of organisations which have an education and/or conservation focus, such as the Bumblebee Conservation Trust, were used in the scoping review to further explore terminologies and themes but were not themselves included in the literature review. Instead, the key words, terms and themes identified through these sources were used to enhance the search of peer reviewed literature. Specific journals available on the StarPlus database were searched using the same key words. Citations from the papers and book chapters found were used to locate further relevant material. Searches were not limited by date. Throughout this research, analysis and write up, the literature was repeatedly searched in the same way. Appendix 1 gives the lists of search terms, journals and organisations used.

Having explained the approach to searching the literature, the rationale for this research is now provided.

2.3 Why it is Important to Research Environmental Education (EE) with Children

Our environmental systems are almost irreversibly damaged by Anthropocene (i.e., the 'current human epoch' (Mitchell & Stone, 2022:4)) activity and man-made stresses put on the environment cannot be maintained (Orr, 2020). The 'planetary boundaries framework' (Rockstrom et al., 2009) argues that if the balance of specific environmental systems (e.g., global biochemical cycles, such as the carbon and nitrogen cycles, and chemical pollution) are pushed too far out of kilter then 'non-linear, abrupt environmental change within continental-to-planetary-scale systems' (Rockstrom et al., 2009:Abstract) may occur with the potential for consequences that are 'deleterious or even catastrophic' (Rockstrom et al., 2009:1). Worryingly, the planetary boundaries model suggests that the three vital boundaries of climate change, biodiversity loss and biochemical flows may have already been crossed (Little, Hester & Carey, 2016:6834). It is now widely believed that climate change is rapidly driving the planet to a catastrophic sixth great extinction event (Ceballos & Ehrlich, 2018).

Since the first United Nations Conference of Parties (COP) in Berlin (1995) drew up a plan of activities to tackle climate change, annual conferences have taken place (except 2020 due to the global Covid19 pandemic). At these events world leaders meet to discuss and agree to measures to mitigate climate disaster. During COP21 (Paris, 2015), The Paris Agreement was signed in which countries committed to an ongoing cycle of climate action. Countries also agreed to submit increasingly stringent plans for national climate action to the UN (COP) every five years. During COP26 (Glasgow, 2021) pledges were again made to rebalance the climate injustice between the Global North and Global South and further commitments were made to implement climate change policies. Again, during COP27 (Sharm el-Sheikh, 2022) more non-legally binding, self-policed policies were agreed to.

Yet, despite decades of talks, agreements, and initiatives, '[t]here has been no let-up in the net loss of nature in the UK' (State of Nature Report, 2019:6); and although this loss impacts us all:

> '[T]he greatest impacts will be upon the lives of young people and generations yet to come, if they have to live in a world impoverished of nature' (State of Nature Report, 2019:2).

Environmental concerns are increasingly prominent across society and the need for positive environmental action is widely recognised (Payne, 2022). Children are becoming increasingly anxious about the environment and these worries are having damaging effects on children's health and wellbeing (Burke, Sanson & Van Hoorn, 2018).

2.3.1 Eco-anxiety

Eco-anxiety is a broad term which ‘can be used to describe any anxiety which is related to the ecological crisis’ (Pihkala, 2020b:3), for example, Usher, Durkin and Bhullar (2019) explain ‘eco-anxiety is a specific form of anxiety relating to stress or distress caused by environmental changes and our knowledge of them’ (Usher, Durkin & Bhullar, 2019:1), whilst the American Psychological Association defines eco-anxiety more succinctly as ‘a chronic fear of environmental doom’ (Pihkala, 2020b:4). Although the term eco-anxiety is defined (and used) in different ways (Pihkala, 2020b) it is widely recognised that eco-anxiety has a detrimental effect on mental health (Usher, Durkin & Bhullar, 2019) with conditions such as ‘climate anxiety, eco-anxiety, and climate grief’ being increasingly reported in the media (Clayton, 2020:2).

Debate continues as to the appropriateness of the term ‘eco-anxiety’ as it risks pathologising an emotion that could be seen as an appropriate reaction to environmental damage which may lead to pro-environmental behaviour change (Dodds, 2021). However, research indicates that eco-anxiety does not correlate with behaviour change (Clayton, 2020); and this is possibly due to ‘tension between the motivating and paralysing effects’ of such anxiety (Clayton, 2020:4). Thus, the term ‘eco-anxiety’ remains a suitable description as it reflects many characteristics and behaviours associated with anxiety (Pihkala, 2020b).

Eco-anxiety is impacting children globally. Hickman et al. (2021) conducted a large-scale global survey, which focused on ‘climate anxiety’ (a subsection of eco-anxiety) and concluded that eco-anxiety is affecting ‘a large proportion of children and young people around the world’ (Hickman et al., 2021:870). Their research, which included 10,000 young people (aged 16-25 years) across ten countries, indicated that climate anxiety is widespread in children around the world and is impacting their daily lives. Across all the countries, Hickman et al. found 59% of all respondents were ‘very or extremely worried’ about climate change whilst 84% were ‘at least moderately worried’ (Hickman et al., 2021:863) about climate change. The respondents reported emotions such as sadness, worry, anxiety, fear, anger, powerlessness, helplessness, guilt, shame, despair, hurt, depression and grief (Hickman et al., 2021). Worryingly, despite the scope and scale of their research, Hickman et al. (2021) believe their findings are ‘probably a conservative estimate of distress levels globally’ (2021: 872).

The emerging field of Childhoodnature uses ecological systems thinking to explore child-nature as ‘a useful guide for theorizing our interconnected social and ecological worlds’ (Logan & Widdop Quinton, 2020:983). This holistic approach, in which humans are seen as ‘being and doing as/with/in nature’ (Logan & Widdop Quinton, 2020:985), allows exploration

of how ‘the ecological emergencies of the Anthropocene are entangled with our/children’s lives’ (Logan & Widdop Quinton, 2020:985). The relationship between Childhoodnature and ecological theory is taken up further in Chapter 3, section 3.3.4.

Today’s children are the most important resource for on-going sustainability and can become vital partners in pro-environmental behaviour (Bessant, 2014). Children reproduce, interpret, advance, and reinvent society (Freeman & Tranter, 2011) and they can affect immediate and ongoing positive environmental change (Ericsson & Boyd, 2017; Uzzell, 1999). High-profile personalities such as Greta Thunberg, (a Swedish student who, in 2018 at the age of 15, refused to attend school and instead used this time to protest the causes of environmental damage) have raised the awareness of a need for climate action. The ‘Fridays for Future’ school strikes initiated by Thunberg are now a global campaign, indicating that children increasingly want to act (De Moor et al., 2020). Crucially, children will become the citizens who make policy decisions in the future (Turtle, Convery & Convery, 2015). However, before being tasked with restoring the environment, children should be able to enjoy nature and develop positive emotions towards the natural world (Soga & Gaston, 2016; Richardson & Sheffield, 2017).

2.3.2 Children’s Disconnection from Nature

Today, ‘many children are highly disconnected from nature’ (White, Eberstein & Scott, 2018:2). This has been attributed to many causes, but whether through urbanisation (Bruni et al., 2017; Colding et al., 2020), the increase in digital pastimes such as computer games (Mullan, 2019), parental fear of potential harm (Hand et al., 2017), or social class and income (Bates et al., 2018) to name just a few, the ‘extinction of experience’ of nature (Soga & Gaston, 2016:94) is problematic. Reduced time in nature has been shown to negatively impact children’s wellbeing and mental health (Friedman et al., 2022), whilst long-term environmental attitudes and behaviours are believed to be influenced by experiences of nature during childhood (White, Eberstein & Scott, 2018).

Informal and outdoor education programmes can increase children’s interactions with the natural world (Cheng & Monroe, 2012). There are many wildlife trusts, conservation trusts, societies and independent organisations which are dedicated to conservation and education and promote environmental protection and pro-environmental behaviours. However, not all children have access to these. Access to out of school activities has been shown to be influenced by gender, socio-economic status, race, and ethnicity (Heath et al., 2022). Family environment and ‘differences in resources, dispositions, and attitudes’ also affect children’s opportunities and experiences (Morris, 2015:270) with a positive self-selection of out of school activities by ‘advantaged families’ (Carbonaro & Maloney, 2019). School, therefore, is

a key place that engagement with nature and EE could take place as ‘school can target children that are not traditionally reached by science outreach or biodiversity-related volunteering programs’ (Ballouard et al., 2011:7).

Although schools have the potential to increase children’s access to nature and to support pro-environmental activities (Rafferty & Laird, 2013) EE and sustainability are not mandated or assessed in mainstream primary education in England and do not explicitly impact league table results. The lack of compulsory assessments coupled with limited time, training, and resources has been shown to moderate engagement with EE (Walker, Bormpoudakis & Tzanopoulos, 2021) and has created uneven access to EE across schools (Gandolfi, 2023). The positioning of EE in English primary schools is discussed in section 2.6.5 of this chapter. Firstly, however, context is provided; sustainability concepts, terminology, and the broad landscape of sustainability, SE and EE are outlined and the effects of neoliberalism on education and EE are discussed.

2.4 Sustainability Concepts and Terminology

2.4.1 Sustainability

Initially an ecological expression, the term ‘sustainability’ now includes economic and social elements alongside the environmental; these aspects are known as ‘the three pillars of sustainability’ (Purvis, Mao & Robinson (2019) provide an historical overview). The ‘three pillars’ are also known as the ‘Triple P’s’, those being: Planet, Profit, People. Although politics has now been recognised as an important aspect of sustainability, it often remains neglected in discourse and research (Hakansson, Ostman & Van Poeck, 2018; Orr, 2020) and the three-pillar model remains dominant (Table 1).

Table 1: Overview of the Pillars of Sustainability (Elliott, 2019).

Pillar	Triple Ps	Definition
Environmental	'planet'	Environmental 'footprint' often used to monitor ecological sustainability; it is argued that current footprint measures are too narrow with long term environmental issues (such as soil damage and heavy metal pollution) being overlooked. (Rockström et al., 2009)
Economic	'profits'	Debates whether one type of 'capital' (human or natural) can replace another, or whether different capitals are complimentary. Strong sustainability argues that human capital (particularly economic gains) cannot compensate for loss of natural capital. (Ekins, 2014)
Social	'people'	Equity of resources between current generations and for future generations, nationally, globally, now and in the future. (Brundtland, 1987)
Political		Highly influential to policy development and enactment but often overlooked in discussions and research about sustainability. (Orr, 2020)

Currently, a working definition of the term 'sustainability' remains unfixed (Ramsey, 2014) as differences between cultures and societies make it 'difficult to agree on a definition of sustainability' (Little, Hester & Carey, 2016:6838). The lack of a comprehensive definition means the term sustainability is often unclear in the literature (Siqueira & Pitassi, 2016) and the concept of sustainability is often used in limited ways (Little, Hester & Carey, 2016); nevertheless, several terms are frequently used (sometimes interchangeably) in sustainability discourse. These are outlined in Table 2.

Table 2: Overview of Popular Terminology Used in Sustainability Discourse (Elliott, 2019).

Terminology	Popular definition
Sustainability	Originally an ecological term that became widened to include the human-centric elements of economics and society. The economic, social and environmental elements of sustainability are often referred to as the 'three pillars'. (Purvis, Mao & Robinson, 2018)
Sustainable Development	Includes environmental and social justice elements with a focus on sustainability for ongoing human benefit. (Brundtland, 1987)
Neo-sustainability	Emphasises humans as part of the environment and aims to protect and restore the environment; notably promotes 'sustainable contraction' rather than development. (McGregor, 2013)

2.4.2 Sustainable Development

The phrase 'sustainable development' began to be used in the 1980's and was popularised by the publication of the previously mentioned Brundtland Report (1987). However, the 'sustainable development' promoted in the Brundtland Report has been criticised for its human-centric focus (Drolet, 2015) with the 'needs' of the present and future generations seeming to prioritise human economic development over environmental protection (which it is argued is unsustainable). Nevertheless, in 1992 the United Nations Conference on Environment and Development (UNCED) (also called the 'Earth Summit') published the 'Agenda 21' plan of action which reiterated the need for 'achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development' (cited Hill, 2012:17). Thus, despite questions about the potentially environmentally damaging human-centric ideology of sustainable development (SD), Agenda 21 advocated for education to encourage local, national, and global sustainability in which the focus on 'development' remained a prominent discourse.

Sustainability was again debated at the 2005 World Summit on Social Development and at this point the United Nations initiated a 'Decade for Education for Sustainable Development' (DESD) (2005 – 2014). This global initiative aimed to build on the previous environmental commitments of Agenda 21 by further promoting education towards sustainable development. However, despite the UN's decade-long focus (2005-2014) to raise the profile of Education for Sustainable Development, in 2010 England the government removed funding from the Sustainable School Initiative (which had been introduced in 2004 to provide

a framework and resources for schools to engage with the DESD objectives). Instead, schools were directed to make their own decisions about how ESD should be integrated into their individual communities and to engage with ESD in ways that were best suited to their specific needs (Scott, 2010). In this way, the government moved the responsibility for sustainability education on to individual schools. This change aligns with neoliberal politics which promote choice and individual responsibility rather than collective action (De Lissovoy, 2018). However, it is important to recognise that for schools to engage with EE there is a need to train teachers in ESD/EE (Riordan & Klein, 2010) and the removal of the ring-fenced funding resulted in training, time and resources for ESD/EE being reduced (Evans et al., 2017). Sustainability interventions were curbed (Wiek et at., 2014) and time for ESD/EE in schools was diminished (Dunlop & Rushton, 2022). The influence of neoliberal politics on EE in the English Primary school curriculum is discussed further in section 2.6.5 of this chapter.

Following the DESD, in 2015, the United Nations drafted 17 sustainable development goals (SDG's) to be achieved by 2030. These ambitious global goals aim to promote sustainable behaviours, include human rights, alleviation of poverty and the development of an environmentally sustainable planet. The SDG's stressed the importance of honest engagement with children and the right of the child to communicate and participate. However, the framework again maintained a 'human-centric' and 'resouce-ist' dimension, with the view that sustainability is important only because it is helpful for 'managing resources for human survival' (Aikens, McKenzie & Vaughter, 2016:344); views considered by some to be flawed, outdated, and inadequate (Jickling & Wals, 2012).

As concerns continue to grow about the damaging effects human behaviours are having on the environment (Evans et al., 2017) newer approaches to sustainability are moving away from 'development' and the human-centred 'dominant expansion and consumption paradigm' (Hart, 2021:4) and towards an inclusive approach with humans as part of and within the environment (McGregor, 2013). These strategies are often referred to as 'neo-sustainability' (McGregor, 2013).

2.4.3 Neo-Sustainability

Ultimately, the wellbeing of the planet depends on reintegrating the human-centric sustainability approaches with a deeper ecological concern and returning the discussion of sustainability back to the previous ecological focus (Orr, 2004). Neo-sustainability introduces the idea of sustainable contraction and 'sustainable restoration' rather than sustainable development (McGregor, 2013). The restoration approach central to neo-sustainability emphasises reducing further damage whilst simultaneously repairing damage

already done; and to do this for ecological rather than human reasons (Farley & Smith, 2020). This approach aligns with the previously mentioned 'planetary boundaries framework' (Rockstrom et al., 2009). Within the scope of this thesis, 'sustainability' is understood within the neo-sustainable framework, and has an ecological, and sustainable contraction focus.

Whether engaging with sustainability is motivated by human-centric purposes (political or economic, for example) or adopts a holistic neo-sustainability approach to reduce ecological harm and restore damage, McGregor (2013) states:

> '[E]ducation plays a pivotal role in communicating the normative notion of sustainability so that people's judgements and actions as human beings are more accountable relative to nature and the future' (2013:3563).

The crucial role of education to promote understanding of sustainability and to encourage pro-environmental behaviours (Annan-Diab & Molinari, 2017) is a grounding principle of my research.

2.5 Sustainability Education

Prominent approaches to sustainability education (SE) include 'Education for Sustainability' (EfS), 'Education for Sustainable Development' (ESD), Climate Change Education (CCE) and 'Environmental Education' (EE). These approaches all focus on empowerment, critical thinking skills and the promotion of pro-environmental action based on knowledge, but there are key differences between them. Table 3 provides an overview of the terminology before a summary of each concept is provided.

Table 3: Overview of Popular Terminology Used in Sustainability Education Discourse (adapted from Elliott, 2019).

Terminology	Abbreviation	Popular definition
Education for Sustainability	EfS	Broad term which usually refers to education focused on the wider definition of sustainability involving all three pillars. (Edwards & Cutter Mackenzie, 2013)
Education for Sustainable Development	ESD	Education involving all three pillars of sustainability, but with a clear human-centric focus – i.e., development for the ongoing benefit of people. (Boeve-de Pauw et al., 2015)
Climate Change Education	CCE	Aims to develop the knowledge, skills, and attitudes to understand and mitigate climate change. Although CCE aims to include social justice principles, it is often bounded within science and geography and focuses on knowledge development rather than emotional or behavioural changes. (Greer, King & Glackin, 2023)
Environmental Education	EE	A specific focus on ecological issues and the environmental pillar; does not necessarily have a human focus. (Robottom, 2014)

2.5.1 Education for Sustainability (EfS)

Education for Sustainability (EfS) (also called Sustainability Education) encompasses the environmental, economic, and social pillars of sustainability. EfS aims for students to use their knowledge to take positive action and increase their participation in environmental and conservation projects (Vincent & Dutton, 2017). The intention of EfS is to create positive outcomes for the environment that are 'replicable transferable and scalable to society at large' (Luederitz et al., 2017:62). Although not overtly political, EfS has an implicit focus on the social process of empowerment and is therefore neither neutral nor impartial (Conger & Kamungo, 1988). Mackey (2012) explains that EfS 'combines environmental education principles with social justice principles' (p:474) through experiencing the natural world, learning about the environment and 'taking action'. Although detailed discussion of the importance of social justice in EfS is beyond the scope of this literature review, recognition of the alignment of EfS with social justice principles is important because these do not always suit government agendas (Lyons Higgs & McMillan, 2006).

EfS has a clear purpose to change behaviour (Pooley & O'Conner, 2000) and advocates for behaviours that support sustainable living (Tarrant & Thiele, 2016; Vincent & Dutton, 2017). However, not all EfS interventions and activities result in pro-environmental

behaviour change (Činčera & Krajhanzl, 2013). A difficulty with EfS can be the size of the problem being studied. Although using large-scale topics such as global warming and climate change can be an effective way to raise awareness and stress the urgent need for action (Karpudewan & Khan, 2017), this approach can be overwhelming and leave people feeling despair and helplessness (Coffey et al., 2021; Strife, 2012; Wals, 2017). Alongside feelings of eco-anxiety (discussed in relation to children in section 2.3.1 of this chapter) powerful information indicating a huge and growing problem can ultimately lead to 'action paralysis' in which an individual feels unable to affect change (Salter, Venville & Longnecker, 2011:149). People feel at a loss as to how they can make any difference to what feels like an overwhelming downward spiral. Such negative effects are a problem because emotional attitude influences pro-environmental action (Pooley & O'Conner, 2000). Pro-environmental action has been shown to be inhibited when too much information is given (Buchanan, 2012) as 'the abstract, probabilistic and intangible nature of climate change dampens emotional reactions to information about the issue' (Markowitz & Shariff, 2012:243) and this 'may lead to powerlessness, apathy and withdrawal' (Wals, 2017:157-158).

These findings prompt the question of how global issues can be made accessible to individuals and communities (Little et al., 2016). As a counterpoint to the messages of hopelessness and despair which result in fear induced inactivity, Wals (2017) suggests adopting teaching and learning models that include aspects of Freire's (1996) Critical Pedagogy (CP).

Critical Pedagogy looks at 'the influence of educational knowledge to perpetuate an unjust status quo' (Popkewitz & Fendler, 1999:51). It asks how particular political stances affect the curriculum and the education given. By illuminating power imbalances in systems and societies, it strives to transform the 'inequitable' to fair (Popkewitz & Fendler 1999:47) and promotes the development of critical and political thinking skills to allow reflection on and questioning of the costs and benefits of problems and solutions. By developing skills to examine arguments and authority, individuals become empowered to make change because understand 'how things work' (Popkewitz and Fendler, 1999:46); this approach supports the 'critical and informed analysis' of information which allows individuals to make their own informed choices' (Van Harmelen, 2003:25).

CP, which promotes the emancipation of people by encouraging the development of skills with which to change their worlds, is the approach used in the fieldwork of this research. Freire and CP are discussed further in Chapter 3, section 3.3.5.3.

2.5.2 Education for Sustainable Development (ESD)

Like EfS, education for sustainable development (ESD) has a holistic approach which also draws on the three pillars of sustainability (McGregor, 2013). It aims to promote ongoing human development in a way that does not compromise global resources for future generations. However, ESD maintains a human-centric rather than an eco-centric focus, which prioritises the privilege of the human over the environment (McGregor, 2013). Thus, as explained by Winter (2007) ESD 'is not a neutral term: it embraces a particular policy commitment…and this like any policy commitment, this inevitably has ethical and political dimensions.' (Winter, 2007:337). Troublingly, the 'top-down' prescribed methods of ESD do not encourage the thinking and skills that are needed to challenge 'power' and 'norms' and as such McGregor (2013) advocates challenging the prescribed and normative approaches used in ESD. The political implications of environmental education are addressed further in section 2.6 of this chapter.

2.5.3 Climate Change Education (CCE)

Climate change education (CCE) aims to help people 'understand and address the impacts of the climate crisis, empowering them with the knowledge, skills, values and attitudes needed to act as agents of change' (UNESCO). However, although CCE aims to include social justice issues caused by climate change (Howard-Jones et al., 2021:1660), it tends to be set within science and geography, focuses on science rather than social impacts, and emphasises cognitive knowledge over emotional and social learning, or behavioural change (Greer, King & Glackin, 2023). Notably, the National Curriculum in England does not 'require children to understand the broader impacts of climate change on the environment, economy and society, or to consider issues of social justice in relation to climate change' (Howard-Jones et al., 2021:1661). Furthermore, in the primary school National Curriculum in England there is no direct reference to climate change (Howard-Jones et al., 2021).

2.5.4 Environmental Education (EE)

Environmental education (EE) has a clear focus on environmental conservation and restoration without the human-centric focus which features in other constructs. EE aims 'to foster positive attitudes and awareness toward nature' (Schönfelder & Bogner 2020:1968) and to provide 'people with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to investigate issues, solve problems and protect and improve the environment' (UNESCO, 1977, cited Ballantyne et al., 1998:285). Although an older construct originating in ecology, EE resonates with neo-sustainability which advocates improving and restoring the planet, not just reducing damage.

One approach to EE can be broadly described as ‘instrumental’ and uses activities which are focused on the attainment of an agreed (often measurable) end behaviour. However, another approach suggested by the United Nations Educational, Scientific and Cultural Organization (UNESCO) is for EE to be a ‘creative and dynamic process in which pupils and teachers engage together in a search for solutions to environmental problems’ (Unesco.n.d). Thus, UNESCO promotes emancipatory approaches whereby active questioning, dialogue and participation between multiple stakeholders achieve common goals by understanding and challenging the political and social systems which may help or harm the planet. A third way uses ‘blended’ participation (Wals et al., 2008) which combines both approaches. The EE approaches used throughout the fieldwork in my research use the blended approach as this is well-recognised as an accessible approach to promoting understanding about sustainability (Wals et al., 2008).

Unfortunately, despite a growing recognition of the importance of including critical enquiry skills alongside practical skill development when teaching EE, there remains a leaning towards EE which maintains the ‘passive assimilation and reproduction of simplistic factual knowledge and an unproblematic “truth”’ (Stevenson, 2007:140); an observation reiterated by Haydock & Srivastava (2019). Instead, Anderson et al. (2016) suggest approaching ‘sustainability as a different way of thinking and teaching’ (p:1) which develops a wider cultural appreciation of nature. They advocate for teaching and learning which involve ‘troubling… the cultural narrative’ (p:14); a narrative they suggest maintains a harmful disconnection from nature and creates barriers to pro-environmental behaviour change.

Watkins, Cornell and Lodge (2007) also recommend EE to move away from the transition model of teaching (that is teaching which focuses on information being transmitted from the knowledgeable adult to the inexperienced child who is then expected to use this knowledge in some way; often to reproduce the information under test conditions) as they differentiate between such ‘surface’ learning in which ‘a good learner’ simply needs to have a good memory and ‘deep’ learning which results in being able to apply knowledge meaningfully in new and different situations. Instead, of transition approaches to teaching and learning, Watkins et al. (2007) develop the idea of learning in terms of ‘interpreting’, ‘constructing’ and ‘understanding’ and describe learning as involving ‘change in cognitive, social or emotional states’ (Watkins et al., 2007:11). These ideas resonate with the Quality Assurance Agency for Higher Education (QAA, 2021) guidance on ESD in further and higher education which advocates a facilitation style approach to teaching, arguing this approach helps to support student development more than transmission models of teaching and learning. Currently, however, the transmission model of teaching and learning is often used in English primary schools (Watkins et al., 2007).

Within the scope of this thesis EE will be used to mean 'education about the natural environment or conservation of the natural environment' (Somerville & Williams, 2015:106) and is openly differentiated from EfS which encompasses all three 'pillars' of sustainability and is distinct from the ESD model which carries a human-centric focus (Barrable, 2019). This research uses the terminology of EE both because EE is less human-focused than EfS or ESD and research indicates it is 'easier to comprehend 'environmental education' than 'education for sustainable development' (Chatzifotiou, 2006:377). Additionally, although ESD appears to be the current ideological 'juggernaut' (Stevenson, Ferreira & Emery, 2016:3), EE is a well-known terminology that has stood the test of time and it is questionable whether the terminology of ESD will be used for as long as that of EE (Stevenson et al., 2016). Importantly, in this research EE remains value led and aims to 'change attitudes and behaviour' (Branchini et al., 2015:12); therefore, I now turn to the debate surrounding the value-led approach of EE and whether educating for 'values' is, in fact, a form of indoctrination (Jickling & Wals, 2012).

2.5.5 The Value-Led Approach of EE

The aim of EE is to facilitate the development of knowledge and skills which ultimately translate into value-led sustainability action (Jensen, 2002). These values and aims are overt and explicit. The University of Sheffield (TUoS) Sustainability Strategy (2018), for example, supports the 'development of values and dispositions as well as knowledge and skills that enhance an individual's sustainability literacy' (Hart 2021:12). It notes a key element of knowledge development is understanding that 'social inequalities and diminished human rights challenge sustainable development' (Hart 2021:13). Here the understanding and development of specific values and ethics are explicitly stated learning objectives. However, debate continues as to whether SE and EE should teach either 'hard facts', or 'values (Thomas, 2004), or both (Wals et al., 2008).

Education which aims to change values and behaviour has been described as 'essentially social engineering attempts' (Garay, Font & Pereira-Moliner, 2017:427). Jickling and Wals (2012) raise the possibility of indoctrination by ESD and question whether educating 'for' something can ever be deemed 'actually educational' (Jickling & Wals, 2012:50). They explain that when teaching 'values' which aim to change attitudes and behaviours, we need to question who decides the attitudes and behaviours that are to be encouraged and warn that this approach to teaching may ultimately 'stifle education' (Jickling & Wals, 2013:79).

In contrast, Van Poeck, Goemminne, and Vandenableele (2016) assert that teaching specific, inherent values in EE is an imperative as:

> ‘[N]either facts nor values can exist by themselves… …facts can only exist by the values, concerns and attachments that sustain them’ (2016:823).

Thus, despite concerns about the possibility of value-led education to stifle development, no education is value-free; all education is a product of value-filled cultures and so has implicit (if not always explicit) values (Modgil & Leicester, 2005). These values, sometimes described as ‘the hidden curriculum’ (Giroux, 1983; Jackson, 1968; Warren et al., 2019) often influence teacher practice (Husu, 2004). For example, by comparing values and ideas in mathematics in different countries (specifically between ‘western’ and ‘non-western’ mathematics), Bishop et al. (1999), demonstrated that ‘there exists mathematical ideas other than those in the canonical mathematics curriculum of the west’ (Bishop et al., 1999:2). They highlighted inherent value structures (such as values of accuracy and persistence) which teachers are often unaware of when they are teaching in what may appear to be a value neutral subject. Thus, Bishop (1999) noted that even when teachers are unaware that values are being taught, ‘values teaching clearly does take place’ (p:1). Hence, they argue that rather than having implicit values, an explicitly value-led approach can benefit teaching and learning.

Furthermore, the teaching of ‘British Values’ has now become a requirement in English mainstream schools and although the discussion about what exactly is meant by ‘British Values’ is beyond the scope of this work, the introduction of mandatory teaching of ‘values’ by the English government erodes the argument that education should or could be value-free (van Krieken Robson, 2019).

Accepting, therefore, the legitimacy of the value-led approach to teaching and learning, in this research EE is understood to have specific values and aims which were explained clearly to the students (Van Poeck, Goeminne & Vandenabeele, 2016). However, to counterbalance potential propaganda (Jickling & Wals, 2013) within the research project, the fieldwork was grounded in Critical Pedagogy and included critical thinking activities to support the children to make their own, informed decisions. This is now explained further.

2.5.6 Critical Pedagogy as a Counterbalance to Potential EE Indoctrination

Fallace (2012) asserts:

> ‘[T]eachers should not take sides on political and social issues, but rather they should provide a forum in which the facts could be explored and considered.’ (p:30).

Critical Pedagogy promotes the questioning of the influence of power on what is or is not taught. Using critical thinking and questioning to explore society and culture, Critical Pedagogy aims to shine a light on the power balances within systems which instigate and maintain inequalities. Questioning the 'why', 'what' and 'who' of knowledge construction enables the examination of 'who suffers, who benefits?' from the approaches and systems of current society (Hakansson et al., 2018:98). The development of critical and political thinking skills allows reflection of the costs and benefits of problems and solutions, empowers individuals to challenge 'official knowledge' (Apple, 2014), and to make change because they have the skills to examine arguments and authority (Kos et al., 2016).

Rather than delivering established facts and values, and advocating binary arguments of right and wrong, Todd (2016) proposes that EE should be viewed as an 'art form' (p:844) which promotes critical thinking, inspires investigation and exploration, and allows people to make informed choices about their actions. The modelling of critical thinking and decision making and the use of real world 'wicked problems' (Wals, 2017:157) (that is problems which cannot be resolved or fixed easily using a straightforward or standard solution) are considered essential to EE (Rolfe, 2014; Nolet, 2017). Providing a spectrum of opinions and philosophies, allows EE to be engaged with in a more critical way and by doing so empowers students to come to their own conclusions about how they will enact the values advocated by EE (Haydock & Srivastava, 2019). Thus, facilitating critical thinking, analysis, and learning skills empowers people to make informed choices about their own personal values, attitudes, and behaviours (Wolff et al., 2017) and prevents EE from becoming indoctrination (Chawla & Flanders Cushing, 2007).

The EE project central to the fieldwork in this research was grounded in Critical Pedagogy (Freire, 1996) and the children were supported to question and explore 'rather than seeking to establish fixed pro-environmental behaviors' (Dunkley, 2016:219). The integration of critical thinking encouraged the class to interrogate information, whilst the inclusion of meta-cognition tasks helped the children to understand how they (as unique and creative thinkers, and learners) can access and develop their learning. Freire and CP are discussed further in Chapter 3, section 3.3.5.3.

2.6 The Influence of Neoliberal Politics on the Environment, Education, and EE

2.6.1 Neoliberalism and the Environment

Neoliberalism proposes that society develops through individual action and argues that rather than relying on government or the state 'competitive markets provide for the public good' (Hursh, Henderson & Greenwood, 2015:303). It emphasises 'principles of individual

responsibility, autonomy, and competition' (De Lissovoy, 2018:187) and forefronts capitalism, consumerism, and individual action rather than collective and social responsibility (Hursh, Henderson & Greenwood, 2015). By promoting markets and economic forces to effectively regulate society (Hursh, Henderson & Greenwood, 2015) the 'ecologically destructive paradigm' (Derby, Piersol & Blenkinsop, 2015:379) of neoliberalism has shifted the perception of nature towards an economic and utilitarian stance which diminishes environmental commitments (Payne, 2016). Thus, there is a powerful argument that the causes and effects of environmental damage and climate change are not only actively downplayed and obscured by the neoliberal political preference for expedient economic gain (Rudolf, 2014), but the neoliberal focus on financial gain and capitalism is a fundamental cause of environmental damage (Derby, Pierson & Blenkinsop, 2015).

2.6.2 Neoliberalism and Education

Political power is maintained by controlling the narrative of what is considered the societal norm (Foucault, 1980). Neoliberal education is 'shaped by the political, cultural, and economic logic of neoliberalism' (Hursh, Henderson & Greenwood, 2015:299) and aims for 'the production of future citizen-workers' (Pimlott-Wilson & Coates, 2019:269). The 'neoliberal policy agenda in education which imposes an economic model on schools' (Teague, 2018:93) positions education as an 'individual rather than social good' (Brown et al., 2021:448).

There are political tensions between the purpose of education to bring about social change and the role of schools to serve the state as it is not in the government's interest to support education that will 'challenge the position of current power holders and the global distribution of privilege' (Winter, 2007:351). It is argued that the conflict between education and state is constrained by 'regulatory and controlling measures' (Winter, 1997:202) and 'through apparatuses of testing and standards and the pervasive anxiety that accompanies them' (De Lissovoy, 2018:202). In this way 'education can be used by privileged sectors of society to maintain the status quo through conditioning students to memorize, repeat and reproduce specific types of information' (Glassman & Patton, 2014:1363). This results in schools that are 'beholden to the public in theory (if not in practice)' (Johnston, 2012:121); and hence Vinson (1999) argues that the curriculum is in fact a form of 'coercive control' (p:313) which embodies a fundamental form of 'oppression' (p:313).

For some time, the connection between education and control has been recognised (Kasparek, 2022) as the more control exerted by the central 'hub' the less likely people will explore and engage with alternative approaches (Glassman & Patton, 2014:1359). Despite

the neoliberal tenet of an individual locus of control, teaching and learning are increasingly led by mandated ‘market-based prescribed curricula’ (Sherbine & Hara, 2022:49) which centre on monitored ‘standardized tests’ (Hursh, Henderson & Greenwood, 2015:306). The results focused approach is becoming more prominent in current neoliberal education practices (Mitchell & Stones, 2022) and this is pushing teaching and learning towards content and approaches which are by their nature easy to measure, record and assess (Lingard, 2011; Watkins et al., 2007).

The assessment focused approach to education (Brown et al., 2021) ‘reflects a neoliberal faith in the fact that those key features of the world worth measuring can be objectively evaluated and expressed numerically’ (Hursh, Henderson & Greenwood, 2015:306). However, the systematic and structured giving of information to children, with the onus placed on ‘learning’ information in a way that can be assessed and monitored stifles creativity and critical thinking skills and perpetuates inequalities (Freire, 1996). The current performance agenda with a strong focus on ‘intellectualism’ and ‘cognitive development’ does not recognise the importance of social learning in the classroom (Breunig, 2019) and key areas of development, such as ‘emotional, aesthetic, social and even moral development’ are neglected (Reich, Garrison & Neubert, 2016:1011). Nevertheless, ‘prescription over what is taught and how has increased’ (Teague, 2018:92). Teachers report feeling uncomfortable allocating time to an area that is not explicitly assessed (Buchanan, 2012) and uncertain using methods other than those they trained in and those that fit with the school culture (Winter & Firth, 2007). Thus, the constraints to what and how curricula are taught are both external (the prescriptive curriculum itself) and internal (teacher belief in what is acceptable or good classroom practice) (Teague, 2018).

As teachers spend ‘more time on academic skills instruction and standardized assessments while spending less time on more democratic and child-selected activities’ (Brown et al., 2021:448) approaches to teaching and learning have reduced. Children are provided with ever-decreasing options and methods to express themselves (Reich, Garrison & Neubert, 2016). This should be recognised as ‘[e]ducation systems increasingly controlled and subject to surveillance through curriculum policy influence who teachers and students are and who they will become’ (Winter, 2017:70). In a reflection of Jickling and Wals’ (2013) warning to be mindful of agendas in value-led education, Berryman and Sauvé (2016) prompt us to question the relationship between education, ‘the individual, and the collective’ (p:105) and to be mindful of the agendas of those whose version of educational excellence is enacted; in the case of my research this is the English government and its mandated curriculum.

2.6.3 Neoliberalism and EE

Tilbury (1995) explains:

> '[A]chieving 'sustainability' requires the development of politically literate individuals, who have the critical skills to understand the complexity of environmental problems and solutions and the ability to participate individually and collectively in the resolution of environmental problems.' (p:204).

However, it is argued that '[n]eoliberalism has overtly and covertly, visibly and invisibly, knowingly and unknowingly diminished the historical commitment and critical commitments of environmental education' (Payne, 2016:71). It is suggested this is because EE is a threat to governments as the critical pedagogies recommended for EE 'may act to challenge narrow conceptions of credentialised knowledge, fostering the well-rounded, independent free thinkers that are able to respond to future challenges' (Pimlott-Wilson & Coates, 2019:276). Whilst the critical thinking and questioning skills encouraged promote the examination of arguments and authority (Popkewitz & Fendler, 1999) and prepare people to 'participate in a democratic society' (Lyons Higgs & McMillan, 2006:46) and to act (Mackey, 2012:474). Despite clear arguments about the need for EE to be an explicit curriculum requirement so that it will regularly be included in the school day (Jeronen, Palmberg & Yli-Panula, 2017; Bridges & Searle, 2011) there seems little political will to include EE explicitly in the curricula or to promote EE in schools (Bridges & Searle, 2011).

Curricula with no mandate for EE has been repeatedly identified as a problem for engagement in EE across the world (Somerville & Williams, 2015) and pressure for management, teachers, and pupils to deliver high levels of performance on mandated tests has been shown to be a powerful moderator for motivation and engagement with EE in schools (Somwaru, 2016). Teachers report a reluctance to include EE in their teaching as lack of training in EE and EE pedagogies leaves them feeling under-skilled and lacking the confidence to facilitate sustainability projects (Green & Somerville, 2015; White, Eberstein & Scott, 2018; Wolff et al., 2017). Lack of support to link EE to curriculum requirements is another key problem for engagement (Weitkamp et al., 2013; Wolff et al., 2017) and is a significant and recognised barrier to the integration of EE into practice (Kitson, 2012).

Although Head Teachers can mitigate barriers to EE by actively reallocating time and budget to EE (Evans, Whitehouse & Gooch, 2012; Wake & Eames, 2013) and by developing clear and detailed timetables (Riordan & Klein, 2010), attempts to increase participation by integrating EE across the curriculum have been shown to result in no one group, discipline or department taking ownership (Wood et al., 2016). Furthermore, EE is often viewed as belonging to the sciences and encouraging teachers of other subjects to become involved

has been shown to be difficult (Goldman et al., 2018) because 'their lack of scientific knowledge does not give them a strong ability to deliver information' (Lasen, Skamp & Simoncini, 2017:403). Whilst moving towards an ESD/EE model which integrates the three interlinking elements (social, economic, and environmental) allows for the 'blurring of boundaries and leaves the door open for educators to 'tick the ESD box' when any, but not necessarily all, aspects are carried out' (Aikens et al., 2016:349). Largely, EE remains an addition to (rather than being embedded within) the school day (Riordan & Klein, 2010).

If activities are to be engaged with and maintained, they need to be perceived (by the adults) as both effective and easy to do (Daniel & Lemons, 2018), but even in schools which have self-selected to be involved in an EE intervention, teachers reported significant problems in the enactment of the programme, citing lack of funding, reliance on volunteers, inequality of access for students, and feeling unable to communicate complex sustainability issues (Weitkamp et al., 2013). Wood et al. (2016) advocate using 'sustainability champions' to strengthen the prominence of EE and Chittleborough et al. (2013) suggest this to be adults who already have a role in the school. However, even teachers shown to be proactive with EE demonstrate low levels of theoretical knowledge and eco-literacy and flawed understandings of environmental issues (Evans, Whitehouse & Gooch, 2012). For this reason, involving the community and nominating a community champion is recommended if expertise is lacking in the teaching body (Roy et al., 2014). Ultimately, however, schools (and individuals) must have both the commitment and capacity for change (Chittleborough et al., 2013).

2.6.4 Neoliberalism and the English Primary School Curriculum

In England, the impact of neoliberalism on education can be seen through the introduction of the National Curriculum and a shift in focus towards 'testing, competition and managerialism' (Teague, 2018:93). There is pressure for schools to deliver an increasingly prescriptive curriculum (White, Eberstein & Scott, 2018) which in English primary schools is heavily focused on English and Mathematics which have several pages of objectives, compared for example, to the several sentences allocated to Art.

The English government ensures teachers and schools conform in their enactment of the standardised National Curriculum through monitoring by the government Office for Standards in Education (Ofsted) which is a non-ministerial department with responsibility for inspecting and regulating services for children and young people (https://www.gov.uk/government/organisations/ofsted). Due to the 'spectre of Ofsted' (Teague, 2018:99), teachers must demonstrate that children have covered curriculum

requirements, maintain a focus which demonstrates clearly what has been done in lessons and they report being unwilling to risk engaging in pedagogies and activities that are neither explicitly outlined (Evans et al., 2017) nor can be mapped easily or clearly to curriculum criteria (White, Eberstein & Scott, 2018). Ultimately, the crammed curriculum and considerable workload (Bridges & Searle, 2011) reduces engagement in topics and areas that are not a government priority (Evans et al., 2017).

Teachers are also held accountable by children's curriculum-led test results. In England, children take national tests twice during their time in primary school, firstly in Year 2, which is the end of Key Stage 1 (KS1), and then again at the end of Key Stage 2 (KS2) in Year 6. These standardised tests are called End of Key Stage Tests and Assessments but are often referred to as 'SATS'. Importantly, student performance on the tests is made visible through published reports and league tables. The pressure to maintain favourable league table places means teaching has moved towards 'preparing students for statutory testing' (Teague, 2018:93). Despite arguments for students to develop creative and critical thinking skills, the subject matter and pedagogy chosen often 'depends on the purpose of the learning' (Bartlett & Burton, 2012:107) (which is often to pass an assessment) and teaching often focuses on 'instruction' rather than the needs and interests of the learner (Bartlett & Burton, 2012). The 'competitive, neoliberal culture of examination result 'league tables', performativity and teaching to the test' has become established (Mitchell & Stones, 2022:6) and the 'dominant culture of schools is still one where teachers are seen as dispensers of knowledge' (Barratt Hacking, Scott & Barratt, 2007:238). Thus, it is argued that students are restricted by a culture of accountability (Kemp & Pagden, 2019).

Article 13 of the UNCRC stresses:

> '[T]he child shall have the right to freedom of expression; this right shall include freedom to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of the child's choice.'

However, in contrast to this, the approach to teaching and learning advocated by the English government results in written (and therefore visible and assessable) approaches dominating the school day. The increasingly prescriptive approaches used throughout the English school system seem to be working hard to silence children rather than aiming to teach empowerment (Rickinson et al., 2004).

2.6.5 Neoliberalism and EE in English Primary Schools

There is a difference between what is written in the National Curriculum and how it is enacted (Slimani, Lange & Håkansson, 2021). This 'philosophy-practice gap' (Barratt Hacking, Scott & Barratt, 2007:235) is a particular problem for the enactment of EE (Barratt Hacking, Scott & Barratt, 2007). There is friction between the current assessment focused National Curriculum embedded in mainstream English schools (Pimlott-Wilson & Coates, 2019) and the pedagogies and content recommended for EE. The critical pedagogy of EE is 'a departure from test-driven teaching' (De Lissovoy, 2018:201) and the inquiry-based, child-led approaches recommended for EE do not fit well with the current education models in England which focus on outcomes that can be measured and replicated. EE struggles to assert itself against the power of the English government's political force for 'a hard-edged positivistic approach to delivering knowledge to children' (Meager, 2018:413). There are tensions between the school structure and the introduction of alternative approaches into the school day (Barratt Hacking, Scott & Barratt, 2007) and when attempting to implement change we are 'confronted with issues of power' (Hildreth, 2012:925). Research indicates that when EE is practiced there is a reduction of the political aspects of EE (Slimani, Lange & Håkansson, 2021). However, Orr explains:

> '[P]olitics, policy, and philosophy should feature in the core of environmental and sustainability education. Otherwise, we leave our students clueless, inarticulate, and adrift in the political turmoil that is engulfing the world and impairing our common future' (2020:15).

Despite problems, teachers report a desire to include EE into their practise, if they can link EE to the curriculum requirements (Weitkamp et al., 2013) and have training in EE pedagogies (Wolff et al., 2017). Recognising the lack of EE in English schools, this research explored how effective EE can be integrated into mainstream English primary education. It is important to have knowledge of how children experience EE within their school day (Lichtman, 2012) so this research examined children's experiences of engaging with an EE project within their school day. The concept and importance of experience and the complexities of understanding experience are discussed in section 2.9.4 of this chapter. Firstly however, factors that influence the effectiveness of EE and previous research exploring school approaches to EE are presented.

2.7 Factors that Influence the Effectiveness of EE

2.7.1 The Landscape of EE Research

When exploring EE, there is a 'considerable amount of research activity' (Rickinson, 2001:302). Several notable meta-reviews have explored and synthesised EE research (e.g., Rickinson, 2001; Rickinson et al., 2004; Monroe et al., 2017; Wetering et al., 2022; Gill, 2011; Fiennes et al., 2015). Hedefalk et al.'s (2015) review highlighted the shift in EE from teaching 'facts about the environment and sustainability issues to educating children to act for change' (Hedefalk et al., 2015:975) and across the reviews EE is identified as effective for promoting 'environmental knowledge, attitudes, intentions, and behaviors' (Wetering et al., 2022:1). Monroe et al.'s (2017) review identified 'personally relevant and meaningful information', and 'active and engaging teaching methods' (2017:1) such as hands-on, inquiry-based and experiential learning were effective approaches for EE. Whilst longer and multi-step activities better supported increased connection to nature and pro-environmental behaviours than short or one-off activities (Fiennes et al., 2015; Wetering et al., 2022). The importance of 'effective follow-up work' (Dillon et al., 2006:2) was highlighted across reviews (e.g., Rickinson, 2001; 2004) and the use of role-models, outdoor experiences, collaborative work, longer programme lengths were repeatedly seen to increase pro-environmental attitudes and behaviours (Rickinson, 2001).

However, the reviews also identified variation; the enactment of EE was found to vary between teachers and settings with some EE practices being praised whilst other EE was criticised for being limited to specific subjects, and 'lacking practicality and relevance' (Rickinson, 2001:301). Although student interaction (e.g., group work, idea sharing and discussions of observations) has been identified as a key factor in effective environmental learning across most reviews (Monroe et al., 2017), Wetering et al.'s (2022) review did not support this. Nor did they find that effects of EE differed with age of study design nor when set in nature. Instead, Wetering et al.'s (2022:2) review found that the link between knowledge and environmental behaviours is 'modest at best' and interpreted these findings that either EE can 'effectively mitigate the psychological barriers that often prevent children and adolescents from engaging in environmental behavior' (Wetering et al., 2022:8) or alternatively, that EE 'may improve environmental behaviors for which young people experience relatively few psychological barriers to begin with' (Wetering et al., 2022:9).

Nevertheless, despite the variation, reviews indicate 'considerable evidence to support the wide range of benefits of learning outside the classroom in natural environments' (Dillon & Dickie, 2012:foreword). The reviews repeatedly found that as increased pro-environmental attitudes, values, behaviours, and an increased care for nature and the natural environment

(Dillon & Dickie, 2012). For example, Malone's (2008) review found that children developed increased knowledge and skills, improvements in critical thinking, problem-solving and decision making when working outdoors; and children's social skills, meta-cognition skills, and self-regulation have also been shown to improve following outdoor learning (Malone & Waite, 2016). Working outdoors has also been shown to positively impact outcomes in science, maths and language (Malone & Waite, 2016). Dillon and Dickie's (2012) paper (which reviewed the social and economic benefits of learning in nature) found benefits to working outdoors include, raising educational standards, increased language development, and increased attainment on tests. These findings align with those of other reviews.

Spending time in the natural world was also linked to children's wellbeing, physical and mental health benefits, motor development, social and emotional regulation. The reviews found that learning in nature also helps children to develop 'non-cognitive skills that underpin successful team working, perseverance and management of stress' (Malone & Waite, 2016:9). Working outdoors increased creativity, increased trust and self-confidence, lowered expressions of anxiety, boredom and anger (Dillon & Dickie, 2012) and was shown to reduce 'classroom management problems' (Dyment, 2005:31). Along with the development of improved social and emotional skills, physical benefits such as improved fitness and coordination have also been identified.

Rickinson et al.'s (2004) large scale review on outdoor learning demonstrated that having access to different approaches of learning are important for students, reiterated in Dillon et al.'s (2006) review. The importance of programmes to have the capacity to 'allow learners to create their own understandings and develop new skills through active, hands-on, inquiry-based learning opportunities' (Monroe et al., 2017:14) was indicated by the research reviewed. Outdoor learning has been shown to facilitate child-centred learning in which children and teachers work together to co-construct teaching and learning (Malone & Waite, 2016); possibly because moving outdoors can disrupt the use of 'transmissive or 'delivery' teaching styles often ingrained and habitual in indoor learning' (Malone & Waite, 2016:24). This idea is supported by Dillon and Dickie (2012), who identified that when given opportunities to work in nature, teachers become more enthusiastic, take increased ownership of school changes, and introduce new teaching strategies into classroom-based teaching (Dillon & Dickie, 2012).

Despite the successes of learning in nature, the reviews highlighted barriers to outdoor learning which included health and safety worries, teachers lacking confidence, curriculum requirements, and limited resources such as time and training. The costs of transport to outdoor learning activities were also recognised by Dyment (2005). Barriers from the

students' perspectives included previous learning and outdoor experiences, fear of animals and potential hazards in nature, different preferred approaches to learning, barriers due to disabilities, and ethnicity and cultural identities (such as personal identification with place). The uncertain outcomes of outdoor learning may also trouble children who are used to the formulaic and predictable approaches often used in indoor learning (Dillon et al., 2006). There is a need recognise how these factors can impact students when learning outdoors (Dillon et al., 2006). The reviews indicate an ongoing need to investigates student learning experiences to understand the differences in outcomes of EE interventions and recommend increasing qualitative research of student experiences which focuses on 'learning and the role learners play within this process' (Rickinson, 2001:208).

Across the reviews, methodological problems with some research have been highlighted. Poor research design, generalisations being made despite small samples, descriptions without analysis, and a lack of long term follow up, have been identified (Malone & Waite, 2016). The reviews indicate that there is not universal agreement on what constituted a successful outcome of the activities across studies, some studies use terms inconsistently, reiterate the same research, and whilst certain groups and activities repeatedly participate in research (e.g., schools, residential activities) other activities (such as scouting) are rarely investigated. Malone and Waite (2016) identified gaps in research to be few large-scale studies, problems with comparing diverse research studies, lack of funding to repeat research in different settings and lack of research which includes control groups. They also highlighted that there were fewer studies in secondary schools and with older children and this aligned with previous findings that indicated a bias towards research which focuses on 'the middle years of childhood' (Malone 2008:9). Rickinson's (2001) review highlights that research often only measures changes in the short-term and 'too few resources [are] devoted to systematic, long-term and comparative research' (Reid & Scott, 2006:573). Gill's (2011) review stressed that although research demonstrates correlations between experiences in the natural environment and benefits it does not show cause and effect. Thus, despite the range of research 'we know that EE can be effective but do not much about what 'conditions and approaches' increase effectiveness' (Wetering et al., 2022:10). Reid and Scott (2006) question whether research neglects to report 'methodological and epistemological flaws and limitations' (Reid & Scott, 2006:572) in its ongoing mission to provide the evidence-based (and quantitative) findings often demanded by policy makers (Malone & Waite, 2016).

Rickinson (2001) recognised that research does not readily inform and influence education policy or practice. Outdoor learning in schools in England has reduced substantially (Dillon et al., 2006; Fiennes et al., 2015). Children are spending less time in nature, and this has

been found to be due to extensive curriculum requirements, busier parents, and the development of a culture of fear of harm (Malone & Waite, 2016). Children and adolescents could be crucial agents for sustainable change' (Wetering et al., 2022:1), and understanding how to optimise EE to promote pro-environmental behaviours is urgent (Wetering et al., 2022). There is a need to; increase the skills and confidence of teachers through training and continual professional development (Dillon & Dickie, 2012:6); to emphasise the benefits of learning in the outdoors, not only for EE but for academic attainment and student wellbeing (Dyment, 2005); and to remove the perception of 'real work' in the classroom and 'additional 'fun' work outside the classroom' (Malone 2008:25). Malone and Waite (2016) highlight the importance for learning in nature to become explicitly included in education policy and their review identified the need for 'greater dialogue between researchers and policy makers' (Malone & Waite, 2016:33).

2.7.2 Significant Life Experience Model

Significant Life Experience research (SLE) explores 'the significant life experiences which people themselves believe to have shaped their environmental attitudes and actions' (Chawla, 1998a:384). It aims to connect adult pro-environmental behaviours with childhood experiences and by doing so 'understand the environmental experiences that young people themselves consider significant' (Chawla, 2001:457). Although SLEs could be singular events (e.g., excursions into nature), people often describe having many experiences which positively influence pro-environmental behaviour, for example, 'adult modeling of respectful behaviors; exposure to nature through books, education programs, teachers; and loss or degradation of valued natural areas' (Derr, 2020:221). Thus, SLE does not necessarily indicate one specific event but rather is 'shorthand for accumulated impressions of this kind over time' (Chawla, 2001:459).

Although there is not one 'single all-potent experience' (Chawla, 1998b:381) that creates knowledgeable and pro-active environmental citizens, outdoor experiences in childhood have been shown to be the most 'consistent' variable 'in shaping […] interest in the environment' (Derr, 2020:229) and to be 'most frequently mentioned as influencing participants' pro-environmental attitudes and behaviour' (Howell & Allen, 2019:815). Chawla (2020) emphasises the importance of childhood experiences in nature to motivate pro-environmental behaviours later in life and stresses childhood to be an important time to develop a connection to nature. This 'childhood nature connection' (Chawla, 2020:620) is increasingly recognised as vital to interest in nature and the environment, and I return to this concept in Chapter 3, section 3.3.4. More time in nature is associated with increased connection to nature and is related positively to increased environmental empathy and pro-

environmental behaviours (Chawla, 2020). Longer activities (overnight stays and multi-day activities for example) show stronger effects on subsequent pro-environmental behaviour than shorter activities (Fiennes et al., 2015), whilst negative experiences such as environmental destruction (Ceaser, 2015) and 'the loss or degradation of a valued place' (Chawla, 1999:15) are recognised as SLEs which also influence ongoing pro-environmental development behaviours (Chawla, 1998b). These findings have been reproduced around the world, across different ethnic groups, nationalities and different types of EE (Chawla, 1998b).

SLE research has been criticised as it explores retrospective memories and attributes meaning to these memories (Gough, 1999). It does not differentiate whether the experiences promoted pro-environmental behaviour or were simply more memorable for people already attuned to nature. Gough (1999) for example, questions whether those involved in pro-environmental activities are more likely to recall previous experiences in nature. SLE research cannot show a cause-and-effect link between experience and future behaviours (Gill, 2014). It is debated whether SLEs are different for people who go on to enact PEB compared to those who do not, and it is questioned whether the experience is the thing that makes the difference, or whether the individuals differ from those who do not enact PEB's (Chawla, 1998b), that is are SLEs in nature 'a cause or an effect of an appreciation of the natural world' (Chawla, 1998b:20). Nevertheless, Chawla (2001) reiterates the importance of understanding SLEs as they 'point us to forms of experience that we should take seriously' (p:457) and emphasises the 'need to understand the environmental experiences that young people themselves consider significant (2001:458). Unfortunately, research indicates that children are experiencing an 'extinction of experience' (Soga & Gaston, 2016) and are spending more time indoors and in urban environments. This is problematic, as in research 'people who did not report enjoyable activities in nature in childhood were also less likely to report an adult interest in nature or actions to protect it' (Chawla, 2009:9).

SLE research stresses that the affective (i.e., emotional) aspects of learning have greater ongoing impact for ongoing pro-environmental behaviour than increased knowledge and as such it is vital to understand these aspects of individual experiences of learning and EE (Cachelin, Paisley & Blanchard, 2009:3). SLEs in childhood are influenced by how adults' structure and direct children's experiences (Chawla, 2009). Chawla argues that children 'develop environmental competence and knowledge through free movement and creative agency in nature, with support from friends, family and other mentors' (2020:626); and their review highlights the importance for children to 'focus on nature in their own way, at their own pace' (p:634) as this results in increased connection to nature when compared with

directed activities. Although, Chawla and Flanders Cushing (2007) recognise the difficulties teachers face because of the 'pressures that many schools face to meet goals imposed by external authorities' (2007:448) children should be given a range of opportunities and experiences during which they can develop their own environmental identity (Williams & Chawla, 2016) and education practice should include 'open-ended, child-directed and playful experiences in natural environments.' (Gill, 2014:19).

2.7.3 Factors that Influence the Effectiveness of EE: Attitude, Empathy, and Self-Efficacy

The ultimate purpose of EE is to prompt long-term behaviour change (Jensen, 2002). Procedural knowledge (knowing how to do something) and impact knowledge (understanding the effects of what is done) are fundamental aspects of EE. However, knowledge alone is insufficient to prompt pro-environmental behaviour change (Boeve-de Pauw et al., 2015) as multiple elements are involved in behaviour (Otto & Pensini, 2017). While it is recognised that multiple aspects affect pro-environmental behaviours three key factors are attitude (Pooley & O'Connor, 2000), empathy (Hauk et al., 2015), and self-efficacy (Berta, Montes & Benayas, 2007; Scrivener, 2003). The following sections look at these in turn.

2.7.4 Attitude

Attitude has been demonstrated to be a mediating factor in environmental behaviour (Lukman et al., 2013). Attitudes have been described as having cognitive elements (thoughts and beliefs about something), and affective aspects (that is the emotional attitude and the tendency to respond positively or negatively toward a certain thing) which together lead to expressed behaviour (Cheng & Monroe, 2012). The development of positive affective attitudes towards the environment is considered crucial to pro-environmental behaviours (Cheng & Monroe, 2012; Lukman et al., 2013). Therefore, the development of pro-environmental attitude is a crucial element to effective EE (Ampuero et al., 2015; Reynolds, Salamander & Wilson, 2018) and as such approaches to EE that include a focus on attitudes could 'be key to achieving internalized responsible environmental behaviour' (Boeve-de-Pauw & Van Petegem, 2011:1516).

Some theories propose thoughts, feelings and behaviours lead to attitudes, for example, Eilam and Trop's (2012) research (which looked at environmental attitudes and environmental behaviour change in Israel) indicated behaviour change was the dominant driver for attitude change; and they argue teaching should focus first on behaviours. However, others suggest that attitudes lead to thoughts, feelings, and

behaviours (Fabrigar, MacDonald, & Wegener, 2005). Pooley and O'Conner (2000) for example, contend that attitude change ultimately leads to ongoing behaviour change and argue teaching and learning should focus on the development of pro-environmental attitudes. Nevertheless, despite differing in initial focus, whichever understanding of attitude is embraced, attitude and behaviour are deemed to be linked (Pooley & O'Conner, 2000) and the development of a positive affective attitude (i.e., their emotional attitude) towards the environment is considered crucial to pro-environmental behaviours Lukman et al. (2013). Sometimes behaviour is included as a third aspect (rather than a result) of attitude (Boeve-de Pauw & Van Petegem, 2011). Within this thesis the term 'attitude' is understood as 'evaluative tendencies that can be both inferred from, and have an influence on, knowledge, affect and behaviour' (Boeve-de Pauw & Van Petegem, 2011:1515).

Using a case study approach to explore environmental attitude, Lukman et al. (2013) identified a gap between primary school children's environmental knowledge and attitudes. Responses to Likert-style scale questionnaires with children in one Slovenian primary school Lukman et al. (2013) indicated that the children's environmental attitudes and behaviours were influenced by existing environmental awareness, the social environment of the school, environmental legislation and structural conditions and gender. Lukman et al. (2013) explain:

> '[A]ttitudes are formed, and changed through the process of having concrete experience, making observations and reflecting on that experience (p:94).

Lukman et al. (2013) therefore advocate for a holistic and integrated approach to EE which involves and promotes the development of an empathetic attitude to the environment. The importance of experience is taken up again in section 2.8 of this chapter.

Later research by Soga et al. (2016) gathered information about children's affective attitudes towards nature and conservation and their contact with nature. Using questionnaires with children aged 9-12 years old in Tokyo, Japan, Soga et al. (2016) asked how they felt about certain animals, whether they would help them, and their willingness to protect nature and conserve biodiversity along with questions about how often children went out into nature and how often they read, watched television, or used the internet to learn about nature (i.e., vicarious experiences of nature) (but notably they did not ask how the children experienced nature or their vicarious learning experiences). This work concluded that the children's willingness to conserve biodiversity was mediated by affective attitude. Crucially this research found the children's affective attitude towards nature correlates with the frequency of both direct activities with nature and vicarious experiences of nature. In Soga et al.'s

(2016) work this was the frequency of looking at nature in books and on television). Soga et al.'s (2016) study supports previous work that has demonstrated the helpfulness of vicarious learning in EE. McCoy et al. (2007), for example, effectively developed classroom-based power-point presentations and facilitated discussions about biodiversity with middle-school children in Florida who did not have access to field trips and outdoor learning. These findings are useful as some schools do not have access to outdoor nature education (Jagannathan, Camasso & Delacalle, 2018) but this approach comes with warnings.

Ballouard et al. (2011) identified that media and internet often focus on 'a few iconic, appealing, and usually exotic species' (p:1) such as pandas and tigers (Schlegel et al., 2015). These flagship species are typically a 'popular, 'cute', charismatic animal' (Smith & Sutton, 2008:127), which has a familiar name, is easy to identify, has some sort of novel feature, and plays an important role in the environment (Schlegel et al., 2015). They are used to prompt interest in both the animal and wider ecology (Smith & Sutton, 2008) and to highlight environmental concerns and promote conservation action (Schlegel et al., 2015).

Ballouard et al. (2011) compared questionnaire responses from school children in France against an analysis of internet content to explore children's knowledge and willingness to protect animals, and whether this is related to information on the internet. Their results showed that children's knowledge of, and desire to protect, animals was mostly limited to the 'few iconic, flagship and ''likeable'' species […] that benefit from a strong charismatic ''cuddle factor'' (p:1) and are most often represented on the internet. This contrasted with the children's lack of ability to identify local species that also need protection. Replicating the study across Europe, Africa, and Asia, Ballouard et al. (2011) found the repeated prioritisation of the exotic species most prominent in the media. However, these animals do not always reflect the vital nature of wider biodiversity (McGowan et al., 2020) and can distort children's perceptions of environmental damage.

Thus, Ballouard et al. (2011) propose that a consequence of the children's lack of knowledge about their local species is a 'worrying disconnection from their local environment' (2011:1) which results in a lack of desire to protect it. They suggest the lack of knowledge of and empathy for local species may explain contradictory behaviours such people continuing to damage local biodiversity by using toxic garden chemicals despite showing concerns about exotic wildlife. Therefore, despite the attractiveness of exotic 'flagship' species for conservation, for effective EE there is a need to connect global issues with local environments (Somerville & Williams, 2015). The importance of local flagship animals is returned to in section 2.7.6.2 of this chapter when the importance of insects and bees is addressed.

2.7.5 Empathy

Empathy has been shown to consistently play a key role in decision-making about conservation and wildlife management and in prompting environmental behaviour change (Berta et al., 2007). Developing positive emotions to the environment is a key characteristic of effective EE (Hauk et al., 2015) and reviving biophilia (love of living things) is an effective 'motivation for the conservation of the environment' (Cho & Lee, 2018:447). Hauk et al. (2015) actively promote the development of an emotional attachment to nature to increase children's pro-environmental behaviours and explain adults need to increase children's awe and wonder as these 'can be powerful catalysts for active hope and sustainability agency' (no page number).

Like attitude, children's empathy to nature correlates with both direct and indirect experiences of nature (Soga et al., 2016). Jagannathan, Camasso and Delacalle (2018) developed an environmental science programme called Nurture thru Nature (NtN) and used it over one academic year in disadvantaged urban schools and in after school and summer camp settings in the US. NtN used a 'Head Hand Heart' approach (Singleton, 2015) (that is the development of knowledge, skills, and positive affect) to education with the aim of improving outcomes in mathematics and science and to increase interest in Science, Technology, Engineering and Mathematics (STEM). NtN draws on Dewey's experiential educational theory which proposes that education is most effective when learning is related to life experiences that support the learner to develop knowledge and understanding through exploring and making connections. Dewey's experiential learning theory grounds my research and is taken up further in Chapter 3, section 3.3.5.1.

NtN employs hands-on experiences and project-based learning to involve students in outdoor and nature education for environmental science. However, Jagannathan et al. (2018) recognised the difficulties for resource stretched urban schools to implement each element of 'Head Hand Heart' equally. Due to 'political and economic necessities' (p:54), the 'Head' aspect of the model was prioritised and NtN was developed as a 'HEAD, Hand, Heart' approach (p:54). Notwithstanding the change of focus, NtN uses the aesthetics of nature to inspire interest and to support the development of a fuller understanding of the connections between individuals, communities, and the environment.

NtN was shown to have 'promising' results (p:53) both for academic achievement and increased interest in nature and the environment and this work demonstrated the importance of developing empathy and a connection to nature. However, the project did not have the same benefits for all the cohorts involved in the study. Jagannathan et al. (2018) acknowledge that their 'experimental' approach (students were randomly allocated into

intervention and control groups) was to some extent confounded by the lived realities of the participants (home backgrounds and peer interactions for example). The authors suggest that differences may also be due to school and/or teacher effects; suggestions mirrored in previous research which has shown school-based EE is affected by teacher values, resources available to support EE (curricular and financial), teacher education, access to nature, and crucially the 'willingness to change by those in charge' (Spence, Wright & Castleden, 2013:197). Thus, Jagannathan et al. (2018) highlight the need for the study to be replicated across schools and over longer time periods for more conclusive evidence.

2.7.6 Self-Efficacy

Self-efficacy has been explained as the 'beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments' (Bandura, 1997:3). The effect of self-efficacy to promote pro-environmental behaviour was recognised in Scrivener's (2003) exploration of action-oriented learning in a primary school. In this study, children in Year 4 and Year 5 of a primary school were given the opportunity to decide a topic for research and action on a topic to 'improve the quality of their local environment' (p:100). The children chose local traffic problems, and the adults facilitated the research and data collection. Using questionnaires and observations the children demonstrated the traffic problems around the school gates. The children then contacted local people with influence (e.g., the mayor), presented their findings and ultimately affected changes to improve traffic conditions. Scrivener (2003) found involvement in local environmental issues encouraged active engagement from the children.

Scrivener's findings are supported by Roy et al. (2014) who studied problem-based learning with children as an approach to SE in Tanzania. Using videos and linking students with forest experts, Roy et al. (2014) supported students to work on solutions for local conservation problems. Findings showed the constructivist pedagogy of problem-based learning and learning things in context (which they called 'anchored instruction methodology' p:74) was more helpful than being given abstract knowledge; something they believe results in inert learning. They advocate for children to proactively problem-solve and for educators to 'empower students by giving them an opportunity to effect small, yet positive changes, to their immediate milieu' (p:84).

Using contrasting methodology, Wake and Eames (2013) used a local lens and an 'action competence approach' (p:307) to investigate an ecological learning project in which primary school children in New Zealand co-participated with an architect and builders to design and build a new 'eco-classroom' building for their school. Wake and Eames (2013) used a holistic approach with a flexible methodology which they described as a 'significant life

experience model' (p:307) (see also section 2.9 for further discussion 'significant life experience'). This allowed for 'dynamic learning and transformation' through activity which encouraged socialisation and the awareness of social consciousness. This flexible methodology allowed for the 'emergence of other outcomes' (p:310) and notably the children were more capable than the adults expected. Action-oriented learning is becoming a popular approach in EE (Lyon et al., 2011) and a growing body of literature indicates that approaches to learning which encourage students to think and problem solve in an interdisciplinary way is an effective approach to EE (Warner & Elser, 2015).

The positive effects of self-efficacy on ongoing environmental behaviours have been repeated with other topics of focus (Scrivener, 2003) and on a larger scale (Wake & Eames, 2013). The uniting thread between these disparate studies is the importance of empowerment and self-efficacy for pro-environmental outcomes. Crucially, when looking at integrating EE into schools, pedagogies that develop self-efficacy are shown to be positive experiences that increase engagement with wider learning (Sawitri, Hadiyanto & Hadi, 2015).

2.7.7 Locally Based EE, Biodiversity, Insects, and Child-Insect Interactions

It is argued that children should explore EE through engagement with their local environment (Kennelly, Taylor & Serow, 2012). Ballouard et al. (2011) also argue for EE to use locally based, practical outdoor activities which increase knowledge of and positive attitudes towards local biodiversity. Although the concept of 'biodiversity' does not have a clear definition, the term nevertheless 'represents a significant knowledge subset of sustainability' (Edwards & Cutter-Mackenzie, 2013:335). EE must be broader than biodiversity (Hovardas & Korfiatis, 2011), however biodiversity is recognised as a vital factor for sustainability and learning about local wildlife and local biodiversity is an accessible way to 'promote positive attitudes and behaviour towards the environment' (White, Eberstein & Scott, 2018:1).

Biodiversity loss is a critical, global issue and the concept of biodiversity is frequently used when discussing environmental concerns (Hill et al., 2016). It is recognised as a vital indicator for sustainability (Visconti, 2016) and biodiversity indicators often play a key role in pro-environmental endeavours and are valuable in conservation action. Even though a complex area to navigate, loss of biodiversity is a feasible path to include sustainability in the curriculum and for primary school children to engage with environmental projects (Kennelly et al., 2012). Natural England's Conservation Strategy for the twenty-first century (Conservation 21, 2016) stresses the important but precarious nature of biodiversity and focuses on the value of insects for biodiversity.

2.7.7.1 Insects

Insects are a vital element of the Earth's biodiversity and are an essential form of natural capital, that is, aspects of nature that are essential for human survival, must be available at above a certain level, and cannot be substituted for something else (Klauer, Bartkowski & Manstetten, 2017; Stevenson, Peterson & Dunn, 2017). They are vital within food chains, carry out essential tasks such as pollination, and through their role in decomposition they are essential 'cleaners' (Losey & Vaughan, 2006). Insects are irreplaceable for the ongoing sustainability of our planet, but they are in crisis (Klauer et al., 2017). Globally, insects are in decline, whether measured by range of areas they are found, numbers, or biomass (Montgomery et al., 2020) with farming and habitat loss causing significant problems (Schonfelder & Bogner, 2017).

There is an ever-growing need to promote insect biodiversity (Schonfelder & Bogner, 2017). However, there is lack of urgency surrounding insect conservation (Prokop & Francovicova, 2017). This is thought to be because the importance of insects is not appreciated, they lack the physiological features (e.g., large eyes, round bodies) to endear then to humans, and they are perceived negatively (Boileau & Russell, 2020). Although butterflies are often an exception (Boileau & Russell, 2020) insects are reported to trigger negative emotions such as fear and disgust (Prokop & Francovicova, 2017) and many people 'find insects abhorrent' (Schlegel, Breuer & Rupf, 2015:230). These findings resonate with Kellert (1993) who identified that in the public 'most invertebrates are viewed with attitudes of fear, antipathy and aversion' (p:851). Such responses are a problem for encouraging engagement with insect conservation. However, more positively, research shows that there is potential for education to protect 'vulnerable insect species' (Boileau & Russell, 2020:1324).

2.7.7.2 Insects as Flagship Species

It is widely accepted that the planet is now facing an insect crisis (Schonfelder & Bogner, 2017), yet the essential but fragile relationship between people and insects has not been a priority and insects remain widely neglected in EE (Potts et al., 2010). Conservation and biodiversity projects often focus on large, exotic, 'flagship' animals to prompt interest in both the animal and wider ecology (Smith & Sutton, 2008) and to highlight environmental concerns and promote conservation action (Schlegel et al., 2015). However rather than looking further afield, Ballouard, Brischoux and Bonnet (2011) argue that conservation education is more effective when it has a local focus and is based on 'species from our own backyards and gardens' (2011:6). Schlegel et al. (2015) therefore emphasise the need for local flagship animals. The crucial importance of insects, the critical need for insect conservation (Guiney & Oberhauser, 2009) and the effectiveness of learning about local

animals to promote conservation efforts (Reynolds et al., 2018) means there is an urgent need to use insects as flagship species.

2.7.7.3 Bees as Flagship Animals

Using the key characteristics of a flagship animal, bees are recommended as an ideal local flagship species (Schonfelder & Bogner, 2018). Despite widespread dislike of insects, Schlegel et al. (2015) found students have an overall positive attitude towards bees. Although students reported feeling afraid of being stung, the negative feelings were offset by positive emotions about the pollination and honey producing capabilities. The potential for positive perception of bees means they can be an effective insect of choice for an EE intervention project and have been recommended as a suitable focus for EE activities (Cho & Lee, 2018). As well as the usefulness of bees as a beneficial flagship species and an accessible way to introduce EE activities (Cho & Lee, 2018), bees are a unique and vital natural capital and 'represent one of the most ecologically and economically important invertebrate groups' (Silva & Minor, 2017:19). Bees are also valuable in their own right; and this is taken up further in Chapter 4, sections 4.2.6 and 4.6.4.

2.7.7.4 Child-Insect Relationships

Despite the importance of insects for the ecosphere, and how badly they are affected by human activity, research exploring human-insect relationships is limited (Boileau & Russell, 2020). Child-insect relationships are influenced both by lived experiences and how insects are portrayed in the wider culture (Boileau & Russell, 2020). Insect bites and stings may lead to fear of insects whilst anthropomorphic representations in books and media may promote positive feelings towards insects (Boileau & Russell, 2020). Insects are included in childhood and education in various ways however looking at insects from a critical animal study perspective, that is 'environmental and interspecies education that focuses on our relationships with other animals, and common world pedagogies' (Boileau & Russell,2020:1324), insects are often anthropomorphised, captured, collected, or displayed as dead exhibits (Boileau & Russell, 2020). Although some researchers recommend using live insects in classrooms (to decrease fear and promote conservation) this approach maintains the commodification of insects for human use (Boileau & Russell, 2020). Hence, Boileau and Russell (2020) ask the question 'how might we offer young children opportunities to develop ethical and caring relationships with insects' and develop education to promote 'multispecies flourishing' (Boileau & Russell, 2020:1324).

Child-insect encounters can be complex and Boileau and Russell (2020:1333) suggest learning during child-insect interactions benefits 'when the teacher guides children towards

an understanding of these creatures [insects] and how to respectfully observe them'. They recommend looking for insects and small conservation projects to 'provide opportunities for children to attend to local insect species' (Boileau & Russell, 2020:1332).

Having explored factors that affect the efficacy of EE outcomes, the literature review now looks at different ways schools have approached EE.

2.8 School Approaches

School-initiated approaches to EE are diverse and include (1) whole school approaches, (2) holistic approaches, (3) experiential learning approaches, (4) outdoor learning, (5) working with Forest Schools, (6) Forest Gardens, (7) garden-based activities, (8) local and (9) place-based approaches. These approaches are discussed in turn, and relevant research shared.

2.8.1 Whole-School Approaches to Environmental Education

Whole school approaches aim to embed, model, and promote pro-environmental behaviours through 'the curriculum, programmes, practices, and policies…to contribute to building a more sustainable future' (McKeown & Hopkins, 2007:22). Multi-disciplinary, cross-curricular approaches to EE have been recommended (Soga et al., 2016) as this approach can promote and strengthen pro-environmental behaviours using role models, shared culture, and learner-centred engagement using real-life problems. However, this approach has had mixed success. Whilst some schools become award winning leaders (Lyons Higgs & McMillan, 2006) there can be problems maintaining whole-school approaches when positive intervention is taken away and some schools soon discontinue EE activities when support from external agencies is removed (Lewis, 2013).

When exploring the effectiveness of whole school initiatives, Lyons Higgs and McMillan (2006) looked at green school initiatives in secondary school education in the US. Using school visits and observations, interviews, and analysis of school documents, they researched the impact of, and challenges faced, by four schools recognised as 'leaders in the design and implementation of SE efforts' (p:40). Lyons Higgs and McMillan (2006) examined four aspects: the use of individual role models; whole school culture; school governance; and school facilities and operations. The research indicated that interdisciplinary, learner-centred, experiential learning, and the use of 'real-life' problems were effective to help students develop the skills to be active citizens. They found students were most likely to copy a model if they perceived it to be 'warm' and 'affectionate' and like their own outlook. They also found that schools need to 'consistently model the same

messages about sustainability' (p:51). This work strengthens the argument for a multi-disciplinary and cross-curricula approach to EE (Soga et al., 2016).

In contrast, Lewis's (2013) three-year, qualitative study which aimed to better understand the effectiveness of the Australian Sustainable Schools Initiative (2005-2009) showed disappointing long-term outcomes. The Australian Sustainable Schools Initiative (2005-2009) promoted whole school and systems thinking approaches to Education for Sustainability (EfS). When Lewis (2013) initially analysed the perspectives of staff, students, parents, and members of the community of an Australian Montessori school, results showed that during the first three years of the initiative the school community reported perceiving it as effective. However, the results in the three years follow up demonstrated that when active input from the initiative stopped the school-based sustainability activities stopped too.

Although the facilitation of EfS fitted well with the Montessori philosophy of the 'whole child' approach, lack of training and leadership support, and lack of community involvement resulted in pro-environmental behaviours not being maintained and 'student EfS outcomes were limited' (p:162). Analysis indicated that even with the pro-active teaching and learning philosophy within a Montessori setting, EE remained within a silo rather than being coordinated across the school, leading Lewis (2013) to find that 'EfS and whole system thinking was more in theory than in practice' (p:163). Challenges faced when embedding EfS into a whole systems approach were highlighted to be communication and staff engagement. Lewis recommended including EfS in teacher training, EfS training for all school staff, and focused training for staff working with different year groups as a more effective way to deepen whole school engagement in EfS.

2.8.1.1 Green Schools

More recently, Warner and Elser (2015) examined how EE can be successfully integrated across disciplines and the curriculum and maintained throughout schools. They developed a measure of whole-school sustainability (the 'interconnectedness' measure) and used it to assess work in K-12 'Green Ribbon' schools in the US. K-12 schools are free (public) education which is from Kindergarten (5 year-olds) until grade 12 (18 year-olds). Green Ribbon schools are schools recognised to be high performers in sustainability and must demonstrate 'reduced environmental impact and cost…improved health and wellness…[and]…effective environmental and sustainability education (Warner & Elser, 2015:7). The new 'interconnectedness' measure was initially used to assess the activities of 59 schools, and this included 289 projects. Their 'interconnectedness' scale allowed the authors to measure how well integrating EE with other disciplines could highlight to students

the consequences of human actions on society and the environment. The scale includes the curriculum (including lesson content, classroom activities and interactions and teacher training), the campus (including school administration and practices, the physical resources and maintenance), and the community (particularly the schools' interactions with parents, businesses, the government, and non-government organisations). It aimed to examine whole-school sustainability and make recommendations to help develop whole-school approaches.

The 'interconnectedness' measure indicated that a school's 'ability' to follow a whole-school approach to sustainability education was due to 'the organization and culture of the school' (p:17) and found that the Head Teachers and administrators had a significant effect on this. They also found that the schools with increased interconnectedness viewed sustainability education as an educational paradigm shift rather than an add on extra which was demonstrated in other schools. The authors stress that an interdisciplinary approach to education is 'essential to provide students with the skills to resolve complex environmental problems' (p:2) and necessitates a connection between sustainability education and the curriculum. However, they conclude that the dominance of traditional standards and testing in the school system prevents integration across subjects and reduces the use of problem-solution-based learning which is vital for on-going sustainability. They hope their measurement of interconnectedness will help in 'overcoming the path-dependency of the disciplinary paradigm' (p:21).

Another approach to encouraging whole-school engagement with EE is the promotion of awards and certification. Green certification in Israel also uses a whole-school approach to promote pro-environmental approaches and provides a 'framework for effective sustainability education' (Goldman et al., 2018:1300). Schools can be awarded different levels of certification depending on the activities they conduct and the length of time they have been actively working whole-school pro-environmental strategies.

Goldman et al's. (2018) study of the effect of a 'green school certification' initiative in Israeli schools used questionnaires and observations with children aged 10-12 in eight public schools; results indicated that pupils in schools with a higher-level green school certification demonstrated more advanced eco-literacy skills than children in schools with a lower level or no certification; schools which were less overt with their environmental activities had pupils who measured lower scores for eco-literacy. Goldman et al. (2018) concluded that schools with higher levels of green certification had incorporated EE and sustainability more comprehensively within the curriculum and throughout the school. These findings resonate with those of Lyon et al. (2011) and Barr et al. (2014) whose research also indicated that EE

cannot be maintained by an individual and instead should follow a whole-school approach. Goldman et al. (2018) also found, however, that simply being part of a 'green school' did not increase pro-environmental behaviour; instead, people need to be actively involved in the school initiatives. These findings resonate with previous research which indicates inconsistent results with the use of awards (Činčera & Krajhanzl, 2013; Olsson & Gericke, 2016). Importantly, when looking at whole school approaches to sustainability, Olsson and Gericke's (2016) study of the 'sustainability consciousness' (p:39) of adolescents attending ESD certified schools indicated a reduction in environmentally friendly behaviour as children enter adolescence; a phenomenon they named the 'adolescent dip'. They found this was amplified in ESD schools and suggest a blanket approach to ESD is not effective for all ages. Instead, they recommend ESD should be adapted for different ages (for example, increased fostering of empowerment and action competence with older children).

2.8.1.2 Eco-schools

In 1994 the 'Eco-schools' initiative was launched in the UK, Denmark, Germany, Greece to support schools to enact EE and sustainability in line with the needs identified by the UNCED (Earth Summit, 1992), i.e., Education for Sustainable Development. Today the Eco-schools programme is a global international charity supported by governments, environmental charities, and industry. In England the Eco-schools scheme is currently operated by the Keep Britain Tidy charity.

The Eco-school philosophy is that students are motivated to take part in, and promote, pro-environmental action when they make a tangible difference to their own locality. The schools use an inclusive, participatory approach in which students, teachers, and the wider community work together to create a more sustainable school environment. To become accredited as an Eco-school, a seven-step framework is followed. This involves creating an Eco Committee (including students, school staff and members of the community), auditing the school for its environmental and social impact, creating an action plan to improve the school's impact, and monitoring and evaluating engagement with the action plan. The action plan activities need to be integrated into the curriculum either within lessons or in specific classes and real-life settings and situations should be used to support understanding of environmental and social issues. It is vital that the whole school is involved, and that the school's environmental activity is actively promoted in the wider community. Finally, each school must develop an Eco Code which highlights the key points within their Action Plan and this must be known in the school community. The seven Eco-school stages can be carried out under themes (such as biodiversity, energy, and litter) which have resources available to support schools, but this is not necessary to achieve accreditation. The Eco-

schools global scheme outlines twelve themes however only ten are promoted by the UK Eco-schools programme with ‘climate change’ and ‘food’ being absent.

Having established and maintained the seven-step programme (usually for two or more years) schools can then apply for ‘The Green Flag’ award which demonstrates Eco-school accreditation. The schools pay an administration fee, undergo assessment, and will be awarded the Green Flag if they achieve the requirements. Accreditation must be renewed annually. To increase international engagement, there is now a school ‘Twining’ programme in which schools that have achieved ‘Eco-school’ accreditation can twin with accredited schools in England.

Eco-schools work towards environmental protection immediately through environmental practices in the school, but also aim for longer term effectiveness through education which changes ‘the way students perceive and interact with the natural world’ (Boeve-de Pauw & Van Petegem, 2013:96). However, schools have been criticised as possibly engaging with the eco-school programme for the ‘prestige it brings, not because the schools truly believe in what they are doing’ (Morgensen & Mayer, 2005:86) and for focussing on measurable outcomes such as school improvements rather than longer term educational outcomes (Morgensen & Mayer, 2005).

Furthermore, research by Boeve-de-Pauw and Van Petegem (2011; 2013) which explored the effectiveness of eco-schools in Flanders on the environmental behaviours of children found that eco-schools did not increase children’s ‘preservation values’ (that is conservation and environmental protection) nor did they influence environmental behaviours. When looking at ‘utilisation values’ (that is anthropocentric focus on the use of environmental resources) children who attended eco-schools indicated lower utilitarian values than children who attended control schools. If, as suggested by Milfont and Duckitt (2010) pro-environmental behaviours are influenced by preservation values rather than utilitisation values, Boeve-de Pauw and Van Petegem (2013) conclude that this may explain the lack of eco-schools’ impact on environmental behaviours. Boeve-de Pauw and Van Petegem (2013) also found significant variation between schools and suggest that established eco-schools may have ‘lessened their efforts’ (p:102) in comparison to schools who are newer adopters of the programme. Thus, the authors suggest further research to study the different pedagogical approaches used by different eco-schools and research which looks at the effects of the teachers’ behaviours and values.

Regardless of the mechanisms and benefits of eco-schools, it is again notable that although Eco-schools are endorsed by the English government this approach places the onus onto

individual schools to take up initiatives rather than placing the responsibility on the government to ensure EE and sustainability is available for all children.

2.8.2 Holistic Approaches for Environmental Education

Holistic approaches to EE maintain the focus on the environment but also include the interrelationships between the social and economic aspects of sustainability, both locally and globally, and introduce the implications of sustainability over time and for different generations (Boeve-de Pauw et al., 2015).

The effectiveness of EE initiatives which use a holistic approach was demonstrated by Manoli et al.'s (2014) longitudinal two-year study investigating the Earthkeepers Earth Education programme with 4th to 7th graders in nine Cypriot schools. The Earthkeepers program aims to increase environmental knowledge and understanding as well as increasing pro-environmental attitudes and behaviours. Initially children attend a three-day 'immersion experience in a natural place away from school' (p:31), this is then followed by further activities at school and home which continue for at least one month. Manoli et al.'s (2014) mixed method research involved data collection via pre- and post-program questionnaires, and interviews with the participants and showed that the Earthkeepers programme was effective for both initial and longer-term knowledge, attitudes, and pro-environmental behaviour change. Manoli et al. (2014) suggest the inclusion of work on values and attitudes within the holistic approach was successful. Although the researchers highlight the possibility of pressure on the participants to please the interviewer, these results mirrored the findings of studies using the Earthkeepers programme in other countries.

The Earthkeepers programme, however, is time consuming and expensive, requiring a three-day residential visit to start the programme, which then needs to be maintained within school by the classroom teachers; and although enhanced environmental experiences, such as Earthkeepers, have been shown to increase pro-environmental behaviour this finding has not been consistently reproduced (Barbaro & Pickett, 2016).

A less successful holistic approach for longer-term behaviour change was Lyon et al.'s (2011) work with an after-school programme which aimed to create positive norms around sustainable behaviours. Initially, Lyon et al.'s (2011) research indicated that positive expectations increased the chance of change and found that there was increased behaviour change when positive environmental behaviours were routinised. They also demonstrated interactive approaches to EE were more effective than the development of linear programmes (i.e., programmes that follow a set sequence of teaching and learning before adding a sustainability element at the end of the programme). Unfortunately, however, on

returning to the participants twice in the subsequent year, Lyon et al. (2011) found low rates of continuation of the sustainability interventions. Barriers to ongoing pro-environmental behaviour change included organisational problems, and individual relationships and motivations. Lyon et al. (2011) suggest integrating holistic pedagogies to create positive norms around sustainability throughout all teaching programmes and that EE should be approached from both an individual and organisational level. However, they also note that on-going resources and support are needed if interventions are to be maintained.

2.8.3 Experiential Learning Approaches

Active participation and increased enjoyment have been shown to be beneficial for effective EE (Crawford, Holder & O'Connor, 2017) . Experiential learning (differentiated from the experience of learning) is summarised by Ballantyne and Packer (2009) as learning by doing, being in the environment, real life learning, sensory engagement and working with a local context. Experiential learning which occurs 'when learners encounter a subject, person, place or thing personally and directly' (Goralnik et al., 2012:417) has been shown to influence emotional and affective attitudes towards the environment: it has been shown to effectively increase children's desire to protect the environment (Cheng & Monroe, 2012) and to increase pro-environmental behaviour (Barbaro & Pickett, 2016). Soga et al. (2016) recommend that 'children should be encouraged to experience nature and to be provided with various types of experiences' (p:10) and this approach is now becoming more popular for ecocentric education (that is education that places intrinsic values on all aspects of the natural environment regardless of their direct benefits to humans) (Washington, 2018).

A striking example of experiential education resulting in transformative education that changed attitudes and behaviours was conducted by Reynolds et al. (2018). Reynolds et al. took students out into the woods to have hands-on experience working with salamanders and snakes. Throughout this activity-based intervention students completed reflexive journals and pre- and post- intervention questionnaires. Subsequent analysis found that after the intervention the students reported reduced dislike and fear towards amphibians and reptiles and increased pro-environmental behaviours in general. By facilitating students to have hands-on experiences with wild salamanders and snakes, Reynolds demonstrated that through a cycle of experience and reflection students developed increased pro-environmental behaviours. This work highlighted the importance and positive effects of experiential, hands-on learning and how pro-environmental behaviours are influenced by emotional disposition and personal affect.

Ampuero et al. (2015) also successfully developed a school-based EE course which used experiential learning activities with primary school children in Chile. Children were supported

to explore and engage with local environmental problems in a way that aimed to deepen the children's affect, empathy, and critical thinking skills towards the environment. Using community-based methodology Ampuero et al. developed an outdoor 'Life Lab' (p:67) (that is a practical space where children can engage in hands-on activities based around the science curricula). In this case the Life Lab was an abandoned play area at the back of the school which was developed into a garden throughout the course of the project; and provided opportunities to engage with the science curriculum in a practical and hands-on way. Learning in the Life Lab was done alongside excursions to local facilities such as nursing homes, markets, and the park. Teachers encouraged the children to think about the 'multiple facets' (p:74) of situations and aimed to maximise the benefit of unexpected events that could be used to extend learning through 'teachable moments' (p:68).

Ampuero et al.'s analysis of the observational and interview data indicated positive psychology and reinforcement of positive emotions encouraged positive behaviour changes in the children. Findings also demonstrated that teachers encouraging interactive and inquiry-based environmental activities resulted in the students demonstrating more positive environmental attitudes. This reflects previous research (e.g., Boeve-de Pauw & Van Petegem, 2011). Importantly, the children also reported an increased feeling of happiness, findings in line with a wealth of research which highlights that EE, conservation, and outdoor activities improve social and mental wellbeing (e.g., Gill, 2011; Pimlott-Wilson & Coates, 2019).

Zocher and Hougham (2020) examined the experiential learning aspects of two curricular interventions in Wisconsin, USA (one a three-credit eco-justice action research project in an urban high school, and the other a community science fair for any age) and demonstrated that Freire's (1996) ecopedagogical framework can support the active engagement of students in activities for climate justice. Exploring how an ecopedagogical framework could be used to advance the curriculum (which they argue is White, western, and inherently biased), Zocher and Hougham (2020) concluded that integrating ecopedagogy into the curricular interventions helped the students to 'dismantle dominant discourses' (p:244), interrogate environmental issues and increased the students' care for the environment. Using experiential education helped the educators to challenge the cultural norms which create and maintain environmental damage and facilitated students to engage with critical EE. The paper also highlights that experiential education is an effective way to integrate social and environmental justice into mainstream education. Zocher and Hougham (2020) advocate for environmental educators to use pedagogies that include environmental justice and 'empower youth to critically examine power in their community' (2020:245); and this is important as these are important elements of EE (Misiaszek, 2020).

Combining Freire's Critical Pedagogy and environmental education (Korsant, 2022:2), ecopedagogy is a critical education approach which aims for 'the protection of Earth's resources' (Korsant, 2022:3). By examining environmental damage 'in relation to power and politics, to colonialism and imperialism, industrial capitalism and class-divides' (Warlenius, 2022:150) ecopedagogy facilitates students to 'deconstruct' socio-environmental issues (Misiaszek, 2020:617) and examine 'environmental problems created by the dominant Western cultural norms' (Zocher & Hougham, 2020:232). It is unsurprising, therefore, that unlike ESD, ecopedagogy has remained a marginal approach (Warlenius, 2022) and 'the center of the ecopedagogy movement has remained in the Global South' (Warlenius, 2022:143).

Ecopedagogy can 'stand-alone' or can be used as a 'pedagogical tool' within EE and ESD (Misiaszek, 2020:618). The EE project in my research combines experiential education and elements of Freire's (1996) Critical Pedagogy and therefore includes elements of ecopedagogy such as problem-posing, critical thinking, teacher-child dialogue, praxis-based learning, and the use of 'local and global lenses' (Misiaszek, 2020:617). However, ecopedagogy's 'focus on power structures' (Warlenius, 2022:149), colonialism, the influence of colonialism on the curriculum, social justice, the politics of environmental injustice and social and environmental violence (Misiaszek, 2020) were not explicit features of the EE project used in my research. This is because ecopedagogy is a radical approach to education and the project was only ten weeks long; I felt it would be unethical to actively include the politics of 'socio-environmental oppressions' (Misiaszek, 2020: 622) into such a short-term intervention project in a primary school. Nevertheless, although not ecopedagogy, by combining the Critical Pedagogy of Freire (1996) with the praxis of experiential education, the project moved from ESD towards ecopedagogy. Freire and Critical Pedagogy and the adaption to ecopedagogy used in this research are discussed in Chapter 3, section 3.3.6.

2.8.4 Outdoor Learning Approach for Environmental Education

Outdoor fieldwork has been shown to have lasting impacts on children's environmental awareness (Scott & Boyd, 2016). It has been argued that working outdoors is an essential aspect of EE as this supports children to have vivid and physical interactions with their environments (Blyth & Meiring, 2018). However, to be effective EE needs to be more than simply going outside as this alone does not always lead to the 'connectedness to nature' which is necessary for prompting pro-environmental behaviours (Ernst & Theimer, 2011; Hoot & Friedman, 2011; Sandell & Ohman, 2013).

When looking at the effects of an ecology-based summer camp for elementary school children in Turkey, Erdogan (2011) used a mixed-method approach to investigate factors affecting children's environmental behaviour. This research with 64 elementary school children demonstrated the outdoor education programme was an effective way to combine hands-on experiences with theory. This, Erdogan (2011) suggests, will 'increase young people's sense of responsibility…which later turn into responsible environmental behaviour' (Erdogan, 2011:2236).

Working outdoors has also been shown to increase affect and positive attitudes to the environment not shown in classroom-based EE (Dieser & Bogner, 2016). For example, Crawford, Holder & O'Connor (2017) used a mobile phone application to encourage children to find out information about flora and fauna. This study indicated that spending more time in nature increased the children's senses of protectivity of nature, and the increased knowledge was linked to increased pro-environmental actions. This study also indicated that whilst active participation increased enjoyment, working outdoors helped the children to develop place attachment and self-efficacy which are also important for effective EE.

Working within school grounds provides opportunities for children to build knowledge of and empathy for their local environment before introducing wider and global environmental issues (Trott, 2019). Best practice, however, requires well-designed and prepared activities that link to curriculum with supporting follow up work (Rickinson et al., 2004). It has been argued there must be strong and clear links between 'outdoor' learning and 'indoor' (i.e., classroom based) learning (Uzzell, 1999) as the integration of theory and practice in EE is vital (Erdogan, 2011; Jeronen et al., 2017; Uzzell, 1999).

In their comprehensive review of outdoor adventure activities and environmental understanding, Rickinson et al. (2004) demonstrated that when outdoor education was developed in the school grounds children expressed increased confidence and pride in themselves and their work, both important aspects of social learning and EE. Their analysis showed that learning in school grounds also led to an increase in positive relationships in the learning group. Working outside and using different approaches, such as independent note taking, photography, independent questioning, and finding 'wow' facts also alters the power dynamics between the student and teachers (Scott & Boyd, 2016:664). Ultimately, in this work the students became more confident and empowered to engage with their learning.

Working outdoors develops practical skills for sustainability (Jeronen et al., 2017) but also promotes independence and confidence (Sandseter & Seland, 2016). Sandseter and Seland (2016) found when working outdoors children could negotiate and make choices; they became more autonomous, and their empowerment increased which Sandseter and

Seland (2016) argued caused the increase in their reported wellbeing. These findings support the work of Mayer et al. (2009) who highlighted that working within nature increases individual wellbeing (Mayer et al., 2009).

Spending time in nature has been shown to lead to an improvement in children's behaviour, to increase their positive emotions when learning, and to increase academic performance (Coates & Pimlott-Wilson, 2019; Quibell, Charlton & Law, 2017). Working outdoors benefits mental, physical, emotional, and moral development (Adams & Savahl, 2017) and children display increased social skills when having spent time in nature (Keniger et al., 2013; Smith, Dunhill & Scott, 2018). There has long been recognition that working outdoors is an effective pedagogy not only for EE but for learning in general (Heft & Chawla, 2006; Potter & Dyment, 2016) as working outdoors 'integrates concrete experiences, interests, emotions, and values' (Jeronen et al., 2017:4) and can effectively support curriculum learning (Marchant et al., 2019). However, there are restrictions on outdoor activities because of 'pressure to achieve national standards' (Coates & Pimlott-Wilson, 2019:22) in mandated assessments. The restrictive curriculum is recognised to impact learning (Pimlott-Wilson & Coates, 2019) and there remains a need for more 'rigorous and in-depth studies on outdoor education in school grounds' (Rickinson et al., 2004:41).

2.8.5 Working with Forest Schools for Environmental Education

Forest schools (FS) provide another approach to engagement with outdoor activities. The development of FS in England in the early to mid-1990's provided a holistic, constructivist approach to learning that was shown to be an effective way for children to engage in outdoor and environmental education (Turtle, Convery & Convery, 2015). Although FS do not directly aim to deliver EE (Turtle et al., 2015), this approach has been shown to increase positive affect towards the environment and successfully promote pro-environmental attitudes (Turtle et al., 2015).

Forest schools provide physical and pedagogical space for teachers and children to interact differently (Harris, 2017). Having alternative 'affordances' available in nature, helps teaching and learning to move away from 'customary patterns' (Harris, 2017:224) and by providing opportunities for children to explore and learn in different ways, this approach facilitates child-led learning. Crucially, being seen as alternative provision, FS were 'less constrained by demands to follow [the national curriculum]' (Harris, 2017:224) and without predetermined targets the 'fear of failure' (Harris, 2017:229) was removed. Harris (2017) found working outdoors subtly changed the relationships between the children and the adults. This paper does not directly address the effects of Forest school pedagogies on environmental attitudes or behaviours; however, the emotional experience of learning is crucial to the enactment of

pro-environmental behaviour. This research promotes the use of FS approaches with primary children as they prove to be valuable relief from the stresses of mainstream teaching and learning.

O'Brien's (2009) thematic analysis of qualitative data from 24 British children (aged 3-9 years old) observed for eight months indicated the FS approach supported the development of social skills, and increased motivation, confidence, and concentration. Improved language, communication and physical skills were also recorded by teachers and FS leaders. However, changes happened slowly, and this work emphasised the need for access to FS provision repeatedly, and regularly and over time. The need for sustained repetition was found to be especially important for children who do not have access to nature as part of their everyday lives. Although O'Brien's paper does not look explicitly at how the experience of FS pedagogy influenced pro-environmental behaviour, analysis demonstrated FS facilitated the development of skills (such as collaboration) and a curiosity and interest in nature which are considered important in EE.

FS pedagogies are recognised as 'a site of divergence' (Waite & Goodenough, 2018:25) from mainstream education Waite and Goodenough (2018) showed that working in an alternative environment (away from school) altered interpersonal dynamics, children were listened to more and they became more autonomous. By having choice and autonomy over activities children became competent in activities they felt were enjoyable and became seen as competent. This different approach allowed the children to 'experience themselves differently' (p:41). However, Waite and Goodenough (2018) found the pressures of neoliberal school practice heavily influenced teacher practice and led to a dilution of FS principles (such as child-led lessons, exploration, autonomy, and hands-on activities) when FS activities were engaged with by mainstream schoolteachers.

Although FS approaches have been demonstrated to increase individual wellbeing, social and academic skills (Sandseter & Seland, 2016) and to boost academic performance (Pimlott-Wilson & Coates, 2019) engagement with FS approaches have also been shown to be restricted by lack of resources and teachers having to justify what they do to the wider school community (Kemp, 2020). Unfortunately, many schools in England do not have the resources available to access FS activities or engagement in FS pedagogies. It is proposed that this is because the founding principles of FS (self-confidence and independence through skills development; and care for nature) are at odds with the performative focus of the national curriculum (Kemp & Pagden, 2019).

Although the child-led, play-based approaches favoured by FS lend themselves to the Early Years Foundation Stage (EYFS) these approaches are used less often in mainstream

schools with older children. Despite advocating that FS should be integrated into schools rather than 'a bolt on or alternative to the rest of the curriculum' (Kemp & Pagden, 2019:492) many FS activities are inaccessible to schools without adequate outdoor provision and are not easily adapted to a classroom. Nevertheless, although FS is separated from the 'pedagogical constraints of the mainstream classroom' (Pimlott-Wilson & Coates, 2019:270), FS skills are transferable to mainstream schools and support both academic, personal, and social development (Pimlott-Wilson & Coates, 2019). Thus, regardless of concerns about the dilution of FS principles, Knight (2018) advises '[g]ood outdoor and environmental education and experiences can and should take many forms' (p:23).

2.8.6 Forest Gardens

Forest gardens recreate features of the Forest School philosophy within the more limited confines of (mostly urban) school grounds (Almers, Askerlund & Kjellstrom, 2018); and the development of 'Forest Gardens' is now emerging and strengthening as a pedagogical approach (Almers et al., 2018). Forest Gardens include elements of FS (such as working outdoors and freedom to explore) with features of a school garden (planting fruit and vegetables for example). The key difference between a forest garden and a more traditional school garden is that '[f]orest gardens are designed to be self-sustaining and easy to maintain with little need for human input of labor, energy, or other resources' (Almers et al., 2018:243).

Forest gardens have been shown to have similar outcomes to FS (such as increased independence and connection to nature (Almers et al., 2018)) as well as the beneficial outcomes of school gardens (such as increased fruit and vegetable intake and increased responsibility). They are often developed close to or within the more limited confines of (mostly urban) school grounds. The proximity of forest gardens to schools combined with their lower maintenance needs reduces the barriers to engagement with FS (e.g., travel, time, and costs) and the barriers to school gardens (e.g., high maintenance, lack of teacher knowledge about gardening) and can provide accessible opportunities to engage children in EE (Almers et al., 2018). However, although established forest gardens do not require a large amount of input or maintenance, the initial development requires resources, expert knowledge, careful planning, and the use of high density, multi-layered, compatible planting.

2.8.7 Garden Based Approaches for Environmental Education

School gardens are a 'logical step for schools in the process of incorporating sustainability' (Goldman et al., 2018:10) and can provide an effective way to engage in EE (Williams &

Brown, 2012). Gardening activities facilitate empathy building towards the environment (Kelley & Williams, 2013) and deepen understanding of the intricacies of the ecosystem (Williams & Brown, 2012). Hands-on gardening activities have also been shown to increase practical skills, academic, and self-confidence (Kelley & Williams, 2013). Notably, working within school grounds supports children to build empathy for their local environment (Hart, 2003) which can then lead to wider environmental action (Erdogan, 2011). School gardens are becoming increasingly popular in England due to initiatives such as 'Health Schools' which promote increased intake of fruit and vegetables, and the previously mentioned 'Eco-schools' which promote environmental sustainability (Passy, 2014).

'[T]he integration of gardening into school life' (Passy, 2014:24) makes EE more visible within the school, something that has been found to be an important aspect of encouraging pro-environmental behaviours (Goldman et al., 2018). The physical and practical involvement in gardening activities allows children to develop a deeper understanding of the complex interactions at work within the ecosystem (Williams & Brown, 2012). Riordan and Klein (2010) explain the effectiveness of these practical experiences is because children find it difficult to mentally manipulate and connect abstract concepts and benefit from the increased use of real world, and hands-on problems to support their learning. This intertwined process approach to learning is summarised by Gibson (1988) as 'perceiving and acting' (p:4). Hence, a garden provides an accessible and suitable 'affordance' to facilitate environmental learning (Tidball & Krasny, 2011) and learning gardens are a positive approach for EE (Williams & Brown, 2012).

Along with facilitating a deeper understanding of the complexity of the ecosystem, gardening supports the development of an empathetic connection to the environment (Jagger, Sperling & Inwood, 2016). Developing positive emotions to the environment is a key characteristic of effective EE (Hauk et al., 2015). Hauk et al. (2015) explain adults need to increase children's awe and wonder as these 'can be powerful catalysts for active hope and sustainability agency' (no page number). Reviving biophilia (love of living things) motivates environmental conservation whilst 'empathy re-connects humans and environment and provides motivations for pro-environmental behaviour and action' (Brown et al., 2019:11).

School gardens are prospective places where children can develop increased empathy for nature (Fisher-Maltese, 2016). Fisher-Maltese (2016) created and evaluated a garden-based science curriculum which focused on insects. Working between the classroom and a school garden (which included six raised beds for growing fruit, vegetables, herbs, and flowers, surrounded by borders of perennial plants), four second-grade classes engaged in week-long themed activities (e.g., life cycles). The children engaged in activities such as

gardening and observing insects in class time and with a teacher. Quantitative and qualitative data were collected throughout. Although analysis of the quantitative questionnaires did not show a difference between the pre and post-test scores, the qualitative data indicated that the children developed a more positive and empathetic attitude towards nature. Fisher-Maltese (2016) suggested quantitative attitude changes may not have been picked up due to ceiling effects caused by the questionnaire design. Fisher-Maltese (2016) advocates the use of school gardens to help children bond, develop an empathy for nature and become 'motivated to protect our Earth' (2016:68) and argues school gardens are 'logical sites to teach about living things and environmental stewardship' (2016:68). However, she also recognises the tension between the 'indirect academic effects' of working in the school garden (2016:68) with the need for explicit curricula outcomes and test results.

As well as developing empathy, working in school gardens can effectively facilitate the development of practical skills. When Sottile et al. (2016) monitored 15 school gardens in Kenya they found the experiential, garden-based learning helped the children to develop important pro-environmental skills; skills which the children used immediately in their lives outside of school, such as gardening at home. Sottile et al.'s study (2016) indicated the gardening activities also helped with the development of academic skills across other subjects. An important finding of Sottile et al.'s (2016) study was that the positive effects of working in the gardens were strengthened if the wider community was involved in the gardens and children's development of pro-environmental skills was further strengthened if they had access to an experienced and knowledgeable person. Sottile et al.'s (2016) work highlights the importance of good resources and support for teachers engaging in garden projects. Unfortunately, as previously discussed, this is something which is often lacking in English school education because of funding cuts and a restrictive curriculum.

When looking at approaches to developing a school garden, Nury et al. (2017) investigated children's experiences and motivations towards gardening at school. By looking at experiences, Nury et al. (2017) aimed to gain understanding to increase the benefits of their gardening programme which was aimed at increasing children's intake of vegetables. Using observations and interviews with 45 children taking part in a year-round gardening programme in Amsterdam, they showed that fun and enjoyment increased the children's intrinsic motivations to take part in gardening. Long explanations and less time gardening was less enjoyable. Analysis showed that the children liked the structure of the gardening programme, but also wanted the opportunity for self-led investigation and experimentation. The authors argue that the gardening activities increased the children's intrinsic motivation by satisfying the three psychological needs identified in Self

Determination Theory (Ryan & Deci, 2000); those being, autonomy of action, personal competence, and relatedness and connection with the social environment. They also highlight that by including children's perspectives, programmes can be aligned more closely with children's likes and expectations and by doing so increases the children's motivations for gardening.

School gardens can also help rebalance growing social injustice by giving opportunities for 'authentic, real-world learning' (Williams, Brule, Kelley & Skinner, 2018:1). Using the lens of motivation and self-determination theory, Williams et al. (2018) looked at the effects of school gardens to influence science engagement and motivation for ethnically diverse grade 6 and 7 children in low-income middle schools. Their work demonstrated the importance of the children's perceptions of themselves as competent and autonomous to be a key factor for increased motivation and learning. Repeated engagement in the garden activities was also indicated to be important to the positive outcomes of the garden intervention. As well as demonstrating the importance of school gardens for science and social justice outcomes, Williams et al.'s (2018) work shows the impact of school gardens on other key areas of EE such as motivation and self-determination.

Comparing standardised test data from all fifth-grade students (the year the standardised tests are taken) across Washington DC, Ray, Fisher, and Fisher-Maltese's (2016) statistical analysis showed engagement with a school garden to be correlated with higher test results. They advocate for school gardens to 'be used as a policy tool to create more environmental equity in urban areas' (2016:379). Reiterating Dewey's (1916) observation that gardens provide an opportunity for best pedagogical practice, they conclude that 'environmental equity' (i.e., having access to a garden) statistically improves grades in mathematics, reading and science. This work demonstrated increased academic success when using garden pedagogy and proposed the potential for school gardens to increase engagement from more diverse communities, thereby providing 'a gateway to … environmental stewardship and civic participation' (2016:392). The demonstration of the effectiveness of EE to rebalance educational inequality is supported by research such as Jagannathan, Camasso and Delacalle's (2018) study of the 'Nurture through Nature' programme which was discussed in section 2.7.4 of this chapter.

Although detailed discussion of the value of school gardens for immediate and ongoing social justice is beyond the scope of this thesis, the finding that school gardens can be a powerful way to reduce inequity in schooling is noteworthy. It directs us back to the political nature of EE which is summarised neatly by Ralston (2011) who explains,

> ‘it can be inferred that while the gardening habit evokes wonder, freedom, patience, and action in the child, it also has the potential, especially in adulthood, to translate into politically transformative action.’ (Ralston, 2011:4).

2.8.8 Local Action

Local, place-based education can positively influence environmental attitudes and behaviour (Hoot & Friedman, 2011) and successfully support the development of eco-sensitivity by encouraging students to focus on their own locality (Rafferty & Laird, 2013). Involvement in local environmental issues has been shown to encourage the active engagement of children in pro-environmental activities (Kennelly, Taylor & Serow, 2012; Scrivener, 2003). The ‘Think Global, Act Local’ campaign (Devine-Wright, 2013) aims to modify the focus of EE and has been found to be a useful way to engage students in pro-environmental behaviours (Coyer et al., 2019). Although some argue for a move away from EE which focuses on local, place-based activities and towards EE which emphasises the importance of global change (Church & Skelton, 2010), Riley (2020) explains ‘a land ethic becomes more likely when an individual is provided with opportunities to form a meaningful relationship with land through experiential encounters of place-based education’ (p:90). Moreover, Somerville and Williams’ (2015) review of research investigating SE and early childhood concluded that working locally is an effective approach to EE which can then be linked to global issues.

Crucially for the inclusion of EE into the school day, small-scale, locally based outdoor, environmental interventions in (sub)urban environments have been shown to be an effective way to increase children’s involvement with nature and to foster pro-environmental behaviours. Kennelly, Taylor and Serow’s (2012) garden project, for example, demonstrated how teachers can use their local environment to engage pupils in a range of curriculum relevant activities when engaging with EE.

A simple and successful, local, place-based research study which influenced the fieldwork stage of my research is that of White, Eberstein and Scott (2018) who investigated how a small-scale bird feeding intervention influenced 7-10-year-old school children’s awareness, knowledge, and attitudes towards local wildlife. Working with 220 children in 8 (sub)urban primary schools in southern England, White, Eberstein and Scott facilitated a six-week project to feed birds in the grounds of each school with the ‘aim to increase awareness and knowledge of local biodiversity and to promote positive attitudes and behaviour towards the environment’ (White, Eberstein & Scott, 2018:1).

Analysis of pre- and post- intervention questionnaires showed the children developed a significant increase in bird identification skills and increases in awareness of local biodiversity and pro-environmental attitudes. The children were keen to continue to develop

their school grounds to increase environmental value, and to use aspects of the intervention at home. Students and teachers described the intervention to be a positive learning experience and several schools were still using the intervention one year on from the study. Despite the relatively short timescale of external 'expert' input, White, Eberstein and Scott's (2018) simple, small-scale, low-cost bird feeding intervention, resulted in strong and on-going engagement by children and adults. This contrasts strongly with other resource heavy interventions (such as the Earthkeeper programme) and interventions which have shown less long-term success (e.g., Lewis' (2013) Montessori study). White, Eberstein and Scott's (2018) work resonates with previous findings that children's sense of self-efficacy and empowerment about how they can help the environment can be a strong predictor of their personal connection to nature (Reynolds et al., 2018).

2.8.9 Place Attachment

Pro-environmental behaviours have also been positively associated with an individual's sense of place attachment (that is how strongly people feel about places and why they feel the way they do) (Hoot & Friedman, 2011). The development of a positive sense of place attachment has been shown to increase empathy and responsibility for the natural world (Crawford et al., 2017; Erdogan, 2011). Sense of place also influences responsibility and environmental behaviours (Koushik, 2016). Koushik's work, developed through research in Canada, theorises that the success of local level EE projects is because they support individuals to develop a sense of place. Koushik (2016) states:

> 'Sense of place, and its two main components place attachment and place meaning, is considered a critical element to creating an environmentally conscious and responsive citizenry' (Koushik, 2016:9).

Although Koushik's (2016) detailed account of 'place' is also beyond the scope of this thesis, their research highlights the importance of providing opportunities for children to engage in experiential place-based education.

Place-based education (PBE) is a hands-on, student-centred, and real-life approach to teaching and learning, which infuses direct pedagogical experiences with the immediate environment to develop the sense of place (Riley, 2020) which is important in the enactment of EE (Ardoin, Bowers & Gaillard, 2020). It has been summarised as; multiple visits to one place; student-led experiential approach with a variety of activities; and an action research approach to learning (Rafferty & Laird, 2013). PBE supports the development of eco-sensitivity, eco-literacy, and wider pro-environmental effects (Rafferty & Laird, 2013) by

allowing students to understand local environmental problems and that global environmental problems often need local action (Ontong & Le Grange, 2014).

Comparing two approaches to place-based education in Australia and the USA, Rafferty and Laird (2013) looked at the potential of 'science-based, outdoor environmental education as a key tool in promoting pro-environmental behaviour and in understanding and addressing sustainability' (2013:background para 2). In Australia, they looked at 'Bugwise for Schools' and in the US they focused on the 'What's Good in My Hood' programme. Bugwise for Schools is a programme based on a university campus. Teachers from two primary schools (local to the university) attended three training workshops and were provided with resource materials, before working with their students independently on the campus wetlands and re-forested areas independently with their students. Interview data about the teacher and student experiences was gathered. The 'What's Good in My Hood' programme, part of the New York Restoration Project, promoted exploration of nature in urban areas and children went to a local park (Swindler Cove) which had been restored to a natural habitat. In this project, teachers had one workshop prior to the programme, used workbooks, and had support from staff from the Restoration Project throughout. Data from the workbooks and surveys was collected. Data from both programmes was coded, summarised, and themed.

Findings showed being outdoors and 'authentic experiential learning' (conclusion para 1) fostered environmental stewardship. Sense of place developed, and eco-sensitivity and empowerment was demonstrated to be facilitated by both programmes indicating both types of outdoor approaches were effective in promoting an understanding of nature. Rafferty and Laird (2013) recognise that not all schools have local access to nature and recommend 'urbanisation of birds and other animals to urban environments as a potential way to begin increasing natural experiences in school (p:6). Their research demonstrated that partnership with other organisations enhances provision and can be an effective approach to integrating EE.

This idea was reiterated by Green and Somerville (2015). They worked with Australian primary schools (who were already pro-actively involved in EfS) to build 'a network of relationships' (p:839) with communities to provide expertise and support for the continual development of EfS and by doing so illuminated the importance of place identity. It is important to note that place plays a pivotal role in Aboriginal ontologies. This work supported earlier work by Uzzell, Poi and Badenas (2002) which emphasised the importance of a person's attitude to their locality for pro-environmental behaviours; and Burgess and Johannessen's (2010) statement that if students are to effectively 'gain insights into functional ecosystem processes they must be supported in the 'cultivation of intimate

knowledge of [their] homeground' (p:4). Due to space restrictions, the theory of self-identity and place theory will not be discussed further, but it is important to recognise that 'place-related social identity' is important in EE (Uzzell, Poi & Badenas, 2002:26).

Although deeper exploration of models of the interconnection between knowledge, behaviour and attitude is beyond the scope of this thesis, it is important to note that literature suggests that for effective EE all three are all crucial. Spending time in nature is associated with increased environmental knowledge, increased connection to nature and future pro-environmental attitudes (Gill, 2011) and as mentioned previously is also associated with personal development, and social and mental well-being (Adams & Savahl, 2017). Thus, fusion of EE and mainstream pedagogies has potential for 'fostering the well-rounded, independent free thinkers that are able to respond to future challenges' (Pimlott-Wilson & Coates, 2019:276). Whichever approach is used for EE, the development of knowledge, affect and attitudes which influence subsequent environmental behaviour is influenced by personal experiences (Ghiso, 2015; Goralnik et al., 2012). To integrate EE effectively into mainstream education greater understanding is needed about how children experience EE pedagogies (Sulsberger, 2018).

2.9 Experience

Children's experiences of EE need to be understood more deeply as:

> '[D]eliberate investigation of lived experience…may be able to provide better understanding into the conditions and context necessary for motivation of pro-environmental behaviour', (Beery & Wolf-Watz, 2014).

Understanding experience is central to my research which explores children's experiences of EE in their primary school. It is useful therefore at this point to discuss the concept of experience and the importance of experience in learning. Following this, the ways experiences can be shared and understood will be discussed. The importance of, and issues around, listening to children's experiences of learning and are then addressed.

2.9.1 The Concept of Experience

Samuelsson and Park (2017) advance '[c]hildren's experiences are simultaneously physical, social, emotional, and intellectual' (p:281). Children's experiences of their learning environments (both material and social) influence their emotions, behaviours, and attitudes which in turn shape immediate learning and the ongoing effects of that learning. Furthermore, immediate and ongoing engagement is influenced by previous and current experiences, knowledge, and understanding. Student experience has been shown

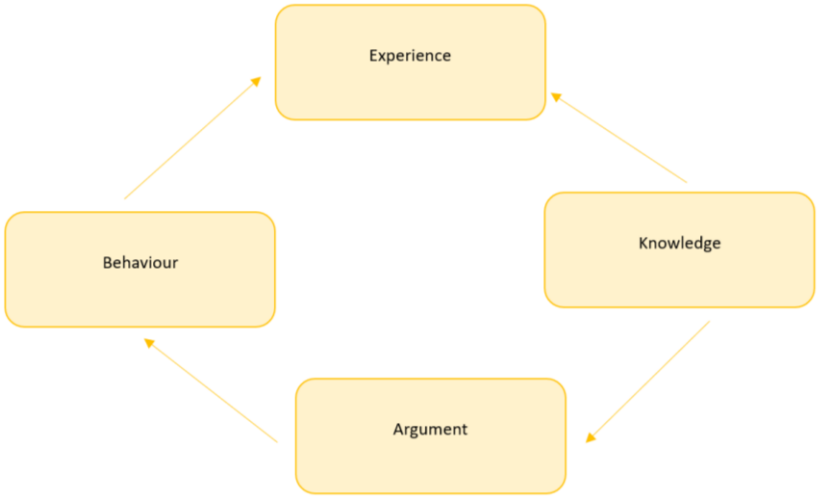
to influence individual development (Rogoff, Dahl & Callanan, 2018) and educational outcomes (Nuthall, 2004).

To gain a richer understanding of children's learning it is important to explore their experiences (Lichtman, 2012) and to 'understand the phenomenon of learning from the perspective of the learner' (Roth, 2012:140). This is because 'when we consider the essence of the experience, we are moving to a deeper level of understanding' (Lichtman, 2012:79). However, in line with Gupta (2006) this thesis does 'not assume that the notions of experience … are perfectly clear' (p:236). Although individuals tend to assume their experiences are the same as those of others, this is not necessarily so (Bartlett & Burton, 2012). Greenwood's (2018) study with identical twins, for example, demonstrated that they interpret and recall 'the same' situation differently. Nevertheless, 'insiders have a privileged access to knowledge of their own experiences' (Tangen, 2008:157) and this is a key strength of talking with people about their experiences.

2.9.2 The Importance of Experience in Learning

Understanding learning from the learner's perspective of their experiences is important (Lichtman, 2012) because experience shapes the immediate effects of learning (Ghiso, 2015). Personal experiences influence learning and are used to synthesise knowledge, deepen understanding and construct arguments (Ghiso, 2015) which may (or may not) subsequently influence behaviour (Fusch, Fusch & Ness, 2017; Goralnik et al., 2012). This process is summarised in Figure 1.

Figure 1: The Experience – Behaviour Cycle; Based on Ghiso, 2015.



The subjective understanding of learning experiences are also important as they significant ongoing effects (Dewey, 1997:26) especially in the development of ongoing emotions to subject matter (Hoot & Friedman, 2011); for example, 'gratifying experiences' mediate the development of positive attitudes (Roczen et al., 2012:341). As:

> '[S]chool success is correlated with intelligence only to a limited degree and that emotional factors play a role. If we can learn in detail just what experiences bring the necessary emotional factors into play, we could presumably influence school success' (Plutchik, 1974:30).

There is a need for 'a more complete picture of the educational experiences…[which] …may allow us to recreate […] positive contexts' (Sulsberger, 2018:730).

2.9.3 The Importance of Listening to Children About their Experiences

The UNCRC (1989) emphasises children are entitled to be respected and valued and promotes that children should be 'considered as persons of value and persons with rights' (Greene & Hill, 2005:106). The Convention calls for children to share their experiences and to be viewed as experts in their own worlds. Articles 12 and 13 of the UNCRC specifically bring attention to the right of the child to a voice. As these articles advocate for the rights of children to express their views (especially around issues that have direct impact on them), to have formal and informal communication available, and for their views to be listened to.

Mannion (2007) outlined four fundamental reasons for listening to children which can be summarised as: empowerment (the child as a 'minority' will become empowered within the listening process), citizenship (the child will learn skills for their future life as a citizen), relationships (listening to children's voices will add value to the adult-child relationship), and enlightenment (the adult will learn something from the child). Children can provide an important contribution to the learning environment (James, 2007) and their input can be useful for the development of teaching and learning activities (Meager, 2018).

Barratt Hacking and Barratt (2009) propose that children's learning is fundamentally influenced by their 'experience of their local community and environment' (p:373). Exploring how to bridge the gap between EE philosophies and school practice (Stevenson, 1987), Barratt Hacking, Scott, and Barratt (2007) worked with 11–12-year-old students (and 17-year-old mentors) in an urban community secondary school. Over one-year, a participatory research project, 'Listening to Children' was used to work with children and teachers to develop approaches with which to share experiences and deepen awareness of how children understand and act in their locality, how they relate this to the curriculum, and how the school could include children's experiences into the curriculum. The ecological and

collaborative approach highlighted that the children valued the expertise of their peers. Enactment of the curriculum was enriched when including the children's environmental experiences. The authors emphasise the value of children's experiences within the learning environment and advocate working with children as an effective way to align EE with curriculum requirements. Although they recognise the conflict between English mainstream schooling and EE pedagogies, Barratt Hacking, Scott and Barratt's (2007) work demonstrates both the need to change curriculum development, content and pedagogy, and the opportunity to do this by listening to children's experiences. They explain that developing activities in a way that foregrounds the children's experiences can make a valuable contribution to the local enactment of EE.

The participatory rights of children in education are also argued for by Hart and Brando (2018) who explain as key stakeholders in the system children should be included as vital partners. Children have different perspectives and knowledge (Engdahl, 2015) which are as valid as those of adults and often provide a new and useful understanding (James, 2007). For example, Genuis et al. (2014) used photo-voice methods with Year 3 and Year 4 indigenous Canadian children and found that the Year 4 children understood cultural sensitivities better than the outside researcher. Gillett-Swan and Sargeant (2018) challenge the 'deficit model' of childhood in which children are viewed as incapable and 'developmentally incomplete' and instead emphasises the need for 'challenging assumptions about children so that acknowledgment of the child's perspective can routinely occur' (Gillett-Swan & Sargeant, 2018:123).

Notwithstanding the benefits, James (2007) outlined several areas which can cause problems when 'giving voice to children' (a loaded term in itself); these included: the representation (who does or does not participate in the research), the authenticity (who decides what is listened to and how, and how accurate is the interpretation of information), the diversity (whether children are seen as individuals or a group) and power differentials inherent in research situations.

Although listening to student voices is considered 'good practice' by Ofsted, and although The UK Education Act (2002) requires schools to consult their students and is looked for during Ofsted inspections, the rhetoric is often not put into practice (Lundy, 2007) and inclusion of student voices about their experiences remains rare (Gillett-Swan & Sargeant, 2018). Despite overt systems being in place in schools to facilitate the active involvement of children in their school life (the student council, for example) rarely do schools include and act on what students express about their learning experiences (Gillett-

Swan & Sargeant, 2017). Research indicates 'classrooms are dominated by the voices of the educators' (Hohti & Karlsson, 2014:549).

As Lundy (2007) explains:

> 'The initial goodwill can dissipate when the rhetoric needs to be put into practice, especially when the effect of this is to challenge dominant thinking, generate controversy or cost money' (2007:931).

Thus, having 'space' for children's voices does not mean that the children's voices are heard (James, 2007). Although involving student voices in learning, school practice and organisational decisions has been shown to result in more effective teaching and learning (Collins & O'Toole, 2006), children's voices remain absent from policy development and 'the goals of the democratic, voice-inclusive classroom remains unfulfilled' (Gillett- Swan & Sargeant, 2018:124).

Understanding children's experiences of their education is important (Hart & Brando, 2018) and there is a vital need for the active and authentic participation of children in teaching and learning as this can empower children to realise their educational rights (Lansdown et al., 2014). More specifically for EE, research is needed that deepens the understanding of the experiences of learners to support the development of effective pedagogies which ultimately lead to better teaching and learning of EE (Meager, 2018). As Koushik (2016) states 'new forms of learning can aid schools and communities in re-orienting people towards a more sustainable society' (p:14).

2.9.4 The Complexities Involved in Researching the Experiences of Children

An individual's experience is always an interpretation of their world; and in research these interpretations are '(re)constructed by the participants (i.e., children and researchers) during the data collection process' (Tangen, 2008:164). Thus, children's voices are ultimately co-constructed with adults, and this construction is fundamentally about the adult and child relationships (Gillett-Swan & Sargeant, 2018). How adults perceive children (and their abilities) is affected by the personal beliefs of the adult (Alderson et al., 2005). Thus, it is important to be mindful of how children's voices are heard and when values are placed upon the voices (Lewis, 2010).

It is also important to understand the reason behind why student voice is being sought. Lewis (2010) directs us to question the specific purpose of listening to children's voices and to examine the ethics which surround listening to children. Lewis (2010) argues that it should not be assumed that listening to children's voices is in and of itself a good thing

but instead emphasises the importance of understanding ‘how, why, when ‘child voice’ is realised in research and professional contexts’ (p:14).

Alderson et al. (2005) emphasise that ‘we need to empower children such that they can tell of their experiences’ (p:15). However, to understand the full richness of any experience, it is important to recognise not only the voices, but also the space within which the voices were shared, the audience hearing the voices, and the influence of these factors on how the voices are understood (Lundy, 2007). Von Benzon (2015) also recommends caution in how adults identify and interpret accounts, for example, when exploring ‘fantasy’ he asks: why does the adult think something recounted by the child is fantasy and what does any specific ‘fantasy’ tell us about the child and their experience? In a similar way, the importance of silence in communication is highlighted by Lewis’ (2010) who emphasises that silences are ‘not neutral or empty’ (p:20) and should be included as a key aspect of analysis.

The influence of adult interpretation of silence is highlighted by Alasuutari’s (2014) work in Finland with children and parents in early education. This research showed that when parents and children were asked to fill in individual education plans, parents, and teachers ‘saved face’ by minimising the importance of sections not filled in by the children. Furthermore, teachers and parents minimised negative comments by the child, preferring to assume a lack of ability in the child rather than investigate a competent child whose participation ‘challenged [the] childhood institutions’ (p:255). Alasuutari’s (2014) work illustrates how research is embedded within ‘broader discourses about the nature and status of childhood’ (Munford & Sanders, 2004:470).

A further perspective on listening to silence is demonstrated in the work of Munk and Agergaard’s (2018) case study with children in 7th grade in Denmark which explored the impact of the hidden curriculum. By listening to silence (by which they mean ‘the things students do not voice’ (p:372)) they explored student participation and non-participation in physical education. They found that ‘silences’ aligned with the expectations of the group and participation was influenced by potential consequences for social reputation. Munk and Agergaard (2018) therefore indicated the importance of silences and prompted researchers to look at silences as valuable data rather than methodological problems.

The context of the research space often has an adult focus (Mand, 2012), and although in conflict with participatory practices, the adult often decides which children get heard and what they can talk about (Mannion, 2007). When working with city children using cultural-geography and third space theories (i.e., that the environment is made visible and can be understood through the actions and interaction between person and environment), Raittila (2012) demonstrated the need to look at the intergenerational spaces created between

adults and children and prompts us to recognise the different ways children express themselves within their socially constructed physical and emotional environments. Raittila (2012) recognises that children's voices are situated in time and place and reminds us to look for wider elements in society that influence children. This is taken up further in Chapter 4, section 4.2.1.

2.9.5 Research that Looks at Children's Experiences of Learning

Investigations of children's learning experiences range from explorations of general classroom experiences (Collins & O'Toole, 2006), outdoor education (Reynolds et al., 2018), emotional aspects of learning (Glendos, 2017) and the learning of specific skills (Meager, 2018). Qualitative, quantitative, and mixed-method approaches have been used. As this research is based in a primary school, the focus here is Early Years and Primary school aged children; that is children aged between one and eleven years of age.

When looking at learning in general, Collins and O'Toole's (2006) a notable qualitative research project looked at primary school children's experience in the classroom. This three-year long 'project on learning' used transactional theory (in which students' understanding is 'situated in context') to better understand the realities of children's classroom experience. Observations, audio, and video recordings, pre and post-tests and mood slips were used to investigate the transactional nature of teaching and learning from the child's perspective. Although criticised for lacking attention to personal identity and wider cultural issues (Davis, 2006), this otherwise rigorous research demonstrated interactions with the teacher and peers and (importantly in relation to this thesis) the subjective experience of the learner to be key elements for learning within the classroom.

The influence of teacher interaction on children's motivation to learn, and their subsequent achievements was also demonstrated by Glendos (2017). When investigating how students can be supported to build resilience, Glendos (2017) found that children want to have choice and agency in their learning environment and to have 'more meaningful educational activities' (p:351). The children were competent to express their opinions and when teaching included their perspectives, interests, and experiences, children were more motivated, and participation increased. This study highlighted that social interactions with the teachers were important to the children's experiences and they valued a friendly learning environment.

The importance of social interactions between adults and children is prevalent throughout research (Ferreira, Cruz & Pitarma, 2016). The value of a friendly learning environment was evidenced by Ferreira, Cruz and Pitarma's (2016) who used socio-constructivist and action-research methodology and a naturalistic and interpretive approach to 'understand, improve,

and reform practices' (p:5622). To research the teaching of ecology to pre-school children, Ferreira, Cruz and Pitarma (2016) created 'a relaxed and entertaining learning environment' (p:5628) which promoted pro-environmental behaviours as children investigated real-life problems. Children were supported to 'observe, question, experience, check and decide' (p:5628) and were encouraged to express their ideas and to explore without the fear of making mistakes. Children were observed for two weeks and these observations along with children's artefacts, and interviews with the children formed the data corpus. Ferreira, Cruz and Pitarma (2016) demonstrated that the relaxed and exploratory approach to real-life environmental problems increased the children's environmental literacy.

Cheon and Reeve's (2015) work explored teaching styles in Physical Education (P.E.) and demonstrated how teacher input influenced student motivation. They used an intervention in which teachers replaced 'negative conditional regard, controlling rewards, intimidation, and excessive personal control' (p:102) with explanations of requests that supported children's autonomy. Primary influencers of an individual's motivation are 'psychological need satisfaction' and 'psychological need frustration' (Cheon & Reeve, 2015:99) and results showed that the use of empowering approaches successfully increased student motivation.

Powerful motivators for engagement in learning are self-efficacy and empowerment (Sawitri, Hadiyanto & Hadi, 2015) and research recurrently highlights the importance for children to be facilitated to use emancipatory skills to deepen their knowledge. Villiger et al.'s (2012) study of reading with fourth grade children found autonomy (e.g., choosing their own book), feeling competent (e.g., the book was not too easy or too hard) and social relatedness (e.g., working in small groups) had a positive effect on the children's motivation. This research demonstrated that focussing on these three aspects of learning increased the children's self-efficacy which in turn increased the efficacy of the reading intervention.

The importance of autonomy in learning is supported by Sandseter and Seland's (2016) work which explored children's subjective well-being and their experiences of the classroom environment. Sandseter and Seland's (2016) qualitative study, with four-to-six-year-old children in Norway, found flexibility and choice within the learning environment correlated positively to the well-being of the children. Children valued the 'opportunity to oppose the staff and negotiate and choose activities that differ from those that the staff select' (p:913). This work also showed children were more 'autonomous' outdoors than indoors. Sandsteter and Seland argue the increased autonomy was key to the reported increase in well-being and propose that choice and freedom of movement have crucial importance for children's subjective well-being and motivation when learning.

Importantly however, pleasant experiences alone are not enough to result in 'positive learning' especially if the experience leads to simplistic cause and effect thinking (Do Nascimento, 2019). Do Nascimento (2019) explains that motivating experiences should only be the starting point for more detailed investigative work which involves focused work that can be deemed truly educational (Do Nascimento, 2019). This is because it is focused work that ultimately results in a deeper educational experience which can empower children 'to actively take part in their own lives and the development of our society' (Kostenius, 2011:522).

2.10 Summary of the Literature Review

Human action is causing unsustainable environmental damage and the damage to the planet will ultimately have the greatest effect on today's children (State of Nature Report, 2019:2). Changes are needed before catastrophic and irreparable, and damage is inflicted on the planet by humans (Rockström et al., 2009). Working with children is a valuable way to protect the planet both now, and crucially for the future (Soga et al., 2016). There is an urgent need for children to have opportunities and experiences to understand sustainability and to develop environmental concepts thoughtfully (Mackey, 2012); and education is critical (Annan-Diab & Molinari, 2017).

There are three main approaches for educating about sustainability: 'Education for Sustainable Development' (ESD), 'Education for Sustainability' (EfS), and 'Environmental Education' (EE). This research uses an EE focus as EE aims for environmental conservation and restoration but unlike ESD and EfS does not have a human-centric focus. Although the value-led nature of EE has been criticised as potential indoctrination (Jickling, 2013), engaging with EE in a way that encourages the development of critical thinking skills aims to help students to draw their own conclusions and make informed choices (Haydock & Srivastava, 2019).

'Formal education' has been shown as an effective way to cultivate 'global environmental consciousness' (Rafferty & Laird, 2013:conclusion, para 2). Nevertheless, despite the possibility for schools to become effective facilitators of EE, it is no longer an explicit curriculum requirement in England. The omission of EE from the curriculum in England has been understood in different ways. Whilst some believe there is little political will to teach a subject that challenges the current neoliberalist view of the environment as a source of economic gains (Orr, 2020) others suggest there is political resistance to educate children in a way that may ultimately challenge government policy (Winter, 2007). Whatever the cause, the alternative pedagogies recommended for EE are not compatible with the approaches currently used in English mainstream education (Rickinson et al., 2004) and EE is perceived

to be difficult to engage with and assess, particularly against curriculum requirements (Wolff et al., 2017).

The importance of engaging children with EE contrasts starkly with the lack of EE in mainstream schools (Evans et al., 2017) and the inequalities of provision and opportunities available (Glackin & King, 2020). Although positive EE experiences may support 'better decisions in the future regarding the natural world and its resources' (Turtle, Convery & Convery, 2015:5), there are significant time, training and resource barriers to the introduction and facilitation of EE within English schools (Evans et al., 2017). This is a serious problem because many children currently do not have access to facilitated EE (White, Eberstein & Scott, 2018).

Teachers recognise the importance of EE and express a desire to include EE in their practice (Weitkamp et al., 2013) and some schools actively engage with EE despite the challenges. Approaches to EE include whole school approaches which are often linked to schemes and certification (e.g., Lyons Higgs & McMillan, 2006), holistic approaches which include social, economic, and environmental elements and look at sustainability locally, globally and over time (e.g., Boeve-de Pauw et al., 2015), linking with external provision such as Forest Schools (e.g., Turtle, Convery & Convery, 2015) and specific interventions (e.g., White, Eberstein & Scott, 2018). Working outdoors is an effective approach (Scott & Boyd, 2016) and school gardens have been repeatedly shown to be a constructive way to develop the skills, motivation, positive attitudes, and empathy to promote environmental action. School gardens also provide opportunities to work at a local level and develop a sense of place and place attachment which are key aspects of effective EE (Passy, 2014; Sottile et al., 2016).

Emotional aspects such as attitude, empathy and motivation are important for the enactment of pro-environmental behaviour and facilitating these elements is a vital element of effective EE (Crawford et al., 2017). First-hand experiences are particularly valuable for EE (Jeronen et al., 2017) and throughout the literature the importance of the children having positive and empowering experiences is evident (Sandseter & Seland, 2016). Children have been shown to benefit from using experimental and questioning pedagogies (Iliopoulou, 2018); and involvement in local environmental issues has been shown to encourage the active engagement of children in pro-environmental activities (Roy et al., 2014).

There is a growing body of literature which explores the effects of interventions and outdoor education. However, these studies often assess the impact rather than the mechanisms of an intervention; that is, does it work not how it works (Pooley & O'Conner, 2000). Research

is needed to understand how and why particular approaches to EE are effective (or not) and what factors are important for the ongoing development of EE (Gaus & Mueller, 2017).

The immediate and the ongoing effects of learning are shaped by experience (Ghiso, 2015). Beery and Wolf-Watz (2014) explain 'deliberate investigation of lived experience…may be able to provide better understanding into the conditions and context necessary for motivation of pro-environmental behaviour' (p:204). Thus, to include effective EE (i.e., EE that empowers children to think carefully and act on environmental information) into the school day how children experience EE needs to be understood more deeply (Meager, 2018). Children can be vital partners in learning (Elder, Damiani & Oswago, 2016; Ghiso, 2015; Hart & Brando, 2018) and when given the opportunity to be actively involved in developing the learning environment, children's contributions have been shown to provide a valuable contribution to teaching and learning (Hart & Brando, 2018). Listening to children's experiences values them as individuals with rights and values and as having agency (Quennerstedt, 2016). Studying children's experiences of EE (and how the children understand their learning experiences) is important to develop a richer picture of EE with which to effectively develop EE in primary schools (Meager, 2018). There is space in the literature to further research facilitated EE in schools by specifically looking at the children's experiences of EE and this should be done because '[e]nvironmental education is just too important for it not to be effective' (Boeve-de Pauw, 2014:2).

Whilst acknowledging that many aspects are important for understanding the effectiveness of children's engagement with EE (for example measuring increased knowledge and/or behaviour change) questions about other aspects of EE development are not asked and are for further research. Instead, the focus of this research was to develop a deeper understanding of how children experience EE. Using a qualitative, case study to explore children's experiences of a facilitated EE intervention project in one mainstream English primary school, the study aimed to develop a richer picture of EE enactment and to provide knowledge that will ultimately lead to better teaching and learning of EE.

Chapter 3: Theory

3.1 Introduction

The positionality of the researcher affects the research questions asked and the approaches taken to answer them and as such 'research is not helped by making it appear value free' (Stake, 1995:95). Firstly, therefore, I will explain my positionality and environmental beliefs. Following this, the theoretical foundation of the thesis is provided.

3.2 My Positionality

3.2.1 Ontology

My ontological beliefs are subjective and realist in that I believe objects exist independently but are understood subjectively by the 'knower' through the influences of culture and experience (Cupchik, 2001). Thus, rather than objective facts, constructed realities develop which have purpose and meaning to larger society (Green & Hogan, 2005). Although human nature has elements of deterministic and conditioned behaviours with individuals living within (and often bounded by) social structures, free-will and voluntarism enables individuals at least some control over themselves and their environments. This individuality means the social world can be changed.

Within this ontology, childhood is 'a product of history, society and culture' (Green & Hogan, 2005:8); and is 'socially, culturally and temporally specific' (Green & Hogan, 2005:8). Education and learning opportunities, therefore, are not neutral transactions, but instead have (often unspecified) biases and agendas (Bartlett & Burton, 2012). Thus, neither education nor the researching of educational experiences can be viewed objectively.

3.2.2 Epistemology

I understand my world through a social constructivist lens which suggests individuals construct their own knowledge by interpreting and interacting with what is around them. Social constructivism asserts that because knowledge is constructed, power structures, culture, and personal interpretation influence what the knower knows. Individuals constantly review their knowledge in the light of new information, and new learning builds upon prior knowledge. As such '[n]o aspects of knowledge are purely of the external world devoid of human construction' (Stake, 1995:100) and there are no objective standards against which constructs can be compared; instead, they are compared against each other.

Within this epistemology knowledge, attitudes, and behaviours are subjective and personal and people know the world through their own 'mental experiences' (Alderson et al., 2005:15); this means there is not one fixed (or objective) social reality. Objects of thought (i.e., words) do not have clear, universal meaning because meaning is dependent on the 'knower' (Stake, 1995:100). Nevertheless, theoretical social constructs (such as childhood) are treated as real and as such become real. Hence, it is important to understand the subjective perspectives and experiences of others and we must 'empower children such that they can tell of their experiences', (Alderson et al., 2005:15).

3.2.3 Axiology

My axiological position is that education systems are a product of value-filled cultures (Modgil & Leicester, 2005). These cultures influence the content, pedagogies, and success criteria of education. The education system is '[c]reated by those in power, it supports and maintains the status quo, a situation most beneficial to society's elites.' (Freire, cited Vinson, 1999:311). Thus, all education is political (Freire, 1996). I believe the regimented and formulaic giving of information to children in mainstream English education with the onus placed on 'learning' information in a way that can be assessed and monitored (i.e., formal education) stifles critical thinking skills and maintains inequalities (Freire, 1996).

Within the spectrum of learning models, my axiological position aligns with the theory of the sociology of childhood (James & Prout, 2003). This theory claims: children are 'legitimate humans and holders of human rights' (Quennerstedt, 2016:8) and are agentic 'social actors who … [have] particular competencies' (Mand, 2012:159); children are active participants in learning who transform and understand their individual experiences through the lens of their own knowledge (Vygotsky, 1978); and children are seen as individuals and reliable witnesses to their own experiences and as such their perspectives should be acknowledged. Thus, children should have access to the resources needed to express their views (Gillett-Swan & Sargeant, 2018); views which are valid and useful (James, 2007).

Pedagogical approaches are informed by how 'the child' is viewed and I view children as capable individuals (Reynaert, Bouverne-De Bie & Vandevelde, 2009). Therefore, instead of the transmission models of teaching which dominate English mainstream education, I advocate for emancipatory education with critical pedagogies, active learning, and self-reflection (Giroux, 1983; Damianidon & Phtiaka, 2016). I believe education should empower the individual, and advance social justice by recognising and challenging the power balances within society that maintain inequalities (Popkewitz & Fendler, 1999). This means education systems should have a duty to engage with learners (both individually and in social groups) to both support the learning of specific information and to develop critical thinking and

questioning skills. Importantly, education should be a shared venture with willing rather than 'coerced' learners (Peters, 2015).

3.2.4 My Environmental Positionality

Anthropocentrism (the belief that humans have ultimate supremacy) has led to environmental problems (Rolston, 2020) which now 'endangers both human and ecological sustainability', (Kopnina, 2016:147). Prioritising political and economic agendas has resulted in reduced concern and care for nature and the environment, and human activity continues to cause extensive planetary damage (Dryzek & Pickering, 2018). Research indicates biodiversity loss has reached a critical point (Dempsey, 2015) but despite awareness raising campaigns and increased media attention, this knowledge is not resulting in positive environmental action (Courtenay-Hall & Rogers, 2002).

In this age of the Anthropocene (Lewis & Maslin, 2015), I believe we should work towards 'sustainable contraction' (Selby, 2007) which advocates moving away from consumption and towards repairing the environment, as the way to heal and protect our world. As 'a multiplicity of thinking is needed' to enact such change (Bazzul, 2019:215), education is vital for a more sustainable future; and the importance of education grounds this research. However, I heed Jickling and Wal's (2013) warning that without due caution education about the environment runs the risk of becoming indoctrination; something discussed previously in Chapter 2, section 2.5.5. Therefore, on environmental education (EE), my views align with Russell (2013) in that it should not seek one correct theoretical orientation. I promote Bazzul's (2019) perspective that EE 'is not a matter of setting each other straight but nurturing different powers.' (p:214). That is, rather than being dogmatic propaganda, EE should be a platform for critical thinking, debate and personal skill development.

3.3 The Theoretical Foundation of the Research

Detailed comparisons between learning theories are beyond the scope of this thesis, instead, I provide an overview of the key theories of constructivism, social learning theory, and ecological theory of learning as these ground my research. I will then turn to Dewey's experiential learning theory and Freire's theory of Critical Pedagogy as these influenced the development of the fieldwork project.

3.3.1 Constructivism

This research is grounded in constructivism, more specifically social constructivism. Constructivism propounds that '[n]o aspects of knowledge are purely of the external world devoid of human construction' (Stake, 2010:100). This means an individual's reality is their subjective understanding of the world constructed through the organisation of their experiences (Leather, 2012). Constructivism explains that rather than passively absorbing information learners actively build on prior knowledge and experiences to interpret information and construct their own meanings and understanding (Phillips, 1995), thus emphasising the importance of prior experiences on current learning (Bandura, 1977).

Constructivism has three main theoretical strands: cognitive, radical, and social. Whilst cognitive constructivism explores how learners synthesise information according to their cognitive stage of development (Piaget, 1977) and radical constructivism is concerned with theories of absolute truth and reality of human understanding (von Glasersfeld, 1995), social constructivism is a social learning theory (Bronfenbrenner, 1994; Vygotsky 1978) and explains that individuals actively construct their own reality through social interactions (Stake, 1995). Social constructivism therefore emphasises the importance of social interactions, culture, and the influence of the surrounding environment on learning (Stake, 1995).

3.3.2 Social Constructivism

Social constructivism maintains that child development is a result of collective action and interaction (Rogoff et al., 2018). It emphasises that learning occurs, is extended, and is deepened by active interaction with surrounding environments and cultures and child growth and development occurs when they interact with their communities through the 'transformation of participation' (Rogoff et al., 2018:3). Vygotsky (1978) highlights the importance of collaboration and describes how knowledge is co-constructed through social interaction. In his 'socio-cultural learning theory' (SCT). Vygotsky (1978) introduces the idea of a 'Zone of Proximal Development' (ZPD) to explain an individual's increased potential for development if they are supported in their learning by a more knowledgeable person. Although the debate about interpretations of the ZPD (e.g., Gillen, 2000) is beyond the scope of this thesis, it is important to note that the ZPD is seen to be currently expanding as globalisation, media, and digital technology provide access to greater amounts of information and wider culture (Brown, 2014; Marginson & Dang, 2017). Social constructivism and SCT are sometimes contrasted (the former focussing on shared exploration whilst the latter emphasising an expert giving guidance), nevertheless both provide useful ways to facilitate effective teaching and learning, especially by highlighting the

importance of educational culture. In education, culture 'provides the tools for organizing and understanding our worlds' (Bruner, 1996:3) and shapes how individuals conceive of themselves and understand their abilities (Bruner, 1996).

Bruner (1996) advocates for schools to have an enabling culture in which children are aware of their thinking and take ownership of their learning and argues that children should be taught in a way that makes them think about what they know, how they know it and what they can do with it. Bruner also proposes 'doing' develops 'knowing' (Bruner, 1996:151) and advocates 'discovery methods' of teaching and learning in which learners work collaboratively on joint activities which involve questioning, investigation, and exploration rather than following an approach of the teacher simply 'telling' (Bruner, 1996:46).

When looking at learning cultures in organised educational settings what is considered effective learning is time and culture dependent. Bartlett and Burton (2012) indicate that educational cultures (by which they mean 'the social practices …not the contexts or environments' (p:245)) 'permit, promote, inhibit or rule-out certain kinds of learning' (Bartlett & Burton, 2012:245). Social constructivist approaches to learning contrast with the transmission approach popular in English primary schools. Instead, if learning is truly to be 'an activity of meaning making' (Watkins et al., 2007:292) there needs to be a move away from the 'hard-edged positivistic approach to delivering knowledge to children' (Meager, 2018:413).

My research is based on social constructivism as firstly, social constructivism aligns with my ontological and epistemological stance; and secondly, it provides a strong theoretical foundation for research that aims to explore children's experiences of EE within the context of their school environment. Thirdly, social constructivism draws together four key elements of EE, those being 'doing' to practise skills, making meaning through experience, the development of 'self', and the importance of membership of a community, as key elements of learning (Wenger, 1998, cited Illeris, 2018:92) and therefore provides a strong theoretical basis for the approaches recommended for effective sustainability education (Wastlans et al., 2017).

3.3.3 Social Learning Theory

Social learning theory (SLT) proposes learning is informed by the social interactions between the individual and their environment (Bronfenbrenner, 1994; Vygotsky 1978) and a person is transformed through the culture of their social group (Vygotsky, 1978). Learning occurs through 'the active participation of the learner' (Tangen, 2008:158) to assimilate and integrate new information with existing knowledge, hence exploration and discovery is

foregrounded. SLT highlights the importance of cognitive factors in learning as knowledge construction is said to be influenced by artefacts such as perception, memory, thinking patterns and skills (Bandura, 1977). Unlike cognitive theories of learning, however, SLT does not specifically advocate for universal age-related development stages, but instead emphasises the influence of the environment on individual development (Stake, 1995). Notably, SLT suggests effective cognitive development is promoted and supported through 'systematic and well-structured … experiences' (Bartlett & Burton, 2012:230) and in education, flexibility in the roles of teachers and learners is encouraged to promote the co-construction of knowledge through collaboration, social interaction, and dialogue (Van den Berg & Schulze, 2014).

SLT has been criticised for focussing on an 'end point' of the child becoming an adult rather than considering that children not only reproduce the current society, but interpret, reconstruct, and develop it (Alderson et al., 2005:8). However, although SLT indicates that behaviours may become fixed and unchangeable if they are sufficiently reinforced, in contrast to behaviourism it recognises that behaviours are not always reproduced (Bandura, 1997). Consequently, within SLT children can be seen to create culture and contribute to adult society (Corsaro, 2005). Throughout this research, it is recognised that 'children act on and can bring about changes in society' (Cosaro, 2005:9). Figure 2 illustrates the relationship between social learning theory and social constructivism.

Figure 2: The Relationship Between Social Learning Theory and Social Constructivism.

Having provided a brief overview of social constructivism and social learning theory, ecological learning theory is now outlined.

3.3.4 Ecological Theory of Learning

Ecological theory explores how children behave in relation to each other, their communities, and environments. It integrates psychology and sociology and focusses on children's

experiences within their environment and allows a holistic exploration of children's experience, development and learning within their social setting (Green & Hogan, 2005).

Ecological theory explains that children live within society and have transactional experiences with their environments; ecological theory does not separate the child from the context and allows for rich descriptions to be collected by exploring how children behave in relation to each other and their environments. The meaning and importance to the child of such interactions is a key aspect of ecological theory. Ecological theory highlights the need to understand the child's perceptions about their membership within different communities, and to explore the relationships and power dynamics that influence learning and behaviour (Gill and Jack, 2007:10). Ecological theory looks at the meaning of the social environment for the child and proposes that aspects of the environment affect individuals in different ways. Observations within social contexts cast light on how children behave in relation to each other and their environments and looks at the meaning of such encounters for the child. Ecological theory is therefore a useful foundation for this research because it allows exploration of children's experiences (Green & Hogan, 2005) and the examination of how the child behaves in relation to others and their environment and can provide insights to help increase child participation in learning (Gal, 2017).

Bronfenbrenner's (1993) (bio)ecological model describes how a child experiences and interacts with different aspects of their environment. This model highlights the need to understand the child's perception of their membership of different groups and cultures. Figure 3 and Table 4 give a brief overview of Bronfenbrenner's model.

Figure 3: Simplified Model of Bronfenbrenner's Bioecological Systems Theory.

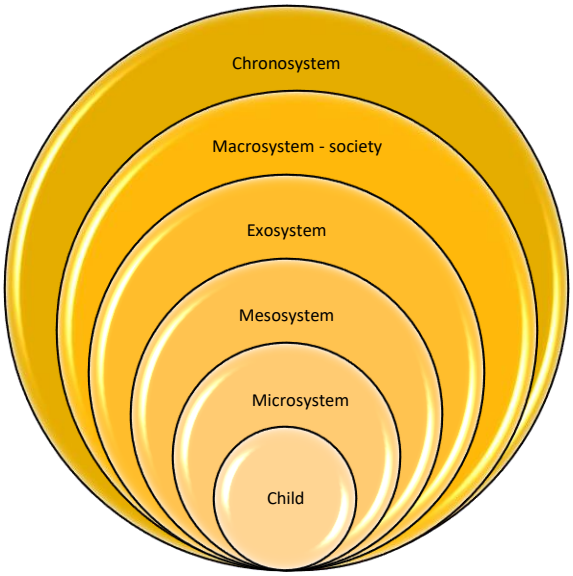


Table 4: Overview of the Elements of Bronfenbrenner's Ecological Systems Model.

Aspect of model	Examples of Elements
Microsystem	Family, Friends, School, Clubs, Health Care, Social Media, Neighbourhood, Religious Affiliations
Mesosystem	Interaction between microsystem and the wider societal structures of the exosystem
Exosystem	Social welfare systems, Media, Legal Systems, Funding Bodies, Committees, Councils, Governmental Bodies, Local Politics
Macrosystem	Cultural Ideologies, Societal Beliefs, Customs, Laws, Class, Values
Chronosystem	Historical Events (that influence other systems), Personal Experiences

My research works within the microsystem of Bronfenbrenner's theoretical model of learning and used a bottom-up, participatory process to look at how children experienced a small-scale conservation project. However, arguments have been made that the influence of culture is deep and widespread, and rather than confine culture to the macrosystem, culture should be highlighted as a key element in the microsystem (Vélez-Agosto et al., 2017). It is important to recognise that the temporal context of Bronfenbrenner's model (the chronosystem) has a particular relevance for EE research, and it is useful to note the importance and influence of the chronosystem on children's environments and experiences; something that can be overlooked when focussing on small-scale research and interventions. In this research the chromosphere aspect of Bronfenbrenner's theory is also important, as currently environmental concerns are becoming increasingly prominent in English society.

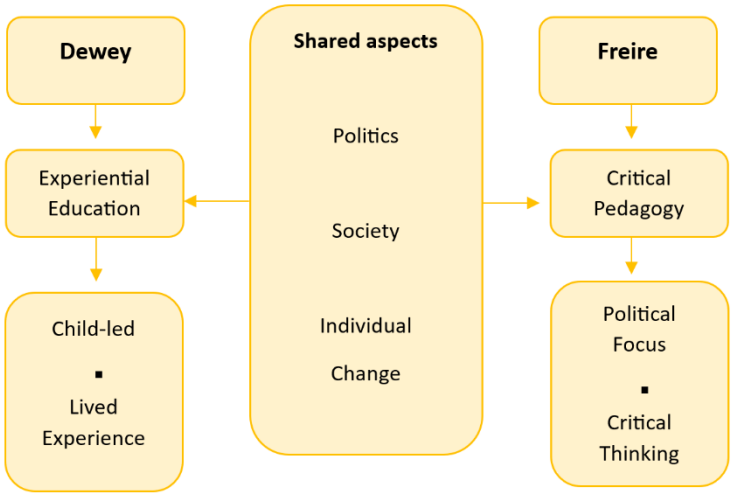
The Childhoodnature ecological model differs from Bronfenbrenner's ecological model as, unlike Bronfenbrenner which focuses on social aspects of the child's ecological systems, the Childhoodnature model also emphasises the interactions between children and other living and non-living aspects of their environments, that is, the 'more-than-human' world (Logan & Widdop Quinton, 2020:986). This post-human perspective reevaluates the human and more-than-human relationships in a way that recognises the interdependencies between human and more-than-human and the more-than-human as significant aspects of children's lives. Thus, the Childhoodnature model which challenges the dominance of human over nature is useful to explore the humancentric problems of the Anthropocene.

Having explored the learning theories that ground my research, the pedagogical theories that influenced the fieldwork project are detailed. Firstly, Dewey's (1997) Experiential Learning Theory is presented before Freire's Critical Pedagogy is outlined in more detail.

3.3.5 Pedagogical Theory

The two key pedagogical theories that influenced the development of the fieldwork intervention project are Dewey's Experiential Education Theory and Freire's Critical Pedagogy. These theories sit within social constructivism. Dewey and Freire both argued that education could rebalance the political, ethical, and economic inequities which they believed were detrimental to the individual and democracy. They reasoned that education could overcome disempowerment and argued for learner-centred education which promotes social justice. Figure 4 shows a comparison between the two pedagogical approaches.

Figure 4: Comparison Between Dewey's Experiential Education Theory and Freire's Critical Pedagogy.



3.3.5.1 Dewey and Experiential Learning Theory

John Dewey (1859-1952) is an influential figure in the development of child-centred learning. He was interested in psychology, human nature, and theories of thought and enquiry. His educational philosophy, grounded in social learning theory and social constructivism, emphasises how active meaning-making by individuals guides the creation of social worlds and, he rationalised, people are either constrained or liberated by the social constructs created.

Dewey's experiential learning theory sits within an ecological approach which integrates psychology and sociology and focuses on the development of the whole person. Ecological approaches recognise the meaning of the social environment for the child and proposes that aspects of the environment affect individuals in different ways. Ecological models suggest learning is both subjective and socially mediated (Bruner, 1996; Vygotsky, 1978) because child growth and development occurs when they interact with their communities (Rogoff et

al., 2018). Dewey (1997) explained that although learning experiences are 'unique and individual to each learner' (p:29), the importance of social factors in the experiences of individuals must be recognised as they are 'co-operative or interacting parts' (1997:53). Ecological approaches therefore aim to understand the child's perceptions about their membership of different groups and cultures, and to explore the relationships and power dynamics that influence learning and behaviour (Gill & Jack, 2007:10).

Ecological practices do not separate the child from the context but instead state 'learning is a thoroughly social process' (James & Biesta, 2007:34, cited Bartlett & Burton, 2012). Dewey proposed an education system based on a 'well thought-out philosophy of the social factors that operate in the construction of individual experience' (Dewey, 1997:21) which could encourage students to develop the thinking and the social skills with which to form the foundation of a truly democratic society. By exploring how children behave in relation to each other, their communities, and environments, the meaning and importance to the child of their interactions are sought and this allows holistic exploration of children's experience, development and learning within their social setting (Green & Hogan, 2005).

As a pragmatist and 'practical educator' (Rolfe, 2014:1179) Dewey believed that true knowledge and understanding comes about through actively 'doing' and argued for 'a philosophy of education based on a philosophy of experience' (Dewey, 1997:29). Dewey advanced that meaningful learning develops through engagement with activities that relate clearly to life experiences as this allows the learner to actively make meaning and connections and by doing so increase their knowledge and understanding. Thus, Dewey's approach to education was that of 'an empiricism that is based on a conception of experience as the development of the dispositions of an active subject' (Dewey, 1997:105).

He suggests that by recognising the lived experience of the child, a teacher can 'direct the experience of the young without engaging in imposition' (Dewey, 1997:40) whilst creating environments and worthwhile experiences that 'lead to growth' (Dewey, 1997:40). However, although learning experiences may be based on the interests of the child, Dewey states they should be guided by the teacher. Dewey argues, there is in fact a moral imperative for a more experienced adult to use their developed 'insights' and 'understanding' to evaluate and guide the learning experiences of the child as what is important for effective learning is the interaction between the child's current 'needs and capacities' and the new subject matter (Dewey, 1997:45). He validates guided input from teachers, explaining suggestions from those with more experience must be as legitimate as suggestions from other sources (e.g., exploration). Nevertheless, he explains, teachers must be 'alert to see what attitudes and

habitual tendencies are being created…and to be able to judge what attitudes are actually conducive to continued growth and what are detrimental.' (Dewey, 1997:39).

Although situations may arise during activities (and these should be used and maximised) they should be used in a continuation of the learning activity not as the 'chief material of learning' (Dewey, 1997:79). Unfettered choice and open-ended freedoms to engage (or not) with resources and activities can disrupt shared and cooperative activities and so turn 'freedom which should be positive into something negative' (Dewey, 1997:63). Hence, Dewey explains, 'guidance given by the teacher to the exercise of the pupils' intelligence is an aid to freedom, not a restriction upon it' (Dewey, 1997:71).

Dewey proposed the value of an experience can only be judged with respect to where that experience subsequently leads. He explained the fundamental problem for education based on experience is to select 'experiences that live fruitfully and creatively in subsequent experiences' (Dewey, 1997:28). He explained education was not lacking in experiences, rather 'the experiences which were had, by pupils and teachers alike, were largely of the wrong kind' (Dewey, 1997:26). These unhelpful experiences risk children losing interest and impetus in learning and becoming closed off to exploring different ideas. Dewey describes as 'collateral learning' the attitudes and 'likes and dislikes' (Dewey, 1997:48) which develop when learning and directs educators to explore the possibility that it may be the subject matter or pedagogies that are problematic if a child becomes disengaged. Furthermore, Dewey emphasises that reflection on activities and experiences is vital to be able to use that experience in a meaningful way to develop further experiences otherwise, however enjoyable, 'intellectually it leads nowhere' (Dewey, 1997:87).

Thus, Dewey argues not for the introduction of 'experience' to learning but to change the quality of experience for learners, both regarding the 'immediate aspect of agreeableness or disagreeableness, and … its influence on later experiences', (Dewey, 1997:27). Nevertheless, Dewey stresses that focussing on a future to the detriment of focussing on the present experience reduces the effectiveness of the lived experience "and only by extracting at each present time the full meaning of each present experience are we prepared for doing the same thing in the future. This is the only preparation which in the long run amounts to anything" (Dewey, 1997:49). This perspective is summarised clearly by Stoller (2018) who explains Dewey's perspective that 'education is not preparation for life but is the very act of life itself' (Stoller, 2018:456).

In contrast to the transmission model, Dewey proposes a theory of Experiential Education, in which engagement with activities that relate clearly to life experiences allow learners to actively make meaning, form connections, and develop deeper understandings (Dewey,

1997). Such ‘authentic tasks’ (Dewey, 1997) lead to meaningful learning and development (Vygotsky, 1978). Whilst highlighting the effectiveness of linking ‘the subject’ to everyday experiences and explaining a more effective pedagogical approach to teaching and learning was to build on the children’s own knowledge, culture and experiences, Dewey was not suggesting removing ‘subject matter’ (the accumulated knowledge and experience of others)’, instead he was promoting the creation of learning environments which encouraged and supported children to explore their learning in ways that were more understandable to them and linked to their everyday lived experiences.

My research draws primarily on Dewey’s experiential learning theory as explained in his work Experience and Education (1997). Although more recent work has used (and adapted) Dewey’s experiential learning theory, returning to the original text allowed a deeper understanding of the founding principles of this theory. Essential aspects of Dewey’s Experiential Learning theory are personal exploration and active information gathering; assessing assumptions; working within a community to develop new perspectives and schemas; recognising the emotions of others; and importantly, developing confidence in one’s own abilities. Despite using the terms ‘progressive’ and ‘traditional’, Dewey’s strongly held belief was that education is not in fact a question of ‘progressive against traditional’ or ‘new versus old’, but instead he prompts us to question what something ‘must be to be worthy of the name education’ (Dewey, 1997:90).

Dewey emphasised the ability to work collaboratively and to strengthen communication skills, explaining ‘one of the most important lessons in life [is] that of mutual accommodation and adaption’ (Dewey, 1997:60). He called attention to the importance of listening to the children’s voices within the learning environment and in this way reconciled the dichotomy of individual freedoms and education-led social control by explaining if an individual has true involvement in learning, they do not feel a lack of freedom. To facilitate true involvement however, it is vital for an ‘educator’ to use their knowledge of both the subject and the learner to develop activities ‘in which all individuals have an opportunity to contribute something and in which the activities in which all participate are the chief carrier of control’ (Dewey, 1997:56). In addition, Dewey does not advocate improvised lessons; rather teachers must have prepared for the lessons and ‘have the material at their fingertips…[and] …devote their time to observing the student’s understanding and response to what is being covered’ (Gray, 2018:443). Dewey recommended using ‘intelligent exploration and exploitation of the potentialities inherent in experience’ (Dewey, 1997:86). If learning is seen through the holistic view recommended by Dewey there is no one best practice because individuals are influenced by aspects such as culture, gender, ethnicity, and socioeconomical status (Bartlett & Burton, 2012).

3.3.5.2 Dewey and Environmental Education

Despite the resistance to change in educational systems, education should be 'a fundamental method of social progress and reform' (Hickman & Alexander, 1998:234). EE has a specific and vital need to challenge the status quo because of the 'threatening if not imminent environmental crisis' (Schinkle, 2009:507). Dewey's educational philosophy and approaches surrounding the development of collaborative and creative problem-solving are well suited to the development of sustainability and environmental education and his ideas about the interaction between social, economic, and environmental aspects resonate with current sustainability philosophies (Ralston, 2011). Dewey promoted the study of, in and with the natural world as this could 'cultivate an emotional, aesthetic, and even ethical attachment to the natural world among schoolchildren" (Minteer, 2006:36). His ideas that our environment is made up of other people and social bonds, and his model of interdependence provides a strong theoretical base for the systems thinking approach recommended for effective sustainability education (Weiland et al., 2017). In contrast to other approaches, it incorporates the political too. The recognition of culture and values central to Dewey's work and his recommendation to develop hands-on learning experiences make his theories and approaches appropriate for EE (Tarrant & Thiele, 2016).

Dewey is an influential figure in the development of school gardens. Not only did he want working in the school garden to be a balance between both the scientific and aesthetic, but Dewey believed 'gardening is an activity that channels students' native interests in all things living into a genuine appreciation of, and even a scientific curiosity about, their environment' (Ralston, 2011:7). Furthermore, Dewey emphasised the importance of gardening as a vehicle to support community development and political awareness (Ralston, 2011). That is, Dewey emphasised the wider benefits for the community by the development of school gardens, one of which is 'the potential, especially in adulthood, to translate into politically transformative action' (Ralston, 2011:4). Crucially, with respect to this research, Dewey promoted gardening as a fundamental way to understand the need for pro-environmental behaviours.

Dewey's work is influential in the enactment of social constructivism in education and his work 'Experience and Education' was a major influence on the development of my research. His Experiential Learning Theory provides a strong basis for the pedagogies recommended for effective sustainability education. The EE project, designed for the fieldwork stage of the research, is grounded in the philosophy of experiential education; and as such the project contrasted with the positivist approach often used in English primary schools.

3.3.5.3 Freire, Critical Theory, Critical Pedagogy and Critical Thinking

Freire (1921-1997) asserted that a key barrier to change is the 'fatalistic belief in the inevitability and necessity of an unjust status quo' (Freire, 1996:22) and argued for education to facilitate the teaching of skills which can be used for actively seeking information and building new 'revolutionary knowledge systems' (Glassman & Patton, 2014:1362). Grounded in Critical Theory, Freire's (1996) Critical Pedagogy promotes Critical Thinking and advocates for a strong political stance in education.

3.3.5.4 Critical Theory

Critical Theory uses a psychodynamic theory of individual change to explore the potential for transformational change through education. Critical Theory promotes the overt development of meta-cognition skills in learning. It highlights the importance of individuals to recognise and use approaches which make information more accessible and help empower them as learners. In Critical Theory, theory and practice cannot be separated and the development of critical thinking skills through the enactment of critical pedagogies is central. Critical Theory emphasises the political aspects of human life and explores how people can be liberated through learning. By exploring how individuals do or do not fit within the cultural system it examines how people are oppressed. By revealing and challenging power structures, Critical Theory explores how societal systems work and how this understanding can lead to change.

Arguing that 'education policy has social implications' (Freire, 1996:22), Freire argues that education must be provocative and should lead to emancipation by providing skills for people to transform their worlds. He advocates that the teacher should be an agent for social change and not a mere 'conveyer of textbook knowledge as an outside source' (Freire, 2000:11; cited Swarts et al., 2018:72-73). Freire (1996) advocates for the use of critical dialogue between teachers and students to create a more equal power balance in the learning environment with the aim that this will lead to 'mutual knowledge creation' (Freire, 1996:29). He emphasises that care should be taken so that the teachers' voices do not 'drown out' the students (Freire, 1996:3).

Freire explained that often education took the form of 'banking education' in which teachers 'deposit' knowledge into passive students (i.e., a transmission model of education) in a way that proports to be apolitical, neutral and 'true' (Misiaszek, 2020). However, if environmental education is taught using the banking model of education, students store information delivered by the teacher, but do not question 'facts' or reflect critically on 'truths'. In contrast to the banking approach, Freire argues instead that teaching and learning should be

dialectical in which student-teacher dialogue promotes mutual learning alongside the exploration and challenging of political influences. This 'problem-posing education' (Warlenius, 2022) contrasts with the 'banking' approaches to education and is an approach to EE which should 'help guide students to use their knowledge, skills, and dispositions also helps them become actively engaged citizens working to dismantle dominant discourse' (Zocher & Hougham, 2020:244).

3.3.5.5 Critical Pedagogy

Critical Pedagogy (Freire, 1996) also has a distinct political stance (Cohen, Manion & Morrison, 2013) which asks who benefits from 'systems and beliefs' maintained in any society or culture and 'analyses the multiple ways economic and social practices infuse schooling (and educational thought) to perpetuate social inequalities' (Seaman & Nelson, 2011:18). Critical Pedagogy aims to shine a light on the power balances which instigate and maintain inequalities by questioning who decides which 'knowledge' is acceptable, and which is not, that is, what is 'official knowledge' (Apple, 2014). It also explores how particular political stances affect curriculum and education and 'the influence of educational knowledge to perpetuate an unjust status quo' (Popkewitz & Fendler, 1999:42).

By illuminating power imbalances in systems and societies and promoting the development of critical and political thinking skills to allow reflection on and questioning of the costs and benefits of problems and solutions, it strives to transform the 'inequitable' to fair (Popkewitz & Fendler, 1999:47). Like Critical Theory, Critical Pedagogy stems from the psychodynamic theory of individual change and aims for transformational change. This approach supports the 'critical and informed analysis' of information which allows individuals to make their own 'informed choices' (Van Harmelen, 2003:125). Keeping Critical Pedagogy approaches central to EE not only allow children to 'engage in a wider participatory process of societal and environmental change' (Burgess & Johannessen, 2010:7) but also gives them the skills to decide how to act on the EE values they are shown. Moreover, the lack of prescriptive suggestions coupled with critical thinking skills ultimately prevents EE becoming dogmatic propaganda (Fien, 2000; Kopnina, 2016).

Critical Pedagogy has been criticised as a theory that lacks clarity over the 'concept of criticism' (Alexander, 2018:903), that is the performance of criticality and is recognised as being a theory that does not provide practical advice (Freire, 1996). Nevertheless, the advocation to explore the motivations behind the structures, rules, and activities within education, makes it an important approach for the potential empowerment of 'the ordinary person' (Little, Hester & Carey, 2016) to effect transformational learning through an ongoing reflection and action cycle (Little et al., 2016). Critical Pedagogy links together the 'who',

‘why’, and ‘what’ of knowledge construction and the educational environment. It questions ‘who suffers, who benefits?’ from the approaches and systems of current society (Håkansson, Östman & Van Poeck, 2018:98). Thus, by developing skills to examine arguments and authority, individuals become empowered to make change.

However, as Critical Pedagogy is concerned with questions about ‘an unjust status quo’ (Popkewitz & Fendler, 1999:46), it has been suggested that there are ‘risks [to authorities] by opening discussion of currently institutionalized authority’ (Popkewitz & Fendler, 1999:42) and so it is crowded out of the current English curriculum which has an increased focus on assessment (Watkins et al., 2007).

3.3.5.6 Critical Thinking

Critical thinking is a key aspect of Critical Pedagogy and encourages individuals to develop the cognitive skills to critically examine information (both what is given and what might be withheld) to develop a critical understanding of situations. Where Critical Pedagogy understands politics and power structures by linking together the ‘who’, ‘why’ and ‘what’ of education, critical thinking breaks these aspects down into separate elements. This understanding helps support individuals to make informed decisions and become empowered to make change (Dwyer, Hogan & Stewart, 2014).

Critical thinking also supports learning by helping the individual reflect on and then use approaches that are effective for their own learning. Bruner (1996), a notable proponent of critical pedagogies, argues that children should be taught in a way that makes them think about what they know, how they know it and what they can do with it, and to do this by developing a ‘new theory of mind’ (p:52). Thus, critical thinking skills are central to the pedagogy of empowerment advocated by Freire (1996). However, the current educational focus in England on ‘compliance’ rather than ‘deliberation; and the subsequent limited time for discussion reduces the development of critical thinking and independent thought (Ghiso, 2015).

Although Haydock and Srivastava (2019) question whether current and ongoing inequalities in society allow for any educational objectivity and speculate whether providing a spectrum of opinions and philosophies which allow students to come to their own conclusions could (or should) allow schools to teach EE ‘objectively’. Popkewitz and Fendler (1999) also argue that ‘the prime aim of education is to develop rationality’ (p:48) and question how critical thinking is affected by culture and develops differently in different ‘academic’ subjects. Nevertheless, critical thinking skills are considered vital for effective EE (Warlenius, 2022) as they help individuals explore information to develop critical

understandings and the modelling of critical thinking and decision making (Nolet, 2017) and the use of real world 'wicked problems' (that is problems which cannot be resolved or fixed easily using a straightforward or standard solution) (Wals, 2017:157) are considered essential to EE (Nolet, 2017; Rolfe, 2014) as they empower individuals to make change because they have the skills to examine arguments and authority (Kos et al., 2016).

There is a stream of (often contradictory) information, and people need to make informed decisions about what to do. Critical questions in EE include:

> 'What are the underlying assumptions of cultural theory and practice? To whom are we giving voice and agency, and at whose expense? And Which forms of cultural knowledge and practice are privileged, and which forms are relegated to the margins?' (Anderson et al., 2016:3).

The development of critical thinking skills to help students to draw their own conclusions and make informed choices is central to EE (Haydock & Srivastava, 2019). Despite a growing recognition of the importance of including critical enquiry skills alongside practical skill development when teaching EE, unfortunately, critical thinking skills, with a focus on subjectivity are incompatible with the current teaching practices in England which often focus on the requirement for objective and easily measurable outcomes dictated by the National Curriculum. Haydock and Srivastava (2019) observe that there remains a leaning towards EE which maintains the 'passive assimilation and reproduction of simplistic factual knowledge and an unproblematic 'truth'' (Stevenson, 2007:140). If critical pedagogies and critical thinking skills are overlooked in EE there is a potential problem of EE maintaining rather than developing our existing (arguably inequitable and unsustainable) cultures (Jeronen et al., 2017). However, if following a holistic approach, Burgess and Johannessen (2010) suggest EE can become a powerful way to reform education.

3.3.6 Ecopedagogy

Social and environmental justice are key elements of EE (Misiaszek, 2020) and the development of 'ecopedagogy' combines Freire's Critical Pedagogy with experiential learning in which the Earth is also identified as 'oppressed' (Zocher & Hougham, 2020). It has long been argued that the environmental crisis has been brought about by the culture of the Global North (Brundtland Report, 1987) and there needs to be more discussion of this aspect of environmental justice in education (Zocher & Hougham, 2020). It is also argued that EE often lacks 'critical reflection about exporting a particular view of 'environment' and 'education' from the Global North to the Global South' (Henderson & Zarger, 2017:285).

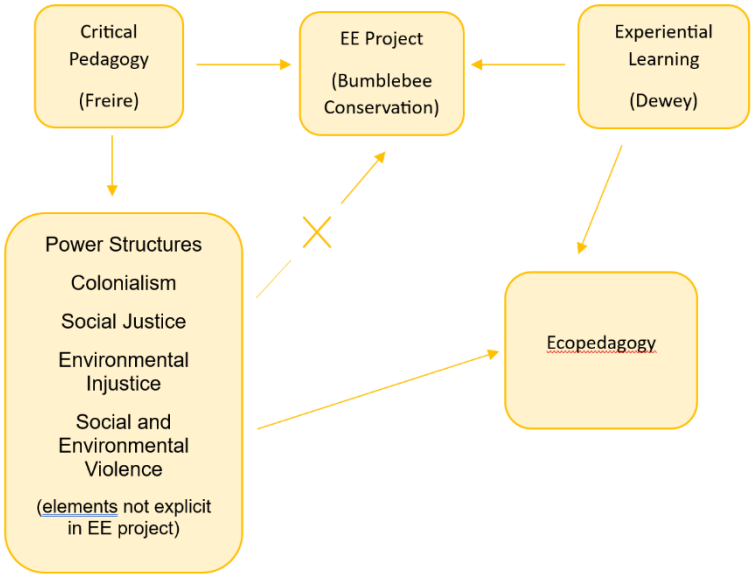
In contrast to mainstream education, ecopedagogy is an approach to EE that recognises the interconnection between environmental injustice and social injustice. Ecopedagogy is grounded in Freire's Critical Pedagogy (in which student-teacher dialogue questions and critically explores 'facts', information, social justice principles, and political influences such as colonialism and patriarchy). Using Critical Pedagogy, ecopedagogy integrates 'culture, power, and the local environment into pedagogical practices' (Zocher & Hougham, 2020:233) and actively highlights the impact of institutional practice to environmental destruction. Ecopedagogy teaches students to understand they are part of (rather than dominant and superior to) Nature and inclusion of local and First Nation knowledge is a key aspect. Ecopedagogy also emphasises mutual learning through teacher-student dialogue.

Although 'ecopedagogy embraces aspects of critical pedagogy and constructivism' (Zocher & Hougham, 2020:235) I do not consider the theoretical grounding of my research to be ecopedagogy because the EE project included some, but not all, of the elements of ecopedagogy. The following section details the adaptation of ecopedagogy that was used for the EE project developed in the fieldwork.

3.3.6.1 Adapting Ecopedagogy by Combining Experiential Learning Theory with Elements of Critical Pedagogy to Develop a Model of EE for the Fieldwork Project

Although the philosophy and pedagogy of ecopedagogy are powerful ways to enact EE, this radical approach is not an accessible or appropriate approach to be used in primary school education. For my research fieldwork project, therefore, I combined Dewey's Experiential Learning Theory with aspects of Critical Pedagogy to create a pragmatic model for facilitating EE in a mainstream primary school in England that moved EE towards an accessible approach to ecopedagogy. The model of EE used in my fieldwork included problem-posing, critical thinking, teacher-child dialogue, praxis-based learning, and the use of 'local and global lenses' (Misiaszek, 2020:617), but colonialism, and the politics of social and environmental (in)justice were not included (Figure 5).

Figure 5: Relationship Between EE Project and Ecopedagogy.



3.4 Summary of Theory

This research is grounded in social constructivism which explains that individuals actively construct knowledge through social interactions and experiences within cultures. The EE project pedagogies drew on Dewey's Experiential Education Theory, Freire's Critical Pedagogy, and Ecopedagogy as these provided an effective philosophical foundation for research exploring EE which also aligns with my own philosophical views. However, ecopedagogy (which combines critical pedagogy, politics, social justice and environmental justice), is inappropriate for a short intervention project in a primary school, I adapted ecopedagogy by including critical thinking, questioning, and research skills, for example, but did not introduce the challenges and complexities of politics, colonialism, and social and environmental injustice. Thus, this adapted approach to ecopedagogy encompassed well-recognised and important features of EE (for example, the messages of individual empowerment and hope which can be a powerful motivator to rally people to action (Ojala, 2017), the effectiveness of locally based, small actions which are effective for individual empowerment group work, hands-on, practical skills, questioning, critical thinking and research skills). These combined elements were well-suited for an EE intervention whilst also being appropriate for a primary school EE intervention project and were central to the activities developed for the fieldwork.

Chapter 4: Research Design

4.1 Introduction

To answer the research question 'How do children in an English Primary School Experience Environmental Education?' I designed and facilitated an environmental education (EE) project which focused on bumblebee conservation. Across 20 sessions, a class of 30 primary school children engaged collaboratively in a range of indoor (e.g., researching, sharing and presenting ideas) and outdoor (e.g., developing a wildlife area) activities. The project framework was developed using research literature and my experience working within English primary schools. A blended approach to EE was used; that is instrumental (e.g., hands-on activities such as planting) and emancipatory (e.g., choice and questioning) approaches were used (Wals et al., 2008). Activities were guided both by the children's interests (e.g., researching bee anatomy) and curriculum requirements (e.g., mathematics based on the wildlife area). Following Dewey, the sessions were planned, but options and choices were available throughout.

Having given a brief overview of the EE project, this chapter continues as follows: Firstly, the research design is explained, then the fieldwork environment is described, and the timeline of the fieldwork given. Next, the pilot stage of the fieldwork is outlined, the problems of the pilot identified, and the changes made are noted. The main fieldwork stage is then presented. Details about the pre-main-project visits and the project participants are shared before the schedule of the project sessions is outlined. An example session plan is provided along with details of activities that were ongoing throughout the EE project. The pedagogical approaches used in the project are then detailed and the data collection and analysis methods explained. Finally, the ethics surrounding the research are discussed.

4.2 Research Design

The aim of this research was to understand the EE project in school as the children as understood and experienced it (Stake, 1995; Cohen, Manion & Morrison, 2002) and to do this by listening to children within the socio-cultural context of their school (Kleine, Pearson & Poveda, 2016). However, there are complexities involved in researching the experiences of others and these are now discussed.

4.2.1 The Complexities Involved in Researching the Experiences of Children

Rinaldi (2001) describes listening as 'an active verb, which involves giving an interpretation, giving meaning to the message and value to those who are being listened to" (p:3)'. For a

child to communicate their subjective experiences they need to have the means and capacity to understand their experiences and have access to the resources needed to express their experiences (Gillett-Swan & Sargeant, 2018). When trying to understand the experience of a child, important questions need to be asked, such as: does the child have the communication skills and resources to share their experiences? Are they re-telling their experience or an ego-building (or destroying) version? Do they realise they are telling an account that may differ from what other people experienced? Why are they recounting their experiences in the way they do? Is the retelling of experience in a 'research' environment different to the retelling of experience in a social environment? If so, how? (Bartlett & Burton, 2012).

Children's expressions of their experiences are 'mediated by the discourses they have access to' (Spyrou, 2011:156) and so it is also important to recognise and remain open to a child's 'non-normative voice' (Spyrou, 2011:157). Spyrou (2011) warns that children's voices are set within specific cultures and contexts and are interpreted through the researcher; and these factors need to be recognised and acknowledged when trying to understand and authentically represent children's voices.

When investigating experience researchers must be mindful about how well their interpretation of data accurately reflects the experiences of others. When listening to children's voices, and exploring research which includes children's voices, the adult perspectives and partialities and the children's positions and perceptions need to be acknowledged (Komulainen, 2007). Adults must try to develop procedures and techniques which can effectively maximise the inclusion of children's voices (Stoecklin & Bonvin, 2014) and Jones (2017) advocates for new methodologies and methods to listening to and including child voice and participation. Although '[h]earing and understanding the perspective of others may be one of the most difficult dilemmas that face the researcher' (Fusch, Fusch & Ness, 2017:925) hope endures that increased awareness of children's rights will promote a change in adult attitudes, and children's communication and participation will increase (Gillett-Swan & Sargeant, 2017).

Rinaldi (2001) describes listening as 'an active verb, which involves giving an interpretation, giving meaning to the message and value to those who are being listened to' (p:3). For a child to communicate… even if 'naturally occurring' data is collected it is undoubtedly affected by the practices available to the children. Even when children are given freedom and empowerment, the voice of the adult often dominates if only because our lived environments have been developed by adults (Raittila, (2012).

When developing systems to allow student voices to be heard, Hall (2017) highlights the need to understand how student voices are heard and prompts us to consider who decides the format for listening and the effect of these choices. Given that children's voices sit within cultures and contexts that must be recognised (Mannion, 2007), research needs to be mindful of adult attitudes towards children's voices and whether the listening is tokenistic (Hall, 2017). Consultation with children should be a two-way discussion (Rudduck & McIntyre, 2008) and listening to children must be done carefully as the interactions between the adult and child ultimately lead to understanding (Cruddas, 2007).

It must also be recognised that the analysis and dissemination of findings is influenced by the (usually adult) researcher (Spyrou, 2011:160). Adult coding and analysis of children's data could result in the loss of 'essential qualities in experience' (Meager, 2018:413), whilst children's voices can be further overpowered when adults select parts of research projects to be used and developed. Hence, Gillett-Swan and Sargeant (2017) warn researchers against the creation of an incomplete picture of children's voices when selecting (and modifying) data. Researchers must also be mindful that even if 'naturally occurring' data is collected it is undoubtedly affected by the practices available to the children. Even when children are given freedom and empowerment, the voice of the adult often dominates if only because our lived environments have been developed by adults (Raittila, 2012).

It is vital to use methods that 'capture the phenomena of interest' (Hughes & Sharrock, 2007:152) and the key decisions made when designing the research project are now explained; those decisions being (1) the choice to use a qualitative approach, (2) using a case study, (3) focusing on EE, (4) using a project-based approach to EE, and (4) bumblebee conservation as the focus for the EE project, (5) working with primary school children, (6) working with one school and one year group, and (6) working in the school grounds.

4.2.2 Qualitative Approach

Individuals develop their own knowledge and understanding (and in turn their own identity) through their unique 'narrative realities' (Bruner, 1996:149). It is not enough therefore to only observe what children are doing, we also need to know what children think they are doing, how children understand what they are doing, and why they think they are doing it. This research aimed to gain a deeper understanding of children's lived experiences of EE by looking at subjective meanings and individual perceptions (Flick, Kardorff & Steinke, 2005).

Qualitative research is a suitable way to answer research questions which aim to understand the lived experiences of others. It does not measure or quantify, as using standardised

measurements can miss crucial contextual and subjective aspects of learning (Fisher-Maltese, 2016), but instead, aims to understand 'complex interrelationships' (Stake, 1995:37) and uses 'ordinary ways of making sense' (Stake, 1995:72). It is '[a] form of research that explores phenomena in its natural setting and uses multi-methods to interpret, understand, explain and bring meaning to that which is being investigated' (Anderson, 1998:255). Qualitative approaches are well suited to understanding the social reality of the learning environment (Cooley, 2013) and can 'provide insight into the attitudes, perceptions, motivations, concerns, and opinions of participants (Clarke et al., 2015:1). Although not 'objective' and sometimes criticised for a lack of 'scientific rigour' and low external reliability (Anderson, 1998) '[t]he richness of detail provided by qualitative research gives insights into the complicated nature of teaching and learning that would be missed through other means' (Cooley, 2013:250).

This research follows a constructivist approach to qualitative research and recognises that interpretations of the world are subjective. Additionally, as 'empirical studies usually assess only the impact of an intervention' (Gaus & Mueller, 2017:1851) (that is does it work, not how it works) using a qualitative approach adds to previous EE research by providing greater understanding EE within a school setting.

4.2.3 Case Study

Case study approaches focus on the exploration of 'bounded phenomena and systems' (Cohen et al., 2013:79) and are time and context specific (Fusch et al., 2017). Within a socio-constructivist paradigm which explains that reality is subjective and cannot be viewed independently to our individual constructions (Lincoln & Guba, 1985), case study is the best (perhaps only) way to understand complex social situations (Stake, 1995). The case study approach allows working with the children in the school setting (Green & Hogan, 2005), provides the opportunity to gather empirical data in a 'real-world context' (Yin, 2018:286) and captures the complex interactions between behaviours and environments (Cohen et al., 2013). Therefore, understanding learning through the 'holistic view' recommended by Dewey, case study is a 'suitable approach to answer the research question' (Stake, 1995:3). Furthermore, the aim of this research is to explore how EE can be integrated into mainstream primary education and '[c]ase study material…can provide powerful human-scale data on macro-political decision making' (Cohen et al., 2013:183).

Case studies are inherently subjective as interpretive methodologies and observation are often central to the research (Nisbet & Watt, 1978). This means idiographic accounts and interpretations are produced (Cohen et al., 2013), and findings are heavily influenced by the participants (Cohen et al., 2013). To mitigate this, I aimed to collect enough data to allow the

study to be replicated as this is key to demonstrating the external validity of the study Fusch et al. (2017). Using a holistic focus, including several data sources, and developing a 'chain-of-evidence' aimed to reduce researcher bias (Fusch et al., 2017), maximise the internal validity of the research (Anderson, 1998:159) and maintain 'the multiple realities' of the case (Stake, 1995:12). Findings were linked to data (Fusch et al., 2017) and data from different data collection methods were triangulated to search for different meanings rather than for confirmation (Stake, 1995). I also aimed to provide sufficient, accurate raw data to allow readers to develop their own understanding of the case (Stake, 1995; Cohen et al., 2013).

In my research, an exploratory case study with one class in one primary school in England was used and data collection was focused on ten children. This was because the amount of data would be unmanageable with more sites, classes and children. The small number of participants may raise concerns about the richness and thickness of the data (Abrams, 2009). However, when designing a case study 'opportunity to learn is of primary importance' (Stake, 1995:6) and a larger sample of participants was not needed to 'capture the phenomena of interest' (Hughes & Sharrock, 2007:152) which was to increase understanding of children's experiences of EE within their school day. Thus, a small, qualitative case study with one group of children within their school day was a suitable, holistic approach to gather robust data to understand how these children experience EE within their school day. The key choices in the case study design are now outlined.

4.2.4 Focusing on EE

With the problems of action paralysis in mind, the focus of the research was one element of sustainability: that of EE; and within EE, the one element of bumblebee conservation was chosen. EE is an accessible route into wider understanding of sustainability and is a clear and explicit term regarding the nature of the project. Moreover, unlike EfS and ESD, EE aims for environmental conservation and restoration but does not have a human-centric focus.

4.2.5 Using a Project-Based Approach to EE

Small, local, micro-projects have been shown to make an environmental difference (Graziani, Cabral & Santana, 2013). Crucially they can promote empowerment for change rather than creating the sense of despair that has been shown to occur when EE is approached through huge topics such as climate change and air pollution (Fielding & Head, 2012). Sustainability programmes are often small-scale and specific to local places and cultures and allow for global understanding to be developed through local initiatives (Luederitz et al., 2017).

Effective EE programmes have a common theme which is reiterated across different contexts (Dieser & Bogner, 2016) and the development of an EE project allowed for elements of EE to be introduced in different ways and across a range of subjects. The project was designed to provide an affordance within the physical and social context of the school (Delia & Krasny, 2018). Importantly, it was developed as a framework for EE rather than a 'prescription' (Hirst, 2019).

4.2.6 Using Bumblebee Conservation as the Focus for the EE Project

It is well documented that bee numbers are rapidly declining (Lozier, 2017:499) and the current media attention concerning the drastic decline of bees strengthens the relevance of developing an EE intervention which focuses on bee conservation. Although the European honeybee (Apis mellifera) has been recommended for EE interventions because they fulfil the criteria of an effective flagship animal (Schonfelder & Bogner, 2017) and students have reported positively about honeybees (Schlegel et al., 2015), this research will focus on bumblebee conservation as there are key advantages in developing a bumblebee conservation project rather than initiating a honeybee project.

Firstly, from an environmental perspective the decline of wild pollinators cannot be compensated for by the introduction of managed honeybees (Tyliannakis, 2013:1532). Moreover, introducing a honeybee colony into an area in which the wild pollinators are already struggling can cause competition stress between the introduced pollinators (the honeybees) and the wild pollinators (Goulson, 2010:189); the antithesis of the aims of insect conservation. In contrast, bumblebee conservation does not introduce competition stress from an introduced bee colony into the environment.

Furthermore, bumblebees are themselves vitally important pollinators, something that is 'either underestimated or neglected' (Sieg, Teibtner & Dreesmann, 2018:1). Bumblebees are more efficient pollinators than honeybees (they can forage for longer and are faster); will forage in cold weather and rain (unlike the less hardy honeybee, bumblebees have been spotted foraging in temperatures below freezing); have either short or long tongue depending on the species (which enable them to gather nectar from a wider range of flower types and by doing so pollinate plants that honeybees do not); and can buzz pollinate (by vibrating their wings at a high frequency bumblebees vibrate pollen off anthers that would otherwise retain their pollen) (Goulson, 2010:163-165). So, for an EE project grounded in a philosophy of EE for 'sustainable restoration' (Selby, 2007) and with a less human-centric perspective, bumblebees are an ideal choice. Importantly, the activities effective for bumblebee conservation helps the support and conservation of wider biodiversity.

From a teaching and learning perspective, the care and maintenance of honeybees is substantial and requires specialist knowledge and equipment. There are also distinct ethical aspects to the management and maintenance of animals (Boileau & Russell, 2020). Unlike honeybees, bumblebees are wild animals and do not need direct hands-on care and maintenance. The resources and skills needed for bumblebee conservation (e.g., developing a garden and caring for flowering plants) are less specialised than those needed for the introduction and ongoing care of honeybees, this means the activities the children take part in during the project (e.g., caring for the plants and garden) can be completed within the school grounds and within the school timetable. Also, conservation activities can be done in small spaces, are more easily accessible to all, and can be more easily reproduced in the wider community to help support ongoing biodiversity restoration and conservation. Sieg, Teibtner and Dreesmann, (2018) also found a positive attitude towards bumblebees and recommends them as a focus for education. However, from a non-human centric perspective, the wild bees will not be used as objects of study (Boileau & Russell, 2020) but seen as valuable in their own right; and the ethics of working with/alongside bees is taken up further in Chapter 4, section 4.6.4.

Bumblebee conservation allows for the incorporation of aspects and pedagogies demonstrated to be effective for EE such as: working outdoors, using hands-on activities, developing a garden, group work, and the development of critical thinking skills which promote and support the practical, social, and political empowerment of individuals and groups. Furthermore, Jeronen et al. (2016) advocates the teaching of a holistic model of EE which includes society and the economy, rather than the usual sole focus of the environment; and the use of bees provides opportunities to include the economic issues (pollinator decline is recognised as a threat to food prices and security, for example). Practically, bumblebee conservation activities can be completed within the school grounds, within the school timetable and is achievable within the time and budget constraints of this research.

Having provided information about decisions made about the design of the research, the fieldwork is now detailed. Firstly, the fieldwork environment is described. Then information about the pilot and main fieldwork stages is provided.

4.2.7 Working with Primary School Children

Research indicates for children to become pro-active environmentalists, it is beneficial if they actively join in at an early age (Goldman et al., 2018). Although there are no clear recommendations for the optimum age for children to engage with EE, literature shows EE to be most effective with younger children but becomes less effective as age increases

(Collado et al., 2015; Lieflander & Bogner, 2014). Children of primary school age have been shown to have high levels of empathy towards the environment (Bonnet & Williams, 1988; Erdogan, 2011). Whilst those actively engaged in projects have been shown to be more engaged long-term and more confident to ask question and make suggestions (Jansson, Martensson & Gunnarsson, 2018). This means working with younger children can give increased return on investment (Heckman, 2012). Therefore, as there are significant advantages to working with primary school aged children, and delivering an intervention in a primary school, White, Eberstein and Scott (2018) argue education to develop knowledge of animals should begin in primary school.

Another advantage of working with a primary school is that the subject-based curriculum in England (which has been shown to be problematic for the delivery of EE) is less siloed in primary schools than secondary (Buchanan, 2012). My previous experience working in primary schools was also a factor in this decision.

4.2.8 Working with One School and One Year Group

Although school-based research excludes non-school based children and those absent or excluded, a school was chosen (rather than out of school provision) because the motivation for the research was to explore how EE can be included into mainstream education. One school was used to keep the data collection and analysis manageable within the scale of a PhD. Although the literature demonstrates that a whole school approach to engage children in EE can be effective, research also shows that smaller-scale projects (such as White, Eberstein and Scott's (2018) bird feeding project) can be helpful and effective approaches to EE. Thus, as using a whole-school approach to EE was not feasible within the bounds of this research, I chose to work with one group as this was more realistic as a lone researcher.

Working with Key Stage Two children (age 7 – 11 years) was the approach taken because they have been shown to respond well to EE activities (Braun & Dierkes, 2017) and to develop a stronger connection to nature following EE interventions when compared to other age groups (Braun & Dierkes, 2017). In addition, I worked with the Year 3 children during the pilot project and the Year 5 children for the main fieldwork project because although still heavily assessed and tested, the primary school years which are not involved in compulsory testing have (a little) more flexibility to work in different ways; and this allowed the research about EE interventions to be more easily integrated into the school day.

4.2.9 Working in the School Grounds

Ballouard et al. (2011) state:

> '[S]chool playgrounds, and not necessarily wild forests, are extremely valuable settings for investigations in nature both in urban and rural areas' (p:7).

Thus, the effectiveness of working within school grounds to engage children in EE should not be underestimated. In respect to EE, working in school grounds has been shown to increase the impact of project work (Rickinson et al., 2004) and supports children to bond locally before encouraging children to turn their attention to global environments (Hart, 2003:226). By providing opportunities to promote 'knowledge of the local with a sensitivity towards the global' (Blyth & Meiring, 2018:112) this research developed an EE project within school grounds which aimed to increase both the relevance and ownership for those taking part (Selby, 2010).

Learning outdoors within school grounds has been shown to develop confidence and pride (Rickinson et al., 2004); and to increase the impact of EE because '[e]mpowerment is increased through such activities and empowerment is a key feature of active engagement with pro-environmental behaviours' (Rickinson et al., 2004:14). Other advantages of developing EE provision within school grounds rather than going off-site include; increased accessibility, it is less expensive (by saving money on travel costs, for example), it maximises teaching time as travel time is not needed, increased familiarity (it can be less frightening than novel environments), and is easier to use frequently and to conduct follow up work and to engage in longer-term projects (Bentsen, Schipperijn & Jensen, 2013; White, Eberstein & Scott, 2018). On a practical note, working on EE within school grounds is achievable within the time and budget constraints of a PhD.

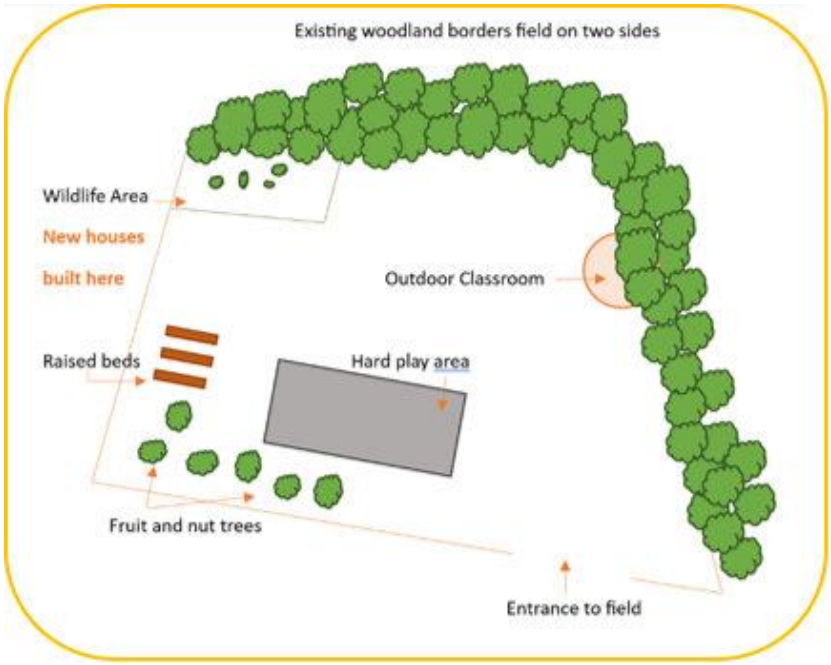
4.3 The Fieldwork

4.3.1 The Fieldwork Site

The research took place in a small, state-funded Catholic primary school in a northern city in England. This semi-rural school is located on the outskirts of a large city, in an area that was formally a village that has been subsumed by 'urban spread'. The local housing consists of a mix of older terraced houses, council houses that are now a mixture of social and privately owned dwellings, along with estates of new build houses. The school, however, has a large catchment area with children traveling from outside of the immediate area. Thus, some of the children live in rural areas whilst others live in urban areas.

The school itself has a large enclosed (almost rectangular) field which is surrounded on two sides by established woodland trees. The school field has a variety of established fruit trees which have been planted by the school community and several smaller, fruit and nut trees which had been planted for approximately 10 years when I began the EE research project. In 2018, the plants along the fourth field edge were removed due local building works. This edge of the field is now lined with a fence and at the time of the main fieldwork project only had grass in front of it. In 2019, the school developed its own 'outdoor classroom' and the school also has access to an enclosed, wooded area developed by a nearby school. However, it is for individual teachers to decide if and how to use these resources rather than something that is integrated practice across school. Figure 6 provides a simple plan of the field.

Figure 6: Plan of the School Field.



The school has one class per year group from Reception to Year 6 (ages 5 – 11 years), has approximately 200 children in attendance with a mixed demographic. At the time of the research fieldwork the school had 7% more girls than boys on the roll. Approximately 5% of the children are eligible for free school meals. The percentages of overall absence and persistent absence are lower than the national average for state-funded schools. For 8.3% of pupils English is not their first language and 13.5% of the pupils have a special educational needs Education, Health, and Care Plan. The school rates as average for reading, writing and mathematics, but these scores are higher than the local authority average, and higher than the average for England.

The school has a learning mentor who provides emotional support for the children and has a system in place for children to nominate an adult to talk to if they need extra emotional support - this system is welcomed by the children. There is a school council in which the children can raise, discuss, and sometimes act on issues that are important to them. However, talking with the children they said they are not convinced they are listened to and sometimes feel ignored and frustrated. For example, they still must work with pencils that they find uncomfortable to use. More positively, the children can voluntarily join an in-school club which provides a forum for children to plan and participate in activities such as fundraising, sharing information about wider issues that are important to them, and activities such as litter picking.

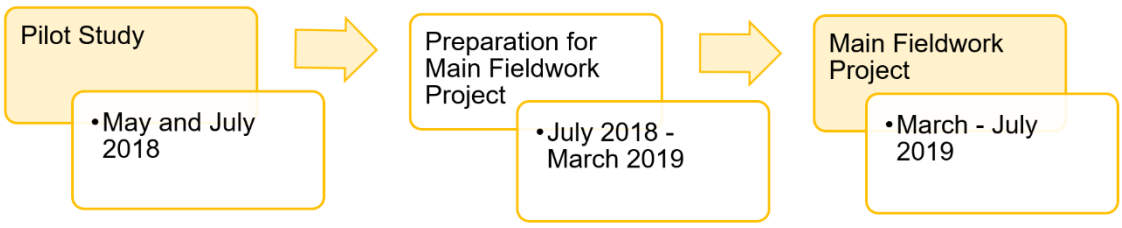
The school website, documents and policies show that the school does not have an overt sustainability and pro-environmental culture, however discussions within the school had already been ongoing as to how more environmental education could be included into school life. For example, the school has invested in recycling bins for paper waste in each classroom. Unfortunately, these are not used properly as they stand next to the general waste bin, and often all rubbish is placed in whichever bin is most convenient, either because one lid is open, or one bin can be more easily reached when everyone is crowding around at the end of the lesson. Thus, the recycling bin is often 'contaminated' whilst wastepaper is still thrown into the general waste. The development of an outdoor classroom (following but not related to the pilot stage of the research) indicated an increased interest in nature and the benefits of working outside. The Head Teacher and one of the classroom teachers also explained they wanted an area in the school grounds where they could provide good, hands-on science education so they did not need to travel to access a wider range of learning activities.

I had an existing relationship with the school (I had been a governor there for several years and had regularly helped throughout the school) and was able to approach them to explain my research and ask if they would like to take part. The Head Teacher and classroom teachers readily invited me to speak to the children to see if they would like to join in. Although the school was chosen for convenience it also fulfilled the criteria needed to answer the research questions. It is important to note, however, that the school has a strong Christian faith culture and ethos which may have influenced the impact of the project.

4.3.2 The Fieldwork Stages

There were two fieldwork stages, outlined in Figure 7.

Figure 7: Timeline of the Research Fieldwork Stages.



The purpose of the pilot study was to explore the practicalities of including an EE project into the school day and to get feedback from the children about different activities and approaches to EE. This was conducted between May 2018 and July 2018 with Year 3 children (aged 7-8 years); this timeframe was chosen as it was suitable for the school and fitted within the timescale of a PhD. The main fieldwork stage took place between March and July 2019 with the Year 5 class (aged 9-10 years). These classes were chosen as although still heavily assessed, these years are not involved in statutory testing and so there was more flexibility (both in terms of time and teacher workload) to integrate the EE intervention into the school day. This timeline was used as it was suitable for the school and fitted within the timescale of a PhD. The pilot study and the main fieldwork project were conducted with different classes as I would not have been able to untangle the influence of the pilot in the children's experiences of the main project if the same cohort had been involved in both stages of the study.

4.3.3 The Pilot Study

Following introductory visits and gaining consent (detailed in Chapter 4, section 4.6), the pilot intervention project consisted of 12 sessions over 3 weeks. Sessions took place indoors and outdoors and the activities (outlined in Table 5) were developed in line with curriculum requirements.

Table 5: Outline of the Pilot Fieldwork Intervention EE Project Sessions.

Pilot Intervention Project: Week 1	
Monday (AM: 1.5 hours)	Quiz in groups Give out personal diaries Explore the field, make observations, and ask questions
Tuesday (PM: 2 hours)	Make and put out bug catchers Make bee life cycle diagrams Watch pollination video clips and complete worksheets Plant sunflower seeds
Wednesday (AM: 2.5 hours)	Make 3D hexagon 'honeycomb' Check bug catchers and use magnifying glasses when exploring field Write and share poems
Thursday (AM: 2.5 hours)	Maths session on retrieving information from a table - based on when different bee-friendly flowers bloom Pollination demonstration using powder paint
Pilot Intervention Project: Week 2	
Tuesday (AM: 2.5 hours)	Planting herbs and biodiversity discussion Observations and drawing Make bee bunting
Thursday (AM: 2.5 hours)	Bug house building Make bee models with pegs and pipe cleaners
Friday (AM: 2.5 hours)	Annotate a bee diagram Biodiversity discussion Check garden/new plants/bug house Make tally chart of flowers and insects
Friday (PM: 3 hours)	Summer Fayre – Children brought family and friends to look at the stall which showed the activities the children have been doing in the intervention project
Pilot Intervention Project: Week 3	
Monday (AM: 2.5 hours)	Bee information, pollination, and biodiversity Fill in missing numbers to decode bee facts Visit garden and bug house Make solitary bee houses
Tuesday (AM: 2.5 hours)	Write a prayer for nature Bee communication
Thursday (AM: 2.5 hours)	Developed bug house Observations and discussion on field Make water stations In small groups, children create own performance about how they feel about bees
Friday (AM: 2.5 hours)	Observations on field – compare with observations in session 1 Discuss feelings and compare with session 1 Scavenger hunt style observational bingo on field
Friday (PM: 2 hours)	Bee party – quiz, music, games, presentation of what the children have done throughout intervention project

After the pilot intervention project, 10 children were interviewed in pairs, in an intervention room. The interviews aimed to gather information about how the children had experienced the different activities throughout the pilot study. Interviews were semi-structured, each one lasted approximately 20 minutes and took place at the start of the school day when the rest of the school was in assembly. The interviews were filmed on small handheld tablet

(Ratcliffe, 2003) to facilitate transcription as I find it difficult to hear and transcribe interviews accurately when they are only voice recordings. Although I aimed to interview the Head Teacher and classroom teacher at the end of the project, this was not possible due to their end of year workloads.

4.3.3.1 Problems Identified During the Pilot Study

During the pilot study, there were many high points, but for space reasons I will limit my discussion to the problems that occurred, and changes made for the main stage of the fieldwork. The main problems during the pilot were those of the time available and structure of the school timetable. The very rigid (but changeable) school timetable resulted in several sessions being cancelled or condensed into shorter sessions. Some sessions took longer than the time allocated, however the teacher was reluctant to alter the original timetable and ended sessions before all the children had taken part (e.g., not everyone got to do planting because of time restrictions). This is a critical problem for fairness and accessibility, and a problem for EE as not all the children had the opportunity to take part in some of the hands-on activities. Several sessions were cancelled because of timetable changes, and the EE activities were secondary to 'essential' classroom-based tasks directed by the teacher. To reduce these problems, I started the main stage of the project earlier in the school year.

The problems of a siloed structure of the school day also became apparent during the pilot because, although the planned activities were mindful of and included national curriculum requirements (Mand, 2012), the adults repeatedly referred to the project as 'science'. This finding supported previous work which concluded that sustainability and conservation activities are very much thought of within the boundaries of science. Furthermore, although enthusiastic about the pilot, the class teacher asked several times to adapt methods to fit with the 'normal school routine', such as asking the children to write things in books to demonstrate (usually to other staff) that the class had been doing 'proper work'.

The differences between adult (teacher) expectations and the children's performances were striking during the pilot. Children were often more capable than given credit for. For example, the teacher wanted to print copies of bees for the children to colour to make bunting because she thought the children would not be able to draw a bee and would become anxious. However, when I asked if they could try to draw something before being given the colouring sheet, the teacher agreed. The children happily drew bees of all shapes, sizes and colours, the bees were equally beautiful and so unique that the children appeared to easily (and excitedly) pick out their own bee picture in the class's bunting.

Another important finding from the pilot was that the sophistication of the children's questioning and understanding was much greater than the teacher expected. For example, the children demonstrated an understanding of how pollinator decline could result in higher food and textile prices. They also demonstrated understanding how social needs are involved in sustainable development (e.g., that new house building was important because people need homes, but the building affects wildlife; their busiest bramble was cut down halfway through the pilot because of the development of a new housing development which backed onto the school field). Thus, the pilot highlighted that the children were often more capable than the teachers expected, and the combination of adult expectations and structured school activities was creating glass ceilings within the children's activities. However, it is important at this point to acknowledge that the pilot was helpful but did not provide a perfect roadmap for the main project.

4.3.3.2 Adaptations Following the Pilot Study

Changes in activities were made following the pilot study due to (1) curriculum requirements (e.g., in the pilot stage the children made and assembled a three-dimensional honeycomb in numeracy, but in the main project the children completed area, perimeter and fraction calculations based on the wildlife area), (2) some activities in the pilot were particularly effective and were included more prominently into the main stage (e.g., the question wall), (3) the activity was unsuccessful (e.g., we did not find any bugs in the bug catchers which was very disappointing but did provide an opportunity to discuss possible reasons for the lack of bugs). Table 6 provides the changes made to the activities following the pilot study.

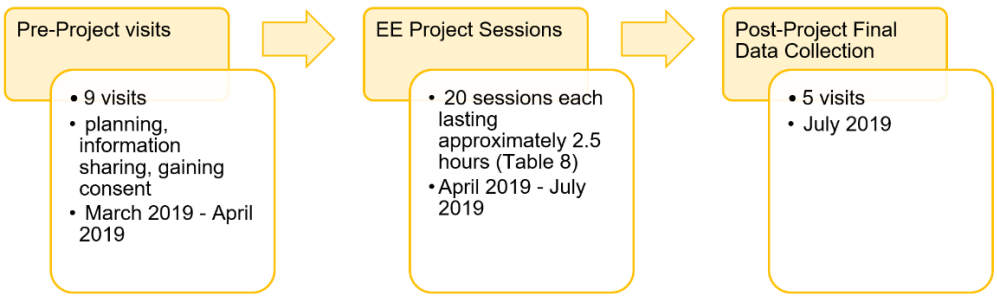
Table 6: Changes Made Following the Pilot Study of the Fieldwork.

Pilot	Outcome of pilot	Changes made
Timeline	Sessions were curtailed by timetable changes and other classroom tasks.	The project was started earlier in the school year to allow for changes to be made to the project timetable.
Questioning and independent research skills	The children could write down questions in their diaries and could add ideas to a 'question wall'.	Made the question wall a more prominent activity and developed a suggestion wall for class to share their thoughts and ideas.
Planting	Children planted herbs in the Reception Class Garden.	Children developed a wildlife area on the school field.
Bug Catchers	Bug catchers were left out around the field, but no bugs were found.	Made solitary bee houses to place around the wildlife area.
3D hexagon honeycomb	The children formed 3D hexagon 'tubes' and attached them together to make a honeycomb model.	Used fractions to make seedballs with the recommended proportions of ingredients. Completed area, perimeter and fraction calculations based on the wildlife area.

4.3.4 The Main Fieldwork Stage

The main fieldwork project took place from March 2019 until the end of July 2019 with the Year 5 class (9-10-year-olds). This timeframe was used as it was suitable for the school and for the PhD timescale. The main fieldwork stage consisted of 9 visits prior to the EE intervention sessions, 20 EE intervention sessions, and 5 visits upon completing the EE intervention sessions, to complete interviews (Figure 7). For clarity, from this point onwards I will refer to the main fieldwork EE intervention stage as 'the project' as this is how the EE activities were collectively called throughout my time in the school.

Figure 7: Timeline of the Main Fieldwork Stage.



4.3.4.1 Pre-Project Visits

After getting permission from the Head Teacher and classroom teachers, and prior to the start of the EE project, I had a two-hour meeting with one of the classroom teachers to discuss the EE project, what it would entail and what the teachers would like to include. With the aim to raise the expectations of the teachers (de Boer, Timmermans & van der Werf, 2018) and for all the children to be invited to engage in activities, regardless of pre-conceptions surrounding individual abilities, we discussed the teachers' worries and expectations about the activities and approaches in the project, along with ideas about how to facilitate the different sessions.

Co-production with the teachers was important to allow the children to take part in the project whilst enabling the teachers to feel confident that they were covering what was expected by the school leadership team. As most of the curriculum requirements were covered before the start of the EE project, the teacher said she was happy with flexible sessions. However, some changes were made between the pilot and the main fieldwork to accommodate curriculum requirements. Such adaptations are often needed in interventions so that teachers will agree to take part (Evans et al., 2017).

A preliminary schedule of sessions and activities was developed with the classroom teachers. However, the teachers' perspectives and input were important aspects of the project and throughout the project, the teachers became more confident and involved in the project and adapted sessions (either to specifically fulfil curriculum requirements or because they felt the children would particularly enjoy approaching an activity in a different way than originally planned); and several sessions changed from conception to facilitation. Thus, my partnership with the teacher developed throughout the main stage of the project and as the sessions progressed the teachers gradually moved into the main facilitator role. Although co-production with the teachers is not elaborated more fully within the bounds of this thesis, the teachers' perspectives and input were important aspects of the project and working collaboratively with the teachers was key to being able to work with the children over a relatively long period of school time. Later, during the project, the Head Teacher also requested changes to the project. The school has a large field and although the original plan was to develop three raised beds, the Head Teacher asked if we could develop a wildlife area instead. When asked, the children were keen to do this and so the plans were changed.

Following the discussions with the teacher, I visited the classroom on two mornings to discuss my research and the EE project with the children and to ask if they would like to take part. Each visit lasted approximately 2 hours. These meeting are detailed in section 4.6.2 of

this chapter. After receiving consent from the children and their guardians. I interviewed 10 children before the start of the project sessions. Details of how these interviews were conducted is given in Table 11 in section 4.4.

4.3.4.1 Participants in the Main Fieldwork Stage – The Year 5 Class

The main fieldwork project was conducted with the class of 30 Year 5 (9-10 years old) children. This cohort were chosen because they were a suitable age and school year to fulfil the requirements of the research questions. However, some background information about this group is useful.

The Year 5 children were described as a 'challenging' class (Mrs Marsham:Mid). The class teachers believe the children are 'better contained' (Mrs Marsham:Mid) and Mrs Lathbury explained they struggle when given freedom and choice. These perceptions have resulted in the class having fewer opportunities to work in different ways because 'they've had less teachers taking risk with them', (Mrs Lathbury:Mid). Mrs Lathbury believes this has reduced the children's opportunities to practise self-direction skills and hindered their development of some social skills. During break times the class is not allowed to play with other, specified, classes because of fighting; this segregation is enforced because of real and possible problems.

Throughout the project however, the behaviour of the class improved, and this was recognised and noted by the class teachers and other adults working in the school. Although the aim of the research was not to explore the impact of EE on classroom behaviour, the change (and improvement) in the children's behaviour was noticeable and highlighted further valuable aspects of the pedagogies recommended for EE: this is discussed further in Chapter 5, section 5.3 when the children's social experiences are presented.

4.3.4.2 The Ten Children with Whom Data Collection Focused

For practical reasons (i.e., the timescale and being a lone researcher) I focused the data collection to ten children to manage the amount of data. The teacher was asked to approach five boys and five girls to ask if they would like to be part of the group with whom data collection focused. Although a request for participants with 'attributes of interest' (Stake, 1995:57) (previous (un)interest in the environment for example) could have been made in an active attempt to seek variety within the participating group, the inclusion criteria for participants was simply their enrolment in the class taking part in the study. Other than to request a mixture of 'abilities', if possible, no other selection criteria were specified. After

returning consent forms, the first five boys and five girls asked said yes. Thus, only ten children were approached by a teacher and asked if they would like to be a part of the group with whom data collection focused.

Unfortunately, this process had an inherent bias because although all in the class returned consent forms and took part in the project activities, the forms were returned at different times, so at the time of asking who would like to be involved with more focused data collection activities, not everyone was in the 'pool'. However, time restrictions made this approach necessary. The teachers and teaching assistants did not provide details of SEN, learning plans or eligibility for free school meals, so as not to influence my initial interactions with any of the children.

Throughout the thesis the children are referred to as 'children' because this is how they talk about themselves. The term 'participant' is not used because of the need to differentiate between the child participants and the teacher participants. However, the inherent power dynamics when using these terms (Mayne, Howitt & Rennie, 2018) are acknowledged. I also recognise that referring to 'the children' portrays a homogenous group, but this is not the case as each child had their own individual and unique ideas and voice, their own strengths and interests and their own focus and talents; however, the parameters of this thesis have made it necessary to group together ideas that were shared amongst the children whilst highlighting differences. Also, as the children often chose who they worked with during the EE sessions, there were many times when the data collected included other members of the class. This has not been included in the data analysed unless it was particularly pertinent to the experiences of any of the ten children. When I have included data from other children (when working in groups for example) it is referred to as [Girl1] or [Boy1]. Again, I acknowledge the inherent differentiation and potential for subconscious power dynamics when using these terms. The details of the ten children who agreed to take part in additional data collection activities are outlined in Table 7.

Table 7: Pseudonyms for the Ten Children Who Agreed to Take Part in Additional Data Collection.

Pseudonym	Gender (as on school register)	Pseudonym	Gender (as on school register)
Cullum	Male	Bryony	Female
Davies	Male	Gwynne	Female
Mason	Male	Heather	Female
Wilkes	Male	Ivy	Female
Willughby	Male	Violet	Female

4.3.4.3 Participants in the Main Fieldwork Stage – The Teachers

Throughout the project I worked one morning a week, primarily with the class teacher, Mrs Marsham, and once a week in an afternoon session with Mrs Lathbury. Mrs Lathbury usually teaches science to the class once per week, but as she is part of the school's senior leadership team (SLT) and had other commitments, I also worked with several other teaching assistants and supply teachers in the afternoon sessions. However, although Mrs Lathbury and I did not always work together in the afternoon sessions, she was the named teacher and so was the person interviewed at the mid and end points of the project. Mrs Carder, the Head Teacher, facilitated one session with me and I interviewed her after the project had ended. Pseudonyms for the adults are shown in Table 8.

Table 8: Pseudonyms for Adults.

Pseudonym	Information	
Mrs Carder	Female	Head Teacher
Mrs Lathbury	Female	SLT and Science Teacher
Mrs Marsham	Female	Class Teacher

To collect a rich, detailed context of the study, the classroom teachers were also observed, and interviewed. Details of the interviews are given in Chapter 4, section 4.4.1 and information about the observations is provided in section 4.4.2 when the data collection methods are presented.

4.3.4.4 The Main Fieldwork EE Project – The Bumblebee Conservation Project

The main fieldwork EE project took place from 16th April 2019 to 18th July 2019 and consisted of twenty sessions. Ten sessions took place on Tuesday mornings from (9.30am – 12.15pm) (i.e., from registration until lunchtime, with a short mid-morning break) with Mrs Marsham whilst ten sessions took place on Thursday afternoons (1.15pm – 3.30pm) (i.e., from lunchtime until the end of the school day) during Mrs Lathbury's (science) class time. During a class discussion, suggestions for the name of the project were made by the children and following a vote, the project was named Operation Buzz (OB). Sessions took place indoors and outdoors. Table 9 shows an overview of all the OB project sessions.

Table 9: Outline of the OB Bumblebee Conservation Project Sessions.

Day	Date 2019	Session	Activity
Tues	30-04	1	Quiz, start question wall, diaries, exploring field and taking photos
Thurs	02/05	2	Types of bees, life cycle, field observations, discussion
Tues	07/05	3	Research, share information, present an argument for an activity, vote
Thurs	09/05	4	Anatomy, stings, pollination game
Tues	14/05	5	What helps/harms bees, warning signals, bee first aid kits, letter writing, design raised beds
Thurs	16/05	6	Bee first aid kits, instructions and letter writing, photography
Tues	21/05	7	Critical thinking, bug hunting, plant hunting
Thurs	23/05	8	Critical thinking (revised), planting seeds
Tues	04/06	9	Poems, saving plants from raised beds.
Thurs	06/06	10	How I learn, food and pollination, powder paint pollination game Meta-cognition
Tues	11/06	11	Researching and designing wildlife area
Thurs	13/06	12	Measuring wildlife area, choose design for wildlife area, how bees sense the world, bunting, poems
Tues	18/06	13	Plan assembly, bee communication and human communication
Thurs	20/06	14	Marking out the wildlife area
Tues	25/06	15	Assembly, bee models, sowing seeds, solitary bee house, wildlife area
Thurs	27/06	16	Planting, bug hotel, water stations
Tues	02/07	17	Fractions, area, perimeter, seed balls
Thurs	04/07	18	Planting herbs, bee nests, bird feeders, log pile, hedgehog houses, compost bin, make signs, documentaries
Tues	09/07	19	Researching from the question wall, presenting to group, documentaries, discussion of project
Thurs	11/07	20	Food tasting, bottle folding, working in the wildlife area, compare observations now to observations at start of project

Each project activity was designed to be completed in one session (either am or pm) but as activities had an element of child-led participation sometimes they took more than one session. Throughout the project the variety of activities allowed the children to access their learning in ways that interested them. Alongside learning about bees and exploring the school field, the children also developed a wildlife area (WA). Working on the WA became a significant focus of the project. As well as planning, designing, and researching, many sessions involved physically making resources (e.g., bee nesting sites, bird feeders) and gardening.

The timetabling of activities was informed by the teachers' knowledge of the children and the school timetable. Tables 10 and 11 provide examples of an indoor and an outdoor session plan. Appendix 2 provides a list of activities. Although the language in the plans is that of 'will', 'children to', the children could choose whether (and how) to take part in the activities.

Table 10: Plan for an Indoor Session.

<table>
<tr><th colspan="2">Session 3: (Indoor) (Literacy)</th></tr>
<tr><th>Activity</th><th>Resources needed</th></tr>
<tr><td>Investigate types of bee – solitary, bumble, honey</td><td>I-pads for research
Books, information sheets
Hexagonal cards for each group
Writing pens and felt tips</td></tr>
<tr><td colspan="2">• Activity introduced as ‘jigsaw learning’ as discussed in previous session.
• Groups of children will work independently in groups to find out a range of information which they will write on hexagonal cards. When the children have found information, they can stick the completed hexagonal cards on to the wall display (There will be a rough outline for them to fill to create a ‘honeycomb’).
• Children work in groups of 3.
• Children select (or lucky dip or are told!) which group of bees they would like to investigate and each group given coloured hexagonal cards to write information on.
• Children choose 2 questions they want to research from a given selection.
• Children also asked to find one ‘fun fact’ about their chosen type of bee.
• Children get on with finding and writing up facts.
If they children have not found out 3 pieces of information within the session, they can keep the cards to complete at another time.</td></tr>
<tr><td>What activities would you like to do?</td><td>I-pads for research
Books, information sheets
A4 paper
Post-it notes
Writing pens and felt tips</td></tr>
<tr><td colspan="2">Breaktime</td></tr>
<tr><td colspan="2">Developing an argument
• In EE (and life) you need to know how to think about what you would like and how to make a persuasive argument
• Children individually write down what they would like to do during the project
• Children share ideas
• Children form groups with others that want to do similar things
• Children think about/research why their activity is important and what they will need to do their preferred activity
• Groups make an argument for their activity using 3 pieces of information they already know or have found out
• Class votes on which activities to do (during the next week)</td></tr>
<tr><td colspan="2">Lunchtime</td></tr>
</table>

Table 11: Plan for an Outdoor Session.

Session 18: (Outside) (Science)	
Activity	Resources needed
Investigating herbs	Herb plants
• Children to sit in a circle and pass round the herb plants • Children look at the different leaf shapes and smell the herbs • Teacher to talk about clover when children are sitting in the circle	
Plant herbs and perennial flowers	Plants Trowels Bottles of water
• Children to work in small groups (3) to take turns planting	
Fill up bird feeders, water plants and top up bee water stations	Extra bird food Bottles of water
• Children top up bird feeders and water tin can plants, and potted plants	
Bee nests and clover	Clover seeds Bottles of water
• Children to check if bee nests are secure and have lids over the top of the pots • Children to sprinkle clover seeds over the bee nest earth pile	
Place compost bin	Compost bin Cardboard
• Children move compost bin into place	
Place hedgehog house	Plastic bucket Water dish Brick/stone Water bowl Food bowl Meal worm
• Children to place hedgehog house • Put dishes of water inside • Weight down the hedgehog house with a heavy object • Discuss whether to put food into hedgehog house • Put food inside if agreed	
Make bird feeders	Plastic bottles Scissors Plastic spoons Tape String Bird food
• Children follow instructions to make their own bird feeders from recycled materials • Children to hang bird feeders around wildlife area	
Make signs for different areas and plants	A4 paper Pens Laminating pouches
• Children choose which sign to make for different areas and plants • Children can put out signs after they have been laminated	
Wonderings	Diaries Pens
• Children to write 3 new wonderings • Children to write three new observations	

Alongside the planned sessions, a question wall, suggestion wall, and personal diaries were ongoing throughout the project. For the question wall children wrote questions that interested them on post-it notes and stuck the notes to a wall display. If anyone has an

answer, they added it to the wall. The children also developed a suggestion wall by writing suggestions for activities to do during the project on post-it notes (Kellett, 2010). Throughout the project the children were also encouraged to keep a record of their ideas and thoughts in small exercise books which we called 'bees' diaries'. The use of individual diaries drew on the 'communication book' approach used by Iwasa (2017). The children could carry their diaries around with them if they wanted to or leave them if not. Part of the diary was for allocated tasks, for example during the first outdoor session in which the children were asked to write (or draw) three observations, three questions and three wonderings. Mostly, however, the book was free for the children to use as they wished and the children were encouraged to use their diaries independently (questions, pictures, ideas, doodle, etc.). The purpose of the diary in the project was not to have the children 'producing something' but to empower the children to record their thoughts if they wanted to.

4.3.4.5 Pedagogical Approaches Used in the Main Fieldwork EE Project

The pedagogical approach for the main project was based on the experiential learning approach advocated by Dewey (1986). This included 'collaborative small-group learning, inquiry-based learning, experiential learning…and place-based learning' (Nolet, 2017:166). A learner-centred approach was used during the project which included pedagogies of empowerment and inclusivity (Freire, 1996). Activities included questioning, researching, increased individual choice and flexibility, and the opportunity for reflection. Rather than following a transmission model of teaching and learning, critical pedagogy was integrated into the fieldwork project and individual decision making was promoted (Sund & Lysgaard, 2013). The project was grounded in a philosophy of shared research and activity as active investigation has been shown to increase confidence and knowledge (Kennelly, Taylor & Serow, 2012). Reduced teacher direction during the sessions, aimed to provide space for the children to explore different ways to engage with their learning and the holistic and less siloed approach gave the children the opportunity to actively make their own connections between the activities, the things they explored, investigated, and learned. In line with socio-cultural theory the project followed a philosophy of 'collaborative knowledge building' (Harasim, 1989:26).

When possible, the activities in the project followed a 'discovery method' (Bruner, 1996) of questioning and providing opportunities to investigate and explore. This inquiry-led approach followed constructivist pedagogies and was an appropriate approach within a constructivist paradigm.

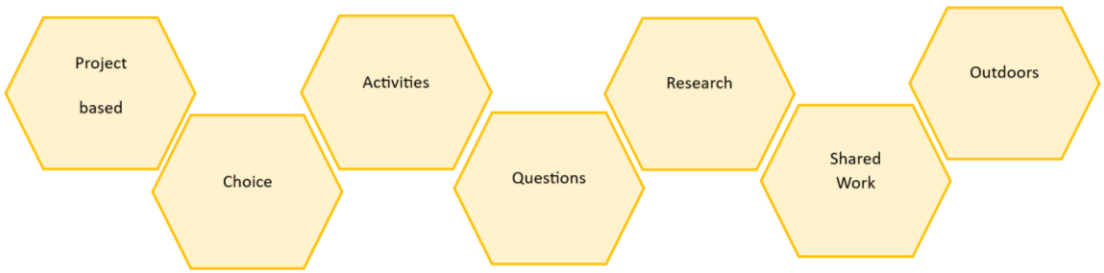
The facilitation style aimed to be democratic (Thomas, 2005) and tried to reduce the power imbalance between the adults and the children and to break down barriers created by

teacher/adult expectations through cooperative learning (Slavin, 1980). Information and guidance were given but the children were encouraged to think of aspects of the project independently and scaffolded questioning aimed to enable the children to develop their thinking skills (Green & Hogan, 2005). Children had access to information and ideas from 'the more experienced other' (Vygotsky, 1978) whether that be another child or an adult through 'mutual exploration of issues and arguments, agreements, and disagreements, questioning together, dynamic interaction and building on one another's ideas' (Harasim, 1989:26). Activities were often carried out as group tasks and the children usually self-selected their groups. Although working in groups can sometimes lead to children copying or producing similar pieces of work (White et al., 2010), it allows the sharing of different ideas and perspectives; and the benefits socially and academically are well reported (Laal & Ghodsi, 2012).

The children were encouraged to think critically about who may benefit or be disadvantaged by different ecological scenarios and to reflect and question the wider social and political costs and benefits of problems and solutions (Håkansson et al., 2018); areas which are sometimes overlooked in EE (Jeronen et al., 2017). Thus, the critical thinking skills considered essential to EE (Fien, 2000) were supported through pedagogies of questioning, enquiry, and empowerment (Apple, 2014), thinking and decision making (Nolet, 2017), and the use of real-world 'wicked problems' (Ferkany & Whyte, 2011; Sharp et al., 2021). Sessions also included meta-cognition activities to support the understanding of the individual and social aspects of learning (Watkins et al., 2007).

Pedagogies aimed to develop an empathy for nature and to increase biophilia (love of living things) as this has been shown to be an effective way to promote environmental action (Cho & Lee, 2018). Positive links between outdoor activities and environmental understanding has been demonstrated (Rickinson et al., 2004) and working outdoors was central to the project. Working outdoors helps children to 'integrate theory and practice' (Erdogan, 2011:2235) and supports the integration of 'concrete experiences, interests, emotions, and values' (Jeronen et al., 2017:4). Figure 8 illustrates key elements of the project pedagogies.

Figure 8: Key Elements of the Project Pedagogies.



4.4 Data Collection

To facilitate children to participate in research, Clark and Moss (2011) advocate using a range of data collection methods (including visual as well as verbal) in a ‘mosaic approach’. I initially planned a range of approaches to collect data with the aim to generate ‘a different form of situated knowledge’ (McGarry, 2016:342) and to create a ‘collective dialogue’ (Ferreira, Cruz & Pitarma, 2016).

Alongside interviews, observations, and notes in my field diary, the methods planned were photo-elicitation (in which self-directed photographs taken by the children were used as interview prompts (McNamee & Seymour, 2013), the children making their own films based on their experiences of the EE project, sentence completion, questionnaires with Likert scale responses, an activity sorting task (in which the children places picture cards representing the EE activities according to specific criteria such as ‘liked the most’, ‘would like to do again’), an emotion identification task (in which the children were asked to point to cartoon pictures of cartoon bees which they felt best represented how they felt during different aspects and activities in the project and to use this to prompt discussion about their experiences of the project). However, for different reasons, not all methods were effective at capturing data.

The photo-elicitation approach did not work because the iPads were used by the whole school, and it was not possible to keep track of who had used which iPads and where the photographs were on the iPads. Thus, this method did not work because of lack of resources. The film making was not used as a data collection method because the teacher liked the idea of the children making films and so this changed from data collection to a documentary making activity that was directed by the teacher. The sentence completion was not effective because eight of the children declined the activity. The two girls who began to fill in the sheets soon stopped when they noticed no one else was taking part. Due to the lack of data (three partially completed sentences in total) I did not analyse this method.

The questionnaires with Likert scale responses were initially too long and the activity was adapted to one in which the children each chose an activity to complete the Likert scales for. Although this gave an insight into what interested the children, when the data were tabulated, and analysed although it supported other findings it did not add additional understanding and was not used in the final thesis. Similarly, data from the activity sorting task and the emotion recognition task was collated, analysed and used for data triangulation, it did not provide additional information or insights. Thus, the data explicitly included in the

final thesis were from the interviews, observations and field diary notes. Data collected and analysed from the other methods is provided in Appendix 3.

Throughout the EE project I was a 'participant observer' (Green & Hogan, 2005:128) and actively engaged with the children to both facilitate the project and collect data. The data collection and analysis aimed to produce a trustworthy and valid representation and interpretation of the children's experiences of taking part in an EE project. To record a narrative of events, interviews before, during and after the project were conducted and I used ongoing observations and short interactions throughout the activities. The data corpus included interviews, observations, and my field diary. Table 12 summarises the data collection methods.

Table 12: Data Collection Methods Used in the Main Project Analysis.

Collection Method And Type of Data	Details	Quantity	Purpose of Data Collection
Semi-structured interviews (Ey, 2016). Direct Verbal	See section 4.4.1.	34 interviews	Perspective Experience Knowledge Suggestions
Naturalistic observations (Cohen, Manion & Morrison, 2013). Direct video and written	Ongoing observations of children taking part in activities throughout the project. Observations were filmed on a hand-held tablet where possible and notes were kept in my field diary.	12.5 hours recorded video	Knowledge Suggestions Perspectives
Researcher Field Diary Direct observation	An ongoing written record of my thoughts, ideas, and observations throughout the fieldwork.	1 diary	My perspectives My suggestions

4.4.1 Interviews

Interviewing is a suitable approach to data collection in this research because '[i]nterviews enable participants – be they interviewers or interviewees – to discuss their interpretations of the world in which they live, and to express their own point of view' (Cohen et al., 2002:267). Semi-structured interviews were conducted before, at the mid-point, and at the end of the EE project, with the ten children who had agreed to be more involved in the data collection. I recognised the children as agentic and that the meanings in the interviews were co-constructed (Green & Hogan, 2005), however I also acknowledge that as I 'led' the interview,

it was not value free (Green & Hogan, 2005). The interviews took the form of ‘guided conversations’ (Lofland et al., 2006) and I used language I heard the children using in class, to each other and to me. When possible, I used the children’s own words to explore and further understand what they meant when they expressed themselves during the sessions.

I also interviewed the teachers at the mid and end points of the EE project and the Head Teacher once, at the end of the project. The interviews were filmed on a handheld tablet to assist my subsequent transcription and analysis. All participants were asked each time before being filmed and reminded they could as at any point to stop the interview and/or recording. Table 13 provides details of the different interviews; and interview questions are shown in Appendix 4.

Table 13: Interview Details.

Semi-structured Interviews	Participants	Number of interviews	Location	Additional Information
Pre-project	Children in teacher allocated pairs (each approximately 30 minutes long)	5	Small intervention room	
Mid-project	Children individually (each approximately 15 minutes long)	9	In the classroom during breaktime	Mason interviewed outside during a P.E. lesson. Wilkes and Davies wanted to be interviewed together
Post-project	Children in original pairs, during morning assembly time (each approximately 30 minutes long)	5	Small intervention room	
Question and Suggestion Wall	Children individually during either morning or afternoon class time when the children were clearing for the end of the school year (each between 12 and 20 minutes long)	10	In the corridor outside the classroom	
Emotion Identification	Children individually during either morning or afternoon class time when the children were clearing for the end of the school year (each	9		
Ongoing informal interactions	Children – short questions and interactions throughout the project		In classroom, school hall, on the field	Most were videoed but occasionally recorded in researcher field diary
Mid-project with classroom teachers Week 10	(each approximately 30 minutes long)	2	In the classroom at lunchtime	
Post-project with classroom teachers	Classroom teachers individually (each approximately 40 minutes long)	2	In the classroom and school office after they had finished teaching for the day	
Post-project With Head Teacher	Head Teacher individually (approximately 40 minutes)	1	In the school hall at the end of the school day	

4.4.2 Observations

Observations of children within social contexts cast light on how children behave in relation to each other and their environments and working with children allows for rich descriptions of their experiences to be collected (Greene & Hogan, 2005). Throughout the project, I was a participant-observer and collected naturalistic observations (Cohen et al., 2013) of the children and the teachers as I engaged in the activities with them.

Data from observations and short interactions were collected either in real time or as close to the activities as possible to reduce complications of short-term memory variations (Rickinson et al., 2004). With permission, observations and short interactions were recorded on a small, handheld tablet when possible and this generated a data collection of 12.5 hours of video clips. When filming was not possible (e.g., I was involved in a hands-on activity), the observations were recorded in my field diary as soon as possible after the event. Throughout the fieldwork children were viewed as individuals with some free-will and independence, albeit bounded within and influenced by social structures. I assumed the children to be competent (Green & Hogan, 2005) and tried to remain mindful of the communication intentions of the participants.

Written notes were also recorded in my personal field diary during activities, either immediately or as soon as possible after an observation or activity, to collect rich descriptions of what was happening, how the children explained their experiences, and to prompt reflection of how I influenced the research. Short notes and drawings were made throughout sessions. At the end of each session, I stayed in the classroom to write further notes and reflections on the session, which sometimes prompted amendments to future sessions and/or interview schedules. The field diary data were analysed thematically; more details are provided in section 4.5.2 of this chapter.

On one occasion, I sat at the back of the classroom to observe a ‘typical’ lesson. Parts of the lesson were filmed (e.g., the teacher’s introduction, behaviours when given tasks, transitioning between tasks, interactive elements). I also made notes in my field diary.

4.5 Data Analysis

Analysis was informed by experiential learning theory, however an openness to other theoretical approaches remained throughout. All data were analysed thematically (Stake, 1995) which allowed exploration of the ‘reality’ of the participants experiences in a way that is compatible with constructivist and critical perspectives (Braun & Clarke, 2006:78)

Initially, a ‘top-down’ approach for the analysis was used as I aimed to answer the research questions already asked. During this stage, analysis was informed by literature, and themes and ideas were identified deductively. However, by moving between the data, theory, and previous research findings I developed deeper understandings, interpretations, and explanations of the data. This prompted further questioning and reading, and the analysis began to follow an inductive data driven approach with no pre-conceived coding frame. Thus, data analysis was both deductive and inductive and the findings are a result of both top-down and bottom-up analysis. The different types of data produced throughout the project worked towards ‘generating a different form of situated knowledge’ (McGarry, 2016:342); and it was triangulated in a non-hierarchical way which aimed to increase the veracity of the findings.

Analysis looked at what the participants explicitly said rather than investigating deeper, hidden meanings, however, I was mindful that ‘language requires the analysis of meaning making in a social situation’ (Martin & Carter, 2015:561). Analysis recognised that the meanings of interviews are co-constructed and that the interview ‘led’ by the interviewer is not value free (Martin & Carter, 2015:561). I looked for possible influences within the social situation, and the effect of power relationships within the project and data collection, both between and amongst adults and children (Luederitz et al., 2017). Care was taken to explore when the children appeared to be ‘off topic’; for example, were they playing, or showing resistance, were they bored, did they, or did they not want to engage? Data were analysed for what the children did or did not do throughout the data collection, and what activities the children did or did not want to share information about, as this can be an indication of how much value the children put on to different ideas and activities (Von Benzon, 2015). What was left out was explored as well as what was said, what could be an untruth, and if thought an untruth analysis looked at what and how the data were produced (Munk & Agergaard, 2018). Care was also taken to look at how the children were expressing their emotions throughout the project (Von Benzon, 2015). Interview analysis and observational analysis are now looked at in turn.

4.5.1 Interview Analysis

Data were pseudonymised for analysis. The footage of each interview was transcribed verbatim. Occasionally notes were made if visual data were also informative. Transcriptions were checked for accuracy against the original recordings before analysis.

Analysis of the interviews was informed by Braun and Clarke’s (2006) six phase analysis and followed a cyclical, iterative approach. Each transcription was coded line by line. Table

14 provides the stages of the transcription and analysis of the video data and Table 15 shows an example of preliminary data coding.

Table 14: Outline of Analysis Procedure for the Interview Data.

Stage	Action
A	1. Transcribe video clips 2. Check transcription by watching videos alongside transcriptions and amend where necessary 3. Repeat transcription checking [step 2] twice more
B	4. Read through transcription – make notes about replies to my own direct questions and tabulate 5. Repeat step 4 6. Go through transcription and highlight questions and replies 7. Add highlighted sections to transcription analysis table 8. Compare tabled notes from step 4, 5 and 6 – if notes very different repeat steps 4, 5, 6 and 7 again 9. Identify themes from analysis table
C	10. Read through transcriptions - make notes on what is said that is not a reply to a direct question and tabulate 11. Repeat as in step 10 12. Go through transcription and highlight individual comments 13. Add highlighted comments to transcription analysis table 14. Compare tabled notes from step 10, 11 and 12 – if notes very different repeat step 10, 11, 12 and step 13 again 15. Identify themes from analysis table
D	16. Read/re-read literature and compare/contrast with data
E	17. Read through transcriptions looking for data that supports or contradicts identified themes 18. Repeat step 17 twice more 19. Read through transcriptions and compare to analysis notes and themes 20. Compare analysis notes and identified themes to analysis and themes from other data sources
F	21. Repeat step 16 22. Write up identified themes with supporting/contrasting data and refer the findings to previous research literature

Table 15: Example of Preliminary Data Coding.

Transcription of mid-project interview with Gwynne: Video Clip 095502
A = yellow Gwynne = dark blue Identified theme = light blue [Mid-project interview with Gwynne. We are in an intervention room.] A we're on good morning thank you for talking to me so I just would like to know *what's the project been like for you so far?* G it's been fun I like it and so far I have learned one thing [positive emotion – fun] A *oooh what's that?* G that I am not..I didn't think I was ..be I didn't think I thought I was scared of bees [negative emotion - fear] A *oh ok* G but like… I'm not because like you.. you've like said they don't want to sting you and they like …and you know ..you know the ways when they like don't want to be near [increased knowledge] A *yeah* G and so I've really took that on board and when I see a bee I like I can go a bit closer [empowerment confidence]

The data and codes were compared within and between the pre-, mid-, and post-project interviews, for each child, activity, research question, and theme codes (Image 1). The generated codes were tabulated, and data allocated to the codes (Image 2). This process was repeated until the themes were identified.

Image 1: Example of Tabulated Data

Mid-project interview analysis

Direct question/topic	Mid-project interview analysis 3 [Highlighted] [M]	Direct question/topic	Mid-project interview analysis 3 [Highlighted] [L]
can you tell me what you think about the activities we've done so far?	I think most of them have been like quite fun and like loads of other people have had really good fun doing it but then other people have kinda spoilt it	the bee conservation project EE project erm so what's it been like for you?	it was good and very interesting we got to learn new stuff and about bees they don't just randomly sting you and there the warning signs
in what way?	like being silly and distracting other people from doing what they want to do	what's the experience been like for you?	fun in some classes we don't get to like go in groups working with a partner we've got to go in groups of friends
what was that like for you when you were doing the activities?	it was a bit like sad because I couldn't like do what I wanted to do and learning and have fun learning	what's group work like for you then?	I like it because so you can do work and you can also have like a joke
what has your favourite thing been so far?	probably going out and doing the flower beds	what's been good?	when we got to do the plants
what have you not liked so much?	when we did the when we went around and got the flowers when we were inside in the little hall	what's not been so good?	remember that erm lesson when it was all bad we were the bees going to the nectar

Image 2: Example of Comparison Between Interview Data and Codes.

The interviews with the classroom teachers, and the Head Teacher were transcribed and analysed in the same way to provide additional context (Kennelly, Taylor & Serow, 2012). Data from the interviews with the adults were compared between the adults and with the children's data and analysis. Codes and the data were repeatedly analysed in the same way and recoding was done when needed. More examples of the transcription and analysis process are provided in Appendix 5.

4.5.2 Observation Analysis

The observational data collected throughout the EE project consisted of short video clips taken as pure observations, short videos taken when I was interacting with the children, and written notes in a field diary. To transcribe the videoed observations, each video clip was watched in its entirety, then watched again as I paused throughout and noted my thoughts and ideas. The clips were then transcribed verbatim with short descriptions and details added to the transcriptions to provide context. Finally, the clips were watched again, and additional notes made if necessary. Table 16 illustrates how the videos were transcribed.

Table 16: Example of Transcribed Video Clip.

Transcription of working with Y on the wildlife area: Video Clip135501
[On the field, the weather is bright and sunny. The children are working on different areas of the sub-divided wildlife area. Mrs Y is helping to dig an edging strip along the wildflower area. Everyone looks engaged and busy.] **R** [is working with N digging in the flower area] **M** [walks past R and N and goes to Girl1] shall we do this bit [M and Girl1 walk back to L and N – they stand in a small group talking] **M** In a minute in a minute you can swap round [carries a small sod of grassy earth and throws it on a pile to one side] **Q** [can be seen walking across the wildlife area – she is carrying a watering bottle and is throwing it lightly between her hands.] End of transcription of working with Y on the wildlife area Video Clip 135501 Time 0:15s

The transcripts of the videos, in conjunction with the original video clips and my notes, were analysed thematically using the same process as the interview transcripts. The original video clips, transcriptions, notes and analysis were used in conjunction with the interview and field diary data and analysis.

The observations and short interaction that were recorded in my field diary were initially transcribed into a Word document to increase legibility for analysis. The transcriptions of each session were analysed thematically in the same way as the interview transcripts. Observations and thoughts recorded in the diary were compared with both the raw data and the analysis of the other data collection methods.

4.6 Ethics

4.6.1 Ethical Justification for the Research

Children have the right to "participate in matters of relevance to them" (Barratt Hacking et al., 2013:438). Globally, children have been shown to express high levels of anxiety over the environment and future environmental degradation; and as described in Chapter 2, section 2.3.1, this 'ecophobia' is increasing (Strife, 2012). However, there are ethical implications to sharing information about sustainability with children as the information can be distressing (Strife, 2012) and increased self-awareness about our own actions may not be very pleasant (Ericsson, 2014). Nevertheless, Samuelsson and Park (2017) stress '[w]e cannot embrace ideas of protecting children and childhood from reality' (p:283) and 'it is possible ... to ignite the spark for environmental protection, without instilling anxiety' (Kemple & Johnson,

2002:210). Ethically, I believe children need to be (and have a right to be) involved with environmental education as avoiding discussions of difficult climate problems does not protect children but does disempower them. Mindful of potential distress, the project was grounded in a pedagogy of hope and empowerment with the aim to engage in potentially stressful learning activities in an ethical way.

4.6.2 Ethical Approached to Recruiting Participants

I visited the class one morning to talk about the purpose and aim of my research, and what the EE intervention project would involve. The children could ask questions and discuss EE, my research, and the project. I explained the timescale, what the focus of the learning would be, the type of activities that may be available, and what the data collection involved. I also explained that ten children would be asked if they would help me to understand their experiences of the project in more detail by talking to me, letting me watch what they were doing, and be doing tasks which would help me gather information. It was explained to the children that they could also take part in the EE project without taking part in the data collection. It was reiterated to the children that it was their choice whether to join in with all, parts, or none of the project, and that there would be no negative consequences if they chose not to participate. The children were told they could opt out of part or all the project at any point (and this was reiterated throughout the project and data collection) as other pre-prepared activities were available throughout the project sessions. The children were given information letters which also contained a consent form for the child and a consent form for the children's guardians (the letters and consent forms used in the main stage of the fieldwork are provided in Appendix 6). The children were asked to think about if they would like to be involved in the project, and to return completed forms if they wanted to take part. I explained I would return two days later to talk more. During the second morning visit, we discussed the research, and more about what involvement in the EE project would involve. All interactions were done in as much of a child friendly way as possible.

Debates surround the viability of truly informed consent (Ericsson & Boyd, 2017) and questions arise as to whether any participant can give genuinely informed consent if they are not experts in the field, and I was conscious of this as I approached the school and the children. To support well informed consent, I provide an explanation of the purpose of the research and a description of the project (both in person during a school visit, and in letter form) and encouraged ongoing questioning and discussion (both in the initial visit and throughout the project) with the aim to create communication channels that would support ongoing informed consent. Consent was treated as 'provisional and ongoing' (Facca et al., 2020:7). I aimed to maintain an 'open and ongoing dialogue' (Cullen & Walsh, 2019:374)

with the children. They were reminded throughout the project that they could opt out of the research, or any aspect of the research at any point. I repeatedly asked for their consent, especially before filming, asking questions and taking photographs. Although data were only actively collected with ten children, because the children could self-select who to work with throughout the fieldwork, I asked for (and gained) consent from all the children and their guardians.

4.6.3 Ethical Approaches to Engagement with the Project

The project was discussed with the Head Teacher and one of the class teachers and was conducted in a way to minimise disruption to the children and school. The wellbeing of the children was paramount (Cullen & Walsh, 2019). Safety was the priority and the school's usual health and safety, and safeguarding procedures and protocols were followed. Participants were advised about safe ways to behave around bees; however, all participants were asked about allergies and all necessary medical equipment was available as per the school policies.

Pedagogies used in the fieldwork provided different approaches to allow different methods of engagement. Approaches were designed to empower the children (i.e., choice, varied approaches, and reminding the children that they could do something else altogether). During the outdoor activities in the project, I was mindful that learning outdoors can place additional demands, stress, and emotional challenges on students (Bixler et al., 1994); and these stressors may not be recognised by the adults (Rickinson et al., 2004). I was also mindful that studies have indicated increased fear and stress can occur when working with insects, and that the children may have felt discomfort and sometimes fear around insects and bees; and the children were reminded that they could join in with activities such as observations and bug hunting to the degree that they felt comfortable. I was wary of the potential problems of 'challenge by choice' (Breunig, 2019:18). This is when participants choose their level of engagement in an activity and the onus is placed on the individual to challenge themselves to try new things. This approach can be problematic as I (as the researcher) do not know what the challenge is for the individual. There is a need to 'understand and acknowledge that choice to participate varies between individuals, and some people are marginalised by these pedagogies' (Martin, 2017:18). Also, increased self-awareness can cause discomfort, as such the project was approached with a non-judgemental approach to mitigate these potential problems and participants were supported throughout the project.

Ethically, it was important to prevent a hierarchy developing between the children. All children (regardless of special educational needs) had equal access to activities and support

(i.e., additional adults and equipment) was available if it was needed to allow full and safe participation; however, this was not needed. Although I only analysed data from ten children, all children in the class participated in the activities because it was part of their school day, and I was mindful to include and to listen carefully to all the children.

Each session took place within the timeframe of the usual school day and school policies, notably health and safety and safeguarding policies, were followed throughout the pilot and the main stages of the fieldwork. The limits of confidentiality were explained to the children, and these were reiterated throughout the research (e.g., I explained to the children that I would speak with their teacher, Head Teacher, or pastoral care worker if I was worried about the children's safety and wellbeing). I was mindful of possible vulnerabilities such as the possibility of increased stress, the influence on (and of) self-image, and the importance of maintaining privacy (Iphofen & Tolich, 2018). Furthermore, all the children could decide whether they wanted to take part in specific activities but as the project was within the school day, they needed to ensure they were doing something in each session.

4.6.4 Developing an EE Project with a Focus on Bumblebees

The focus of the EE project was bumblebee conservation and I recognise that interactions between humans and nonhuman animal are not always 'desirable from the viewpoint of all involved' (Tammi et al., 2020:1316). Therefore, throughout the project there was ongoing 'ethical consideration' (Tammi et al., 2020:1315) that bees are valuable, living creatures in and of themselves and that they deserve respect and consideration (Tammi et al., 2020). The EE project moved away from the anthropocentric position of nonhuman animals (i.e., the bees) as human resources (Saari, 2020) and they were not objectified as 'mere resources for human use' (Boileau & Russell, 2020:1331). Instead of using the bees as 'objects of study' (Young & Rautio, 2020:1214) the bees were valued as 'our thinking, acting and living companions' (Young & Rautio, 2020:1219). As well as the ethical concerns about the children's safety (e.g., not getting stung) there was also an ethical non-anthropocentric perspective of not disturbing or hurting the bees. Thus, teaching and learning about the bees focused on learning how to 'respectfully observe them' (Boileau & Russell, 2020:1333). This ethic of care was widened to all the animals we encountered during the EE project.

4.6.5 Ethical Approaches to Data Collection

The ethical approach to this research is grounded in Article 12 of the UNCRC which states:

> '[P]arties shall assure to the child who is capable of forming his or her own views the right to express those views freely in all matters affecting the child, the views of the child being given due weight in accordance with the age and maturity of the child', (unicef.n.d).

Data collection methods used a range of approaches to increase engagement for the children. Approaches were designed to reduce pressure on the children, such as taking breaks in interviews and reminding the children that they could do something else.

It was also important to ensure that the ten participant children missed as little of their usual day to day school activities when taking part in data collection activities outside of the project activities (e.g., interviews, questionnaires). I conducted data collection activities during assembly time when possible, and during the last week of school when the children were doing end of year activities such as clearing down the classrooms. The children were asked each time if they wanted to take part in the data collection activity and were asked throughout the activity if they wanted to continue or to stop. The data collection activity took place in a different location if children preferred it, the children worked in pairs if they wanted to, stopped when they wanted to, and talked about other things when they wanted to. Although I did not 'presume expertise, knowledge and understanding' (Tucker, 2013:274) I was mindful of inherent power imbalances due to being an adult in a school environment and I tried to recognise how my use of language impacted the power relationships (Cullen & Walsh, 2019).

As the researcher I aimed to use a 'least-adult' role (Warming, 2011:44) but my role in the research environment was still that of an adult, for example, it was my responsibility to safeguard the children. Occasionally I had to intervene to ensure the children were safe (to stop them swinging on furniture for example) and these times highlighted the power relationship that still existed. However, I tried to reduce the power imbalance by using first-name terms, reiterating that I was not 'a teacher', and reminding everyone that they did not have to take part in any project activity.

During data collection, I was aware that the children may have felt pressure to please and reminded them that there was no right or wrong way to feel about the project and activities. I explained that I was interested in how they experienced the project and that it was as important for me to know things that they did not enjoy as much as the things they did. I reminded the children that the data collection activities were not tests, that they did not have to answer any questions if they did not want to and could stop any activity as soon as they wanted to. Several times during the data collection, the children told me they wanted to do

something else, and they stopped the activity. I reassured the children that stopping was not a problem and thanked them for telling me that they wanted to do something else.

The children were not remunerated for their participation, but all the children in the class were given small gifts (bumblebee themed stationery items) at the end of the project.

4.6.6 Ethical Approaches to Data Handling and Storage

Confidentiality was maintained throughout the research process. Children could ask for their data to be removed at any point up until 31st July 2020; the predicted date for the data to be fully anonymised. The school regularly anonymise photographs and videos of children who do not have permission to be shown on the school website and social media. I liaised with the school and used their permitted way to anonymise photographs and videos. Details of the data storage and data removal were detailed on the consent forms and explained verbally to the children and any parent that asked questions about the process. During and following the project, data were handled and stored in line with the ethical requirements required by TUoS. Pseudonymised data were encrypted and stored behind password protection on my computer and on the University of Sheffield's protected servers. Data on iPads and memory sticks was encrypted and stored behind strong passwords. The data were downloaded to an encrypted, password protected laptop or computer at the earliest opportunity and was deleted from my iPad and the memory stick. Initially data were pseudonymised for analysis and for use in the thesis, and then fully anonymised before uploading onto a secure TUoS data base. In line with the guidance of the Information Commissioner's Office (ICO), anonymised data will be stored securely for as long as necessary to verify and defend the research (ICO:2018).

Following the completion of the PhD, data is to be removed from my working computer and stored in the University of Sheffield's ORDA data base. In line with ICO Data Protection Legislation Article 89 (1) 'further processing for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes shall not be considered to be incompatible with the initial purpose of the data collection' ('purpose limitation').

Ethics was granted by the University of Sheffield.

4.7 Summary of the Research Design

This research aimed to explore children's experiences of EE by developing a small-scale EE project with one year group of primary school aged children in England. The research is grounded in social constructivism, a theory which allows exploration of children's

experiences within their social setting. Dewey's Experiential Learning Theory and Freire's Critical Pedagogy informed the design of the EE fieldwork project.

The fieldwork project focused on bumblebee conservation and took place within school grounds and within the school day. The small-scale project was an accessible way for the children and teachers to engage in EE in an accessible way and allowed for global understanding to be developed through local initiatives (Luederitz et al., 2017). Focusing on bumblebee conservation is unusual as even though the catastrophic loss of insects has been recognised and it is now widely accepted that the planet is facing an insect crisis (Montgomery et al., 2020) they are often neglected in EE (Potts et al., 2010; Schonfelder & Bogner, 2018).

The fieldwork project used an experiential learning approach based in 'child learning' rather than 'adult teaching'. Pedagogies demonstrated to be effective for EE such as working outdoors, using hands-on activities, developing a garden, group work, independent research, investigation, exploration, the freedom to question and critical thinking and meta-cognition skills were woven throughout. Children were viewed as knowledgeable experts about their own experiences and were listened to as reliable 'experts in their own lives' (Clark & Statham, 2005:46). Initially a mosaic approach to data collection was developed, however, as described in section 4.4 of this chapter, ultimately the data used in the final thesis was collected from interviews, observations, conversations, and field diary notes. All data collected was qualitative, was transcribed verbatim, and was analysed thematically.

Chapter 5: Findings

5.1 Introduction

The initial research question for this thesis was: How do Children Experience an EE Project in an English Primary School? This was answered through the subsidiary questions:

RQ1: How does the bumblebee conservation project fulfil the objectives of EE?

RQ2a: How do the children describe their social experiences of the EE project?

RQ2b: How do the children describe their emotional experiences of the EE project?

RQ2c: How do the children describe their physical experiences of the EE project?

RQ2d: How do the children experience the EE project in comparison to a typical school day?

RQ3: What are the implications of the findings for the enactment and inclusion of EE into the school day?

The Findings chapter will firstly demonstrate how the bumblebee conservation project, Operation Buzz (OB), fulfilled the objectives of EE. Then the analyses of the children's experiences of OB are presented before a comparison of experiences of the EE project and 'typical' school day is shared. All data were interpreted thematically (Stake, 1995) and the questions are answered using the framework of the themes identified; these themes are illustrated in Figure 10 which is in section 5.3 of this chapter. Narrative descriptions running through the data were examined and throughout the Findings Chapter examples of similarities and differences identified in the data are given. The chapter then turns to the implications of the findings for the enactment and inclusion of EE into the school day. A summary of the findings concludes the chapter. Quotations from interviews are as noted as 'Pre' (pre-project), 'Mid' (mid-project), 'Post' (post-project), 'QW' (question wall) whilst the abbreviation 'VE' indicates data from a video extract.

I recognise we can only have a partial understanding of another's experiences because experiences are interpretations that are constructed and reconstructed by those involved in data collection (Tangen, 2008). I also acknowledge that the data has been selected to answer a specific question (Vaesen & Katzav, 2017) and thus the re-telling and presentation of 'children's voices' within this thesis is my subjective 'hearing' and interpretation of my own interactions and observations. This may or may not be recognised by the children as accurate representations of their experiences and voices (Schecter & Ganon,

2012). Therefore, mindful of Reich et al.'s (2016) warning not to mistake the outcomes of my analysis to be a factual reality, it is within these bounds and caveats that the findings are presented.

5.2 RQ1: How Does the Bumblebee Conservation Project Fulfil the Objectives of EE?

The objectives of EE are to increase people's knowledge about the environment, to 'foster positive attitudes and awareness toward nature' (Schönfelder & Bogner, 2020:1968), and to increase pro-environmental behaviours (Branchini et al., 2015:12). Data demonstrated that the EE project fulfilled these objectives by increasing the children's knowledge and positive attitude towards bees, other insects and the environment, and by increasing the children's pro-environmental behaviours; and these aspects are now looked at in turn.

5.2.1 Changes in Children's Knowledge, Attitudes and Behaviour Towards Bees

Initially when asked, the children demonstrated little knowledge of, or interest in bees. They all expressed feeling fear around bees which was associated with not understanding bee behaviour. Bryony, for example, explained: 'I don't know what it's going to do to me…' (Bryony:Pre), whilst Willughby described how:

> 'Sometimes I feel scared sometimes I feel happy it depends like… if it's like coming towards ye and it looks like it's quite angry… sometimes it's a bit scary' (Willughby:Pre).

Even the children who express feeling more confident around bees also indicated uneasiness. For example, Mason explained:

> 'When I come up to [bees] and stand still and I feel like they're kind but like that I shouldn't do anything like like that [shakes hands around]… around them and just to stay still and not move' (Mason:Pre).

Cullum was an exception. He appeared proud when describing how he stopped a classmate killing a bee: '[A bee] was just on the floor… [Boy1] in my class wanted to kill it… so I tried I tried to put it outside' (Cullum:Pre).

The children expressed reservations about investigating bees and these were based around fear, however all the children said they would like to learn about them. The mixed feelings were summed up succinctly by Gwynne:

> 'I'm fifty fifty… cos I'm like I want to do this project but then again I don't wanna like be stung by a bee in the process of it… hopefully by the end hopefully by the end of

> Year 5 the beginning of Year 6… and throughout school I'll like bees and I won't go ooh it's a bee [she mimes flinching away from a bee]' (Gwynne:Pre).

Throughout OB the children's knowledge about bees increased and this reduced their fear and helped them to feel more confident around bees. The children had the opportunity to use iPads to look carefully at images and short films of bees before going outside to explore. This helped reduce the fear of bees and was particularly helpful for Bryony who actively looked for bee videos to watch (Field Diary). A session about bee communication also helped the children understand the warning signals bees give. Learning how to understand and behave around bees helped the children to feel confident to explore and engage with their natural environment. Cullum felt OB:

> 'Was good and very interesting because we got to learn new stuff and about bees and that they don't just randomly sting you and there [are] warning signs' (Cullum:Mid).

Whilst Gwynne explained:

> 'So far I have learned one thing… I thought I was scared of bees… you've like said they don't want to sting you and… you know the ways when [bees] like don't want to be near … so I've really took that on board and when I see a bee I like I can go a bit closer' (Gwynne:Mid).

By the mid-point of the project, all the children said they felt more confident around bees and could be seen spending quite some time watching them. Image 3 shows a picture of a bee taken by Gwynne.

Image 3: Close-Up Photograph of a Bee; Taken by Gwynne.

The initial fear of bees, described eloquently by Bryony as being: 'Like a horrible disease going round' (Bryony:Post) was replaced by feelings of happiness and excitement, and compassion and curiosity. In contrast to her prior feelings of fear of the bees on a plant

outside her house, following the project Bryony 'will now scoot past the bee bush' (Bryony:Post).

All the children showed an increased empathy for bees and interviews and observations indicated the children had developed an open fondness for them. Willughby (who in the pre-project interview said he wanted to attack bees with twigs) said that before OB: 'When bees flew passed, I used to run away' (Willughby:Post) and appeared proud when explaining:

> 'Knowing a bit more about bees and bee lives so I don't move cos those bees outside in assembly and it landed on me… and I didn't move' (Willughby:Post).

Heather also demonstrated a noticeable change in her attitude and behaviour towards bees when at the end of the project she explained:

> 'I always see the bees and I always was like scared of them… because of the noise and the stuff ..but once we did this I felt more into them and exploring them and that we're researching that the leg goes up and you actually see it it's actually really happy and exciting for you to see it' (Heather:Post).

The children increasingly recognised the important role bees play in the environment and how reducing bee numbers is a problem for us too. They became more enthusiastic to help bees, and there was evidence of spill-over effects (White, Eberstein & Scott, 2018). For example, the children talked about sharing their learning and described advocating bee-friendly and pro-environmental behaviours with family and friends; and several children recalled their successful attempt to rescue a bee that they found on their way to Violet's birthday party. The children explained to the adults how to provide a sugar and water solution and between them they saved the bee. Following the half term break, Mrs Marsham commented: 'I mean how many of them have saved bees over the holidays. It's been amazing …I saved a bee! … so it's working isn't it it's working' (Mrs Marsham:Post). These findings support previous research (e.g., Reynolds et al., 2018) which demonstrates hands-on interventions reduce children's fear and dislike of certain animals and increases pro-environmental behaviours.

When they were too late to rescue a bee, some of the children conducted funerals. Ivy recounted how she and her friends found and buried a dead bee (complete with a little service and a lollipop stick grave marker):

> 'I found a dead bee yesterday at [after school club]…and we went and buried it…and we wrote a big like…we wrote on lollipop sticks…erm RIP bee and we called it Becca…cos it looked like a girl…yeah and it still had its stinger…cos boys don't have stingers' (Ivy:Post).

Here Ivy not only illustrated her change in empathy for bees, but also demonstrated the strengthening of her knowledge and observation skills.

5.2.2 Changes in Children's Knowledge, Attitudes and Behaviour Towards Insects

Prior to OB, the children indicated they were not familiar with many insects. Cullum, Willughby, Davies and Violet confused insects and arachnids. When shown photographs of insects, the children could identify butterflies and ladybirds but struggled to identify other common insects including honeybees and hoverflies (Appendix 7 provides photographs and a summary of the children's recognition of different insects). When asked about their favourite insect, Heather explained she does not: 'Have like a favourite insect because 'erm cos I don't really like look of all of them' (Heather:Pre) and Willughby declared: 'I hate them all' (Willughby:Pre). These findings strengthen previous work which demonstrated the way insects look triggers feelings of fear and dislike towards them (Prokop & Francovicova, 2017; Schlegel et al., 2015); and this is problematic from a conservation perspective.

Feelings towards insects were not universally hostile, however. Although Gwynne explained she has never seen a fly up close and has not had any contact with bees because she actively avoided them, she became more animated when speaking about the crickets she could see and hear when on a recent family holiday; she also likes the look of butterflies (Gwynne:Pre). Although Bryony explained: 'I don't really know much about insects really' (Bryony:Pre), she had a positive outlook stating: 'When you're outdoor like there's loads of like … …insects and you can learn a lot about them' (Bryony:Pre). Mason said: 'I kinda like the leaf insect… like how they can camouflage itself on to sticks and like stick insects' (Mason:Pre) and Ivy confidently expressed: 'I like ladybirds… …I just like how they crawl around' (Ivy:Pre). Table 17 lists the children's responses in the pre-project interviews when they were asked about their favourite insect.

Table 17: The Children's Favourite Insects.

Participant	Favourite insect	Participant	Favourite insect
Cullum	Tarantula	Bryony	Butterfly
Davies	None	Gwynne	Butterfly
Mason	Leaf insect	Heather	None
Wilkes	Grasshopper	Ivy	Ladybird
Willughby	Hates them all	Violet	Butterfly

The more the children learned about bees, the less fearful of other insects they became. For example, Heather demonstrated a change to her initial dislike of insects by keeping calm when a ladybird landed on her (Transcription Box 1 and Image 4).

Transcription Box 1: Heather Talking About a Ladybird: VE.

Heather	so a ladybird was on my skirt
Bryony	and then it flew away
AM	*and what was that like?*
Heather	it
Bryony	it was like it was very like [inaudible]
Heather	and then it went on my hand
[Girl1]	it was really delicate

Image 4: Heather and a Ladybird.

5.2.3 Changes in Children's Knowledge, Attitudes and Behaviour Towards the Environment

In the pre-project interviews the children talked about air pollution (because of cars), plastic pollution, and water pollution (due to plastics). They all identified food and water waste as harmful to the environment. The children were not familiar with the term 'sustainability' or 'biodiversity'. When asked about helping the environment, they shared practical ideas about how to reduce pollution (e.g., walking rather than using a car) and reduce plastic waste. The children demonstrated a pragmatic understanding, for example, Heather explained how she likes to walk to school but cannot do it all the time. Planting trees and not destroying plants were also highlighted as helpful activities: these ideas come from direct experience of planting trees that died following damage caused by other children.

All the children indicate they are genuinely worried about what their future will hold. Catastrophic imagery such as: 'We don't want it [the Earth] to die' (Violet:Pre) is evident in all the pre-project interviews. Notably, all the children state they want to be proactive and to know what to do, for example: 'The world is infected … we need to know what to do' (Violet:Pre) and: 'The world is wrecked … we need to help it' (Cullum:Pre).

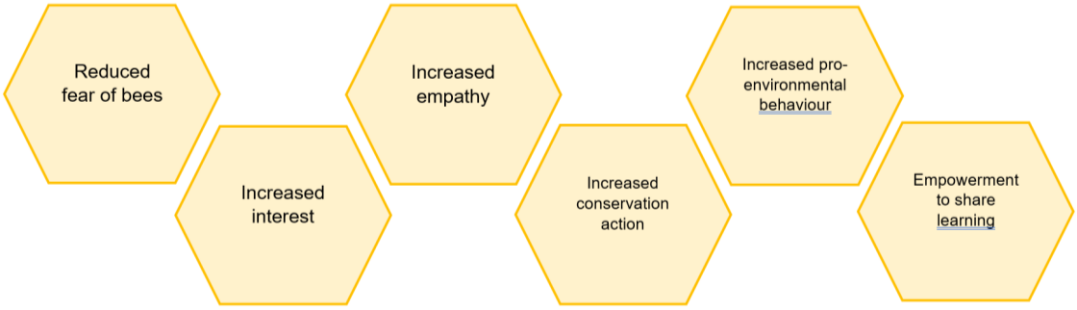
Throughout the project, the children began to make wider connections to environmental issues. They recognised that bumblebee conservation helps the environment more widely and expressed understanding of the purpose of OB to be wider than just to: 'Change how we act towards bees' (Cullum:Post). The children demonstrated a deeper understanding of key environmental issues, primarily the importance of pollinators, and the importance of the interaction between different elements of the ecosystem. The children became increasingly motivated to take part in the project and indicated increased pro-environmental attitudes as the project progressed. Violet, for example, described how the project: 'Helped me learn about more the environment cos I didn't really care but now… now I do' (Violet:Mid). Violet's change in attitude after her involvement in OB was mirrored by all the children. They all expressed increased compassion for both their local and global environment, and all showed increased confidence to act.

The children demonstrated a desire to share their knowledge and to prompt behaviour change. For example, in school, they asked to lead an assembly. They also feel old enough to talk to and share their learning with adults and say they are putting their learning into practice and are sharing it at home. Gwynne explained:

> 'We're old enough to say actually mum dad whoever erm you're doing this wrong …you're not being very environmentally [friendly]' (Gwynne:Post).

Whilst Wilkes feels able to talk with his family to: 'Tell them to reuse some plastics and things' (Wilkes:Mid). These data align with previous work in which students 'developed a sense of empowerment and accomplishment and a belief that they could make change happen' (Hildreth, 2012). Figure 9 illustrates some of the changes occurring throughout OB.

Figure 9: Changes Throughout OB.

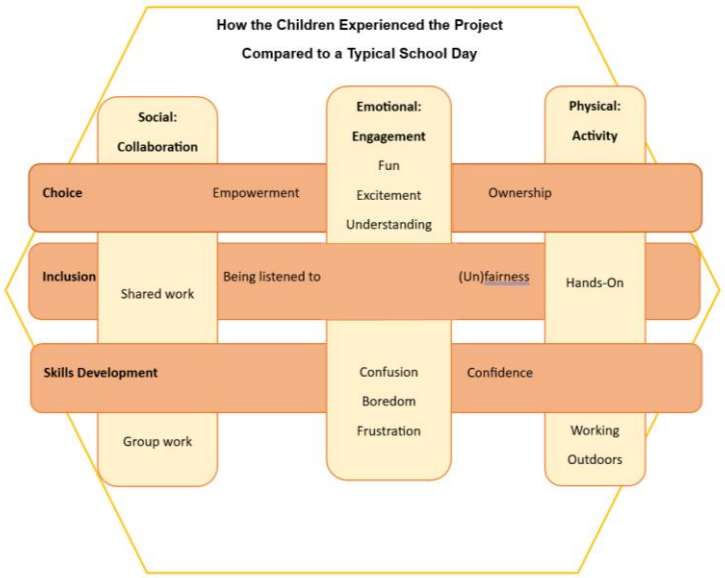


Having established that OB fulfilled the criteria for effective EE, I now address the core research question.

5.3 How Do Children Experience an EE Project in an English Primary School?

To answer the core research question, data were analysed using the lens of the supplementary questions which focused on the children's (a) social, (b) emotional, and (c) physical experiences. Themes of (1) social collaboration, (2) emotional engagement, and (3) physical activity were recognised. Analysis identified three additional themes intersecting and embedded within the data. These were (4) choice, (with subthemes of empowerment and ownership); (5) inclusion, (with subthemes of being listened to and sense of fairness); and (6) skills development, (with a subtheme of confidence). Figure 10 illustrates entanglement and intersection of the themes and subthemes identified throughout the data. This visual representation of the entangled themes draws on the Te Whāriki child-centred curricula guidance for early childhood used in New Zealand (Lee et al., 2013). Te Whāriki (meaning 'woven mat' in the Māori language) uses the concept of multiple interacting elements of education combining to produce distinctive and unique patterns and outcomes (Carr et al., 2002).

Figure 10: The Entangled Themes and Subthemes: Weaving Mat Design Adapted From the Te Whāriki Approach to Early Childhood Education (Carr, May et al., 2002).



5.3.1 RQ2a: Social Experiences: Collaboration

Analysis identified that the children's social experiences throughout OB heavily influenced their overall experience of the project; and the predominant theme when exploring the social experiences throughout OB was that of collaboration. The class usually works independently or in teacher allocated pairs, however throughout OB the children worked either individually before sharing their work (e.g., the question wall), as a whole group (e.g., the pollination activities), or in small groups to produce a bigger piece of work (e.g., creating an information display, and developing a wildlife area). Being part of the learning community was important to the children and they found it fun to work together, valued support from their peers, and enjoyed sharing information. This strengthens previous research (e.g., Watkins et al., 2007).

Despite regular squabbles, the immediacy of help was seen as helpful to learning and the children enjoyed working collaboratively. Cullum expressed his excitement when working with others:

> 'Like if you don't know something and someone doesn't know something but then you know the thing and they know the thing [claps hands together]… that's interesting' (Cullum:Post).

The importance of peer support is also illustrated by Heather who explained:

> 'Group work it's better because you can share ideas… if someone didn't get it we could explain it and then like you've got somebody by your side if you're struggling' (Heather:Post).

The children found it helpful to look at other people's ideas, and this made group work:

> 'Very fun because we can share each other's ideas and then we can come up with a big idea that we all agree with er that can be very fun I like working in this way as well because we can share idea[s] about what other people think' (Gwynne:VE).

Whilst the importance of support from peers when she is feeling stuck with her work was highlighted by Bryony:

> 'Cos you might be you might be like oh my gosh look I've no idea like wh no ideas and then your friends come along and have got loads of ideas you can share ideas to them can't you' (Bryony:Post).

Heather highlighted how she enjoyed the social aspect of working in groups as: 'Being in a group […] you get like teamwork, and you can make friends…' (Heather:Pre). Bryony and Gwynne also enjoyed it when they could: 'Work as a team' (Bryony:Post); and explained interacting with their peers improved their learning experiences because: 'Teamwork is good' (Gwynne:Post).

However, there is complexity when using group work as an approach to teaching and learning. For example, Willughby explained he enjoyed group work: 'Cos I was working with my friend', (Willughby:Post), but Ivy stated: 'I like to be kinda independent cos I don't like talking to people much like… cos like I don't really like people' (Ivy:Post). Whilst Cullum describes how much he enjoys working in groups with his friends because: 'You can do work and you can also have like a joke' (Cullum:Mid), Davies is sometimes overwhelmed when working in groups and feels he does not get his ideas listened to or acted on. In contrast to Cullum, Davies says he prefers to work alone, explaining:

> 'I prefer the individually... because you don't have to listen to everyone and they'll just say that we're using their idea and then you can't really do anything else… they just say we're using our idea and that's it…[they] do everything… no they do everything and then you can't do anything (Davies:Mid).

These feelings were mirrored by Wilkes who felt working alone was: 'Sometimes … a bit better because then I got to be by myself, and I got to do like more stuff' (Wilkes:Post). However, despite often preferring to work independently, both Davies and Wilkes valued sharing ideas and tasks amongst the wider group and recognised that at times the support given by their classmates was beneficial. Wilkes recounted:

> 'My like friends have helped me when like… erm cos you can't really do all of it yourself because like you can't just do like the bug pictures when we did when we

> took the iPads out and put some pictures on… you couldn't just do that by yourself you had to take someone with you to do it… it were fun', (Wilkes:Mid).

This demonstrates that at times Wilkes enjoyed collaborating within a learning community, and it was important to him to be part of the bigger 'whole'. Wilkes also explained that his friends were the most helpful aspect of OB, which further highlighted the effectiveness of the collaborative approach to learning. Throughout OB the children could collaborate either by working independently before sharing their ideas and information, or by working together as a whole group, or in small or large groups. The most common approach during the project was that of small (self-selecting) groups working on different tasks before bringing them together to create a larger piece of work. Each of these approaches are now looked at in turn.

5.3.1.1 Social Experiences: Sharing Ideas and Information

Questioning and researching different things helped the children to develop confidence to share their work and they all expressed enjoyment of the open, cooperation, collaboration, and shared learning. The main activity when working independently before sharing information was the development of a 'question wall'. In this simple approach, modelled on Kellett (2010), the children were encouraged to add questions (using post-it notes) to a delegated space on the OB display in the classroom. This provided an open, accessible space for everyone to share their thoughts and ideas at any time and created an interconnected learning community in which asking questions was respected. The children engaged with the question wall differently, some asked questions, some answered, and some did both. They all said they felt more comfortable sharing their questions via the wall rather than asking them out loud and the data showed that having a space where asking questions was acceptable and actively encouraged helped the children to become more confident to ask questions and less fearful of being teased. For example, Violet felt it: 'Was good because like when you put when you put a question up people answer it and then you can look at it and it helps your learning' (Violet:Post). Wilkes also found it helpful that: 'If you need help you can just like put like something on there and someone can answer it' (Wilkes:QW), whilst Bryony explained: 'I could write a question down or look if it was already there and find the answer' (Bryony:QW). Cullum liked: 'When we wrote questions that we didn't know the answer of [sic] and we got to know the answer'. He explained: 'Everyone gets to know what questions you asked, and everyone gets answers to their questions' (Cullum:QW). He also liked the range of questions that were added to the board.

Working on the question wall helped the children to develop the confidence to ask questions and share information and this contrasted with a prior unwillingness to openly express confusion or misunderstanding, or to ask for help because of feeling embarrassed and fear of being ridiculed. The positive effects of having space and freedom to ask and answer questions in a non-pressurised way was provided powerfully by Wilkes who explained he: 'Felt good' answering questions on the question wall: 'Because I I can't really normally answer questions, but I could because I understood most things' (Wilkes:Post).

Ivy also demonstrated a noticeable increase in confidence when she explained how she enjoyed researching other people's questions because: 'You got to see other people's questions and you got to answer them' (Ivy:QW). She went on to explain that it: 'Felt good because like they didn't know the answer and then you're giving it to them, so it felt like erm you use just like erm you're helping others in a way' (Ivy:QW). This contrasts markedly against her descriptions of sadness, frustration, and annoyance when she feels she cannot engage positively with her learning (illustrated in Transcription Box 2).

Transcription Box 2: Talking with Ivy in the Classroom: VE.

Ivy	if it's like maths and it's like really hard I get really annoyed at myself cos it's like I can't do it… so it's like you just like scribble on your page cos once I covered a whole page like I was writing stuff down and kept getting the answer wrong and I kept scribbling it out and my whole page was just covered in scribbles… cos I couldn't do it
AM	*what did that feel like then when you were doing that?*
Ivy	annoying… and sad because I got nothing done

As well as answering questions herself, Heather valued the reciprocal help and the teamwork aspects of the question wall. She explained it was: 'Nice to get feedback from the class' (Heather:QW) and felt the question wall helped her understanding because: 'Other people put [answers] down in ways that made sense' (Heather:QW). Willughby also explained: 'You could understand … people could know that and then you would understand it too' (Willughby:QW). All the children said they would use a question wall again. Table 18 provides a summary of the children's interview responses when asked about the question wall.

Table 18: Children's Responses When Asked About the Question Wall.

Responses from Question Wall Interviews						
	Used it	Good	Interesting	Helpful for learning	Helpful for understanding	Would do again
Cullum	✓	✓	✓	✓	✓	✓
Mason	✓	✓	✓	✓	✓	*
Gwynne	✓	✓	✓	✓	✓	✓
Wilkes	✓	✓	✓	✓	✓	✓
Bryony	✓	✓	✓	x	x	✓
Ivy	✓	✓	✓	✓	# Don't know	✓
Heather	✓	# Liked it	✓	✓	✓	✓
Violet	✓	✓	✓	✓	✓	✓
Davies	✓	✓	✓	x	✓	✓
Willughby	✓	✓	*	✓	x	✓
✓ Agreed with statement x disagreed with statement * no data collected # gave variation on wording						

Image 5 shows the children choosing to engage with the question wall and other displays throughout the project.

Image 5: Groups of Children Looked at the Displays Throughout the Project.

5.3.1.2 Social Experiences: Whole Group Work

Throughout OB the class worked as a whole group several times. An example of a productive whole group activity is shared in Transcription Box 3 and Image 6.

Transcription Box 3: Outside Smelling Herbs: VE.

Children are on the field, they are sitting in a circle, taking turns to look at and smell the different plants before they are planted. There is lots of discussion and interaction as the children pass the plants around.

Image 6: The Whole Group Smelling and Discussing Herbs.

During this session, the children interacted calmly, passed the herbs around carefully, and shared ideas thoughtfully.

A less successful whole group activity was the first pollination session. This happened at the beginning of the project when the children were still unsure about what to expect from OB. The activity took place in the school hall and involved the children acting like bees by carrying 'pollen' (post-it notes) between plants and gathering nectar (sherbet straws) as they moved around. Unfortunately, despite my best made plans, everyone agreed the pollination activity was nothing short of unpleasant chaos. The activity was summarised succinctly as: 'Rubbish because [the children] were talking and messing about' (Davies:VE). The disruption in the room was ultimately called to an end by an infuriated classroom assistant who appeared in the hall and told us all that enough was enough.

Back in the classroom, we discussed the positives and negatives of the session. All the children felt frustrated by the confusion and were annoyed that the opportunity for movement and activity resulted in silliness. Interestingly, a key reason the children gave for their negative experience was that because people were messing about, they felt they had not learned anything. Although the children initially blamed their peers for the unsuccessful session, through shared reflection they began to take responsibility for their own actions and acknowledge that they all struggled in the session because they did not listen (Field Diary). Transcription Box 4 provides Cullum's experiences of the activity.

Transcription Box 4: Talking with Cullum in the Classroom: VE.

Cullum	I liked the thing [the pollination activity] but when everyone started screaming and shouting it just got annoying
AM	*yeah …what what was annoying about it then?*
Cullum	so we couldn't ..like if you were talking us through it we couldn't hear anything if you said an instruction we couldn't hear
AM	*yeah*
Cullum	and we didn't know what to do

Ivy was a notable exception to the nine children as when asked which session she would like to repeat, she replied: 'Erm [grins] the pollination cos it was funny [laughs]… everybody was… sticking notes to each other it was just funny [laughs]' (Ivy:Post). When asked what she had learned, Ivy replied: 'That people do get really rough… and people do get really crazy… er that bees fight maybe? Bees fight over the flowers' (Ivy:Post). This provided a clear example of when learning outcomes bear no resemblance to the learning objective aimed for by the adults.

The first pollination session was one of the least popular activities because it: 'Got out of hand…we didn't learn anything' (Bryony:Post). Nevertheless, even though it was initially seen as a frustrating disaster in terms of enjoyment and learning, looking closely at the data indicated the outcome of the subsequent group discussion was pivotal to the children understanding their role in their own learning. Although there were further times when the children's exuberance bubbled up during sessions, the frustration of the first pollination session was ultimately a significant learning experience for the children and me.

5.3.1.3 Social Experiences: Small Group Work

The main approach used throughout OB was working in small groups; and the children enjoyed this and found it helpful. They could choose who to work with (except for one occasion when the teacher intervened) or could work alone, because in the words of Wilkes: 'Sometimes you [sic] might just want to work by themselves or sometimes they might not want to work by themselves' (Wilkes:Post).

The children liked the small group interactions and particularly enjoyed the open cooperation of jigsaw learning (Watkins et al., 2007); that is researching different aspects of the topic in small groups before bringing their information to create a shared piece of work. Gwynne described how this approach supported the class to: 'Make something bigger and better' (Gwynne:Mid) than if they worked alone. Transcription Box 5 provides an extract in which Gwynne shares her thoughts about the jigsaw learning approach.

Transcription Box 5: Extract from Mid-Project Interview with Gwynne.

Gwynne	I like [jigsaw learning] because like you've got your own little bit to do you can get on with this tiny little piece instead of doing lots of short little bits of work you can have a long time just on a little bit of work and everyone can do a different bit and..you can get more facts by the end of it
AM	*how do you find it when everyone brings their information together? What's that like for you?*
Gwynne	you just think like wow!

Gwynne indicates the importance of having time to focus clearly on a ‘tiny little piece’ of work and to immerse herself more deeply in her learning, something that can be overlooked in the fast-paced and highly structured practice that is a feature of results driven teaching. Later when talking about the jigsaw approach, Gwynne also described how: ‘More brains are better than one (Gwynne:Post).

Working together on the wildlife area (WA) also provided time and space for the children to work together in small (or larger) groups to share ideas and activities. An example of an inclusive small group activity is given in Transcription Box 6 and Images 7 and 8.

Transcription Box 6: Heather, Mason and Wilkes Deciding How to Use an Object in Wildlife Area: VE.

Mason, Wilkes, and Heather are crouched around a concrete bowl made of 3 different parts. They are looking at the different parts and discussing what they could be used for.

Heather	we could put this [the lid] into the bottom so that it's not that deep for the birds
Mason	but you could push
Wilkes	but then the water will get down there and
Heather	[stands up. She is holding 2 bottles of water]
Mason	[looks up to talk to Heather] we could put a little plant in and then it could stand on the plant
Heather	[gets distracted by a conversation between Mrs Marsham and Girl1 that is happening behind her]
Wilkes	oh…[turns to me] is there any animals that like birds like erm if there's a little plant and like water coming up there…like little..?
AM	*oh like a little a little mini pond?*
Wilkes	yeah
Mason	[has stood up but bends over whilst talking to Heather and points to the pot] just put some water in it because then we can see if they can stand on here (points to a small ledge around the top of the pot) and see if they can drink out of it [bends to pour water into the pot]
Heather	[bends to pour water into the pot]
Wilkes	wait
Mason	so it can be a water station and a bath
Wilkes	[to Mason and Heather] would we be able to have that thing where like we get to rinse this get it all the way around (swirls water around the edges of the pot) and then I can put some more water in

Image 7: The Children Discuss How to Best Use the Concrete Bowl.

Image 8: The Finished Product.

The theme of inclusion is woven throughout the data and is addressed further in section 5.5. Before that, however, the problems identified, and improvements made, when working in groups are presented.

5.3.1.4 Social Experiences: Problems with Group Work

Although positives of working together have been identified (enjoying teamwork, enjoying sharing ideas and increased understanding, for example) when looking more closely, the experience of working together varied for the children. Working with others was not always beneficial and sometimes group work proved to be stressful. All the children mentioned times in OB when their classmates became more of a hindrance than help.

A significant downside of group work was the frustration caused when other children disrupted learning, and this was identified as the least helpful aspect of OB. Wilkes explained that sometimes he felt group work got boring as: 'People just messed about' (Wilkes:Post). The disappointment and annoyance felt when their classmates stopped them from learning was raised by all the children at some point during the project and they all explicitly stated that people messing around was distracting and spoiled their experiences of learning. At the mid-point of OB, when Mason was asked about his experience of the activities, he replied:

> 'I think most of them have been like quite fun and like loads of other people have had really good fun doing it, but then other people have kinda spoilt it… like being silly and distracting other people from doing what they want to do… it was a bit like sad because I couldn't like do what I wanted to do and learning and have fun learning' (Mason:Mid).

Heather also described how disruptive behaviour negatively impacted her learning: 'Sometimes it has been some like confusing like with the … the distraction' (Heather:Mid). She explained she found it hard to taking part in activities when: 'People [are] making a fuss' (Heather:Post). None of the children liked noise and disruption (except for Ivy's amusement during the chaotic pollination activity discussed previously in section 5.3.1.2) and shouting, talking, and messing by other children was experienced as distracting and annoying. Whilst Heather expressed that other people's disruptive behaviour made her feel 'disappointed' (Heather:Post), Mason explained:

> 'We're wanting to learn and not be distracted …[but]… to make it fun you have to have like people that don't mess around… to make sure everyone doesn't mess around and everyone can get on with it and have fun doing it with their friends and stuff' (Mason:Post).

Gwynne, who also felt frustrated at episodes of disruptive behaviour, had clear ideas about where the problems lay:

> 'It can be quite annoying when the… boys disrupt your learning and things and I know sometimes it can get a bit much for some boys… too exciting… we don't do we don't do like this very often so it's like a really nice chance as well so the boys get quite excited' (Gwynne:Mid).

However, a different perspective is given by Cullum, who stated that although he enjoys working with friends, he also finds it frustrating and annoying when people behave in a way that spoils his learning. This is because it is important to him to do something productive. Transcription Box 7 gives an extract from an interview with Cullum.

Transcription Box 7: Mid-Project Interview with Cullum.

AM	*what's been unhelpful?*
Cullum	when you're trying to concentrate on something and everyone's just chatting so you can't really concentrate
AM	*what was that like for you then when you couldn't concentrate?*
Cullum	frustrating and annoying

These findings contrast with the work of Adderley et al. (2015) in which the participating children were unaffected by disruption and shouting.

Sometimes group work was unhelpful, not because of disruptive behaviour, but because of strong opinions. Gwynne and Bryony's experiences of the first critical thinking task provides a clear example of a negative experiences of group work. In this session, one girl was forceful in her views about the topic (people want to go on holiday, but if flying causes damage to the environment what should we do?) and that she felt the critical thinking activity was a waste of time. Transcription Box 8 details some of the difficulties.

Transcription Box 8: Post-Project Interview with Bryony and Gwynne.

Bryony	you know erm a girl in our group was just like I can't do this right you know how we like going on holiday we can't just stop using aeroplanes I'm sorry… that's what she was like so yeah
Gwynne	like they were just like if one person said oh I can't do it all of a sudden they say
Bryony	so they're like oh yeah I can't do it
Gwynne	and then if the … they like the [whispers] what do you m'call it like the… … the infectiousness of the …the badness
Bryony	the disease
Gwynne	the infectious like… badness I can't do it… kind of thing goes and spreads onto everyone else
Bryony	see cos [Girl1] started saying don't count [Girl1] started saying I can't stop I can't stop using
Gwynne	I'm going on holiday in like three days you can't start banning you can't ban aeroplanes now

Bryony and Gwynne eloquently develop the idea of a negativity spreading disease-like through a group which ultimately ended in the group giving up the activity. This episode was a good illustration of the powerful effects of social interactions which reduce the enjoyment of learning. The problems during this critical thinking session are taken up again in section 5.3.2.2 when the children's emotional experiences are addressed.

Who the children worked with (or did not work with) was important to their experiences of OB. All the children identified people who they work well with and the people they would prefer to work with. Wilkes, for example, explained:

> 'Sometimes I like to be by myself but… … sometimes I like to be with someone and… … sometimes I don't like want to be with certain people' (Wilkes:Post).

This sentiment was summarised clearly by Violet's statement that: 'It's better if you are not with annoying people', (Violet:Mid) and although when asked Bryony and Gwynne felt that: 'Everyone likes to pick their own groups' (Bryony:Post) choosing groups was sometimes problematic. It was unpleasant and there were problems when children felt excluded, and troubles, such as arguing, when picking groups were recognised. Wilkes and Ivy, for example, indicated they often struggled to work with the people they wanted to, as Ivy explained:

> 'I like choosing…I like choose [Girl1] but then I don't like choosing anyone else […] cos we ask [Girl2] and she's like 'I'm already in a group' and then we asked [Girl3] and she was like 'I'm already in a group' so like everyone was already in a group… … of like four or three and us guys was just a two' (Ivy:Post).

Alongside the problems of choosing groups was the difference in confidence to move between groups. Although some children (e.g., Mason) felt they could swap groups for different activities, others did not and this was sometimes problematic. Wilkes and Ivy both said they got bored working in the same groups, which happened when the children chose who to work with. Ivy described how she: 'Tended to stay in the same groups… … sometimes it got boring … … being with the same people', (Ivy:Post). Wilkes and Ivy both would have preferred it if the groupings were changed more and were assigned by random or teacher allocation.

Davies however preferred being able to choose for a slightly different reason. His approach to being left out was to actively choose to work independently. He explained before the project began that:

> 'It's better when you choose… because […] sometimes you get like people who basically don't want you in it… so then you just do what you want… with your own

> group like by yourself … so you don't have to listen to everyone else … and just [get on with it]' (Davies:Pre).

During the project, Davies reiterated his preference to work alone, explaining he could use his own ideas and avoid the frustration of not being listened to: 'Cos I don't have a partner telling me what to do all the time' (Davies:VE). Nevertheless, despite different preferences in who to work with, feeling included in the activities (either as an individual or as part of a group) was an important aspect of the children's experiences of OB. The importance and effect of inclusion is taken up again in section 5.5.

5.3.1.5 Social Experiences: Improvements in Group Work

Despite the ups and downs associated with group work, as the project continued, and the children worked together more, they became better at working in groups. Heather explained:

> 'We're used to being in partners and to being independent but when we're in groups we got better and better and now I'm actually like I actually like being in groups… because erm basically you can share ideas and they can help you with things that you might not be used to' (Heather:Post).

Throughout OB, a strong sense of community and support developed. This contrasts with Ivy's previous observation that: 'We're a bit of like a scrappy class like we always argue and fight… which is stopping all of us from learning more and doing more' (Ivy:Mid). Ivy noticed a positive strengthening of the class community during the OB activities (which she associated with OB being more fun than her usual experience of learning) saying:

> 'it's better for some people because it's like some people get really bored easily…but and it they've been joining in more like…it's more like erm like some of the boys get bored really easily…I can get bored really easily but then if you like if like we do what you we're doing with you it's quite you know like..we..join in more and we're like not erm just getting kind of left out a bit' (Ivy:Mid).

Although sometimes friends and classmates became a source of annoyance, and working with certain people was sometimes difficult and arguments occurred, overall, the children recognised the effectiveness of collaboration to generate ideas and share workloads. Even if shared work was not always deemed to have been done fairly (and this important aspect of the children's experiences is addressed in section 5.5.2), the children valued input from their classmates. Eight of the children (and all the adults) felt the class had improved in their group work and social skills and this was reflected in my observations (Field Diary). The

exceptions were Ivy, who felt they were already good at group work and did not improve and Wilkes who just felt there had not been a change. Although the children's experiences varied, by the end of OB, they all felt they would now rather work in groups than in teacher allocated pairs. This new preference was a big change, especially for Davies, Wilkes, Willughby, and Ivy.

5.3.2 RQ2b: Emotional Experiences: (Dis)Engagement

The children recognised how their feelings affected their learning and whether it was 'positive' emotions of fun and excitement or 'negative' emotions such as boredom, frustration and anger, the children rarely remained neutral when asked about their emotional experiences of the project. Fun, and other positive emotions such as excitement and enjoyment were universally associated with; a positive learning experience; increased engagement with OB activities; a desire to join in; and an impetus to do more of the activity. These in turn promoted further positive emotions and increased engagement. Cullum for example, when talking about OB explained: 'It's fun and it's I would I would love to do it more' (Cullum:Mid).

In contrast, negative emotions such as confusion, frustration and boredom, reduced engagement with OB activities and often resulted in a cycle of further 'negative' feelings such as anger and sadness. Analysis identified that a crucial aspect of these emotional experiences during OB was the effect on individual engagement. The following sections, therefore, look at the emotional experiences of OB as they relate to the children's (dis)engagement. As analysis also showed that participating in OB influenced the children's attitudes to learning more widely, these findings are also presented. The data from the emotion identification task was collected, analysed and used to triangulate with other data sources. Although not explicitly written up in this thesis, this data is presented in Appendix 3.

5.3.2.1 Emotional Experiences: Engagement - Fun, Excitement, and Understanding

An overwhelming feature of OB was the children's engagement. Mrs Lathbury stated the children were: 'All engaged' (Mrs Lathbury:Post) and seemed surprised that: 'They all want to do it' (Mrs Lathbury:Post). Analysis identified that the increased levels of engagement were related to the sense of fun and excitement the children felt during the project. For example, Heather said she was: 'Excited, happy for when we do stuff' (Heather:Mid) and described OB as:

> 'a bit like it's a part of school where you want where it's exciting because you're doing things to help the world erm instead of just learning your average English and maths' (Heather:Post).

Ivy, who openly talks about her struggles in school (e.g., Transcription Box 2), indicated her increased engagement when she described OB as:

> 'Fun because we like er we got to try a lot of things we got to do a lot of things … … we've been doing activities inside and outside and we've been doing like like we make stuff and we write stuff down and we do like research so it's like all of our lessons put together in one… cos we'll just chat and sometimes we do activities and then sometimes we'll write and then sometimes we'll just do bits in between' (Ivy:Mid).

The children also expressed OB as an exciting part of school because: 'We're doing helpful things' (Mason:Post) and: 'Learning about real life' (Gwynne:Post) indicating their engagement was also related to the relevance of what they were doing and being able to make connections to their 'real lives'.

Throughout the project the importance of understanding was also key feature of the children's engagement and experiences. Understanding how to do something, whether because the activity was explained in a clear way (e.g., the second critical thinking session), or because the children had time to explore (e.g., digging and planting) created positive emotions which increased engagement and was beneficial in terms of learning skills and boosting the children's confidence. For example, Cullum explained if something is interesting: 'We understand ..er we know what what it is and we know what to do and we like it' (Cullum:Post). Mason also stated: 'What we do makes me understand it' (Mason:Mid), mirroring his succinct description of effective teaching and learning that he gave in his pre-project interview: 'The things that makes me understand more and learning is doing fun things' (Mason:Pre).

Data showed that engagement and understanding increased when academic tasks were linked to OB. For example, linking mathematics calculations (perimeters, areas, and fractions) to the WA provided a connection between the 'academic' processes in the classroom and the children's lived experience. Bryony explained understanding a clear purpose helped support the development of maths skills and she found this approach helpful for her maths learning. Gwynne and Bryony explained how linking mathematics to the wildlife area helped their learning and an example of their feedback is given in Transcription Box 9.

Transcription Box 9: Post-Project Interview with Gwynne and Bryony.

Gwynne	cos like Bryony said when we're doing maths we never thought that as a class that like there could be physical things to do with maths like so we never knew that we could like... do physical things like
Bryony	remember how we like measured out the stuff that's like physical maths
Gwynne	yeah that was like physical maths
AM	*how did it affect your maths learning?*
Gwynne	better because it was like …when we did the measuring and then we'd done the maths work we knew ..that we were like…
Bryony	we've done it right
Gwynne	it was more enjoyable because we were still working on the wildlife area but just in maths and in books so it's a bit like..fun!

Mason also found connecting the WA to maths helpful:

> 'You normally think of maths like it's sums and working on a piece of paper but then when you go outside and you're actually measure stuff you find out the maths can be more fun than it seems so when you like go out and measure things and put things down and like be able to work out where it is and stuff' (Mason:QW).

He explained: **'**It's like it's made me think there's more to English and maths than it seems when you just go into it' (Mason:Post).

Indoors, making seed bombs also helped make mathematics more engaging and accessible for Davies. Transcription Box 10 shows how he explained his experience and demonstrated how it helped him understand the purpose of the maths.

Transcription Box 10: Talking to Davies About Making Seed Bombs in Maths: VE.

AM	*what was making that seed bomb like for you?*
Davies	fun!
AM	*was it fun*
Davies	and dirty [holds his hands up]
AM	*[laughs] fun and dirty…so what sort of maths would help you make really good seed bombs*
Davies	er..probably the amount of stuff you need to use
AM	*yeah*
Davies	sort of like ..fractions

All the children enjoyed making the seed bombs (filmed classroom observations) and this activity moved maths from the realms of 'boring' into a meaningful and fun learning experience for the children. Images 9 and 10 show the children's engagement when making the seed balls.

Image 9: Gwynne and Willughby Making Seed Bombs.

Image 10: Ivy and Her Partner Show off Their Completed Seed Bombs.

However, the data showed that simply doing something that was 'fun', 'exciting', or 'understandable' was not always sufficient to increase engagement. As Wilkes and Davies explained, they often did not feel engaged in school activities that were: 'Given them to do' (Davies:Mid). A beautiful demonstration of this was seen when Willughby and his classmate (who often work together) led a classroom-based seed planting activity. This session was initially quite chaotic with the teacher prompting, reminding, and issuing warnings loudly and regularly. Then Willughby and his friend asked if they could lead the activity instead of the teacher. Left to their own devices, the two boys very quickly organised themselves and the rest of the class into a smooth, controlled system of pot – compost – seed choice – seed allocation – seed planting. Within a few minutes they were directing the activity and ensuring that everyone worked together in a cooperative way. The organising and leadership skills of the two boys was impressive, between them they commanded patience and cooperation from all the seed planters (Field Diary) and were noticeably more effective than the teacher at maintaining a controlled system (Field Dairy). With a more central role in the session, Willughby became more engaged himself and the other children became more focused and engaged too. Even Cullum who stated twice that he did not want to plant seeds decided to opt in to at the last moment when he saw Willughby packing the resources away. At this point Cullum decided he did want to take part in the activity, and dashing round the classroom at the last minute, quickly planted his seeds (Field Diary). This episode was only one of many which demonstrated that giving children the central role in their learning effectively increased their engagement.

5.3.2.2 Emotional Experiences: Disengagement - Confusion, Boredom and Frustration

In contrast, to fun, excitement, and understanding increasing engagement with learning, confusion, boredom, and confusion reduced engagement. Violet explained this negative

spiral: ‘It’s like when like you’re disengaged, and you don’t really like listen and then you don’t know what you’re doing’ (Violet:Post). Ivy’s description of what happens when she feels bored in the classroom also clearly illustrates the cycle of negative emotion and disengagement:

> ‘You don’t really…enjoy it and you don’t really like…you get bored really easily you don’t want to do it you just give up… …feeling miserable…like this is boring (Ivy:Mid).

The children all expressed frustration and disappointment when they experienced this cycle of disengagement.

A vivid illustration of the barrier to engagement with learning when something is confusing happened during a session making pictures of the life cycle of bees. As I approached Willughby’s table, he appeared to be sitting inactive and disengaged. Transcription Box 11 details our conversation.

Transcription Box 11: Indoor Session About the Bee Lifecycle: VE.

AM	*tell me what it’s like for you doing this…is it interesting is it confusing is it boring*
Willughby	weird
AM	*why is it weird*
Willughby	because like because like .. it’s just because
AM	*[to another child] it’s alright it looks ok when you put it on*
Willughby	I don’t get what we’re doing
AM	*ah ok…so …wh ..tell me what you think you’re doing*
Willughby	[picks up glass pebble that is meant to represent the bee] magnifying
AM	*oh ok*
Willughby	and that’s it
AM	*[talks to another child briefly then back to Willughby]..can you remember what topic we’re doing what subject are we what are we talking about generally?*
Willughby	bees
AM	*bees so what are we doing here?*
Willughby	..representing the bumblebees…life cycle [becomes increasingly animated]
AM	*do you know what life cycle means have you done have you done*
Willughby	yeah
AM	--------
Willughby	it’s like it’s how they make other animals
AM	*yeah*
Willughby	and how they like live their life
AM	*yeah*
	[Willughby looks down and begins to write on his card]

After this short discussion, Willughby looked at the work with the boy sitting next to him and completed his bumblebee life cycle. He worked without further adult intervention.

This episode illustrates how confusion led to inactivity that could be perceived as 'poor' behaviour. However, talking with Willughby indicated that confusion was causing a barrier to his learning. Supporting him to think about the purpose of the session helped him to take control of his own learning. Willughby completed his diagram quickly and quietly. Looking at the work of his friend also helped Willughby's learning; and the importance of peers to support understanding and learning is embedded throughout the data.

The epitome of confusion, boredom, and frustration leading to disengagement, however, was the first critical thinking session which aimed to develop the thinking skills which are crucial for EE. This session was described in section 5.3.1.4 when problems with group work were presented, however, this session also highlights how confusion led to disengagement and negative experiences. The children did not understand the session and it was confusing and frustrating for them. This led to disengagement and disruption by some children which in turn increased the frustration and annoyance felt by others. It was universally agreed to be an awful, negative experience for all the children, and was specifically identified as one of the worst experiences of the project that none of the children enjoyed. A fair representation of the feedback came from Davies and is provided in Transcription Box 12.

Transcription Box 12: Post-Project Interview with Davies.

Davies	we did that critical thinking
AM	*can you tell me about that?*
Davies	it was rubbish
AM	*why is it rubbish?*
Davies	cos it was annoying
AM	*what made it annoying?*
Davies	that people weren't doing it and it
AM	*was it was the topic annoying or the fact that you couldn't do it properly because people were messing about?*
Davies	both of them

In hindsight, the session had not been structured properly as I misunderstood the skill level of the children when developing this activity. I had been told the children were familiar with critical thinking activities, and they practised them regularly in school (mind-mapping and spider diagrams mostly). However, talking with the teachers after the first critical thinking session, Mrs Carder explained the children are usually given closed questions that the teachers know the answers to, and the children try to work out the 'correct' answer). In the OB critical thinking activity, however, the EE thinking prompts were open questions with no clear or obvious answers. I did not understand how far removed the activity was from how they usually do things in school, and so the activity developed was incomprehensible for the children. Even though this session took place outdoors which provided relief from the

uncomfortable classroom, and I thought it would be lovely for everyone, it was a remarkably unsuccessful session.

Wilkes and Davies' explanation of why they thought the disruptive behaviour had occurred is shown in Transcription Box 13.

Transcription Box 13: Mid-Project Interview with Wilkes and Davies.

AM	*what's been not so good?*
Wilkes	the critical thinking… because everyone just kept running around and didn't do anything really
Davies	cos they were bored
AM	*cos they were bored*
Wilkes	I didn't know like what actually to do they just they didn't know what to do so then they just… did something else… and they got it a bit boring… I thought it was a bit boring too… … …
Davies	you also did too many things
Wilkes	too much things at once
Davies	you like did three things at once
Wilkes	and no one could get them done that quick
Davies	or they just couldn't be bothered to do it
Wilkes	what's good for the environment one where we was outside and everyone kept messing about that weren't that fun cos everyone was messing about… … cos some people I think were just confused in that one… they didn't know what to actually do

Wilkes and Davies concise and open criticisms of the critical thinking sessions demonstrated that they clearly identified what the problems in the session were. The children were bored and disengaged because they didn't understand what to do or why they had been invited to do it. Nonetheless, although the critical thinking was not a positive experience for any of the children at the time, it was still an important session as it allowed everyone to make direct links between lack of understanding, boredom, reduced engagement, and ultimately disengagement. The children's way of coping with confusion and misunderstanding was to disengage and Wilkes makes the link between the overt behaviours of his classmates when recognising people: 'Mess about because they don't understand something' (Wilkes:Mid).

Talking and collaborating with the children helped to develop a second session which was structured differently, had less content and was ultimately more accessible and engaging. Although this was still not a popular session and none of the children particularly enjoyed it, they all engaged with the second session. Even though this session took place inside, the children's behaviour was calmer, and (unlike the first session) no behaviour sanctions were used. The improved behaviour was partially due to better explanations and the children having a greater understanding of the task and this effectively enabled behaviour change. However, behaviour also changed because the children were developing skills and understanding, learning different ways to behave in the classroom, and how to take control of their learning.

Another example of how confusion led to disengagement was demonstrated by Cullum's disengagement during an indoor session watching video clips on the whiteboard. During the session Cullum was ducking under the table and crawling around, his behaviour surprised me as I had thought the clips were short enough and interesting enough that the children would enjoy watching them. When I spoke to him, he said he could not see the film on the whiteboard because the sunlight was too bright which meant he did not understand what was happening. Here the physical resources available in the classroom created a significant barrier to learning which resulted in Cullum disengaging from the activity altogether. Cullum explains that not having: 'Anything to do' resulted in feelings of boredom which he mitigated by simply: 'Doing something else' (Cullum:VE). This episode illustrates the connection between the emotions felt when 'learning' and the behaviours that ensue. Cullum's potentially disruptive behaviour may have been avoided if the video clips had been accessible to him. An extract of our discussion is provided in Transcription Box 14.

Transcription Box 14: Talking with Cullum After an Indoor Session: VE.

AM	*I just noticed that towards the end of that session that you seemed a bit distracted could you tell me about that?*
Cullum	err [lifts hand to face] like what
AM	*when you were sitting on the floor playing with your friend's legs and stuff*
Cullum	err… … …
AM	*what was it about the activity that … led to you being distracted?*
Cullum	erm … … … … I just didn't have anything to do… I just got bored
AM	*oh ok… what was everyone else doing?*
Cullum	erm … sitting down
AM	*were they watching the film?*
Cullum	yeah
AM	*did you not want to watch the film?*
Cullum	well..I.. I just didn't like … … really get it
AM	*oh ok*
Cullum	I just didn't know what..what.. I just didn't get it
AM	*and how did you feel when you didn't get it?*
Cullum	I just tried to find something else to do
AM	*oh ok.. yeah that makes sense so what would have made it better for you then?*
Cullum	erm… …
AM	*what would have helped you to be more interested in what we were doing?*
Cullum	er have an activity I could understand… …something
AM	*think about the things we're doing in class then to make it more accessible cos to me it sounds like you're saying you couldn't get into it cos you didn't know what it was about so how do you normally what do you normally do to get…*
Cullum	I ask questions
AM	*oh ok yeah*
Cullum	er
AM	*do you think if it had been explained differently would that have helped?*
Cullum	yeah

Throughout OB there were occasions of 'disruptive' behaviour that arose due to lack of understanding and/ or communication breakdown (Field Diary). Throughout the project, it became clear that when the children demonstrated disengaged or disruptive behaviours, it was less because they did not want to learn and more because they could not (e.g., Ivy's description of scribbling in her book, Transcription Box 2). Without exception, the children expressed a strong desire to engage with learning and explained it is often the practices used in the classroom, or interpersonal relationships that affected their work and behaviour, not a lack of desire to learn. However, these problems lessened throughout the project as the children became familiar and better practised in the OB pedagogies, and I got to know the children better too (Field Diary).

5.3.2.3 Change in Emotional Attitude to Learning

Engagement with OB was not only a positive experience in itself but increased positive emotions and behaviours towards wider learning too. Eight children felt their experiences during OB had also impacted positively on their other learning in school. Violet did not feel the project had influenced on her wider learning, Willughby said taking part in OB did not help his wider learning in school, but he also said he felt OB had had helped him to reengage with his 'normal' English and maths lessons. This variation is discussed in section 6.11 of the Conclusion chapter (when the limitations of the research are discussed). At the end of the project, Gwynne and Bryony, explained taking part in OB had changed their attitudes to learning (Transcription Box 15).

Transcription Box 15: Post-Project Interview with Gwynne and Bryony.

Gwynne	I kind of like…changed my attitude..towards like
Bryony	attitude to learning
Gwynne	so like
Bryony	maybe not maybe have the right attitude so say if you're in maths you're like I really can't do this it's so hard
Gwynne	and then I'll just reflect
Bryony	I'm just not going to do it
Gwynne	on the good times about it and then that gives me a bit of
Bryony	just like yes I can do it if I
Gwynne	like power that I can do it
Bryony	so if I like say I can practise this I'm going to get better
Gwynne	if I can do this this means that I can do this because this is really linked to this

Here Gwynne and Bryony indicate increased confidence and willingness to persevere. They also show an understanding of how drawing on previous experiences and knowledge can

support new learning. Gwynne and Bryony's comments resonate with Ivy's description of how her experiences during OB, have helped her to now persevere with a difficult learning task rather than giving up (Transcription Box 16).

Transcription Box 16: Mid-Project Interview with Ivy and Wilkes.

AM	*do you think the things we've done in the project has helped you with your learning?*
Wilkes	yeah… cos I normally I was a bit distracted in somethings but now I'm not that distracted
AM	*do you think the project's helped you with your learning?*
IVY	Yes… because I used to be like I couldn't be bothered to do my learning I wouldn't do my learning I'd just chuck my book on the floor… and like not do it and then when we started doing this it's got me more into doing my work and like actually like not giving up… and keep going and keep going and keep going until you do actually like you can't do it any more… like physically can't do it any more
AM	*what do you think's made that difference then?*
Ivy	cos it's maybe it's a bit more active a bit more funner

Here, as well as showing her strong desire to learn (despite behaviours that may indicate the opposite), Ivy indicates increased self-motivation and empowerment; and the contrast between Ivy's explanation of her fun and active experience of OB and how she feels when she struggles in class is marked. Her description of wanting to work hard contrasts powerfully with her previous experiences of demonstrably giving up, disengaging and throwing her book on the floor because of feelings of frustration and sadness due to a perceived lack of progress. Instead, she feels prepared to work hard to make progress and to persevered with an activity. She described her ongoing efforts in a positive way and recognises that repeated attempts to complete an activity is not 'getting nothing done' (Ivy:Post) but rather a useful part of the learning process. Ivy puts this change in attitude down to her different experiences of learning during OB. She explained that because the project was more fun, she: 'Actually wants to do stuff' (Ivy:Post) rather than choosing to walk away (which is another strategy she often uses when she is stressed in the classroom). Ivy's wanting to 'do stuff' parallels Bryony's explanation that she felt she had learned something because as well as having fun she was 'Actually doing something' (Bryony:Post).

The importance of active engagement in learning was recognised by all the children and they all indicated a change in attitude towards their learning; and this was visible in their behaviour. For example, Wilkes explained that he used to be distracted: 'But not anymore' (Wilkes:Post). When it comes to effective learning Bryony explained 'I've learned that you've got to concentrate, and you've got to have fun' (Bryony:QW).

5.3.3 RQ2c: Physical Experiences: Activity

Increased physical activity was something all the children said raised their enjoyment and engagement and by doing so improved their experiences of learning. From simply being able to move around the classroom to share ideas with each other or make use of resources, to hands-on activities and working outdoors, the increased physical activity of the OB sessions contrasted positively against the usual highly structured, mostly sedentary, desk-based practice used with the class. The children preferred hands-on activities to the mostly paper-based teaching and learning activities they mostly experience in school. Heather described the difference between the OB activities and her usual school day as 'doing more of stuff in your lessons instead of doing things on paper' (Heather:Mid). When asked about their favourite activities nine children chose a hands-on activity. Table 19 summarises the children's responses.

Table 19: Children's Responses When Asked About Their Favourite Activities During OB.

Participant	Favourite Activities
Mason	Flower beds; Digging, bug house
Gwynne	Going outside; Documentary
Ivy	Digging
Cullum	Doing the plants; Learning about stings
Violet	Raised beds; Stuff for bees; Researching; Wildlife area
Heather	Drawing what they think; Bug hunting; Bug house
Wilkes	Outside taking pictures, water stations
Davies	Digging; WA; Planting; Watering people
Willughby	Planting and making people muddy
Bryony	Planning and developing the WA; Documentary, bird feeders

5.3.3.1 Physical Experiences: Working Outdoors

In terms of EE, working outdoors was important for the children to gain experiences of nature and to give them an immediate link between their learning and pro-environmental action; and the children said they enjoyed working outdoors and found it helpful for their learning. Working outdoors gave an immediacy and relevance to the activities. Heather explained:

> 'Going outside instead of looking at pictures online… by going outside and actually seeing the bees do the work … it's like more like like you believe it more… because you're seeing it yourself instead of looking at somebody else videoing what they saw' (Heather:Mid).

Here Heather illustrates how linking learning to 'real life' was beneficial for her learning and how seeing things for herself made an important difference in her experience of learning (Heather:Mid). Violet also explained how working outside helped her develop a deeper understanding:

> 'We … planted all the wildflowers so we can attract like… it helps us understand like what it the earth is actually [all] about' (Violet:Post).

Physically working in the WA (especially digging and planting) was the aspect of OB that all the children indicated to be the most enjoyable experience of OB. They all thoroughly enjoyed the opportunity to get dirty. Mason described how he:

> 'Liked the digging… because …I like getting my hands dirty and everyone else was like having fun with when we were digging' (Mason:Post).

Image 11 is an illustration of the children choosing to plant.

Image 11: All the Children Took Part in Digging and Planting.

Gwynne further illustrated how enjoyable digging and getting muddy was with her delighted exhortation when digging a flower patch: 'Look at my knees and my hands [hold up very muddy hands] it's the funnest thing I've ever done!' (Gwynne:VE). Image 12 shows Gwynne's excitement at her dirty hands.

Image 12: Gwynne, Heather, and Their Partner Getting Muddy.

A key aspect of the children's experiences when working outdoors was the increased physical comfort; and this was noted by all ten children. The classroom felt small and was uncomfortably hot despite air-conditioning being used. All the children talked about how the hot, noisy, and cramped classroom environment made them feel physically uncomfortable and impacted negatively on their learning. Davies, for example, complained about being: 'Bunched up together' in the classroom (Davies:Pre) and described how: 'In that classroom upstairs it's so full… you're just cramped in one little room'. Willughby described how children push each other to get more space: 'When you have those little tables' (Willughby:Pre) and how this eventually leads to squabbles.

The importance of space and the enjoyment of 'going out getting fresh air' (Heather:Mid) was raised by all of the children. Willughby explained:

> '[OB has] been good because like I said it makes me more active and energetic… cos you're not just sitting in the classroom being bored …you just sit there… and when you're outside it's you've got more space… to do stuff outside' (Willughby:Mid).

Wilkes describes his experiences of working outside as getting 'fresh air' and being able to 'relax'; he said both were helpful to his learning. However, as the children do not often work outside of the classroom, their distinction between the classroom being for (boring) work and outside being for fun and play was immediately obvious. At first, simply being outside was sometimes seen more as 'playtime' (Heather:Mid). Heather felt the children's unruly behaviour was brought about because the class associated being outside with breaktime and explained: '[The children] might think it's break because they're outside' (Heather:Mid). Gwynne believed the initial disruptive behaviour when outdoors was: 'Because people think the rules and expectations change' outside of the classroom(Gwynne:Mid). However, as the sessions progressed the children adapted to

outdoor learning and began to self-regulate and to work well. Willughby said OB had helped: 'By making me understand how to behave outside' (Willughby:Mid) and as the project progressed, the children increasingly associated the outside with learning, and (importantly) learning with fun.

Working outside helped reduce the negative emotions of working in a the hot, noisy, uncomfortable classroom. Free from the cramped environment of the classroom the children had more opportunities to move away from stressful situations. Ivy and Wilkes, who had both previously mentioned problems they faced when working in the noisy, crowded classroom, explained they both felt less stressed and learned best when working outdoors because they could move away from disruptive noise (Ivy and Wilkes:Post). The data extract given in Transcription Box 17 illustrates this well.

Transcription Box 17: Post-Project Interview with Wilkes and Ivy.

Ivy	because you're less crowded in one room and it can get really really hot
Wilkes	[working indoors] can make you can get a headache quite easily cos quite a few people shout out'…but outside if someone's
Ivy	screaming you could just move and go somewhere else… and then you don't…really hear it that much

Having room to roam mitigated the stressfulness of group work and reduced the friction that sometimes occurred during sessions. Outdoors there was space for the children to physically move towards or away from things they did or did not want to be involved with. Thus, they could move away from annoyances and by doing so physically enact choice and empowerment within the learning space. This is demonstrated well by Gwynne's reaction to Violet during an outdoor session which is illustrated in Transcription Box 18.

Transcription Box 18: Measuring and Planning the Wildlife Area Facilitated by Mrs Lathbury: VE.

The children have splintered of into smaller groups and are dotted around the area cordoned off to be the wildlife area.	
Gwynne	[walks towards us swinging a metre stick] Violet's getting mardy at me so I'm just walking away
Mrs L	good idea
AM	*good work*
Gwynne	I know […]cos the I had an idea someone does a good note and someone does a bad note because we have two note pad things and then Violet was like no no no you're not the boss of me I can do whatever I want

In the above extract, Gwynne demonstrated that she was strengthening her social skills and coping strategies as she recognised that she had made an active choice to remove herself from an unpleasant situation. This supports previous findings that 'by working in groups individuals develop emotional intelligence' (Manring, 2012:158).

Although feelings of frustration were sometimes mitigated by increased physical activities and/or being outside, this was not always the case. For example, the first critical thinking activity (outlined in section 5.3.1.4), took place outside and was an almost total disaster, in terms of learning and enjoyment. Working outside was not enough to overcome the barriers to learning that were inherent in my poor session design; and it is possible having more space outside gave the children greater scope to mess about. Thus, simply being indoors or outdoors does not in itself help or hinder learning. Instead, the relevance of the activity, the pedagogical approach, and having a clear understanding of purpose were all vital.

5.4 Choice

Throughout OB, several activities and approaches were available to access learning. In each session the children had the opportunity to choose what to (or not to) do; and this was helpful for the children. Heather explained:

> 'I liked [OB] because we did lots we did different things every single lesson that was good… … we did erm researching and then next we'd go outside and explore about what we'd researched and it was fun because er … …we've got different things … like people that prefer being on electronics and searching up things they've got a little bit of that in that lesson but …then also we've got exploring for all the people that love it' (Heather:Post).

Analysis identified that removing the elements of conformity and increasing variety and choice (both about what and how to investigate) was interesting, and (mostly) enjoyable for the children. Violet, for example, simply described OB as: 'Good… […] you get to like decide what you want to do' (Violet:Mid). Increased agency increased the children's empowerment and ownership of their learning and when asked which approach to learning they preferred in OB, all the children indicated it was 'choice!' (Willughby:VE).

5.4.1 Choice: Empowerment and Ownership

The increased choice throughout OB empowered the children to take ownership of their learning. A clear example of the effectiveness of choice was demonstrated when the children were encouraged to choose their own questions to explore and given time and resources to investigate them. The openness of this approach was new to the children and the teachers, and everyone found it to be more interesting. Gwynne's explained, when using worksheets there is often only one answer but researching their own questions was like: 'Being on safari' (Gwynne:Mid) because there was a much wider range and scope of answers and ideas. The children usually chose to research on iPads to answer their

questions, but wildlife books and information from The Bumblebee Conservation Trust were also available. Gwynne described how researching using the iPads:

> 'Can be really helpful because yesterday I found a list of about a hundred… foods that bees and I tried and tried and tried to write them all down and it took me ages and I still haven't finished' (Gwynne:Mid).

Davies also said he liked to use the iPads: 'Cos there's quite a lot on the internet isn't there?' (Davies: VE). Transcription box 19 provides an extract from an iPad focussed research session.

Transcription Box 19: Classroom Based Research: VE.

Mason	I'm researching up this one [points to a question in his bee diary] why do bees have a [pupae] don't they just evolve up like we do just grow up into adults when they grow
AM	*no they don't do they*
Mason	why do they have to go into a pupae
AM	*and you want to find out why that's a really good question*
	[Willughby leans over Mason's shoulder and taps iPad]
AM	*[to Mason] do you like doing things like this or is it just too*
Mason	I like it

Looking at this vignette, Mason was happy to actively engage in researching independently on the iPads. However, although eight children found the iPads a helpful way to increase their knowledge, Ivy noted that she found it hard because all the websites said the same thing. Heather said she sometimes found the iPads confusing and when asked which elements of the project she found helpful replied:

> 'I might if I had to pick one, I'd pick exploring because I just sometimes I don't get things on iPads…it's like confusing but also it's…like you could actually do it you could actually explore when you're in your person instead of researching' (Heather:Post).

This data demonstrates that alongside the choice of activities, it was important for the children to have choice and variety in the resources to support their learning.

Another positive example of choice on learning behaviours was seen during an outdoor activity scattering seeds to develop a wildflower area. Initially, Violet was hesitant to take part, but having time and space to watch from a short distance allowed her to assess the situation herself and make an active choice to join in (Transcription Box 20 and Image 13).

Transcription Box 20: Sowing Wildflower Seeds in the Rain with Mrs Marsham: VE.

Mrs Marsham hands out handfuls of seed mix to the children who then walk across to the wildflower area and begin to scatter the seed. Violet has not taken any seed and waits behind briefly as the others cross to the wildflower area. She follows behind and stays a little way back watching what the others are doing. She then steps forward and waits for her turn to be given the seeds. When she has the seeds, she immediately walks off to scatter them. Davies smiles and waves to me as he returns from scattering his seeds.

After scattering the seed Violet jogs back to Mrs Marsham to get more.

Image 13: Violet Deciding What to Do.

Violet's behaviour in this vignette mirrors Cullum's choice to join in with the indoor seed planting (illustrated in section 5.3.2.1) and provides a further example of the positive effects of giving choice rather than trying to coerce the children into participation. Throughout OB, there were several times when children who initially refused to engage, changed their minds when realising they had genuine choice.

The children became more confident when they could research, experiment, and explore. They increasingly began to guide their own activity and to work cooperatively as small (and sometimes large) teams. Working together to create a wildlife area (WA) provided many opportunities for freedom of choice as the children could usually self-select which aspect of the wildlife area to work on. The children also became increasingly empowered to make decisions about how they wanted to do things in the WA; and the data extracts in Transcription Box 21 and Image 14 illustrate how the children embraced choice and independence during the outdoor sessions.

Transcription Box 21: Working in the Wildlife Area with Mrs Lathbury: VE.

We are inside the wildlife area. Children work in small groups, with each group being involved in different activities. Willughby and Gwynne are planting in the flower area, Heather is walking across the wildflower area, she walks up to her Girl1 friend who is holding a plant and stepping over into the flower area. Violet is standing with Wilkes; Violet has a plant in her hand, Wilkes is hanging up a bird feeder. Bryony is standing next to the flower area holding a plant.

Image 14: The Children Chose How to Work in the WA.

Transcription Box 22 provides a further example of how the children made their own choices and took ownership of the activities.

Transcription Box 22: Digging the Flower Patch: VE.

[Outside digging the flower patch. Gwynne is crouched down on the grass digging, she is next to [Girl1] who is also digging. Heather is standing opposite them – she is holding the spade.]	
Heather	so our plan
AM	*mmhmm*
Heather	is to dig this and then dig it all the way up to there to connect it up to the hole over there
AM	*that's a good idea*
Heather	and then dig another area and then connect it
Girl1	yeah
Heather	to other places… … wildlife! [holds up her finger to show me a tiny insect on her fingertip]

This extract also demonstrates Heather's positive change in attitude towards insects as she had previously found them frightening.

An important aspect of developing the WA was choosing how to use resources. The freedom and flexibility in this supported the children to work creatively and to take ownership of their concepts. The children showed ownership and pride in themselves, and their work as demonstrated by Wilkes' water station and Bryony's birdfeeder which both show powerful

examples of the beneficial outcomes of choice (Transcription Box 23 and Images 15 and 16).

Transcription Box 23: Bryony Demonstrating a Birdfeeder She Has Made: VE.

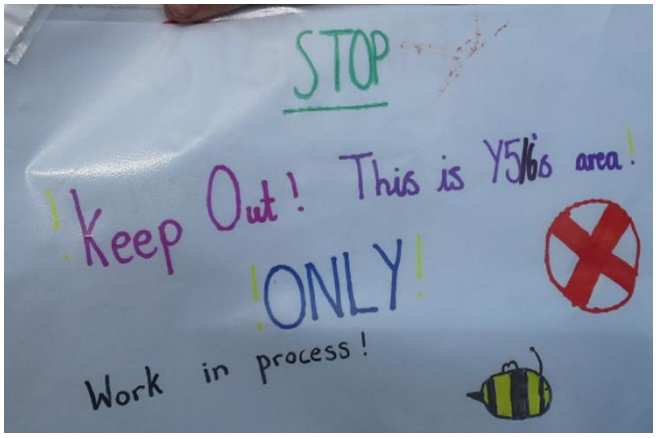
Bryony has come to ask me to look at her birdfeeder. She turns and walks, then jogs, across the wildlife area. She gets to a tree where her handmade, recycled birdfeeder is hanging – she reaches and holds the birdfeeder.	
Bryony	it's that one [she waits for me to catch her up] er me and Girl1 made it and actually I think it's good because if birds peck it [she puts her finger on to the spoon so that it tips down and feed falls into the spoon] like that it all comes out

Image 15: Wilkes' Water Station Made from Recycled Material.

Image 16: He Decided to Hang it in This Tree.

As well as feeling ownership of their individual projects, the children developed a strong sense of ownership of the WA. They felt very protective of the area and this was particularly noticeable with Willughby who (despite stating how much he hates school) became strongly attached to the wildlife area. Not only did he want to fence off and padlock the area to keep people out, but he also wanted to burst the balls that were kicked into the WA during break times. Image 17 shows a notice made for the outside of the WA. When the children realised they would not be 'Y5' for much longer, the '/Y6' was added.

Image 17: Notice Made by the Children.



5.4.2 Problems with Choice

Although there were many positives, there were also downsides to having choice. The problems choosing groups have been presented in section 5.3.1.4 when the problems of group work were addressed. However, other troubles came along too. The children felt increased disappointment and frustration if they were not able to take part in their preferred activity. This was usually because other people were already doing it or if they felt the task sharing was unfair. Ivy highlighted how lack of guidance with some of the activities resulted in unfairness when she recalled a specific occasion in the WA:

> 'When we did the wildlife area it was a bit like nobody knew where to go so it was like one a load of group would just like surrounding one thing and there would be another surrounding one thing and there was only [Boy1] and [Boy2] on the earth pile which I think they should have had more because I went over and they said we need more people down here so I stayed down there and like not a lot of people was bringing it like there was only like two people bringing it… … I don't think was fair to be honest… so they're doing more or less all the walking and all the work whilst everyone else is digging up big earth piles' (Ivy:Post).

Although the boys building the earth pile did not have the same concerns as Ivy, she felt more children should have been asked to help with this heavy job and she explained how she felt frustrated when her requests to alter the workloads was not listened to by the other children. The children's feelings when they felt they were not listened to is returned to in section 5.5 when the theme of 'Inclusion' is addressed.

The children also experienced negative feelings if their choice could not be, or was not, accommodated. Although the OB sessions aimed to be flexible and child-centred, sometimes the teachers intervened and directed learning activities. Although against the spirit of individual empowerment that was central to OB, this was usually done either because too many people wanted to do the same thing or because it the teachers needed to

ensure that the children were overtly: 'Getting something done' (Mrs Marsham:Mid). At these times the children felt disempowered, and this negative experience reduced their engagement.

Cullum also felt there was an unfair gender bias in the classroom whereby the: 'Goody-goody girls' (Cullum:VE) are treated differently. Cullum demonstrated his annoyance when the teacher limited his choice and activity: 'I didn't get to do the one that I wanted… …because the GIIIRRLLSS just had to do the same one as well' (Cullum:Post). Although the teacher did not give a reason, Cullum explained that he felt he couldn't do the activities he wanted to: 'Because the girls got first choice and preferential treatment' (Cullum:VE). He also complained that when they worked in groups:

> 'we had to do different stuff so there was litter picking and some ..so some people put their hands up for something and some people put their hand up for the same thing and they didn't get to do it they had to do something else' (Cullum:Post).

Here again, Cullum felt his choices were unfairly limited by decisions made (but not explained) by the teacher. Other children also described experiencing feeling frustrated when the teacher said 'no' without explaining the reasons for their decision. For example, on one occasion, the children were not allowed to collect waste fruit for the compost bin despite having learned about the importance of reducing food waste and the usefulness of developing a compost area for the wildlife area. The lack of dialogue felt unfair to the children and triggered feelings of frustration. Transcription Box 24 provides a data extract showing Bryony's feelings.

Transcription Box 24: Post-Project Interview with Bryony and Gwynne.

AM	*is there anything you feel has been unfair while we have been doing the bee project?*
Bryony	when we weren't allowed to collect the erm fruit…in the er compost bin because I think we should have done that we should have keep cos Miss Lathbury wouldn't really let us collect the fruit I think we should like start putting more stuff in it
AM	*did she say why you weren't allowed to do it was there a reason?*
Bryony	no she said no we're not allowed… …I want to do it

The lack of communication from the adults prevented the children from thinking critically and questioning how different aspects and practicalities of EE inter-relate within communities.

These examples highlighted the problems caused when the aspiration of a flexible and child-led approach to learning collides with the practicalities and resource issues in main-stream primary education in England. Nevertheless, despite problems, the data showed that overall

having choice in what to do and how to do it increased the children's positive experiences of OB.

5.5 Inclusion

Alongside the negotiations involved with forming groups which was addressed earlier in section 5.3.1 of this chapter, the children's feelings of inclusion during OB were influenced by whether they felt listened to and whether they felt a sense of fairness about the organisation of an activity; these aspects are looked at in turn.

5.5.1 Inclusion: Being Listened To

The children (and adults) were surprised they were asked what they would like to learn during the project and then were able to do some of the things they requested; and being listened to and having their ideas acted on was a fundamental, and positive, difference for them. Bryony explained:

> 'it's very fun… and also we've actually you know how sometimes teachers say oh let's plan a wildlife garden and then throw it out the way… but actually we've actually made a wildlife garden to help like the… area and it's really fun that we've done that…(Bryony:Post).

Willughby also put at least some of his enjoyment of the project down to the fact that: 'You actually listened to us' (Willughby:Post).

Throughout OB the children had different ways to communicate their ideas and learning (e.g., discussions and pictorially) and this was also helpful. Heather, for example, explained she felt she could share her thoughts more clearly by drawing:

> 'You can show people how you imagine it… … when you show them the picture they might get a better brief of what it looks like… … when like you talk it doesn't make sense but when it's on a piece of paper drawn it's more [waves hands around] vision' (Heather:Post).

All the children said they liked having the opportunity to share their ideas as: 'It feels good to share ideas' (Gwynne:Post). To share ideas, the children requested the instigation of a suggestion wall; and so, we developed one alongside the question wall. The children found having a dedicated space for sharing ideas helpful as: 'Lots of people had different ideas' (Heather:Post) and 'You got to know what other people's suggestions were and what they wanted to do and not just what you wanted to do' (Ivy:Post). The children were interested in and valued the contribution of their peers, explaining: 'It helped by thinking what others want

to [do].. not just me' (Cullum:Post). The flexible approach to how to interact with the suggestion wall increased inclusion for the children and they liked the variety of suggestions. Mason found that as well as increasing knowledge, reading the suggestions helped him to: 'Understand other people's way of doing things (Mason:QW), and that:

> 'It like helped me to know that other people had other opinions about different things and not just it's not one opinion that's right there's loads of different opinions' (Mason:QW).

Wilkes (who sometimes felt disappointed when he was not listened to and said this impacted negatively on his learning) said: 'I thought it was a good idea so [...] everyone likes gets to say something like they don't just do one person's idea that we do like a few people's ideas' (Wilkes:Post). On a purely practical level, Ivy commented: 'If you don't know what other people want to do you can't do it' (Ivy:Post).

Heather noticed having time and space to share ideas by writing them down felt an accessible and less stressful way to participate in the group. She recounted that some people may have a good idea but: 'Don't like saying it' (Heather:Post) but with the question and suggestion walls: 'It's just on the wall so like everyone can see their ideas' (Heather:Post). This perspective was supported by Mason's comment that it was good that people did not have to stand up to share their ideas.

The suggestion wall data not only demonstrated a strengthening of their collegiate approach to learning but also that the children liked to be listened to and have input and flexibility in how they share ideas. Mason, for example, pointed out the positive aspect that people didn't need to: 'Risk that they would forget their ideas' (Mason:QW) and it was helpful that he could: 'Go back and have another look' (Mason:QW). Ivy also liked the semi-permanence of the suggestion wall, saying that: 'Having it on the board means you can always see' (Ivy:QW). Having the time to revisit and think about other people's ideas proved to be interesting and useful for the children and contrasted with the rapid: 'Get things done' (Mrs Marsham:Post) practices that are often used in the school.

Data showed that the suggestion wall was also a powerful tool for communication between the children and the adults. Bryony explained: 'If you had a suggestion wall may erm that means the teacher will look at it and just not ignore it kind of' (Bryony:Post); and Gwynne also felt the teacher is more likely to do suggestions if they are up on the wall and might not ignore them. Willughby also supported this idea when he said the suggestion wall: 'Was good because the people got to have a chance of [doing] their ideas except [sic] from all the teacher's ideas' (Willughby:Post). It was exciting for the children when the teacher used

some of the ideas from the suggestion wall, for example, Gwynne suggested making bird feeders and was pleased when we did this activity. Being listened to and having their ideas acted on was a positive experience for the children; they all commented that they liked that they got to do things they had asked to do.

Although everyone liked having a suggestion wall, not everyone said they found it helpful. Bryony did not feel it had helped her learning or understanding and Davies didn't use it at all. Nonetheless, regardless of their interaction and engagement with the suggestion wall all the children, when asked, would do it again. Table 20 provides a summary of the responses from suggestion wall interviews.

Table 20: Responses from the Suggestion Wall Interviews.

Responses from Suggestion Wall Interviews						
	Used it	Good	Interesting	Helpful for learning	Helpful for understanding	Would do again
Cullum	✓	✓	✓	✓	✓	✓
Mason	✓	✓	✓	✓	✓	✓
Gwynne	✓	✓	✓	✓	✓	✓
Wilkes	✓	✓	✓	✓	✓	✓
Bryony	✓	✓	*	x	x	✓
Ivy	✓	# ok	✓	✓	✓	✓
Heather	✓	✓	✓	✓	✓	✓
Violet	✓	✓	✓	✓	✓	✓
Davies	x	*	*	*	*	*
Willughby	✓	✓	*	✓	x	✓
✓ Agreed with statement x disagreed with statement * no data collected # gave variation on wording						

5.5.2 Inclusion: (Un)fairness

The children demonstrated a deep sense of fairness and equity throughout the project, both about how they and others should be treated, and fairness was an important theme throughout OB. Usually, however, the children only raised this topic when they felt something was unfair. For this reason, the findings focus on the times in OB when the children felt things were unfair; and these broadly fell into two categories: unfairness when choosing, and unfair distribution of work. As the problems of fairness when choosing groups was addressed in section 5.3.1.4, this section will focus on the children's experiences when they felt sharing the workload and choices of activities were not fair.

A focus of 'fairness' was often how the children shared the workload and the tasks between themselves. This was pronounced when the children were working in groups. Wilkes explained: Some people when you get into groups people say come over here and then you go into their group but then they just like… sit back and leave you to do all the work… or the

other way round', (Wilkes:Mid). He reiterated this problem in the post-project interview, stating: 'There's sometimes like erm your friends go off and play and then you're left to deal with all the things' (Wilkes:Post).

Unfair job allocation was also highlighted by Ivy when she explained that parts of OB were stressful for her when people did not do their fair share: 'Because then we was just doing all the work' (Ivy:Post). She felt strongly that certain groups of children dominated the activities instead of taking turns. For example, she said:

> 'I think that like cos a lot of people when we was making the bug hotel a lot of people was like you need to leave there's too much people here when they've been there for like ages and then the other people have only just came and I think that was unfair because…they should have left instead' (Ivy:Post).

Ivy felt this activity would have been more inclusive if the teacher had intervened and this illustrates that the positives of choice can be undermined when tasks were not felt to be shared equitably. Image 18 shows the children building a bug house.

Image 18: The Children Negotiated How to Build the Bug House; Some Children Felt Excluded.

Limited resources also sometimes caused the children to feel things were unfair. Wilkes and Ivy felt the food tasting was unfair for example. Unfortunately, by the time Wilkes had returned to class following his music lesson, there was less food available, and that food had been in contact with lemon juice, something he does not like. Ivy felt some children took more food than others:

> 'Cos yesterday a lot of people were hogging the food like they'd take a load of it and then just leave you with like tiny bits' (Ivy:Post).

Ivy's comment contrasts with my classroom observations of the food tasting session and her description of how she experiences the session highlights the need to talk with children rather than relying on observation.

5.6 Skill Development

Skill development was a vital aspect of OB. The children learned practical skills needed for bee conservation (e.g., gardening), academic skills (e.g., maths) and thinking skills (e.g., questioning) all of which are important for effective EE. They also began to develop stronger social skills which helped them to negotiate interactions during different activities. The children expressed enjoyment when doing these things. Although not a popular activity, the meta-cognition session was useful to help the children (and adults) understand their emotions when learning, and to think about themselves as thinkers, learners and co-members of a community. However, as with critical thinking, findings illustrated that there is room to support children to understand themselves as thinkers and learners.

5.6.1 Skill Development: Confidence

During OB the children were able to engage in activities that were new to them; and they became more confident in their own abilities when they did something they had not done before. In relation to bee conservation, the children's confidence to observe and help bees and insects increased. Heather, who initially talked about how frightened she was of bees and her strong dislike of insects now enjoys looking at: 'What we can do to help' (Heather:Post). She now feels 'If you see a bee in danger you can help it' (Heather:Post) and describes how: 'We could be like an ambulance for them' (Heather:Mid). She showed her confidence in her newly developed skills when she explains:

> 'I feel like erm I know more like stuff and I feel like erm I know a lot about insects and bees and stuff so I like it if somebody asked me about bees or if someone was playing with a bee I know what to ask tell them' (Heather:QW).

The opportunity to be brave and try new things was discussed by Bryony and Gwynne. Bryony felt good picking up a worm:

> 'I felt good about myself picking up a I picked up a worm as well because I've never picked up a worm before and it's like trying another food say' (Bryony:Post).

And Gwynne agreed:

> 'Some of us have been really brave and we've like picked up worms … … so er we're doing like lots of different things that help us in different ways' (Gwynne:Post).

Throughout OB, the children began to feel increasingly confident to engage with pro-environmental behaviours, to enact behaviours that they feel are necessary to help their environment, and to take a lead on project activities. This is exemplified in Cullum's explanation of his attitude and behaviour after taking part in EE: 'We're more like we're kind of more responsible we know erm like there's some things that others don't know about the environment so we can help the environment' (Cullum:QW). He explained how the children can immediately use their learning from OB and can now do things on their own without being asked (Transcription Box 25).

Transcription Box 25: Post-Project Interview with Violet and Cullum.

Cullum	now you [sic] can just like be doing stuff without being told to
AM	*what kind of stuff do you do without being told*
Cullum	me [Boy1] and [Boy2] and [Boy3] have got a job to water the plants… …erm Miss Marsham said something every …I don't know what day it is we we should go outside and water… the thingies the plants outside…

This change was demonstrated by all the children. For example, Wilkes explained he felt more confident to do things on his own because: 'Now I can like do like different stuff like make stuff like the bug hotel the log pile…different stuff like that' (Wilkes:QW). Bryony stated proudly: 'I feel very happy that we're making the environment, [...] we're making the nature more happy' (Bryony:Mid) and Violet explained: 'Now we know how to help the environment and have a better life in the future' (Violet:Mid). Whilst Mason feels more able and confident to help others with EE because: 'It's been easier for me so I can help making [sic] it easier for others' (Mason:Post). Image 19 shows Willughby confidently planting on his own.

Image 19: Willughby Planting a Geranium.

The children became increasingly confident to take part in activities, to question and to express their own ideas. When given time and space they embraced the opportunity to

learn, share information, and support each other. The children also expressed the need for others to understand more about EE and were keen to pass on their learning. They asked if they could prepare and delivering an assembly to the whole school to explain why Y5 were developing the WA. The wanted to tell the school about bees but also hoped sharing information would stop others from damaging the WA as previously they had planted trees which were then pulled up by other children. Image 20 shows the children at the end of an assembly they prepared and delivered.

Image 20: Celebrating Delivering Their Assembly.

The increased confidence also spilled over into other aspects of their school day. For example, creating a culture of questioning encouraged the children to ask questions more broadly. Ivy explained: 'You're a bit more confident basically and ask more questions in maths and English' (Ivy:QW). This is a big change in confidence in Ivy, who had stated previously: 'I used to be not like like say to like the teacher I can't answer I can't answer and after this [OB] I could answer them' (Ivy:Post). The children's increased sense of pride and achievement when developing skills and 'doing something' (Bryony:Post) resonates throughout the data.

5.7 RQ2d: How Do the Children Experience OB in Comparison to a Typical School Day?

Usually for Year 5, all morning is dedicated to English and mathematics which is delivered in a formulaic way, using prescriptive work schemes and a regimented approach which was believed to produce consistent (and higher) results. The repetitive approach is dominated by 'teacher says, child writes' (Mrs Marsham:Mid) which the children find monotonous and boring. When asked what makes lessons boring, Ivy replied: 'Everything… writing it, reading it, listening to it… looking at it staring at it' (Ivy:Post). The sedentary nature of their learning is reiterated by Willughby when he explained that it is boring in the classroom because: 'You

just sit there' (Willughby:Pre). My observations supported their comments as the usual teaching and learning for this class are noticeably deskbound with children sitting in long rows, facing towards the 'front' of the classroom.

In the afternoons, science, history, and geography are predominantly topic and project based and this is where art and music are included when possible. Although the children like the experiments in science and the choice of activities available in history lessons they do not associate learning with excitement or having fun, but instead indicate learning must be hard work and a struggle.

Although all the children say they would like to move around more in the classroom, and to be able to work in different parts of the school, the rigid structures and procedures do not easily allow this to happen. Unfortunately, when there is potential for more flexibility to teach and learn differently, the teachers are reluctant to do so because: 'It's taking risks with a class that you know are difficult' (Mrs Lathbury:Post). Working outdoors rarely happens with this group, who have: 'Always been quite challenging' (Mrs Lathbury:Pre); it is: 'Just not done' (Mrs Carder:Post) as the teachers prefer the children to be behind desks in the classroom. A picture of the usual teaching and learning in Y5 is painted by Gwynne:

> 'Normally when we do science we normally stay in classroom when we do religious education so that's R.E. then we stay in the classroom …when we do English we stay in the classroom [chuckles]' (Gwynne:Mid).

Although as explained in section 5.3.3.3 the classroom is an uncomfortable working space for the children and Bryony's statement: 'I think we need to spend a bit more time outside than inside' (Bryony:Pre)' was a good representation of the children's feelings.

All the children associate school-based learning with difficulty and boredom. The children explained having a break from the usual routine was enjoyable because the humdrum repetition of the morning routine of English and mathematics had become boring for them. Moreover, they enjoyed the pedagogies and practices of EE and found them helpful, engaging, and interesting. Increased physical activity, working outside, and having fun were aspects that the children explained were the most different from their usual experiences of learning in school. In contrast to their typical school day, Violet described her experience of the project activities as: 'Getting work done in a fun way' (Violet:Post). This was the opposite of her earlier descriptions of schoolwork being 'hard' 'a struggle' and 'boring'. Willughby explained that OB broke the monotony of school and felt OB was effective: 'Because you're not just stuck doing boring work in maths and R.E.' (Willugbhy:QW). Whilst Bryony said: 'I think I've experienced it's been very fun' (Bryony:Mid), a statement which contrasted

markedly with a comment from her pre-project interview in which she explained: ‘Er to be honest [in school] some lessons are a bit serious’ (Bryony:Pre).

Wilkes did not even associate the project with school when asked: ‘How much do you think you’ve learnt during the bee project?’ (AM:Post), he replied: ‘Loads...I think more than we do at school’ (Wilkes:Post) indicating the difference between OB and his usual school days was so great he had separated his engagement with the project from learning in school. Everyone felt they had learned more than in their usual school lessons (as did the teachers) and explained that the variety of activities and enjoyment made learning more accessible.

Children worked on different elements of the project at their own pace and there was little direct comparison between children. The need for something written in a book, or a ‘mark’ at the end of each session became less important. Throughout the project the children’s perceptions of the purpose of learning and ‘successful’ outcomes changed and the children developed their own success criteria, for example, saving a bee, picking up litter, and sharing information. This indicated a change in the children’s understanding and expectations of education.

The different pedagogical approaches, the ‘less formal’ (Mrs Lathbury:Post) methods, and less siloed approach created an increasingly fluid learning environment. The flexible sessions provided opportunities for the children to actively make connections between the things they explored and investigated, and the time and space to develop their own ideas and thoughts. Not needing to conform to prescriptive learning styles and outcomes allowed them to direct their own learning and this increased engagement with learning.

As well as having time to develop practical and social skills, the children felt they were also given time to develop their thinking and researching skills (rather teachers imposing their ideas and preferred way of doing things (Mrs Lathbury:Mid)). This contrasted with the usual school day, the structure of the lessons sometimes hinders the development of learning, and the children explain they sometimes feel rushed by the teacher:

> ‘Sometimes you think and then the teacher says ‘right we’re going to do this now, no more time to think’…cos you think and don’t get to write it’ (Wilkes:Post).

Having explored the children’s experiences of taking part in an EE project, and how these compare to their experiences of a ‘typical’ school day, the findings turn to Research Question 3; and the implications of the findings for the inclusion of effective EE into the school day are now shared.

5.8 RQ3: What Are the Implications of the Findings for the Enactment of EE in the School Day?

The implications of the findings for the enactment of EE in the school day regarding practice, policy and education theory are addressed in the Discussion chapter, here the children's and teachers' perspectives of the enactment of EE in the school day are presented.

All the children felt old enough to understand and to take part in EE, as illustrated by Gwynne and Wilkes' statements in section 5.2.3 which demonstrate they feel old enough to encourage family members to adopt pro-environmental behaviours too. However, they explained finding it hard to learn about and help the environment when they are in school all week (Heather and Mason:Pre) and explained they wanted access to EE because: 'We need to save the earth' (Violet:Post). All the children took part in all aspects of OB. They enjoyed the project approach and said the structure and activities in OB gave meaning to their learning and increased the relevance and purpose of the learning for them. The focus of the project on local, wild bees was accessible within the school grounds and although (as explained previously in section 5.2.1) the children initially described feeling fear around bees, they very quickly became interested and excited by them. Developing an EE project around bees is unusual but Heather explained:

> 'Like in school you don't learn about that much animals you normally like learn about tigers and more bigger animals… you don't normally learn about ants and bees and stuff so when I learned about that I was like really interested because there was lots of things about them… because lots of people care for bigger animals like dogs and stuff but also [local insects are] just important' (Heather:Post).

EE is important: 'Because if you don't learn about it then you're just going to like ruin the wildlife… … instead of saving it' (Ivy:Post). The children: 'Want to be taught EE so you let the children know what's happening and explain to them what we need to do to help the environment' (Cullum:Post) and feel strongly that adults: 'Need to let children know what is happening and what to do' (Violet:Post). They all believed that: 'All schools need EE…there's lots to learn' (Wilkes:Post) and think it should begin in primary school and be taught regularly because it is: 'As important as English and maths' (Heather:Post). Ivy and Wilkes felt that all children should have equal access to EE; they feel it is unfair that different schools engage in different amounts of EE. They all would like it to be included into school every day. Eight children would like EE to be a separate subject, but Davies thinks it should be integrated throughout other lessons, and Wilkes is undecided as to the best approach. Whichever approach is used, when asked all the children said that EE should have a higher priority and to be included in the school day so they have a chance to be more

environmentally pro-active. These sentiments are reiterated throughout the post-project interviews, for example when asked if EE should be included in the school day, Mason says:

> 'Yeah… because like then we can grow up to be to know like ..the how to help the environment in different ways' (Mason:Post).

And Gwynne explains:

> 'We should do it because it's like it's something that it's a skill you'll need for life because at the end of the day when we get to like 30ish… … the world could be just.. nothing' (Gwynne:Post).

However, although Mrs Lathbury explained how she would like the principles of the project to drive lessons (driven by the children, children having ownership, choice, working outside and being active) but she does not want to risk the sessions not working and then not having time to cover everything on the curriculum (Mrs Lathbury:Post). All the adults express concern that they may not be able to map EE activities explicitly on to the curriculum and facilitate activities in a way that they can demonstrate they are fulfilling mandated objectives. Mrs Lathbury felt that for teachers to be willing to facilitate EE projects they would need training to increase their knowledge, skills, and confidence, and this was reiterated by Mrs Carder. They all said teachers would need professional development to be able to confidently facilitate an EE project. Sadly, they also highlight that there is not capacity to accommodate this. Furthermore, Mrs Lathbury explained she could not have done many of the EE activities if she was a lone adult with the class because 'staffing makes a difference' (Mrs Lathbury:Post). As ongoing financial restrictions schools are reducing the number of teaching assistants, this is an additional issue for the facilitation of EE. Monies for activities are limited and reduced school budgets impact the chances of EE being accessible in schools. However, this research has demonstrated that the EE pedagogies, although seemingly not in line with curriculum outcomes, effectively supported them. This highlighted the wider learning outcomes of including EE into the school day and strengthened the argument that EE should be seen as beneficial inclusion into the school day rather than an optional extra when time and budget allows. This finding is taken up further in Chapter 6, section 6.7 when the contributions of the research to practice and policy are addressed.

5.9 Summary

Findings demonstrate that the EE intervention project Operation Buzz (OB) was effective in terms of EE. The approaches and activities increased positive attitudes and empathy towards bees and insects and supported the development of pro-environmental attitudes

and behaviours. An outcome that was not initially looked for but became noticeable throughout fieldwork was that taking part in OB also increased the children's positive attitudes towards wider learning.

Central to the children's experiences of the project was freedom, flexibility, and choice of how to engage in activities and sessions. Developing questioning skills led to increased confidence to share ideas, to discuss, and to research. The development of a question and suggestion wall promoted the use of independent questioning and research. The children described how helpful it was to look at other people's ideas and became increasingly empowered to ask questions and voice their own thoughts and opinions.

Social experiences were central to the children's experiences of OB. Initially the freedom of choice resulted in disruption and disengagement from learning, which all the children said was disappointing and annoying. However, the development of stronger social skills through the increased social interaction and group work, and increased self-regulation, improved the children's abilities to work collaboratively and to engage productively with OB. Although they took a short time to adapt to the new pedagogies, the children ultimately embraced sharing ideas and workload and described these as enjoyable and engaging experiences.

Whether working individually, as a whole class, or in small groups, the data consistently indicated that the children want to work in a way that will enhance their work, and that they benefited most when they had choice in how they participated. Analysis highlighted a close, reciprocal relationship between the children's emotional experiences of OB and their engagement with their classmates and the activities. Enjoyment was an important feature of OB, but the children gave different reasons for their enjoyment. For example, Davies stated that he enjoyed digging whereas Heather enjoyed the drawing, going outside and thinking how to help. Positive experiences (e.g., fun and understanding) resulted in increased engagement in a positive learning cycle whereas negative experiences (e.g., disruption and frustration) led to disengagement and a negative learning spiral.

Learning practical skills empowered the children to engage with pro-environmental behaviours. The physical activity and working outdoors contrasted markedly against the children's typically deskbound learning and at first the increased movement and activity resulted in chaotic behaviour which everyone found disappointing. However, the children adapted to the change of pedagogy and their engagement with their learning improved and ultimately the increased physical movement and working work outside were highlighted as reasons the children associated the project with fun and freedom. Some aspects of the physical environment remained problematic for the children (e.g., lack of resources, the hot classroom, an inaccessible whiteboard) and resulted in negative experiences and

disengagement from learning. Thus, activities and pedagogies were neither intrinsically engaging nor off-putting as the experiences and engagement were subjective. However, certain activities were universally popular (e.g., digging) whilst others were universally unpopular (e.g., critical thinking). Despite being less popular activities, critical thinking and exploring meta-cognition helped the children to begin to understand themselves as learners.

Increased choice empowered the children to have ownership of their learning and helped them to grow in confidence and this confidence spilled into other areas of the school day. Feeling included, being listened to, and perceptions of fairness were significant in the children's experiences of the EE project and had a powerful influence on engagement with activities.

The children's experiences of the experiential learning approach of the EE project contrasted markedly against their usual highly structured, desk-based, sedentary, writing-focused learning routines. They described OB as more fun, interesting, and active and indicated they were enjoying the EE project much more than their usual learning in school.

The EE pedagogies used in the project were considered 'high risk' both for consequences for the children's behaviour and attainment (Mrs Lathbury:Mid) especially with a class who are perceived to need firm 'boundaries' (Mrs Lathbury:Post). However, despite teacher concern that the class needed firm boundaries, after an initial phase of disruption which was caused by the change in pedagogy, the children's behaviour improved, and they engaged positively with OB. There were still times when the children needed to be reined in and directed to focus on a task, and occasions (for safety reasons primarily) an adult needed to step in and re-direct some of the children; however, the children were more capable that the teachers expected, and these occasions became fewer and further between. By the end of OB, behaviour sanctions were rarely used and the improved behaviour of this 'disruptive' class was noted by the teachers. Mrs Marsham, for example, described her surprise when the children were more engaged and proactive than she had expected. Notably, these behaviour changes also spilled into other areas of school (e.g., lunchtime) and this was noted by other adults.

Learning about EE was important to the children, and they want to be able to take part in EE in school. Importantly, they felt all children should have equal access to EE. Although the teachers expressed reluctance to take part in EE, because of limited resources, lack of training, onerous curriculum requirements, and lack of time. However, this research demonstrated that an EE project, including curriculum requirements, was achievable within the usual school day.

Chapter 6: Discussion

6.1 Introduction

This chapter first reiterates why the initial research question was asked and the approach taken to answer it. The discussion then demonstrates the intervention project used as the focus for a school intervention was effective in terms of EE. After this, the answer to the initial research question is discussed using the other subsidiary questions; and findings are related to previous research and theory. The interrogation of the findings through the lens of Dewey's (1997) Experiential Education Theory and Freire's Critical Pedagogy (1996) provides insights and understanding of how aspects of the project were (or were not) effective in terms of EE. To differentiate between the experiential education approach and environmental education (EE), throughout this chapter experiential education will be referred to as Experiential Learning Theory (ELT). The comparison of the children's experiences of EE pedagogies to the children's experiences of their typical school day is then discussed. A discussion of the findings in relation to practice and policy present the implications the findings have for the enactment and inclusion of EE into the school day; and suggestions for both are proposed. Finally, through the examination of the adapted combination of ELT and CP which produced a pragmatic and workable iteration of ecopedagogy, the contribution of this thesis to theory is presented. The chapter ends with a summary.

6.2 Why the Initial Question 'How Do Children in an English Primary School Experience Environmental Education?' was Asked

This research aimed to answer the question 'How do children experience an environmental education project in an English primary school?' This question was asked for three key reasons:

Firstly, children need to have access to EE (Annan-Diab & Molinari, 2017). Literature indicates the world is entering a sixth great extinction event (Ceballos & Ehrlich, 2018) and the damage caused by Anthropocene activities cannot be sustained (Morrow & Torres, 2019). There is growing awareness of global environmental issues and children are receiving powerful messages about the environmental problems which are looming large (Wals, 2017).

Children, increasingly concerned about long-term sustainability are showing increased anxiety about environmental damage (Burke, Sanson & Van Hoorn, 2018). This 'ecoanxiety' is impacting negatively on their wellbeing (Strife, 2012). More positively, children can be powerful environmental stewards (Soga et al., 2016) and they want to have the knowledge

and skills to make effective, positive change (De Moor et al., 2020). However, in England, EE is not a statutory curriculum requirement, and this reduces children's access, experiences, and learning opportunities (Pimlott-Wilson & Coates, 2019). Teachers explain they are willing but unable to provide EE within the school day due to the pressure they feel to deliver the huge amounts of statutory curricula requirements (Somwaru, 2016). This is problematic, because without adequate EE 'the next generation will be simply unprepared to face the [environmental] challenges presented by the contemporary world' (Stoller, 2018:463).

The second reason I asked the question is because research shows that not all approaches to EE achieve the pro-environmental behaviour change aimed for by EE (Boeve-de Pauw & Van Petegem, 2018). Research often explores 'what works' rather than how approaches work (Gaus & Mueller, 2017); and this means understanding of the mechanisms of effective teaching and learning is less prominent in the existing literature (Beery & Wolf-Watz, 2014). Listening to children can strengthen understanding of both how and why pedagogies are effective (or not), but children's voices are heard less often in research (Hart & Brando, 2018) and the crucial aspect of their experiences of learning is limited in the existing literature (Meager, 2018). This research, therefore, addressed the problem of the limited number of studies which explore children's experiences of EE in mainstream education by (1) focusing on environmental education (EE) in a mainstream English primary school, and (2) examining the children's experiences of an EE intervention in this setting. By doing this, the research aimed to provide useful knowledge to improve practice, support policy development, and develop EE theory to ultimately increase participation in EE in mainstream English primary school education.

The third reason the initial research question was asked is because the current neoliberal model of education has increased barriers for the inclusion of EE in primary schools (Pimlott-Wilson & Coates, 2019). As detailed in section 2.5 of the Literature Review chapter, neoliberal politics which promotes individualism, competition, and market forces (De Lissovoy, 2018) positions the environment as a commodity for economic growth; and this is resulting in an environmental catastrophe (Orr, 2020) and is incompatible with EE (Payne, 2016). The neoliberal imposition of 'an economic model on schools' (Teague, 2018:93) is resulting in teaching that focuses on instruction to pass tests rather than the learning needs of the child (Kemp & Pagden, 2019). The pedagogies recommended for EE contrast with the transmission model of teaching currently used in mainstream education in England, and teachers, who are held accountable for the outcomes of the children, are reluctant to include these approaches into their teaching practice (Meager, 2018).

It is also argued that the practical, thinking and questioning skills facilitated by EE are a threat to people in power and the tension between education for social and environmental change and education delivered by the neoliberal state results in EE being sidelined in mainstream education (White, Eberstein & Scott, 2018).

Ecopedagogy is an approach to EE that combines practical skills, with critical questioning and thinking skills. The experiential learning pedagogies and the critical pedagogies central to ecopedagogy facilitate the development of the awareness and empowerment to enable social and environmental change. However, ecopedagogy also has a strong focus on the politics of social and environmental injustice, the dominance of the Global North and the negative impacts of colonialism on both the environment and education (Zocher & Hougham, 2020). Therefore, although a powerful approach to facilitating EE, ecopedagogy is too radical an approach to be realistically integrated into the mainstream school day.

Children need the skills and knowledge to prevent further environmental destruction and to restore the damage already done. The initial question was asked to prompt the exploration of the children's experiences of EE to better understand how effective EE could be integrated into mainstream education. This is because EE is a vital area for education and is too important to be implemented ineffectively, or worse, in a way that is counterproductive to the children's empowerment and wellbeing.

6.3 How the Initial Research Question was Answered

To answer the research question, a qualitative case study was conducted with one year 5 group (children aged 9-10 years) in a one-class per year semi-rural primary school in Yorkshire, England. The use of a case study allowed the examination of 'multiple perspectives, within a real-world context' (Anderson, 1998:119) and rich descriptions were collected throughout to examine the children's experiences of the ten-week long EE project that took place within their school grounds. Using a combination of my experience working in English primary schools, researching the literature, and my love for bees, I developed an EE project focused on bumblebee conservation. The project embraced a pluralistic approach within a social-constructivist framework and although each session had flexibility, overall the project was developed to support well-structured and systematic learning experiences (Dewey, 1997). The inquiry-led activities followed constructivist and critical pedagogies as this was an appropriate approach within the theoretical framework of the research; as well as for a project which aimed to increase inclusivity and empowerment. The project focused on local environmental benefits whilst raising awareness of global sustainability problems (McGowan et al., 2020) and incorporated elements demonstrated to be effective for EE (i.e., working outdoors, using hands-on

activities, developing a garden, group work, and critical thinking skills (Blanchard & Buchanan, 2011)). Although the project was initially focused on the local environment, social and economic issues were included too (e.g., the effect of pollinator declines on food prices and availability).

The aim of the project was to be interesting and accessible for the children (and adults); fulfil curriculum requirements; be achievable within a typical school day; and crucially, included the aspects recommended for effective EE. To achieve these aims, Experiential Learning Theory (ELT) (Dewey) was combined with a modification of Freire's Critical Pedagogy (CP). This adaptation of the theories (which is detailed in Chapter 4, section 4.3.4.7) combined the lived experience of hands-on activities, questioning and investigation (Dewey) in conjunction with the active development of physical, emotional, cognitive, and critical thinking skills which also aim to promote self-empowerment (Freire, 1996). By doing this, the approach to the fieldwork integrated key aspects which research suggests are central to the facilitation of 'effective' EE (Schönfelder & Bogner, 2020) whilst overcoming the problems of introducing potentially problematic political elements which neither align with the neoliberal positioning of mainstream English education and the government-led curriculum, nor would be ethically appropriate to raise without the time and resource to effectively explore. Thus, through the development of an EE project which combined ELT with an adapted approach to CP (rather than using the more usual ecopedagogical approach described in Chapter 2, section 2.8.3.1) the research also aimed to contribute to the development of education theory.

In line with Stake (1995) who stated, 'the best research questions evolve during the study'(p:33) the following subsidiary research questions were asked as the research and fieldwork developed:

RQ1: How does the bumblebee conservation project fulfil the objectives of EE?

RQ2a: How do the children describe their social experiences of the EE project?

RQ2b: How do the children describe their emotional experiences of the EE project?

RQ2c: How do the children describe their physical experiences of the EE project?

RQ2d: How do the children experience the EE project in comparison to a typical school day?

RQ3: What are the implications of the findings for the enactment and inclusion of EE into the school day?

6.4 How Does the Bumblebee Conservation Project Fulfil the Objectives of EE?

EE aims to develop knowledge, practical skills, thinking and questioning skills, and crucially environmental empathy too. As demonstrated in Chapter 5, section 5.2, the bumblebee conservation project successfully facilitated the development of the children's knowledge: 'We got to learn new stuff and about bees (Cullum:Mid); practical skills by 'Actually doing something' (Bryony:Post); and thinking and questioning skills, explicitly by developing a question wall and taking part in critical thinking activities throughout the project. The children's positive attitude, empathy, and behaviour towards the environment also increased, as Violet explained 'I didn't really care but now… now I do' (Violet:Mid). Fulfilling these aims, the project was effective in terms of EE (Schönfelder & Bogner, 2020). These findings were reflective of the work of Erdogan (2011) which found 'nature-related and outdoor activities enhance students' sense of responsibility…which turn into responsible environmental behaviour' (p:2236). These findings also advance previous research which indicated having a focus on local wildlife can be equally as engaging and effective (e.g., Cho & Lee, 2018; Silva & Minor, 2017) and that local conservation is effective for EE (White, Eberstein & Scott, 2018).

Although previous research has indicated that knowledge does not always lead to positive behaviour change (e.g., Waddington et al., 2018), findings throughout the EE project demonstrated engagement with the activities did inspire pro-environmental behaviour change. The children described changes in their behaviour such as actively saving bees using sugar solutions (Violet:VE). They were also observed showing behaviour changes based on their increased knowledge (Heather remaining calm when a ladybird landed on her, for instance. Thus, my data is more compatible with the work of Cheng and Monroe (2012) which indicated children's experiences in nature, and connection to nature, positively affects their pro-environmental behaviours. Further examination of the data showed that the new knowledge and experiences during the project simultaneously reduced the children's fear of bees and other insects, and increased interest, concern, and compassion for them; and it was this combination that supported their behaviour change.

Importantly, the children felt they were learning knowledge and skills they can use immediately and in the future: 'Now we know how to help the environment and have a better life in the future' (Violet:Mid). These changes strengthen the findings of Hildreth (2012), whose work (also grounded in Dewey's experiential learning theory) demonstrated that children who participated in a civil engagement initiative were empowered to make change. The children felt able to talk to family, friends, and others to influence their behaviour too, for example to: 'Tell them to reuse some plastics and things' (Wilkes:Mid) and presenting an

assembly to the school. These findings build on the work of Mackey (2012) who demonstrated that children can be 'confident advocates for the environment and for a more sustainable world' (p:473). The development of a (WA) was a significant element of OB and in line with previous research (e.g., Roy et al., 2014) the children experienced pride and empowerment when they were able to make a positive change to their school environment (Bryony demonstrating her birdfeeder for example). The children showed a strong desire to protect the wildlife area which also aligns with Vinson's (1999) finding that hands-on activities increase ownership and connection to learning experiences.

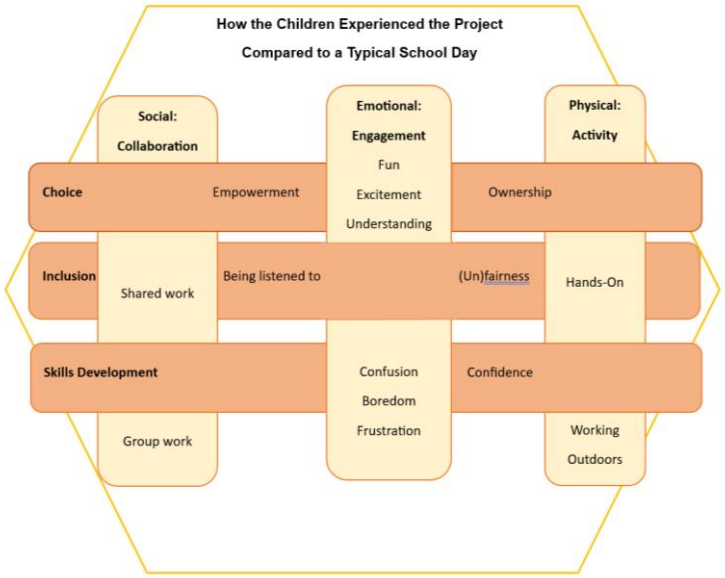
There was also evidence that participation in the project had wider impacts than simply bee conservation, and that the children's environmental perspectives had changed, for example, Violet explained: 'I didn't really care but now I do' (Violet:Mid). This again supports previous work that asserts that 'beliefs change with experience' (Fusch, Fusch & Ness, 2017:934).

Having demonstrated that the project successfully achieved these outcomes and can be deemed effective in terms of EE research, I now discuss how the children's experiences led to these effective EE outcomes, by examining the findings through the lens of the theoretical framework of Experiential Learning Theory and Critical Pedagogy.

6.5 RQ2: How Do Children Experience EE, (a) Socially, (b) Emotionally, and (c) Physically?

The findings showed that social, emotional and physical aspects were woven and entangled throughout the children's experiences. The interaction of these aspects was important in the children's experiences. Figure 10, repeated from Chapter 5, section 5.3, illustrates the entanglement and intersection of the themes and subthemes identified throughout the data.

Figure 10: The Entangled Themes and Subthemes: Weaving Mat Design Adapted from the Te Whāriki Approach to Early Childhood Education (Carr, May et al., 2002).



This chapter now turns to the subsidiary research questions by deconstructing the interwoven social, emotional and physical experiences that thread throughout the data and discusses them in relation to ELT and CP.

6.5.1 Social Experiences

Using ELT pedagogies throughout the project allowed everyone in the class to contribute to the group's learning; and the social benefits could be clearly seen. The ELT pedagogies provided opportunities to work together, and the increased coproduction and shared learning changed the social atmosphere of the classroom. Although this class has a reputation for being: 'Quite challenging' (Mrs Lathbury:Pre) and almost always work sitting at desk because otherwise: 'It's taking risks with a class that you know are difficult' (Mrs Lathbury:Post) the increased choice and freedom of approaches to learning helped the children develop important social skills. Despite regular squabbles they mostly enjoyed working together, giving reasons such as: 'You've got somebody by your side if you're struggling' (Heather:Post), Gwynne felt: ''Teamwork is good' (Gwynne:Post), and Wilkes liked to share work when: 'You can't really do all of it yourself' (Wilkes:Mid).

The children enjoyed the peer support. They enjoyed sharing information amongst themselves, they all found it helpful to work with or alongside others and felt they benefitted when they listened to each other as 'more brains are better than one' (Gwynne:Post). This extends previous research (e.g., Watkins et al., 2007) and the increased pupil voice that developed throughout the project furthers the work of Ruddick and McIntyre (2008) which

demonstrated that active participation in project work supported students to 'see themselves in new ways: as having a voice, being able to make a difference' (Hildreth, 2012:930).

Importantly, for the class community, my findings also extends previous research which found '[s]pending time together in nature is a great equalizer, providing opportunities for teachers to see students, and students to see each other, in a different light' (Burgess & Johannessen, 2010:7). However, the data also demonstrated that it is important if the children are asked for their ideas and opinions, these become part of a genuine conversation. For example, Bryony explained one reason the EE project was fun was because: 'sometimes teachers say oh let's plan a wildlife garden and then throw it out the way… but actually we've actually made a wildlife garden' (Bryony:Post). These findings strengthen prior research which demonstrates the empowerment of being listened to and having ideas engaged with (Hildreth, 2012) and the importance to children of having input into the development of educational activities (Glendos, 2017). Thus, in respect to the positive effects of EE pedagogies, my findings build on and extend previous research.

Additionally, although previous research has indicated the effect of interventions in terms of EE outcomes, little is said in the literature to highlight the problems and conflict in the learning environment which can be aspects of the lived experience of research participants. In contrast to previous research, my findings demonstrated tensions and upsets between the children during the project as there were ongoing disagreements and squabbles throughout the project. For example, Transcription box 18 in Chapter 5, section 5.3.3.1 which provides Gwynne's description of walking away from Bryony because 'she was getting mardy at me' is one example of this. However, recognising the interpersonal difficulties throughout the EE project, allowed for open discussions between the children, teachers, and me, which helped to increase understanding of the stresses and problems the children were feeling; and to discuss approaches to address these issues. This was not only helpful for my understanding as the researcher, but also helpful for the teachers and children.

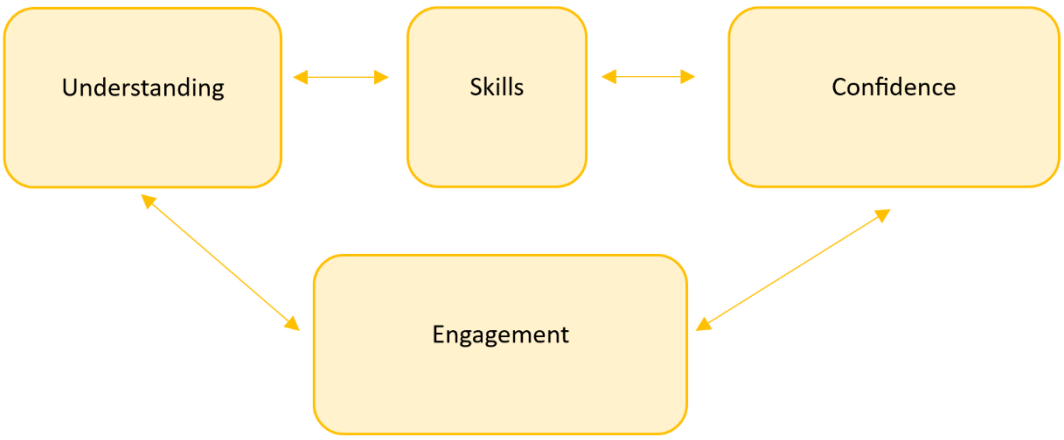
By acknowledging social difficulties that arose during the EE project, my research sheds light on the realities of working and facilitating learning in a school environment and is an important and useful extension to literature. These findings are also useful for future research as they highlight the realistic probability that there will be at times be some level of tension between the children; and this tension may result in disruption. Recognising this as a reality of researching and working in a fluid, learning environment, supports further discussions with teachers, and other adults in the school, and supports the ethical management of these issues in a way that is beneficial for the learning community.

6.5.2 Emotional Experiences

The emotional experiences of learning were recognised by everyone. Whilst fun and enjoyment were linked with understanding and engagement (for example, Cullum noted positively when: 'we know what …what it is and we know what to do and we like it' (Cullum:Post). In contrast, boredom, frustration and annoyance were universally described as negative experiences which increased disruptive behaviour and reduced engagement in learning, for example in the critical thinking activity the children: 'Didn't know what to do so then they just… did something else… and they got it [sic] a bit boring' (Wilkes:Mid).

An important finding in the research was that although the children sometimes displayed behaviours that indicated they were not interested in the learning [e.g., Willughby recreating a bumblebee life cycle, or Cullum not watching film on the whiteboard] all the children described feeling frustrated when something hindered their learning because 'We're wanting to learn and not be distracted (Mason:Post). Findings demonstrated that when the children understood the purpose and expectations of the sessions, they became calmer, more focused on the activities, and began to self-regulate and work pro-actively. Even though the teachers were initially concerned with possible problems with the children's behaviour and attainment, the children's behaviour and engagement improved throughout the EE project; and this was noted by the other staff (Mrs Carder:Post). These findings build on Huser, Dockett and Perry's (2022) work which showed '[c]hildren's agency can be nurtured when they have empowering opportunities to partake in shaping […] the physical environment' (p:60). Figure 11 illustrates the positive learning cycle that occurred when using an ELT approach to EE.

Figure 11: The Positive Learning Cycle Facilitated by the Project Pedagogies.



Drawing on CP, the meta-cognition session provided an explicit opportunity to support the children to think about how they (as individuals) learn, and how their emotions lead to different behaviours in the classroom. Giving the children a framework of ideas and terminology helped them become aware of the concepts of 'thinking' and 'learning'; and to understand themselves as thinkers and learners. Data showed that supporting the children to recognise their emotions, the cause of their emotions, and providing strategies to help them to engage in a positive way was an effective approach to increased engagement in the teaching and learning. Using pedagogies of empowerment helped the children understand what causes them problems when learning and to express why they disengage from activities. Viewed through the lens of CP, these data demonstrated the children took ownership of their learning; and observations and interactions with the children during OB indicated they were happier, more confident. Ivy for example, explained the variety of activities during the EE project had: 'Got [her] more into doing my work and like actually like not giving up' (Ivy:Mid) whilst Wilkes felt good using the question wall because during the project he could answer questions, when he: 'Can't really normally answer questions' (Wilkes:Post).

An unexpected, but important finding from the meta-cognition sessions was the benefit to the teacher. Working with the children on this activity helped her to have a greater understanding of the children's experiences when learning and subsequent behaviours. This session highlighted keenly how open and honest dialogue between children and adults helps with mutual understanding. These findings build on the importance of viewing learning holistically but also as a subjective endeavour (Coffield, 2008) and strengthens the assertion that working together can enhance peer collaboration and transform the traditional role of the teachers, other adults and students, enabling participants to develop and draw on each other's relative expertise (Vossoughi & Bevan, 2014). The children expressed they felt listened to, enjoyed having input into what activities were done, and were enthusiastic about having choice in what they did. These findings build on with Taylor, Smith and Nairn's (2001) work which demonstrated that children expressed the desire to express their opinions, be listened to, and to make their own choices. Thus, a suggestion for classroom practice that I advance in section 7.4.1 of the Conclusion chapter is the introduction of meta-cognition (in an appropriate format) at the beginning of each school year to strengthen the teacher's understanding of the children.

Another important finding was the pride and empowerment the children experienced when they were able to make a positive change to their school environment (Bryony demonstrating her birdfeeder for example). Throughout OB, the children indicated they were feeling increasingly empowered to take ownership of their learning and developed a belief that they

could make change happen. This increases knowledge and develops understanding of Taylor's (1997) theory of 'self-growth' (cited Manring, 2012:163) whereby individuals develop increased confidence in themselves and their abilities through the activities they engage in and furthers Roy et al.'s (2014) research which showed children are empowered when they can make positive change to their local environment.

In contrast to the overall positive experiences, the children highlighted several areas they felt were unfair; and this often depended on whether you were working with people you wanted to or not, or if you would have preferred to work alone. The children felt the group work was sometimes unfair, sometimes the work was not divided equally and sometimes people didn't help. Sometimes the unfairness came with limited resources, for example, not everyone could do their first choice of activity, and sometimes teacher intervention was deemed unfair (the ban on compost collection for example). These data build on those of Adderley et al. (2015) in which '[p]erceived unfairness undermined the teacher–child relationship and peer relationships' (p:113). However, although previous research has shown how the lack of resources limits teachers' willingness and ability to engage with EE (Green & Somerville, 2015) these findings demonstrate the negative effects of limited resources on children's feelings of fairness, inclusion, and emotional wellbeing. Unfortunately, there was no clear solution to the predicament of resource restrictions within the timescale of the fieldwork, but these findings highlight the challenges of both researching and implementing EE projects with school children and further strengthens the arguments that adequate funding and resources are important for children's engagement with, and experiences of, EE. This is discussed further in section 7.4 of the Conclusion chapter.

6.5.3 Physical Experiences

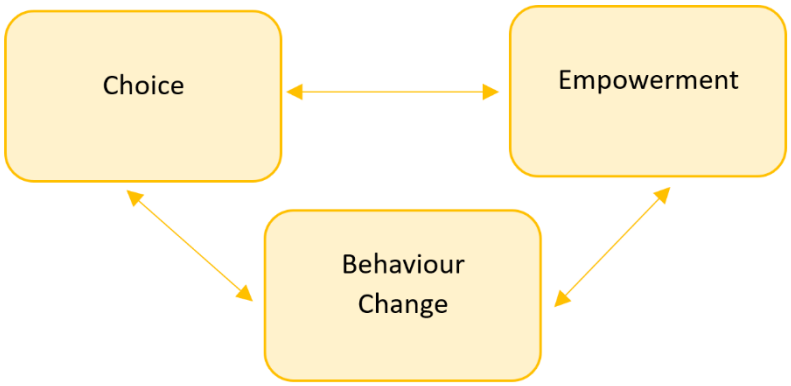
The physically active sessions were helpful for the children, and they benefited from the increased activity, movement, and working outdoors. Wilkes explained concisely, 'I like it when we're moving around' (Wilkes:Mid). All the children positively contrasted the EE project against the sedentary nature of the usual classroom-based activities. They all particularly enjoyed their experiences of the hands-on activities. No individual approach or activity was uniquely popular, but all the children enjoyed digging, planting and (when allowed) making compost. These findings extend Jeronen et al.'s (2016) study which showed hands-on learning activities to be particularly useful and effective for teaching sustainability education; and build on Dewey's advocacy for the benefits of learners seeing things for themselves and the assertion that hands-on activities help to make learning more understandable and ultimately more effective.

The children also explained that they wanted to spend: ‘a bit more time outside than inside’ (Bryony:Pre) and working outdoors was a central pedagogy of the EE project. When working outdoors the children expressed feeling ‘fun and free with the work’ (Violet:Mid) because they were ‘not just sitting in the classrooms writing’ (Cullum:Video Extract). The children explained they were also more physically comfortable working outside. This was a positive experience as the children expressed the physical discomfort in the classroom increased negative emotions as: ‘In that classroom upstairs it’s so full… you’re just cramped in one little room’ (Davies:Pre) and ‘it can get really really hot [working indoors, it] can make you can [sic] get a headache’ (Ivy:Post).

An interesting finding also highlighted how, when working outside, the children could more easily move away from disruptive noise and commotion and this both reduced friction (and fighting) between the children and increased engagement with learning; this was demonstrated clearly when working outside Gwynne chose to walk away from her group following a disagreement (this data is presented in Chapter 5, section 5.3.3.1). Thus, rather than disengaging with their learning as the teachers had feared, when given choice and space, the children were increasingly empowered to (and chose to) behave in ways that enhanced their learning. This data advances previous research which indicates physical approaches to learning are beneficial for increased social and emotional wellbeing (Adams & Savahl, 2017).

Interrogating these data using the lens of ELT and CP, the apparent paradox of the children’s engagement and behaviour improving when the ‘firm boundaries’ were loosened, is more understandable. As the children had a choice in how to engage with learning, and were developing social, emotional and cognitive skills to better manage their interactions, they felt less disempowered and frustrated. To cope with experiencing negative emotions, they did not need to employ the more disruptive approaches they often used because they had other options available. Both Davies and Wilkes, for example, benefitted when they chose to work alone rather than in a group when they felt their ideas were not being listened to and when others in the group: ‘Do everything and then you can’t do anything (Davies:Mid). The importance of choice in engagement with learning mirrors the children’s emotional experiences of the EE project. Figure 12 illustrates the cycle of positive behaviour change identified in the findings.

Figure 12: The Cycle of Positive Behaviour Change.



The physical choice and freedoms when engaging in ELT pedagogies empowered the children and promoted positive behaviour change; this created a positive cycle of choices and behaviours which led to the children being allowed greater freedoms and feeling increasingly trusted and empowered to engage with their learning. Sadly, this physical enactment of choice is not possible within the typical classroom practice of fixed seating plans and teacher allocated pairings; especially for this cohort who, due to previous behaviour, are kept within strict (and seemingly counterproductive) boundaries; and this is discussed further in section 6.6 of this chapter.

Having examined the children's experiences of the EE project the discussion now moves on to answer Research Question 2d by discussing the comparison between the children's experiences of the project to their typical school day in relation to previous research and the pedagogical theories used in the project.

6.6 RQ2d: How Do the Children Experience the EE Project in Comparison to Their Typical School Day?

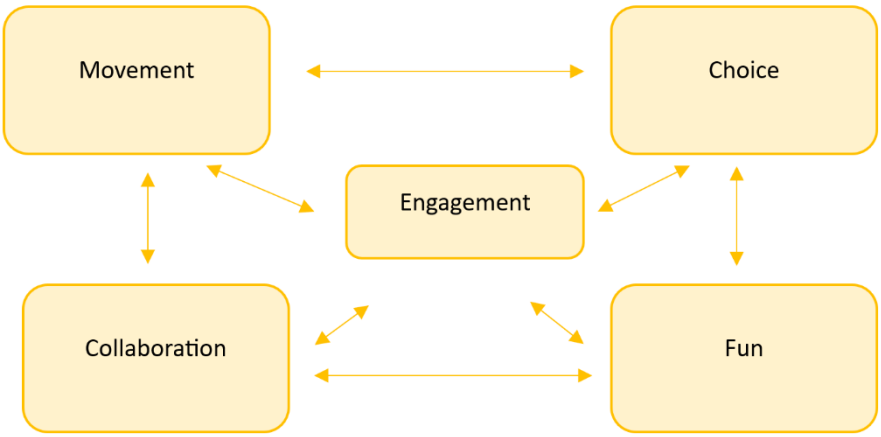
The first obvious difference between the EE project and a typical school day was the amount of activity and movement. The difference in physicality was discussed in the previous section. However, when comparing the project to the typical day, not only did sessions differ in that some were outside and involved hands-on activities, but even when working indoors, there were rarely times when the children were expected to sit in their allocated places. After a bumpy start, when this new approach became established, the freedom of movement did not result in disruptive behaviour. Instead, the children used the opportunity to access different resources (be that the wall display, or another member of the class for example), to take time to calm down and regroup if they were upset by something, or even to simply move around and change activity if they were getting bored and restless. This

approach to working is very different to the typical classroom practice, however, although the children were not sitting at their desks, findings showed repeatedly that they were more engaged than usual as: ‘They all want to do it’ (Mrs Lathbury:Post). The children and teachers all expressed that they had learned more than usual, expressed by Wilkes’ comment that during the EE project he had learned: ‘‘Loads...I think more than we do at school’ (Wilkes:Post).

The second main difference was that the children all expressed enjoyment to be a core aspect of their experience of the EE project as ‘everyone was having fun’ (Heather:Post). This contrasted markedly with their description of learning in school being boring and: ‘a bit serious’ (Bryony:Pre). Findings indicated that the children benefited from the less ‘formal’ approach of the pedagogies of ELT, and they demonstrated increased levels of engagement and interest as the project developed. This data extends Roesch, Nerb and Riess’s (2015) findings that children were more motivated when they had the opportunity to work autonomously and builds on the work of Dewey (1997) who advocated for learner choice and agency and promoted ELT as an effective way to facilitate both.

Thus, data showed using ELT and CP as theoretical and pedagogical frameworks for the project, facilitated the children to develop hands-on, thinking, questioning and meta-cognition skills and supported the children to actively engage with their learning. In turn, the children’s engagement increased despite initial concerns from the teachers about potential behaviour problems. Just as developing social and emotional skills increased understanding and developed confidence, the increased activity and choice, increased empowerment and facilitated positive behaviour change; this further increased enjoyment and supported increased collaboration and engagement. Figure 13 illustrates the relationship between the elements of ELT and the children’s experiences of the EE project which created a positive learning cycle.

Figure 13: The Relationship Between the Elements of ELT and the Children's Experiences of the EE Project.



A crucial difference between the EE project and the typical school day was engaging in activities and creating end-products that were something other than writing in a book. These different approaches to learning used throughout the project were described as 'good', 'fun' and 'different'. Not having a direct comparison between the work they were doing developed an atmosphere that was collaborative rather than comparative as: 'More brains are better than one (Gwynne:Post) and this also increased the confidence and wellbeing of the children who were: 'Excited, happy for when we do stuff' (Heather:Mid).

However, on the occasions that I had not prepared a suitable activity the children were unable to access learning. Notably, the first pollination session was held before the group had adjusted to a new way of working and the freedom was unsettling for them; and the session was: ''Rubbish because [the children] were talking and messing about' (Davies:VE). Whilst the shockingly poor critical thinking session was a result of me presenting the children with an activity that was not only too confusing, but it also had too many elements. The findings from both sessions build on Dewey's advice that for experiential learning to promote positive engagement with learning it should be supported by a well-prepared and organised facilitator using a flexible framework of activities enacted within a controlled, safe environment.

In a more positive contrast, the mathematics based on wildlife area was for me perhaps the clearest example of how ELT can work well in practice and effectively fulfil curriculum requirements. The children used calculations in a practical way that related to their experiences working on the wildlife area and they could immediately see the purpose of what they were doing. The mathematics was: 'More enjoyable because we were still working on the wildlife area but just in maths and in books so it's a bit

like..fun!' (Gwynne:Post). Here, the findings build on Dewey's (1996) recommendation to develop environments which encourage and facilitate children to link learning to their lived experiences. In totality, the findings showed that difference between the typical school day and the project which used the adapted combination of ELT and CP was 'a difference in motive, of spirit and atmosphere' (Dewey, 1915:12).

Due to the impact of neoliberalism and the neoliberal curriculum (discussed in Chapter 2, section 2.5) teaching in English primary schools is increasingly sedentary, increasingly regimented, and with greater focus on 'academic' learning rather than social and emotional development. However, the findings in my research have demonstrated this approach is unhelpful and counterproductive for the children's engagement with learning. Using different means to facilitate learning, incorporating choice, activity, and collaboration was fun for the children and increased engagement. Although the content and pedagogies of the EE project contrasted with the children's typical school day, and initially may have appeared to be in opposition to the school's teaching objectives, findings showed that these approaches were compatible and beneficial for them.

The following section now turns to address Research Question 3. By exploring the findings through the lens of ELT and CP the implications of the findings for the enactment and inclusion of EE into the school day are addressed and suggestions for practice and policy are presented.

6.7 RQ3: What Are the Implications of the Findings for the Enactment and Inclusion of EE into the School Day?

The findings have demonstrated that EE can be effectively integrated into mainstream primary school education using a project-based intervention that incorporates ELT and CP. Findings highlighted that the EE project was effective in terms of EE but also positively influenced wider learning and behaviour in school. The implications of the findings are now presented in relation to EE and classroom practice, and then in respect to curriculum policy.

6.7.1 Contribution of the Research to Classroom Practice

The effectiveness of a small**,** local, insect-based project is a useful finding. Research indicates that EE and conservation projects often focus on large, exotic 'flagship' species, tigers for example tigers, whilst insects are rarely selected as a focus for EE interventions (Potts et al., 2010). Heather recognised this in her own experience as she explained that in school: 'You normally like learn about tigers and more bigger animals (Heather:Post). However, structuring an EE project around bumblebees, increased the

children's positive affect towards bees, encouraged locally based environmental action, and had a positive influence on their interest in wider environmental issues. This builds on previous research which indicated having a focus on local wildlife can be equally as engaging and effective (e.g., Cho & Lee, 2018; Silva & Minor, 2017) and that local conservation is effective for EE (White, Eberstein & Scott, 2018).

Findings demonstrated that using experiential learning and critical pedagogy to facilitate EE provided immediate meaning and purpose because they were: ''Learning about real life' (Gwynne:Post) and this increased engagement and enthusiasm. For example, Mason explained how: ''You normally think of maths like it's sums and working on a piece of paper' (Mason:QW), but by relating mathematics to the wildlife area: 'You find out the maths can be more fun than it seems' (Mason:QW). Thus, working on a wildlife area increased the relevance and purpose of activities for the children. The findings broaden research that shows hands-on activities and working outdoors help children understand the world (Dewey, 1997) and extends the work of Erdogan (2011) which demonstrated outdoor activities help children to 'integrate theory and practice' (p:2235).

In contrast to their usual learning in school, the children felt the EE project had helped them: 'Understand like what it the earth is actually [all] about' (Violet:Post) and that they had been learning: 'A skill you'll need for life' (Gwynne:Post). The findings indicated the development of 'deep' learning (to develop understanding and meaning) rather than 'surface' learning to pass a test (Bartlett & Burton, 2012) and progresses Giamellaro's (2017) work which identified 'the presence or absence of content knowledge contextualization contributes to transforming an experience into meaningful learning.' (p:5).

The shift from the usually siloed nature of primary education to a project-based approach supported the children to connect different aspects of their knowledge. The children wanted to be involved in the development of the project and they enjoyed that: 'People got to have a chance of [doing] their ideas except [sic] from all the teacher's ideas' (Willughby:Post). These findings advance previous research in which children became increasingly motivated and involved when developing school-based projects (e.g., Hildreth, 2012).

Throughout OB the children increasingly demonstrated that (at times) they could self-regulate well, and if working in a group became difficult for them, they choose to walk away and work individually, rather than continue to feel thwarted and frustrated within a dysfunctional group. Thus, data indicated that developing social skills and emotional understanding empowered the children to make active choices whether to remain in the group or to move away and work alone. These data extend earlier studies that found 'by

working in groups individuals develop emotional intelligence' (Manring, 2012:168) and build on the findings of Kariippanon et al. (2019) who demonstrated that flexible learning spaces promoted increased collaboration between children.

When viewed through the lens of ELT and CP, this seemingly paradoxical behaviour is more understandable. The experiential pedagogies and activities had immediate relevance and meaning for the children. They wanted to learn the skills and do the activities; and when they wanted to do the 'work' their attitudes and behaviour changed. In addition, CP explains that the change in pedagogies and having a new understanding of learning, effectively changed the power relationships in the environment (Apple, 2014). If looking at the children as social actors, with some rights but not others, their misbehaviour can be seen as challenges to the boundaries (Larkins, 2014). With the new framework of the project, the children were able to perform 'different facets of empowerment' (Shera & Wells, 1999:22) and could assert themselves through positive learning behaviours. Mrs Lathbury commented that she had noticed the children taking ownership of their learning and believed this motivated them to self-modify and self-regulate. These findings develop Scott and Boyd's (2016) study which demonstrated participation in outdoor ecological fieldwork altered the power balance between teachers and learners and build on the work of Ansbacher (1998) who noted '[i]f students feel they are responsible for and contributing to their own experience, social control will largely take care of itself' (p:46).

In contrast to the positive experiences when using ELT throughout the project, including critical thinking, a key aspect of CP, highlighted an unexpected finding. The first critical thinking session, which is detailed in section 5.3.1.4 of the Findings chapter, was confusing and boring; and disruptive behaviour ensued which everyone (children and adults) found annoying. The research showed that although the teachers believed they were supporting the development of the children's critical thinking skills, engaging in critical thinking rooted in CP, showed that the 'critical thinking tasks' previously done in school were critical thinking in name only. My research demonstrated the current education structure in English schools which is focused on prescriptive approaches may 'tick the government tick boxes' (Mrs Carder) but does not support the development of important life skills. Using Dewey's interpretation of education as an endeavour which should lead to an opening of thought and future development, the limited outcomes of the current English approach is not an educational success.

6.7.2 Contribution of the Research to Education Policy

During the fieldwork in this study, all the children expressed concern over the ongoing damage to the planet and the children's visions for their futures if behaviours do not change

were repeatedly unhappy ones. Their comments were unnervingly like previous research (Green, 2017). The children wanted EE to be integrated into the school day, not only for themselves, but for all primary school children because they wanted adults to 'let the children know what's happening and explain to them what we need to do to help the environment' (Cullum:Post). Thus, there is a vital need for EE for the immediate wellbeing of the children, as well as for ongoing sustainability.

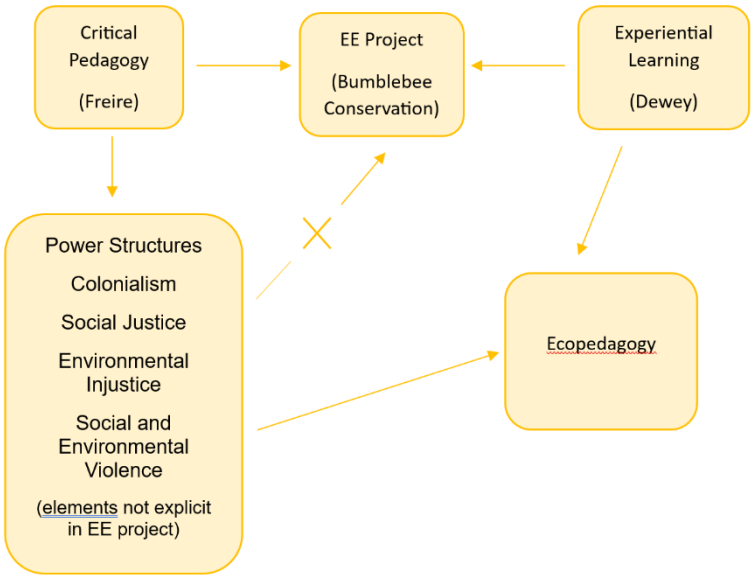
My research demonstrated that although the teachers would like to integrate EE (and the pedagogies of EE) into their practice, they do not because their focus is curriculum 'priorities' (i.e., English and mathematics). The findings show that the performative curriculum puts pressure on teachers (and children) to produce specified, 'expected' outcomes, and reduces engagement with EE and this extends previous research (e.g., Rolfe, 2014). Time commitments preparing children to pass curriculum-based assessments meant the teachers often felt unable to work beyond explicit curriculum requirements and chose not to do EE at all. These findings build on the work of Jeronen et al. (2017) which demonstrated that as EE is not a statutory requirement it is seen to be an 'optional extra' not a necessity and is only included in school activities if there is a keen EE advocate in the school. The teachers also described how there was not the time or funding available for them to learn the skills they needed to facilitate EE, nor the time or funding to implement EE into the school day; this buttresses previous research (e.g., Kennelly et al., 2012). Thus, although '[e]nvironmental education should be all-pervasive' (Blyth & Meiring, 2018:113), because EE is not a statutory requirement in the English primary school curriculum and schools are instead encouraged to include EE in ways that are suitable for their needs, it remains as an optional 'add-on' (Buchanan, 2012). Importantly, however, although the pedagogies and focus of learning in the EE project did not immediately appear to align with the mandated curriculum enacted by the school, data collected throughout the fieldwork demonstrated that engagement in the project enhanced learning outcomes. The research demonstrated that this pragmatic adaption of theory was an accessible way to integrate effective EE within the school day; and in a way that was both workable for the school community and compatible with the politics of neoliberal mainstream primary education. More is said about this in section 6.9 when the effectiveness of the model of EE developed in the research is discussed further.

6.8 The Contribution of the Thesis to Education Theory

The main contribution of the research to theory was combining Experiential Learning Theory (Dewey, 1997) with selected elements of Critical Pedagogy (Freire, 1996). As explained in Chapter 2, section 2.8.3.1, ecopedagogy in its purest form is neither appropriate for a short intervention in a primary school nor compatible with the political leaning of current

mainstream education in England. Figure 4 (first presented in Chapter 3, section 3.3.2.8 is repeated here to reiterate the relationship between the EE project and ecopedagogy.

Figure 4: Relationship Between EE Project and Ecopedagogy.



6.9 The Adaptation of ELT and CP to Develop a Pragmatic Iteration of Ecopedagogy

Both Dewey (1986) and Freire (1996) advocated for education that liberates and provides hope. They believed education had the power to transform individuals and society, to instigate change and disrupt the existing order. However, I suggest there is a lack of political will to introduce the critical pedagogies of empowerment and critical thinking skills which allow students to engage with the democratic process (Håkansson et al., 2018) into mainstream education. Thus, there is conflict between EE (which can challenge political structures) and the state mandated school system (Barratt Hacking, Scott & Barratt, 2007) and the skills needed for EE are crowded out of the school day.

Although Jagannathan et al. (2018) suggest that children who are struggling with language and mathematics, do not have the 'luxury of engaging in political discussions around 'how best to save the planet'' (p:61), I disagree. Maths calculations and sentence structure are undeniably important skills, but for society to develop in a progressive and productive way, they are not enough. A progressive, sustainable society needs people who can process and synthesise diverse information, people who can think creatively and explore issues from a variety of perspectives, and people who can stand tall and disagree with the dominate group think. I argue, therefore that education should not distinguish between learning 'facts' or learning 'to think', learning to conform or learning to disrupt, learning the 'academic' or learning to critically explore our environment. There is benefit in doing both.

Thus, although ecopedagogy does not align with the neoliberal model of primary education in England today, children must have access to effective EE. This research has demonstrated that project-based EE grounded in ELT embraces the 'best practices in education such as integrated, learner-centred, and experience-based approaches' (Burgess & Johannessen, 2010:5), and has the potential to be 'a potent means for educational reform' (Burgess & Johannessen, 2010:7). Importantly, the project pedagogies provided an effective way to support empower the children to engage with learning, self-regulate, and develop the critical thinking and questioning skills that are needed throughout all education.

6.10 Summary

This thesis argues that EE is vital but not engaged with consistently across English primary schools. Currently, the English curriculum prioritises learning which is easily measurable rather than developing children's potential to 'not only reproduce their society, but also interpret it and reinvent it' (Corsaro, 2005:22). This is doing a disservice to children and young people as they will be left without the skills to face the challenges that lie ahead for them.

The main contributions of the research were (1) to address the problem of the limited number of studies which explore children's experiences of EE with the aim that having a greater understanding of their experiences would increase understanding of how best to include EE into the school day; (2) by developing an EE intervention which focused on local wildlife and integrated the ELT pedagogies recommended by Dewey with elements of Freire's CP, the research aimed to explore approaches to effectively include EE into the school day; and (3) by analysing data thematically, and using the lens of ELT and CP, the research increased knowledge of how and why the project pedagogies influenced learning which is important as understanding the mechanisms of effective learning is something that is less prominent in the research literature.

Firstly, the findings extend previous research which shows that children are feeling anxiety and concern about environmental changes (Burke, Sanson & Van Hoorn, 2018). Building on the work of De Moor et al. (2020) the findings demonstrate that children want to access EE, and in my research the children felt school is a place they want this to be done. This research developed an accessible and low-cost EE intervention project, which focused on bumblebee conservation and was designed to be interdisciplinary and involved cross-curricula activities which aimed to prompt interest and action rather than simply supplying facts and values (Todd, 2016).

Secondly, the findings showed that the children enjoyed the experiential, project-based pedagogies. The children benefited from choice and inclusion, and this was supported by the development of practical, academic, social, and emotional skills. Being listened to and having ownership over their learning was a powerful experience for the children and an effective mediator of behaviour. My findings show the children did not need rigid structures to engage with their learning, instead they needed to have (1) a clear understanding of the purpose and expectations of the session, (2) a meaningful way to relate the session to their own lived experiences, and (3) an understanding of how they (as learners) can best approach and access the session; and as explained by Bryony, the best way to access learning was usually that 'you've got to concentrate, and you've got to have fun' (Bryony:QW). Thus, the findings show importance and impact of experiential education should not be underestimated as this approach overcame the problems of children disengaging from learning (which were often because of the stagnant, repetitive methods currently used in schools).

Thirdly, although experiential education involves taking 'pedagogical risks' (Breunig, 2019:16) and initially the teachers lacked the confidence to use EE approaches that were unfamiliar to them, the research demonstrated that EE can be integrated into classroom practice. Furthermore, not only did the model of EE used in the research increase positive environmental attitudes and behaviours but increased positive attitudes and behaviours towards learning more widely. Currently, the neoliberal approach to education in England is not child-centred but instead focuses on testing and measurement (Teague, 2018). Although child-centred, project-based EE, facilitated through ELT and CP may not suit the current neoliberal education agenda, as educators we must heed children when they lament 'the world is wrecked … we need to help it' (Cullum:Pre). Despite problems with time, training and budgets, this research showed that a project-based approach, based on local wildlife and integrating ELT and CP was effective in terms of EE, beneficial for the children, enjoyable for the teachers, fulfilled curriculum requirements, and was manageable within the school day. My research has therefore demonstrated a pragmatic approach to EE that was an effective way to facilitate the development of the crucial EE skills necessary for long term sustainability in a way that is not only compatible with other learning requirements, but with the use of experiential learning and critical pedagogies enhances wider aspects of teaching and learning. This thesis has contributed to EE practice by demonstrating that EE can be included into the school day in a way that is accessible to, and appropriate for, mainstream primary school education in England.

Chapter 7: Conclusion

7.1 Introduction

The aim of this research was to increase understanding of the enactment of environmental education (EE). As the importance of children's experiences when learning is crucial (Dewey, 1997), I asked: **How do children experience an EE project in an English primary school?'** To answer this question, I developed an EE intervention project and used a qualitative, case study approach to work with a Year 5 class in a small primary school in Yorkshire, England to explore their experiences of the EE project. The initial question was answered through the analysis of the data using subsidiary questions which asked about the children's social, emotional and physical experiences. Findings demonstrated that the project was effective in terms of EE. Importantly, the children enjoyed the experiential learning pedagogies, ad this had a positive impact on behaviour. The children felt increasingly confident to take part in EE, and this also increased engagement with the learning. The increased confidence and engagement spilled over into other aspects of the school day and positively impacted wider learning.

This chapter will now present my reflections on the research process, firstly from the stance of an ethically responsive researcher and then by addressing limitations of the research. Following this the contributions of the research to practice, policy and theory are presented. Suggestions for further research are then proposed before a summary ends the thesis.

7.2 Being an Ethically Responsive Researcher

Drawing on the mosaic approach (Clark & Moss, 2011) I initially aimed to increase accessibility for different children by providing different ways for the children to share their experiences of the project. The individual methods were all theoretically suitable ways to explore the research question, however the children did not like some of the activities and they either declined to do them or disengaged. Three long questionnaires which used a Likert scale to record the children's responses about their experiences felt more like assessments and ethically I could not subject the children to this activity. Gathering the children together, I asked them to take turns to choose which activity from the enormous list that they would like to ask each other about. Whilst a sentence completion task in which the children were given sheets with the opening of a sentence and were asked to complete the sentences was declined by eight of the children and only started by two of the girls who quickly stopped. The children had told me that they did not particularly enjoy writing and felt they did too much of it in school, and although due to the lack of data, this findings from this method were not included in the data analysis, the outcome reiterated that the children were

not keen on writing. Although I reflected on the methods from a research perspective, the data gathered were not included in the data corpus for this thesis. Thus, as I reflected and responded to the children, the research evolved as the data collection methods were adapted.

Hence, although important information can be gained if voices are accessed through methods that do not rely solely on verbal or written information (Green & Hogan, 2005) ultimately, my data corpus primarily consisted of interviews and observations as these methods were the most accessible approach for the children; and the most informative approach for me. They provided data that was accessible to me, and I was able to triangulate it with observational data. It is important to recognise however, that there were also ethical considerations and limitations to these approaches.

Looking at the interviews, although the interviews were designed to be semi-structured, they became more in line with guided conversations (Loftland et al., 2006); because this felt more comfortable. Although it could be considered that this approach may reduce the reliability of the data, all the children were asked the same questions at some point in the interviews, but the less structured approach increased rapport and helped me to develop a deeper understanding of the children's experiences. For example, talking with Bryony about how she played outside on her scooter after school developed into a conversation about how her attitude to (and experiences around) bees has changed after taking part in the EE project. There were times, however, when the noise and activity made data collection difficult and affected my ability to hear and transcribe data, but by combining multiple interviews with many short interactions throughout the project, this problem was minimised.

Sometimes the children gave different responses to what I considered to be essentially the same question, for example, as shown in Chapter 5, section 5.8, Willughby said taking part in the EE project did not help his wider learning in school but later also said he felt it had helped him to reengage with his 'normal' English and maths lessons. By analysing the data throughout the fieldwork, I was able to revisit the questions in a different way. Without referring to apparent contradictions, I was able to talk with the children about how they understood the questions, was able to ask questions in a more understandable way and check with the children if I had understood them correctly. Hence when talking with Willughby he confirmed that taking part in the EE project had helped him with his English and mathematics, but he did not associate English and maths with the term 'wider learning'. Throughout the fieldwork, by comparing what the children said and reflecting on seemingly conflicting responses, I was able to increase the reliability of the data.

I asked permission to ask questions and record our interactions, and reminded the children regularly that they did not have to answer any (or all) of the questions and could end the interviews and interactions at any point. However, I was also watchful for signs that may have indicated that a child felt uncomfortable or did not want to take part. For example, on one occasion I asked a child about their experiences using the iPads (something that has happened in almost every session), and they replied, 'I can't remember about that'. Although it did not happen often, there were several occasions when a child appeared to be politely bringing an aspect of the data collection to an end. At these points as an ethically responsive and reflexive practitioner, I did not pursue this specific data.

Another limitation of interviews is that data collection and interpretation 'is never free from the influence of power-laden social contexts' (Barton, 2015:199) and that there is a purpose to the 'conversation' during an interview. As meanings of interviews are co-constructed and not value free, the influence of power balance was important (Lichtman, 2012). Warming (2011) highlights that my role as an adult participant-observer within an adult dominated context and culture may have influenced the children's behaviours, interactions, and responses. For example, Violet's comment that wasps should die but bees should not, indicates that the children may have been influenced by demand characteristics such as trying to please me, or to say what they thought was the 'correct' thing. However, I reiterated to the children throughout the fieldwork that there was no right or wrong way to experience any aspect of the project, but rather it was helpful to me if they said what and how they felt, whatever that was. In this way bias in the children's responses was mitigated and the examples when the children felt comfortable telling me (sometimes at length) how some of the activities had been challenging supports this.

Turning to the observations, I was a participant observer throughout the project, and this meant I did not collect systemised observations. However, the role of participant observer was a suitable approach which suited my experience of working in schools and the fluid nature of the evolving EE project and is a recognised approach to collecting qualitative data (Stake, 1995). However, again, there were limitations to the data collection using this approach. Observations were often done when I was interacting with the children, and I asked their permission to film or make notes about the activity. When observations were done without direct interaction with the children, the whole class was reminded that I would be filming and making notes, and all the whole class were always asked permission for me to do this (even though they were not the focus of data collection). One child in the class (who was not part of the group of children who agreed to take part in additional data collecting activities but sometimes worked with the children who were) did not always want to be filmed or to have her photograph taken. I always spoke with her in an unobtrusive way

before the observations to ask how she felt about me observing different parts of the session, and what she would like to do. Sometimes she was happy for me to film the whole class and to be included in the data, at other times she preferred for me to only film in a way that she was not on film, or identifiable (e.g., talking in the background). I asked each time if she would prefer for me not to film at all, but she never wanted this. At the times she was working directly with any of the children who were part of data collection group, we had the same conversations; and again sometimes she preferred to be included (but liked to look at the photographs and films to see if she was happy with them) and at other times she did not want to be included but was happy for me to film in a more focused way on the other children.

Also, observations were only made during sessions when the children were involved in EE activities and when they had been told I would be making observations. If the children appeared to be doing something that was not to do with the EE project, I either noted they were 'off task' (my shorthand for doing something else rather than an indication of where I thought their priorities should lie) or made a brief note of the activity (e.g., rubbing pencil eraser across top of desk). If the children appeared to be discussing something that was not related to the project, I stopped filming and moved away as I did not consider this ethically appropriate data collection. I made a note that the I had stopped the observation. In this way, I maximise observational data collection whilst maintain an ethical duty of care to all the children in the class.

I recognise that the research was limited in terms of the inclusion of children's voices. Working exclusively within the school environment excluded children not in school and members of the wider community but the aim was to research primary school education so this was not considered to be a problem. However, as I developed the initial research idea (i.e., exploring experiences of EE using bumblebee conservation) and engaged the children in directed project and data collection activities this inherently limited the input from the children. Although I initially planned to include a Mosaic Approach to data collection (including visual as well as verbal methods) to increase accessibility for the children's voices and to provide different approaches to share experiences (see Chapter 4, section 4.4) some of these were not possible or effective. The limitations and problems which arose during some of the data collection methods may have been mitigated if I had more time to discuss with the children how they wanted to share their experiences, instead of providing pre-prepared data collection tools.

There are also tensions surrounding researching a project which I instigated and developed, and the difficulty of being 'impartial or objective' when researching children, nature and EE

(Gill, 2014:11). Alongside academic reading, my lived experienced had provided anecdotal evidence that experiential education and critical pedagogies were effective approaches to education; and thus, I believed utilising these approaches would be effective for an EE intervention too. Therefore, there was an inherent risk of confirmation and researcher bias.

I advocate for the publishing of 'negative' results and results that do not confirm initial research hypotheses as I believe 'null' results and unexpected results provide important data which is as equally valid as confirmatory findings. However, I am aware that on a personal level, I would have been disappointed had the EE intervention not resulted in positive outcomes regarding EE, wellbeing and social development. Mindful of this, I actively analysed the data for indications and examples of when the children's experiences of the EE project were not in line with my beliefs and expectations about the enactment and experiences of these pedagogies. These analyses were used alongside and compared with the other findings to develop a reliable and trustworthy account of the children's experiences. For example, although I had expected working in groups outside to be beneficial to the children's learning (partly due to the uncomfortable working conditions in the classroom) analysis of the children's experience of the first critical thinking session (detailed in Chapter 5, section 5.3.1.4) demonstrated that simply working in groups and moving outside was not sufficient to create a useful learning experience.

The research aim was to use a case study to explore children's experiences of an EE intervention to provide additional insights into the facilitation of EE in primary education (Green & Hogan, 2005) and a limitation of this approach is that generalisations cannot be made from a case study. However, the intention of this research was not to generalise but to gain knowledge to contribute to knowledge and a small-scale study does this. However, notwithstanding limitations, the research provided important findings which extend previous literature. The following section will now address the contribution of this research to practice, policy and education theory.

7.3 The Contribution of the Study to Education Practice, Policy and Theory

7.3.1 Contribution of the Research to Education Practice

Research indicates that education and conservation projects often focus on 'exotic flagship' animals (Ballouard, et al., 2011) and rarely on (Potts et al., 2010). Nevertheless, developing an EE project around bumblebees increased the children's positive affect towards bees and other insects, encouraged locally based environmental action and positively influenced interest in wider environmental issues.

- Therefore, this thesis advances (1) that school practice should include EE which includes local wildlife and biodiversity.

Another key finding was that the ELT pedagogies used throughout the project had beneficial spillover effects across the school day and positively influenced wider engagement in learning. The children explained that their experiences of learning in the project not only supported the development of crucial EE skills, but importantly facilitated increased engagement in English and mathematics as well. The sense of confidence that the children developed by being 'successful' in new and different ways was evident and their engagement with learning and behaviour improved. For example, when Ivy had the opportunity to use EE pedagogies, her anger and frustration with the difficulties she encountered in English and mathematics lessons was reduced and her reengagement, resilience and more positive attitude towards learning was evident. She described how she was: 'A bit more confident basically and ask more questions in maths and English' (Ivy:QW). Children who had been restricted by the rigid, non-diverse teaching and learning methods, when given the opportunity to express themselves in different ways grew in confidence and became much more active members of the learning community (Wilkes' enthusiasm to answer questions for example). Thus, the project pedagogies were shown to facilitate the development of a positive learning cycle which positively impacted other learning. This demonstrates the wider effectiveness of ELT and CP to education.

- Therefore, this thesis advances (2) that school practice should include EE which is grounded in ELT and CP as this not only facilitates EE but supports the development of social and emotional skills which have wider benefits on learning.

Looking at these findings specifically in relation to classroom practice, using ELT to engage with explicit and statutory curriculum requirements increased the relevance for the children and supported their engagement and understanding. They realised **'**there's more to English and maths than it seems when you just go into it' (Mason:Post) and began to make connections between previously distinct elements of the curriculum. This was more interesting for the children who explained they found it interesting: 'Because you're doing things to help the world erm instead of just learning your average English and maths' (Heather:Post).

- Therefore, this thesis advances (3) that school practice should use ELT and CP pedagogies to connect curriculum requirements to other aspects of learning and the children's lived experiences to increase the meaning and relevance of learning.

The ELT project-based approach also helped the children to recognise that learning is more than desk-based, teacher led activities; and they began to transfer learning behaviours to

different situations and environments. For example, although at the beginning of the project the children thought outside was: 'Sometimes seen more as 'playtime' (Heather:Mid) at the mid-point of the project, children were actively engaging in learning when outdoors. Willughby for example explained how being involved with the project had helped him by making [him] understand how to behave outside', (Willughby:Mid).

- Therefore, this thesis advances (4) that school practice should use flexible, project-based approaches which allow children to work in different environments in the school, support them to actively make connections between different aspects of learning, and facilitate the development of a holistic understanding of learning (i.e., 'learning' is not only writing in books).

Throughout the EE project, the children wanted to work collaboratively and to be part of an active learning community; and when they were able to do this their confidence and skills developed. As the children were working on different elements (e.g., jigsaw learning; working in the wildlife area) there was little direct comparison between them, and this allowed the children to both focus and share different aspects of the topic. Whilst providing a range of methods for the children to engage with tasks and do things in different ways also helped increase communication and was universally helpful. For example, Heather enjoyed the opportunity to draw pictures to share her ideas because: 'when like you talk it doesn't make sense but when it's on a piece of paper drawn it's more [waves hands around] vision' (Heather:Post). Although increased communication and understanding between the adults and children and played a key role in the children's experiences; as Willughby explained 'you actually listened to us' (Willughby:Post). The data also highlighted that the learning interactions between classmates is an important and unique support and learning network that cannot be replicated by child-adult interactions. Although lack of time and other resources can cause problems for interactive pedagogies, this research demonstrated the question and suggestion walls were very easy to implement in the classroom.

- Therefore, this thesis advances (5) that, considering the high impact on engagement, but low impact on resources, primary school classrooms should adopt the use of question walls.

A further contribution from the research was the importance of meta-cognition skills to support individual engagement with learning. Despite the children having an innate understanding of their own learning, no explicit ideas or strategies for learning were being discussed in the classroom. However, by not giving the children the opportunity to think about and understand the ways things happen in school they are hindered in their engagement and ownership of their learning. The extent to which this helped the teacher to

understand the needs of the children was an unexpected finding and is another valuable contribution of the research.

- Therefore, this thesis advances (6) that meta-cognition activities should be done early in the school year so that children can explore their emotions and behaviours when learning; and to support the teachers to better understand and support the children.

Looking at behaviour management, the research findings demonstrated that the children want to learn, and episodes of 'disengagement' and 'disruptive' behaviour were related to confusion, boredom and frustration. Although the ELT pedagogies were considered 'high risk' (Mrs Lathbury) both in terms of the children's behaviour and attainment, and the choice and physical activity allowed by the ELT pedagogies provided a new and flexibly way of working which was initially worrying for the teachers, these approaches soon supported increased engagement from the children. The more freedom the children were given the 'better' their behaviour became. This 'challenging' class adapted very quickly to the project approaches and 'engaged better than expected' (Mrs Carter:Post). Despite the initial fears of the teachers, the children interacted and learned in ways that far exceeded the teachers' expectations. Contrary to teacher expectation, the children did not only cope with the new pedagogies but thrived in these sessions. The behaviour improved with the more freedoms the children were 'given'. They became calmer and more focussed on the activities and began to self-regulate and work pro-actively.

- Therefore, this thesis advances (7) physical movement and choice are beneficial to engagement and learning. Children should have more flexibility in how they engage with learning. Teaching activities should be developed so that children can have more input into their own learning and more physical freedom when learning.

The vital importance of the group dynamic in the children's emotional experiences was entangled throughout the research. However, although peer support could be helpful when looking more closely, it affected the children differently; and was not always equally beneficial for each child. Although most of the children were happy to approach to increase their understanding and learning by asking for help, it was unhelpful if people disagreed about approaches (Violet and Gwynne's disagreement about notetaking, for example) and it was unhelpful to be distracted when trying to work. All the children say they find it helpful to be asked who they work best with, and who they would like to partner with. Choosing who to work with was particularly important for eight of the children. Wilkes and Ivy stated they would prefer to have either random allocation or teachers selecting groups; but they explained this was because they struggled to work with the people they wanted to. This

again highlights how much individual preferences influence the experiences of peer support and potential pitfalls when using this approach. However, although the teachers intervened to stopped children working together if they were not getting on well (Field Dairy), they did not appear to actively support children who were struggling to join groups, and this was an interesting observation.

- Therefore, this thesis advances (8) children should have flexibility in approaches in both accessing and sharing learning. They should also have flexibility in who they work with. However, freedom of choice can be problematic, and teachers should support children to interact with people they work well with – not only by stopping people who antagonise each other from working together, but crucially by also supporting children to engage with people who may enhance their learning.

The strategy of keeping Year 5 contained in the belief that this helps the class works better appears to be demoralising the children and my research findings demonstrated that such containment is unnecessary. Findings repeatedly demonstrated the children had a strong desire to learn and when things stopped them from learning it was: 'rubbish' and 'annoying' (Davies:Post). During sessions, talking with the children and trying to identify the barriers to their learning helped them to engage differently. Talking to the children in the moment to try to understand the reasons for their apparent negative behaviour takes time and often more than one adult, resources that are not often available to the teacher. However, using a combination of ELT and CP and encouraging the children to think of themselves as co-members of a learning community, helped them to reflect on their own choices the sessions (not listening in the first pollination session for example) and to take more responsibility for their actions. Rather than using behaviour sanctions, increased understanding supported increased self-regulation and reduce the need for behaviour management. Thus, although this individualistic approach can initially take a little time to embed, in times of heavy curriculum workloads and reduced resources, this approach to classroom management could quickly pay dividends for the school community.

- Therefore, this thesis advances (9) that children want to learn. Problems with engagement and behaviour should not be presumed to be rooted in a lack of desire to learn but to be related to a barrier to learning.

7.3.2 Contribution of the Research to Education Policy

EE is essential to empower children to protect and restore the environment (McGregor, 2013). Children must be supported to develop the knowledge and skills to stop and reverse environmental damage; and to do this EE is vital. However, although the National

Curriculum includes suggestions and nudges to include teaching and learning about the natural world and the climate crisis, my research strengthens the argument that because EE is not an explicit curriculum requirement it remains either absent from the school day, or organised in a piecemeal way, integrated into different topics in different ways by teachers (who may or may not be open to new methods and new learning). Thus, it remains an unsystematic and haphazard experience, which does not allow all children to develop understanding and skills in a coherent way. This is a critical and fundamental problem for children who fear 'when we're 30ish the world could just be nothing' (Gwynne:Pre). If EE is to be anything more than an optional extra, embraced by 'alternative' schools but only included in mainstream school if they have particularly passionate EE advocates, it must become an explicit and compulsory curriculum requirement.

- Therefore, this thesis advances (1) English primary school education policy needs to change. EE must be explicitly included (and resourced) as a statutory curriculum requirement. Only in this way will time, training and resources be provided to ensure all children have the knowledge and skills they need to negotiate the 'wicked' problems they are facing.

Another key finding in my research was that that despite teacher concerns about behaviour, the need to fulfil curriculum requirements, and lack of time and resources in the school system, the project-based approach to EE, grounded in ELT and CP supported increased wellbeing, behaviour and attitude to learning. All of the children described feelings of fun and excitement when doing the project activities, attitude to learning, for example: 'If I like say I can practise this I'm going to get better' (Bryony:Post) and the project: 'Got me more into doing my work and like actually like not giving up' (Ivy:Mid), Willughby explained, working on the project made him feel: 'More active and energetic… cos you're not just sitting in the classroom being bored', (Wilughby:Mid). Although the teachers explained there was no time or funding available to learn these pedagogical approaches, outdoor learning is already an integrated aspect of the Early Years Foundation Stage (EYFS). However, although central to teaching in the Early Years, outdoor and experiential learning is removed from the classroom when the children move to Year 1. The children's responses to the project pedagogies demonstrated that these methods are helpful for older children too.

- Therefore, this thesis advances (2) that rather than changing the fundamental pedagogies of learning when children transition from EYFS to Key Stage 1, experiential and outdoor learning should be integrated throughout primary school education.

Rather than an end in themselves, ‘knowledge and facts’ should be taught in conjunction with critical pedagogies and practical skills because by having both knowledge and skills for further enquiry, learners can explore, challenge, and develop society.

- Therefore, this thesis advances (3) that there needs to be a more flexible approach to teaching and learning. Rather than focussing on increasingly complicated curriculum testing, there must be a range of ways to recognise what the children can do; and schools should instead focus on facilitating children to have meaningful learning experiences.

As responsible educators we need to facilitate children to develop the skills they need to cope with the challenges they will face. To engage with wider social issues, questioning and thinking skills to understand the connections between everyday life and political policies are needed (Hildreth, 2012). Policy makers should look at how truly critical thinking activities can be included into the school curriculum. Integrating critical thinking through EE using ELT and CP helped the children develop an ability to question and challenge what was happening around them; and was an accessible and effective way to effectively introduce critical thinking into the primary school day.

- Therefore, this thesis advances (4) schools should integrate EE grounded in ELT and CP to support the development of children’s critical thinking in a more meaningful way.

The findings in my research demonstrated that supporting the children to understand social and emotional aspects of the classroom improved teaching and learning. However, despite the need for children to constantly develop their social and emotional skills the teachers explained this is not reflected in curriculum objectives beyond Early Years (ages 4-5 years); and important social and emotional skills are not prioritised in the curriculum for older children. In line with Dewey, this thesis argues that maintaining focus on ‘fixed, final, and predefined standards seriously hamper caring, and responsible relationships in learning communities’ (Reich, Garrison & Neubert, 2016:1004).

- Therefore, this thesis advances (5) that there needs to be a greater focus on children’s social and emotional experiences of learning throughout all years of primary school education.

This thesis argues that if children are to develop positive emotions towards the environment, see themselves as capable contributors, and be empowered to take positive environment action EE is critical and needs to become a central priority within the primary education system. This research demonstrated that using a model of ELT combined with CP is an

effective way to integrated EE into the school day in a way that is realistic for the teachers, enjoyable and effective for the children, and fulfils curriculum requirements. Moreover, not only is EE crucial for a sustainable future, but the learning and wellbeing benefits of EE engaged with using ELT and CP are so great that it should be integrated into mainstream education.

- Therefore, this thesis advances (6) that EE should be a statutory requirement in the curriculum. The model of EE which combined ELT with CP used in this research is an accessible and effective approach to integrating EE into mainstream education practice in English primary schools. This model should be adopted.

There is a need for a fundamental shift in English schools, away from prescriptive pedagogies which deliver a fixed curriculum and towards child-led experiential, project-based pedagogies that facilitate EE knowledge and skills. As well as promoting EE to increase pro-environmental behaviours and academic performance (Dyment et al., 2014). EE should be seen as an effective way to support children to develop in a holistic way. However, findings showed that lack of resources negatively impacted on the children's experiences and teachers felt they needed training to facilitate sessions.

- Therefore, this thesis advances (7) schools should have the resources needed to facilitate experiential EE in the school day and teachers should be trained in EE, ELT and CP. This investment will pay dividend not only in its impact on EE but on wider learning and engagement .

7.3.3 The Contribution of the Thesis to Education Theory

Ecopedagogy is a powerful way to enact EE, however this approach is an unrealistic approach to integrate into the current neoliberal model of primary school education in England. However, EE which does not introduce the critical thinking skills which are needed to address the 'wicked' problems of sustainability is to the detriment of children who need these skills to tackle the environmental problems they are facing. In this research, the tension between the needs of EE and school politics was addressed through the careful integration of ELT with key elements of critical pedagogy. The research demonstrated that this pragmatic adaption of theory was an accessible and way to integrate effective EE within the school day in a way that was both workable for the school community and compatible with the politics of neoliberal mainstream primary education.

Therefore, this thesis advances (1) the use of the adaptation of Dewey's (1997) Experiential Learning Theory with selected aspects of Freire's (1996) Critical Pedagogy developed a workable model that overcomes the tensions between the political nature of mainstream

education in England with the need for children to access EE. This is a useful contribution to education theory.

Having presented the contributions of this research to practice, policy and theory, the conclusion now puts forward suggestions for further research.

7.4 Suggestions for Further Research

Suggestions for further research are group into three general categories (1) future research to replicate and develop the original research to build on the findings in relation to EE, (2) future research to develop children's voices in participatory research (3) future research to build on the findings for education practice more generally, and (4) future research to develop education theory.

7.4.1 Future Research to Develop EE

Firstly, it would be useful to repeat the case study. I strongly advocate for research that replicates studies as a powerful way to strengthen, develop and advance findings and arguments. Having identified key aspects of experience, developing research to include more detailed and structured observations and data collection of these (empowerment and engagement for example) would allow a greater understanding of the impacts of the children's experiences.

Developing research in which the EE project was teacher-led would also be beneficial. More work is needed to understand the teachers' experiences of EE interventions to help effective incorporation of EE into the school day.

The EE project should be repeated in different schools. The school was in a semi-rural area and had access to a large field, this allowed easy access to an outdoor space to explore and develop a wildlife area. Repeating the research in schools which have limited access to green spaces (urban schools for example) would be beneficial.

In my research, the children were capable and competent when talking about their own experiences. They gave important ideas and perspectives for EE (and wider learning) and provided perceptive contributions for the development of teaching and learning. More work should focus on the inclusion of children's voices about their experiences of education, and their ideas for educational development. Thus, further research should include children in developing their own environmental projects including (1) the research design, (2) what aspects of EE to research, (3) the EE project design.

7.4.2 Research to Increase Children's Voices in Participatory Research

To increase the participation of the children, future research would benefit from working with the children prior to the project, facilitating the children to develop their own project focus, and supporting the children to explore and develop their own ways to communicate their experiences.

7.4.3 Research to Develop Wider Education Practice

This research explored an adapted version of ecopedagogy and in doing so one unexpected finding stood out. The confusion over critical thinking activities demonstrated that although the teachers were including activities that were 'critical thinking tasks', the children were not developing critical thinking skills. On reflection with the teachers, they explained that the critical thinking tasks they set in class were sometimes closed questions, the teacher always had an answer or solution to the task that was set, and the children often tried to work out the 'correct' way to respond to the activity. More work to explore adaptations of CP aspects of EE would help to strengthen the model to better facilitate the development of the critical thinking skills that are crucial to EE, long-term sustainability, but also education more widely.

Another unexpected finding was the impact of the meta-cognition activity, not only on the children's understanding of themselves as a learner, but also of the teacher's understanding of the children. Although the schoolteachers in my study had undergone meta-cognition training, they only used it to support their understanding of learning more generally and had not introduced the concepts to the children. Future research should explore the impact of adaptations to meta-cognition activities (especially at the beginning of the school year) on the children's access to learning, and the teachers' methods of teaching. This knowledge would be beneficial for EE, but also teaching and learning throughout primary school education.

7.4.4 Research to Develop Theory

The model of EE developed in this research used an adaptation of ecopedagogy which included ELT and CP with a Year 5 class in a primary school in England. Further research is needed to explore how this model can be used in other year groups in primary schools. This would be useful for the development of whole school approaches to EE. Research is also needed to explore the effectiveness of this approach in other education sectors (secondary schools for example) and in different countries.

The model used in this research did not include key elements of ecopedagogy (the environmental damage and injustice resulting from the neoliberal politics of the Global North,

or the impact of colonialism for example). Future research should explore how different adaptations of ecopedagogy can be used in education, for example, when and how to introduce environmental justice effectively and ethically into EE.

7.5 Summary

This thesis has argued that EE is essential for children and should be a statutory requirement in the English primary school curriculum. In this case study research, an EE project focused on bumblebee conservation was developed and facilitated in a primary school in England. The project was grounded in Experiential Learning Theory (ELT) (Dewey, 1997) combined with elements of Critical Pedagogy (CP) (Freire, 1996). Data analysis of the qualitative data collected about the children's experiences, demonstrated that the project was effective in terms of EE outcomes, and the children's experiences of the project was overwhelmingly positive. The pedagogies of ELT increased choice, which helped the children to become increasingly empowered and to take ownership of their learning, whilst the increased opportunity to work together supported the development of social and emotional skills, and increased collaboration and feelings of inclusion. The physical activity, hands-on activities, and working outdoors was not only fun, exciting, and enjoyable for the children, but reduced friction between them and promoted the development of social, emotional, and practical skills which raised the children's feelings of confidence. Findings also showed that the increased engagement and positive behaviour change spilled over into the rest of the school day.

Thus, the findings demonstrated that (1) EE can be integrated successfully into the structures and boundaries of the school timetable and fulfil curriculum requirements; and (2) the children's experiences of the EE project pedagogies (i.e., experiential learning and critical pedagogy) were successful in terms of outcomes for EE and were beneficial for the children's wider learning and behaviour. Based on the findings, this thesis advanced actions for teaching practice and education policy, whilst the adaptation of ecopedagogy (through the combination of experiential education based on Experiential Learning Theory (Dewey, 1997) and selected aspects of Critical Pedagogy (Freire, 1996), has also extended education theory. In these ways, this thesis has contributed important findings to the research literature on environmental education.

At times of growing environmental concern and the need for pro-environmental action, by exploring effective ways to include EE into English primary schools gaining insight into children's experiences, this research is timely. Firstly, the research strengthened previous findings that children want access to EE (De Moor et al., 2020). Secondly, the data demonstrated that using an adapted version of ecopedagogy, which draws on Dewey's

Experiential Education Theory (i.e., using hands-on, lived experiences, group work, skill building and choice) along with the critical thinking, questioning, discussion and research skills of Freire's Critical Pedagogy, created an emancipatory approach to EE which was accessible to the children and adults, and was an appropriate primary school pedagogy. The EE intervention project increased the children's respect and empathy for nature, supported the development of pro-environmental skills and prompted pro-environmental behaviour change. Importantly, by focusing on bees as intrinsically worthwhile (rather than focusing on their pollination and honey making benefits for people) a less human-centric model of EE is created that I argue is well-suited for education in the Anthropocene. Thirdly, taking part in the project was transformative for this group of children, not only for their engagement with EE; and participation in the project also had positive transformational effects on the children's social skills, behaviours and wellbeing which was seen across subjects and throughout the school day. This alternative approach to classroom practice improved behaviour, facilitated the development of social skills, and increased engagement with learning whilst also fulfilling curriculum requirements and enabling children to achieve expected curriculum outcomes. The project activities were purposeful and relevant, and the flexibility, variety and choice created an inclusive environment of learning in which everyone (including previously marginalised children) engaged as equals.

Although teachers report concerns about ongoing accountability and performativity expectations linked to the national curriculum (Greany, 2018) and state these worries as reasons to use prescribed approaches to teaching and learning, this research shows that to be successful, education does not have to be formalised and rigid. Despite the rhetoric from the government and Ofsted about 'what works' in primary school education, namely, standardised programmes of work and ongoing, formalised assessments to monitor what has been done and the 'progress made' by the children (Braun & Maguire, 2020), this research demonstrated clearly that school practice can be done in a different way and still maintain (even improve on) expected outcomes. I recognise that working within the constraints of the National Curriculum, teachers and school management worry about including EE into the school day and engaging in alternative pedagogies. I argue that the holistic, nature driven approach to content and pedagogy (i.e., an adapted version of eco-pedagogy) offers an alternative conceptualisation of curriculum enactment for English primary schools which is an effective approach for EE and to teaching and learning in the Anthropocene. As such, school leaders need to be brave and take risks when facilitating EE and looking at curriculum reform (Balgopal, 2020; Brundrett & Duncan, 2015).

Epilogue

To thank the school and the children for their help with my research, it was originally planned that I would continue to help the school as a volunteer in the academic year 2019-2020, and to work with the children in school and in the wildlife area. However, although I did initially return, during the winter of 2019 the Coronavirus, COVID19, was making its way around the world. In March 2020 (after weeks of chaos and confusion) the UK government conceded that England was within the grip of what had become a global pandemic and mandated the first UK wide lockdown. The movement and activities of people was heavily restricted. For whole swathes of children, primary education in mainstream settings essentially halted as schools were closed and 'distance learning' was introduced. The lockdown meant my visits to the school had to stop. I was disappointed not to be able to continue working with the children and the teachers, but the pause gave me time to reflect on the research process and how my relationships with the teachers had also evolved during the fieldwork.

In hindsight, I realised that I did not initially appreciate how much the teachers trusted me and how much of a privileged position I was in as a researcher because I was already known to the school. When looking back, I also recognised that although discussions with the teachers and having flexibility of approaches throughout OB were important for the project to fit in with school requirements, timetable and available resources, I did not at first understand how uncomfortable the teachers were with using the project pedagogies nor that they felt unable to facilitate sessions. Thus, although I talked through the sessions with the teacher prior to the start of each one, I did not initially recognise that the teachers expected me to lead the project facilitation rather than being a researcher who was also a participant observer. However, throughout the project, the teachers became more confident to challenge themselves to engage with new pedagogies and felt more trust in the children's abilities to productively guide their own learning; and over time my relationships with the teachers shifted away from me as the researcher facilitating sessions, to a co-production model in which the teachers increasingly engaged.

Working together, several sessions changed from the initial activity idea or moved away from the pre-prepared outline suggested when the teacher wanted to facilitate the sessions in a different way or wanted to include elements more closely linked to the curriculum. For example, in the session about bee communication the teacher included a worksheet which compared how humans and bees communicate. Adaptations to the data collection also happened throughout the fieldwork when the teacher wanted to include something for the whole class. An example of this was when the initial idea for the ten children to make a short film about their experiences of the EE project was changed by the teacher into a more

directed lesson in which the whole class made documentaries about OB and the wildlife area. Thus, flexibility, co-production and adapting activities to fit in with school requirements, timetables, and available resources was key to the project's success but was also important for the teachers' investment and ownership of OB. Furthermore, when looking back at the data collection, I would now also ask the children which approaches to data collection they would like to use because their input at an earlier stage would have saved us all a lot of time and energy.

Although I was not able to return to the school to work with the children during their Year 6, I do occasionally still pass the school. I can see the wildlife area in the distance, the long grass of the 'no mow' area swaying between the trees; and although I am never close enough to see if the herbs and wildflowers survived, or if the bee nests and houses are being used, to me, it is still beautiful. I hope to go back one day.

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Appendices

Appendix 1: Search Terms, Journals, Organisations and Online Resources Used.

Appendix 1a: Search terms used for literature review.

- Bumblebees
- Bumblebees + Education
- Case Study
- Children + Environment
- Children + Experience
- Children + Research
- Children + Voice
- Conservation Education
- Conservation + England
- Conservation + UK
- Dewey + Education
- Dewey + Experiential Education
- Eco-schools
- Education for Sustainability
- Education for Sustainable Development
- Environmental Education
- Environmental Education + England
- Environmental Education + UK
- Experience
- Experiential Education
- Experiential Education + Environmental Education
- Flagship animals
- Flagship animals + Conservation
- Flagship animals + Education
- Forest Gardens
- Forest Gardens + Education
- Forest School
- Forest School + England
- Forest School + Experiential Learning
- Freire
- Freire + Critical Pedagogy
- Freire + Education
- Freire + Pedagogy of Hope
- Listening to Children
- Listening to Children + Qualitative Research
- Neoliberalism + Conservation
- Neoliberalism + Education
- Neoliberalism + English + Education
- Neoliberalism + Environment
- Neoliberalism + Environmental Education
- Neoliberalism + Geopolitics
- Primary education + England
- Primary school education
- Primary education + UK
- Primary education + environmental education
- Qualitative Research
- Qualitative Research + Children
- Sustainability Education

Appendix 1b: Journals Searched for Literature Review.

- Childhood
- Childhood Education
- Childhood and Philosophy
- Children and Schools
- Children, Youth and Environments
- Children's Geographies
- Education 3-13
- Educational Action Research
- Education and Culture
- Ethics and Education
- Environmental Education Research
- Educational Research
- Education Research International
- Global Journal of Environmental Research
- Journal of Cleaner Production
- Journal of Environmental Education
- Journal of Environmental Management
- Journal of Environmental Psychology
- Journal of Environmental Sustainability
- Journal of Innovation and Research in Primary Education
- Journal of Primary Education
- Journal of Sustainability in Higher Education

Appendix 1c: Website used for activities.

www.bumblebeeconservation.org

www.energy-heroes.org.uk

www.globaldimension.org.uk

www.growtoschool.co.uk

www.se-ed.org.uk

www.susted.com

Bees and flowers communicate with electricity: youtube.com/watch?v=fzqcuUZiz6Q

Flowers in ultra-violet - Insecta Spectra.

How bees can see the invisible – https://www.pbs.org/video/how-bees-can-see-the-invisible-kunhee/

Internet clips:

Smell: why why club.com – search 'bees' = Lulu the bee clip

Movement – Smithsonian channel 'What's the waggle dance?'

Warning signals – tree bumblebee displays 'back off' signs when threatened (You Tube)

Curiosity.com/topics/bees-yell-whoop-when-theyre-startled

Appendix 2: Activities in the Operation Buzz Sessions – Outlines of the first 8 sessions; details of specific activities, and examples of critical thinking question prompts.

Appendix 2a: Outlines of the first 8 sessions of Operation Buzz (to provide examples of the project session structure).

Session 1

- Bee quiz
- Mind mapped what we thought/knew about bees
- Started Thinking Diaries and Question Wall
- Explored the field – wrote 3 observations and 3 'wonderings'

Session 2

- Bee life cycle
- Explored the field and raised beds
- Talked about different ways of learning – especially 'jigsaw' learning.

Session 3

- Types of bee – honey, bumble and solitary
- Jigsaw learning – investigated questions using books, sheets and iPads in groups and made 'honeycomb' display for the wall
- Discussed in small groups what we would like to do in the EE project – each group developed an argument for their ideas and presented to the class – we voted and the bee rescue kits won.

Session 4

- Bee anatomy and bee stings
- Watched Youtube clips of bee warning signals
- Watched Youtube clips of bee stings and a bumblebee rescuing another bee from a spider
- Pollination activity in hall

Session 5

- Bee rescue kits
    - What do we need to know?
    - Watched Youtube clips of bee behaviour
- Observational drawing of raised beds now alongside pictures of what we would like
- Started the bee club
- Wrote a letter to Mrs Carder – everyone contributed an idea/sentence

Session 6

- Bee rescue kits
    - Made saturated sugar solutions
    - Assembled bee rescue kits
- Wrote a letter to Mrs Carder by everyone contributed an idea/sentence
- Worked as a team to take photos of plants and bugs that we can find on the field now

Session 7

- Read and signed letter to Mrs Carder
- Critical thinking (outside).

Session 8

- Tried critical thinking again
- Planted seeds
- Bumblebee Activities Requested by Y5 Children.
- Investigating bee stings.
- Drawing bees on rocks.
- Bee first aid kits.
- Model beehive.
- Honey tasting and questionnaire.
- Children developed ‘bee corner – bee yourself!’
- Arts and crafts.
- Develop the flower beds.
- Bee anatomy.
- Squishy bee.

Appendix 2b: Example of Activities during the Research Project.

Activity	What is involved
Photography in the school grounds	Children choose and take their own photographs using the school iPads
Annotate a bee	Children will be given information which they can use to annotate a bee.
Bee life cycle	Children are given information and materials (cardboard, pasta etc) to recreate the bumblebee life cycle
Pollination	The children will investigate pollination using information supplied (information from the bumblebee conservation trust, internet, and books). Then they will use powder paint, model flowers and model bees for a hands-on demonstration.
Question Wall	Children write their ideas and questions on post-it notes and display them on a classroom wall – other children can read the questions/add to the questions/answer the questions
Research - bees	Children will use the school's IT equipment and library resources to research questions about bees – some questions will be directed but I hope most of the research will be child-led
Hunting for different types of bee	Children will be given information about solitary bees, bumblebees and honeybees, they can ask questions and explore identifying features of the different type of bee before going to the school field and garden to look for bees and other insects.
Research – environment and hands-on conservation activities	Children will use the school's IT equipment and library resources to research questions about the environment and hands-on conservation activities (such as bughouse building which was suggested by the children in the pilot project) – some questions will be directed but I hope most of the research will be child-led
Gardening	Planting bee-friendly, child-safe plants will be demonstrated to the children before they take turns planting and gardening. Children will have the opportunity to touch and smell the plants (this will be done in line with the school health and safety policy and the plants chosen will be informed by the parental feedback forms advising of any allergies or intolerances).
Poetry	The children will have time to write a free-form poem about topics such bees, the environment, their gardening, insects and other animals.
How to communicate	Children will learn about how bees communicate. Children will take turns communicating between themselves without using speech.
Planting seeds	Inside the classroom (or outdoors if suitable) children will plant sunflower seeds to take home
Bug house building	Children will research and design bug houses, as a group they will develop a final design which we will build with the assistance of the caretaker who knows about safe structures in the school grounds.
Observational drawing	The children will have time to look at different features of the school field and will draw a feature of their choice. These pictures will be used as prompts for discussion.
Tally charts	Children will use tally charts (probably supplied by the bumblebee conservation trust) to investigate which flowers bloom when, which seasons have the most food for bees etc.
Diaries	The children will each have their own book which they can use for collecting their own thoughts and ideas. One half of the book will be entirely for the children's own work, the other half of the book will be used for directed activities, such as the poetry writing.
Building water stations	Children will use the school's IT resources to research water stations for bees before working in groups to build two or three water stations.
Additional activities to have to hand: • Word search • Pictures to colour and annotate • Crosswords	• Templates for acrostic poems • Maths problems • Information booklets

Appendix 2c: Question prompts for critical thinking session 1.

- Everyone should go on holiday. Flying is bad for the environment. What should we do about flying to go on holiday?
- We need more flowers. Slugs eat flowers. What should we do about the slugs?
- We need to drive cars. Driving cars is bad for the environment. What should we do about driving cars?

Appendix 3: Details of Additional Data Collection Methods.

Appendix 3a: Likert Scale Questionnaires

Children chose an activity from the list below and everyone filled in their responses on response forms.

List of Activities to choose from:	
Bee Anatomy	Looking for plants and flowers
Bee communication	Writing in diaries
Food tasting	Writing a poem
Planting flowers and herbs	Researching about bees
Sowing seeds outside	Making bumblebee nests
Sowing seeds to take home	Making hedgehog houses
Bee water stations	Building log pile
Bee first aid kits	Assembly
Foldable bottles	Summer Fayre
Making bird feeders	Watching bee films on the white board
Putting out birdfeeders	Taking photographs
Litter picking	Making videos
Observing field	Writing a letter to Mrs Carder
Watching bees	Critical thinking
Bug hunting	Pollination

Likert Scale for Feelings when Doing a Particular Activity.

					Neither					
Confused										Understood
Anxious										Calm
Relaxed										Stressed
Interested										Bored
Happy										Unhappy
Engaged										Unengaged
Excited										Uninterested
Confident										Unsure
Curious										Not interested
Frightened										Relaxed
Disappointed										Happy
Listened to by my classmates										Ignored by my classmates
Listened to by my teacher										Ignored by my teacher

Involved										Not involved

My ideas are important										My ideas are not important

Included										Not included

My suggestions are important										My suggestions are not important

I would do this again										I would not like to do this again

I would change this activity										I would not change this activity

Likert Scale for Feelings when an Activity they Asked to Do was not Done.

Easy										Difficult

Annoyed										Calm

Relaxed										Stressed

Happy										Unhappy

Engaged										Unengaged

Confident										Unsure

Upset										Relaxed

Disappointed										Not bothered

Listened to by my classmates										Ignored by my classmates

Listened to by my teacher										Ignored by my teacher

Extension Likert Scale

When you chose who to work with, how easy was it for you to work in groups?

Easy									Difficult

When you were told who to work with, how easy was it for you to work in groups?

Easy									Difficult

How much do you think you have learned during the bee project?

Nothing									More than usual in school

How much do you think the wildlife area 'belongs' to you?

Not at all									Totally

Activities Chosen by Children

T	3	Food tasting
M	4	Planting flowers and herbs
O	7	Water stations
P	8	Bee first aid kits
L	12	Litter picking
R	15	Bug hunting
U	23	Assembly
S	24	Summer fayre
N	27	Making videos
Q	28	Writing a letter to HT

Summary of Responses from Likert Scales.

Activity	Positive	Neutral	Mixed	Negative
food	8	1	1	
planting	8			
Water stations	2	5		3
First aid kits	8	1		
Litter picking	5	2		1
Bug hunt	6	1	1	1
assembly	4	3	2	1
fayre	6	3		
videos	7	2		
letter	6	1		1

Feeling when:	Positive	Neutral	Mixed	Negative
Own suggestion was done	7			
Own suggestion not done			1	3
Someone else's suggestion not done	2	2		1

Feeling when:	Positive	Neutral	Mixed	Negative
Chose own group	8			1
Put into group	4	2		3
How much learned	9			
Ownership of wildlife area	8			1
Ownership of bee project	7			

Appendix 3b: Activity Sort.

The activities children were given to sort were:

1	GROUP	Working in groups	9	WS	Making water stations
2	BDF	Making and filling bird feeders	10	YTUBE	Watching internet clips
3	PTF	Planting flowers and herbs	11	PLWL	Planning wildlife area
4	THINK	Learning about learning (critical thinking)	12	COMP	Developing compost heap
5	BKITS	Making bee first aid kits	13	IPAD	Research on i-pads
6	BUGH	Making bug house	14	HHH	Making hedgehog houses
7	CORK	Making cork and stone bees	15	LTR	Litter picking
8	AMBY	Assembly			

Example of the Activity Cards.

Questions Asked.

Please order the activity cards to answer the following questions…

- Order the activities from most important to least **important for you.**

Most important ----------least important

- Order the activities from the thing you enjoyed the most to the thing you **enjoyed the least.**

Enjoyed the most ----------enjoyed the least

- Order the activities from the thing that was most challenging to the thing that was **least challenging.**

Most challenging ----------least challenging

- Order the activities from the activity when you learned the most to the when you **learned the least.**

Learned the most ----------learned the least.

- Order the activities from the activity that you would **most like to do again to the activity you would least like to do again**

Would most like to do again----------would least like to do again

Responses.

For each question, the responses were written down in the order given by the child. These responses were then colour coded and tabulated for each child. Data within the table was analysed for each child, between children, between activities, and compared to other data sources.

Example data for Child Q from 'most' to 'least' for questions 1 to 5 successively.

BUGH 6	HHH 14	BDF 2	WS 9	PLWL 11	PTF 3	GROUP 1	LTR 15	IPAD 13	BKITS 5	CORK 7	COMP 12	AMBY 8	THINK 4	YTUBE 10

HHH 14	BUGH 6	PTF 3	WS 9	LTR 15	BKITS 5	BDF 2	PLWL 11	COMP 12	CORK 7	GROUP 1	YTUBE 10	IPAD 13	AMBY 8	THINK 4

THINK 4	CORK 7	IPAD 13	PTF 3	HHH 14	BUGH 6	WS 9	PLWL 11	YTUBE 10	BDF 2	GROUP 1	BKITS 5	LTR 15	COMP 12	AMBY 8

IPAD 13	YTUBE 10	THINK 4	BKITS 5	HHH 14	BUGH 6	PTF 3	PLWL 11	LTR 15	CORK 7	WS 9	BDF 2	GROUP 1	COMP 12	AMBY 8

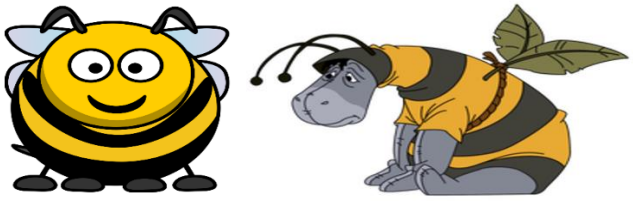
BUGH 6	HHH 14	BKITS 5	LTR 15	BDF 2	WS 9	PLWL 11	PTF 3	CORK 7	COMP 12	GROUP 1	AMBY 8	IPAD 13	YTUBE 10	THINK 4

Most															Least
Child Q															
Important	6	14	2	9	11	3	1	15	13	5	7	12	8	4	10
Enjoyed	14	6	3	9	15	5	2	11	12	7	1	10	13	8	4
Challenging	4	7	13	3	14	6	9	11	10	2	1	5	15	12	8
Learned most	13	10	4	5	14	6	3	11	15	7	9	2	1	12	8
Like to do again	6	14	5	15	2	9	11	3	7	12	1	8	13	10	4

Appendix 3c: Emotion Identification Task.

The children were given a copy of the bee cartoon pictures and asked 'What did you feel like when we were doing [named activity]?

Examples of 'Bee' Cartoons for the Emotion Identification Task.



To analyse the data the pictures identified by the children were tabulated alongside the video clip verbatim transcription. Using both the transcriptions and the pictures, I allocated the emotion described during specific activities as 'positive', 'negative' or 'neutral'. The results were tabulated using the codes p = positive, n= neutral, x= negative, pn = mixed positive and neutral, px = mixed positive and negative, , nx = neutral and negative. The codes were colour coded in the table. The table was then compared to other data.

Example of Data from Emotion Identification Task.

	Activity /Child	S	N	R	Q	P	M	T	O	L	U
1	Anatomy	20 Disengaged Bored	12 Involved	21 Interested Excited	22 Relaxed	8 Enjoyable	20 Confused	2 smiling	18 Fun	16 Ok	4 Good
2	Communication	2 Happy	2 Happy	10 Happy	4 Bored	10 Warned	10 Good	7 Wide eyed	10Interesting	11 Happy	11 Good
3	Food Tasting	18 Excited	7+13+14 Confused Brave	18 Happy (to learn the information)	18+22+ 23 Smiling arms wide Thumbs up Angry arms folded	15 Tasty	8 Happy Fun	10 Smiling	14 Not sure – lemon spoilt it	10 Wonderful	20 Alright
5	Sowing Seeds Outdoors	9 Liked but too short	8 Happy	9 Ok	5 Left out	3 Bored	21 Fun	17 Grumpy face	20 Fun Boring when too long	2 Happy	9 Good
7	Water Stations	19 Happy Interesting	Ok	2 More to the good side	18 Happy	11 Strong ?	19 Happy Good work	22 Thumbs up	22 Fun	18 Amazing	*3 Sad
8	First-Aid Kits	10 Happy Can help	10 Boom!	10 Interested Happy to help	9 Happy Excited	6 Happy Loveable	16 Boring Good	18 Smiling Arms wide	16 Should have done it straight away	21 Interesting	*14 Not bothered
10	Making Bird Feeders	*3 Felt left out	*	*9 ok	8 Relaxed	4 Misunderstanding	10 Happy	10 smiling	4* Looked fun	2 Fun	15 Happy

Summary of Data from Children's responses to Emotion Identification Task.

Activity	Positive	Neutral	Mixed	Negative
Anatomy	7	1		2
Communication	8	1		
Food tasting	7	1	2	
Planting flowers and herbs	9			1
Sowing seeds outside	4	1	2	3
Sowing seeds to take home	6	1		2
Bee water stations	8	1		1
Bee first aid kits	7	2		
Bottles	5	1		3
Making Bird Feeders	6	1		2
Putting out the bird feeders	7			1
Litter picking	8		1	
Observing the field	5	2	1	2
Watching bees	8			2
Bug hunting	8	1		1
Looking for plants and flowers	6	2		2
Writing diaries	2	2	2	4
Writing a poem	4			6
Researching about bees	9			1
Making bee nests	7	1		2
Making hedgehog houses	7	2		1
Building log pile	6	2		2
Assembly	5		1	3
Summer fayre	6	1		1
Watching clips on whiteboard	8		1	1
Taking photographs	7	1	1	1
Making videos	7		2	1
Writing letter to HT	6	1	2	1
Critical thinking	2		1	7
Pollination 1	4			5
Pollination 2	7		1	2

Appendix 4: Interview Question Frameworks.

Appendix 4a: Interview Questions for Children.

Pre-Project Interview Questions for Children.

- Can you tell me about your favourite animal or animals?
    - What do you like about them?
    - Why?
- What sort of things have you done in school about plants and animals?
- What about biodiversity, do you know this word?
    - Have you done anything about this in school?
    - Tell me what you think about it…
- What do you think 'environmental education' is?
- And what sort of things have you done about the environment?
    - What sort of things do you think are important for our environment?
    - What kinds of activities do you think help to keep our environment healthy?
    - And what kinds of things do you think might harm our environment?
    - Is there anything you do that you would say are 'environmentally-friendly'?
        - Can you tell me about them?
    - Are there any things you think people could do to help the environment even more?
        - What sorts of things do you think would be good?
- And sustainability? – Have you heard that word?
    - What does it mean to you?
- Thinking about the project we are going to be doing on bumblebees:
- Can you tell me what do you know about bees?
    - And what do you know about bumblebees?
- How do you feel about bees?
    - And insects?
    - Do you have a favourite insect? What is it?What sort of things would you like to learn about during the project?
- Just for fun… have a look at these pictures… we'll go through them one at a time and can you can tell me if you know what they are!
    - Do you know anything (else) about these animals?
- I'm interested in how you learn and what learning is like for you.
- What is learning like for you in school?
    - What do you like?
    - What do you not like?
- When do you think you learn the best?
- What sort of activities do you feel help you the best?
- What is group work like for you?
- If I want to understand what school learning is like for you what question do you think I should ask?
- What is learning in school like for you?
- What helps you to learn?
- What makes learning harder for you?
- What do you find fun?
    - What about this makes it fun for you?
- If there is anything, can you tell me about things you find boring in school?
    - Can you tell me about that?
- How do you think finding things fun or boring influences your learning?
- Do you feel you are better at the things/topics you find fun? Why is that?
- Do you do anything in school that helps you to think about how you learn? What learning is?
- Can you tell me how you learn in school?
- How are different things/topics/activities broken down in school?
- What sort of words are used when you are learning? What things do your teachers say, what words do your classmates use, what sorts of words do you use?

Prompts:	Note:
Can you tell me more about…	Body language
What do you mean by…	Surroundings
Check for understanding (mine/child) - paraphrase, repeat back	Atmosphere
What is not said…	Tone and emphasis
Body language…	

Mid-Project Interview Questions for Children.

- What's the project been like for you so far?
    - What makes it fun?
- What's the experience of the different activities been like for you so far?
    - What's been good about it?
    - What's not been so good?
- What's helped you in the project?
- What has been unhelpful?
- What have you enjoyed?
- Is there anything that you'd want to do more of?
    - What?
- Is there anything that you've not enjoyed - What have you not enjoyed?
- If you had to pick one thing to do again?
- How have the different activities compared to each other for you?
- How has working on the project compared to other lessons in school?
- Do you think the project's helped you with how you learn?
    - How's that worked?
- If you could change anything that's happened so far what would you change?
- If you could change anything to make the project better what would you change?
    - What would you change to make it better?
    - How would you make the boring things not boring?
- Do you think the project has helped you with your learning?
    - How? Why?

Post-Project Interviews for Children.

- Can you talk to me about the bee project?
- Can you share your thoughts about what we have been doing?
- Do you think it is important to have environmental education in school? Why?
- Within the project, what have you done that you think is important?
- Do you think environmental education should be on the curriculum like 'maths', 'English', 'science' etc.
- If you could talk to/ write to the people in the government who are in charge of education in schools and the curriculum, what would you say to them?
- Is there anything you feel has been unfair while we have been doing the bee project?
- Have you learned anything about how you learn (your learning)?
- Do you understand how **you** learn?
- Can you tell me what you think a 'good learning experience' is?
    - Why do you think that?
- Have you done to help your own learning?
    - What? Why not?
- Can you tell me what you think about how learning is organised in school now?
- Can you tell me what you would school to be like?
- What do you think about how the project was organised?
- Why do you think some activity suggestions were done, but not others?
- How did you get on with the group work?
    - Did you feel comfortable working in different groups?
    - Did you like choosing your own groups?
    - Do you think you got 'better' working in groups as the project continued?
        - In what ways do you think you got better?
        - Why do you think you didn't get better at working in groups?
- What did you do that made you feel good about yourself?
        - Why do you think that was?
- How did you feel when the idea to develop the raised beds changed to developing a wildlife area?
    - Is there anything else you would like to say or talk about?

Question and Suggestion Wall Interview Questions for Children.

• What did you think about the question wall? • Did you use it? How? • Did you find it interesting? Why? • Was it helpful for your learning? How? • Was it helpful for your understanding? • Why? • Would you do it again?	• What did you think about the suggestion wall? • Did you use it? How? • Did you find it interesting? Why? • Was it helpful for your learning? How? • Was it helpful for your understanding? • Why? • Would you do it again?

Additional Interview Questions for Children.

- Do you think the learning you have done on the bee project has helped you (had an effect on) your learning in other things in school?
- Do you feel you are able to do things on your own 'empowered' now – more, less, the same?
- What has helped you understand one of the hard things to understand?

Appendix 4b: Interview Questions for Teachers.

- What were you expecting before we started the EE/BB work?
- How have you found the project so far?
- What has been comparable with what you were expecting?
- What has been better?
- What has been worse?
- Which elements have you felt most comfortable delivering?
    - Why?
- Which parts have you found the most difficult?
    - Why?
- What do you think has worked well?
- What have you enjoyed?
- What has not been so good for you?
- How does it work having different teachers doing different sessions?
- How do you think the children have engaged with the work?
- Do you feel this is different to how they usually engage?
    - If so, how? Why?
- If any, what do you think are the benefits of this kind of working for
    - The children?
    - The teachers?
    - The school?
- Have you changed the way you think about anything within 'education' as a result of the project so far?
- Do you think you will change anything about your teaching practice as a result of the project?
- How well/easily do you think the activities fulfil the curriculum?
- How would you feel about facilitating a project like this within school?
    - If you were provided with resources?
- Do you think it is realistic for teachers to facilitate this kind of projects within schools?
    - Why?
- What differences do you think there have been between your 'usual' teaching/lessons and the OB project activities?
    - Can you tell me more?
        - Positives
        - Negatives
- How would you facilitate the project?
- What would you change?
- How do you think the children are understanding the project?
- What problems do you think there would be for teachers if they were asked to 'deliver' a project like this?
- What advantages do you think there would be for teachers if they delivered a project like this one?
- What disadvantages?
- How do you think a project like this could be integrated into a whole school approach?
- Overall, what do you think of the project
    - Content
    - Activities
    - Engagement
    - In relation to the curriculum
    - From a teaching perspective
    - From a learning perspective

Additional Post-Project Interview Questions for Teachers.

- Do you think EE should be explicit on the curriculum?
- Why do you think EE is not explicitly on the curriculum?
- Do you think involving children in EE has a wider effect on their learning in other subjects?
- How do you think the children's behaviour compared to their behaviour during other activities in school?
- If EE was explicit on the curriculum, would you prefer it to be 'woven through' the curriculum or a stand-alone subject?
- What do you think the children would prefer – stand along or woven through?
- How would having an additional subject/curriculum element influence your everyday work?
- When I talked about developing a scheme of work to include EE in the existing curriculum you said 'Good luck with that!' why did you say that?
- What are the problems around developing/using a pre-prepared scheme of work?

Appendix 5: Examples of Transcriptions and Analysis.

Appendix 5a: Examples of Transcriptions.

Example of Transcriptions of Interviews.

Transcription of post-project interview with Ivy and Wilkes Video clip 20190712_132644

A = yellow Ivy = violet Wilkes = red

A right we're going right so can you just talk to me generally about what you thought about the bee project what you thought about it

O it was fun (Wilkes Int Post).

Q it was fun

O and it was like …so we got to do different things … …(Wilkes Int Post).

Q I think it was fun because we like er we got to try a lot of things we got to do a lot of things

A yeah

O [nods]

A so when you say fun so what I was saying to the others is when you say fun I might think of something that's not actually…what you meaning by that so what do you mean by fun?

Q like

O going outside(Wilkes Int Post).

Q like say if

O making stuff sometimes(Wilkes Int Post).

Q like…doing stuff more than just sitting in the classroom

A ah ok

Q and talking or like erm…it could be.. erm.. something like ..so say if you ha were playing with your friends it's really fun

A yeah … I see thank you erm the project we've been doing has been about EE but like focussing on bees mainly do you think it's important to have EE in school or not

Q yes

A why do you oh what do you think O?

O mm yes(Wilkes Int Post).

A why do you think that?

Q because if you don't then it's like…you're not you're never going to be really nice to the wildlife

A ooh good point

O yeah

Q and you're never going to help the wildlife you're just going to be their like disa like er bees are stupid and caterpillars are dumb and stuff like that when actually there's a lot to learn about them

O yeah

Example of Transcription of Video Clips.

Transcription of a Filmed Observation Video clip 20190611_114501.

O and T are standing at the front of the classroom presenting their ideas for the wildlife area. There is a small amount of shuffling but generally the class is sitting quietly. L comes in after a few seconds – he picks up his water bottle and walks to his seat.

S also enters the classroom along with 1 NPG, they sit down quietly on the middle row and O and T are able to continue their presentation undisturbed (this is a noticeable difference to sessions earlier in the project when anyone entering or moving around the classroom caused quite a lot of disruption).

O and T provide reasonably detailed information and ideas:

What hedgehogs can eat – and what O and T would like to provide in the wildlife area for them;

Planting plants for the bees;

Putting in a bird table – see their diagram for extra detail.

Towards the end of the presentation Q puts her hand up but lowers it as O and T continue with their presentation. At the end of the presentation when X asks for questions Q does not raise her hand or volunteer any information.

Transcription of video of activity Day Part Video clip 20190611_114501

Time 1:43

Appendix 5b: Examples of Analysis.

Pre-Project Interviews Analysis (first round).

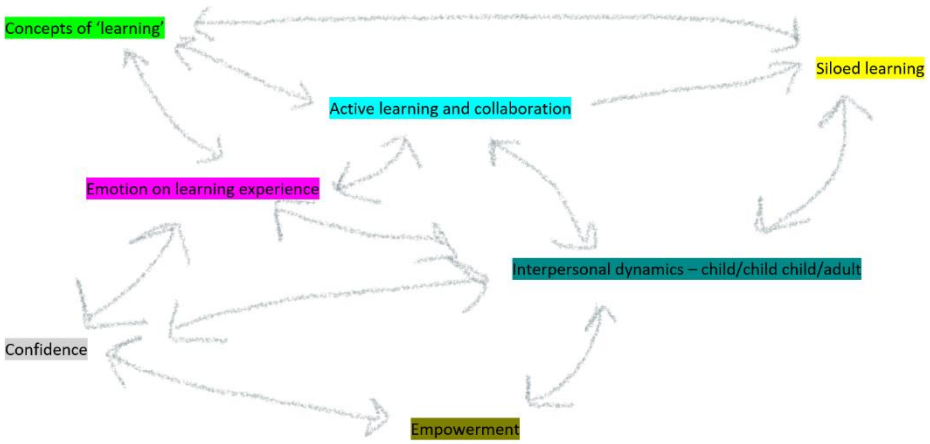
Question	U + T 0426-091403	S + L	P + N	Q + O 0424-091647	M + R
Plants and Animals	Y3	Go out and recognise Y3 Hunted Used in cosmetics Y2 once Science Not much done in school Swap some topics (sun and moon) for plants and animals	Done nothing Food chains Y5 rainforest Lots of wildlife in school No wildlife on the field Y2 dinosaurs	Y1 How plants grow Life cycle of animals Tried to plant – it was fun to try different things	Science
EE	Foresteer Climate change – can't remember what Y4 Built animal houses in scouts Helping the environment Looking after animals Learning about habitats Help bees Use less Alternative transport Oil/gas not immune to pollution – kills plants and animals (Didn't mention water)	Food waste Water waste Confusion about water cycle Look after animals Look after the world Litter Recycling – different bins cause confusion Plastic pollution in the seas	Not sure Charity litter pick The outside Being mature Dolphin friendly fishing nets Pollution Food waste Car pollution Walk to school Recycle - difficult Water Standing up for yourself plastic	Pollution Reduce plastics – use different things Rubbish Look after what you've got Don't waste water Not only think about about yourself Helping things grow Helping bees and insects Help people	Looking after the environment Learn about the environment Clean up Litter pick Pollution – plastic/cars Alternative transport
Sustainability	Didn't know 'not sustainable = not right'	-	Don't know	Heard word but don't know what it means	Heard – don't know what it means
Bees	Live alone Honey and stuff Sting you and die Live in grass Hives Queen – are big Scary – would attack a bee if he saw one Pollen – hay fever All the same Bumblebees and honey bees are different	Confusion about wasps and bees Prefer bees to wasps Different types Honey bee Queen Honey bees and bumblebees the same Bumblebees are 'normal' bees 'I like the fluffy ones'	Like from a distance Don't want to sting Die when they sting Don't know if bee will hurt them Don't know about bumblebees Make friends with them Don't want to touch them Want to learn Bee emotions Bee wasp confusion	Scared Happy Don't want to sting Don't annoy They sting – it hurts – they die Remember 250 types Queen – lives underground 'normal' vs 'not normal' bees Do bumblebees die in summer?	Curious to learn Die when they sting Do a 'job' Bumblebees are bigger Scary Mixed feelings good/scary
Insects	Some knowledge Confused with arachnids	Could identify some of the pictures	Could identify some of the pictures	Low knowledge (probably)	Like leaf insects Frightening/ugly

	Hate them all	Confusion with arachnids Favourite = butterfly Had science activity to identify insects on the field – 'it was like learning'	Don't know much No favourite Like butterflies Don't like wasps	Confuse insects and arachnids Like grasshoppers Like ladybirds	
Learning	Want to get out of the classroom Learn a lot in English Learn best in English ADHD Difficult when people talk Disengage if boring U460	-	Brain stores things and you remember	-	Desire to learn Too hard – need to move zones – need to stick in head Pretty good Do fun things Learn everyday Like P.E. and English Different methods good e.g. video clips Different things Making things helps Science Important to 'put self' into work
Learning about learning	Talked about pens and pencils Sometimes teachers use words Not much else said	No Do the same thing but harder	'fun' Interactive	Adult mentor = emotional support Sheets to complete = what is negative, what is positive, what do you want to improve?	
Group work	Problems when sharing Likes it more than working alone – no prefers to work alone T265 Stressful U266 Likes pairs Conflict between girls and boys Girls dominate group work Prefer to choose Sometimes left out of groups T327 Struggles over equipment Ok with friends – annoying if with others (Check who U worked with throughout project) Own ideas spoilt	Better to choose Sometimes helpful sometimes not Share ideas and get something bigger Like everyone to be included Arguments Don't work if grouped with 'annoying' people Good working with friends Can self-regulate if in group with friends	Fun People take over Left out Don't enjoy if working with someone you don't like Group choice depends on lesson Can choose if good	People argue who will be in group Can be distracting Some people not joining in some people not helping out Mix boy/girl groups better because they don't want to talk about the same stuff Depends on group Q prefers working with boys but usually works with girls who are not friends O prefers to work alone	Unfair Angry Prefer to choose Sharing ideas Learning from each other Team work Important to do something Increased self-regulation if know people in the group Positive if know and like people in the group Potential for exclusion
Questions ppt would ask	-	Teachers to ask what children want help with to learn	Do you enjoy it? What do you learn?	What do you like in school? What do you not like in school?	-
Effective learning	When quiet Time to work P.E. = active Being able to change ideas	Working cooperatively Breaking things down Using art to support learning	No distractions People helping each other Sticks in your head if it's fun Methods like antonyms	Need sufficient information e.g. miss beginning of session O 253 Going outside If it's fun	Making things – science Sharing ideas Looking at others work Mix of people mix of activities

	Doing own ideas not what the teacher says Watching videos Being able to move around Making things Nice teachers who don't shout Circuit of activities Work with friends Being able to fiddle with things	Thankful for support Feel good when improving Choice Would try to get better if thought it was useful Clear support from teacher e.g. spelling Lack of formality helps Not sitting at desk Can talk in lesson	Sharing ideas and knowledge When boys are quiet Paired learning Teacher recap Having things explained Exploring Going outside Seeing the real thing Fact finding is fun When it's easy it's fun Communication is important Talking 'interactive lessons' Working together	Range of activities – different groups doing different things – different resources (e.g. i-pads) – did this once in science Experiments P.E. Games Project work Not always in classroom Moving around school If I know more about a thing Reduced if sad Creating/colouring	Videos increase understanding Getting something stuck in your head Make it your own R734/387 Good when you make something Subjective – games, TT rock stars at home not usually in school Competition to focus efforts Friendships Knowing what other people think Best when teacher is not always doing – best when everyone shares Focus on one thing Learning affected by mood, hunger, tiredness, running late, boredom Important to put self into learning = unique work
Learning in school	Strict teachers unhelpful Stressful if rushed Stressful sharing sheets Tables too small ICT = fun Mile = fun P.E. = fun Fun learning = time goes faster Hard when people talk Stressful if don't know the point of something not like Uni – Uni you can go out U592 Boring if you don't know the stuff – but good because you are leaning something (607)	Likes it when can talk in lesson Like P.E. don't have to sit at desk – not work Better when working with same ability Like art Not always good Repetitive work – barely anything to learn Do the same thing but harder Some teachers helpful and fun Like to have chances on ready respectful chart Unhelpful when teacher too strict Forget one thing when learning another What's the point? Not something we need in life Happy when repeat stuff – easier but boring Don't like science	Teacher recap 4 B's It's fun to learn stuff Others help you to remember things Silent reading boring – library books dull Boys are loud (unhelpful) Like art Class discussions N is competitive wants to get head down to get good results Chat in class P likes it to be quiet Have to wait if you don't know Get laughed at if you don't know Get told off if not finishes (unfair) Mostly enjoyable Sometimes too serious Sometimes teacher too strict Helpful because teacher tells them what to write (culture of correctness?)	Don't like staying in to finish work Talked about behaviour policy O ike maths - TT rock stars Q don't like maths Liked the way things were done in reception If not understanding = boring Self-help by asking others Hard if you miss some of the lesson Annoying when fighting with boys Unhelpful when not given enough time to calm down Children help each other Coke and mentos Outside = fun Inside = hot and boring Learn best outside Boring if don't know it or understand it 1-2-1 input can increase understanding and engagement Writing too much Coming back to finish work = annoying Boring Too long on each thing	Listen to advice

			Mrs X kind – gives chances, can sit with friends Don't try hard enough Need to spend more time outside Don't like being kept in (sometimes associated with unfairness) Only allowed access to certain places (e.g. field) Silence is golden hard if you don't understand what to do Depends on lesson Behaviour rules talked about a lot Like lesson if teacher interactive		
Confidence	Awards given	-		Fun to help others in class	Increased confidence = increased enjoyment Practice at things = get better = increased confidence (e.g. TTRockstars) R (art) = 'part of me that knew what I was doing' 734/426 M = 'amazed at what she could do' 734/432
Engagement	-	-	-	Reduced if distracted Marbles if seen to be working well Reduced if confused	-
Empowerment	Want to do own ideas but can't At Uni you can leave the building	"You can even chat with her" – L 0092/55	Not listened to about chips	Self-help by asking others Suggestion board Fun to help others in class	-
Fairness	Fixing games so younger ones have a chance	Supply teacher being harsh Boy sitting on own Getting told off when haven't done anything wrong	Kept in if not finished – even if not given help	Being kept in Fair if teacher picks groups	Fixing games so young ones get a chance
Subversion	-	Telling supply teacher the wrong name	Throwing things in the wrong bin	Forging signatures Stealing marbles	-

Initial Thoughts about Themes:



Example of Analysis of Interview Data: Mid-project Interview with 'L' Extract from Analysis 1, 2 and 3).

[Analysis 1 and 2 – handwritten notes written up and tabulated, analysis 3 highlighted sections of transcript cut and paste into table.]

Questions L comments Themes and thoughts

Direct question/topic	**Mid-project interview analysis 1**	**Mid-project interview analysis 2**	**Mid-project interview analysis 3 [Highlighted]**	**Themes and thoughts**
Project so far the bee conservation project EE project erm so what's it been like for you?	Good Very interesting because we got to learn new stuff and bees don't just randomly sting = warning signs	Good Interesting We got to learn new stuff about bees They don't just randomly sting you – warning signs	it was good and very interesting we got to learn new stuff and about bees they don't just randomly sting you and there the warning signs	Learning new things important Understanding reduces fear
Different activities	Fun Got to go in groups with friends Got to work in groups which sometimes not allowed to do			Enjoy variety Enjoyed group work
what's the experience been like for you?		Fun Get to go in groups with friends In some classes we don't get to work in groups – working with a partner	fun in some classes we don't get to like go in groups working with a partner we've got to go in groups of friends	Usually work with partners – less often work in groups Enjoys working with friends
Group work what's group work like for you then?	Can do work and have a joke	Like it Can do work and also have a joke	I like it because so you can do work and you can also have like a joke	Likes to have fun when working – but indicates here that the work is also important
Good what's been good?	The stings of the bee Removing the plants in the flower beds Got to 'discover' how bees work – the food they pollinate	The plants in the flower beds Bee stings Got to know how bees work	when we got to do the plants	Doing activities = good THEME – active/physical working
Not good what's not been so good?	Pollination in hall	Pollination 1	remember that erm lesson when it was all bad	THEME – children want to learn – didn't enjoy the messing and not learning

			we were the bees going to the nectar	
not good about it?			we got to discover how bees work we got to know like the bees the po the what food they pollinate	
Helpful activities what's helped you in the project in the different activities so far?	i-pad – fun facts and what other people have said about bees	i-pads – fun facts and info	we got to go on the i-pads we get to like find out fun facts about the bees the different types of bees and like stuff that everyone in the world has like said about bees	Likes researching and hearing what others think Thought – how does investigating different ideas align with right/wrong/closed questions they are used to?
Unhelpful what's been unhelpful?	People talking so you can't concentrate – frustrating and annoying	People talking when you're trying to concentrate = frustrating and annoying	when you're trying to concentrate on something and everyone's just chatting so you can't really concentrate	THEME – children want to learn THEME – emotions – frustrating when can't learn
when has that happened?			last week or the week before	
what was that like for you then when you couldn't concentrate?			frustrating and annoying	
Enjoyed what have you enjoyed?	The stings	The stings	about the stings	Chose to investigate stings and enjoyed doing this THEME – voice/choice
Not enjoyed what have you not enjoyed?	The pollination – couldn't hear and people walking around and doing random stuff	Pollination – couldn't hear, everyone walking around – random stuff	the pollination	THEME – children want to learn
what did you not like about it?			you tried to tell us something and I couldn't hear and everyone was just walking around and random stuff	THEME – children want to learn
Comparison between activities how have the different activities that we've done compare with each other	You find stuff out by doing different stuff – ipads – outside – and you can bring it all together to make one big thing	Find stuff out doing different stuff Likes them all the same Find the same stuff out by going outside and on i-pads = bring together to make one big thing	you find stuff out by doing different stuff so you can find the same thing out by going outside and on the i-pads and then you can bring it all together to make one big thing	THEME – choice Mixtures of activities helpful for learning
how have the different ways of erm doing things compared for you? do you like some more than others or like them all the same			I like them all the same!	Likes the mixture rather than specific activities – links to S (likes i-pads but too much)
Project compared to 'normal' school how's working on the EE project or bumblebee project whichever erm compared to how	Fun I would like to do it more	Fun Would like to do it more	it's fun and it's I would I would love to do it more	THEME - emotion

you normally do things in school?				
Affected learning how has it affected your learning do you think the way we've been doing things?	Makes us change how we act to bees Might be like a reading comprehension	'it makes us change how we act to bees' (L) 69	it make us like it makes us change how we act to bees	THEME – learning about learning – not associating different activities with different ways of learning – associated with behaviour change THOUGHT – are children more empowered if they are actively taught how they learn best as an individual?
Helped learning do you think the project has helped you with your actual learning?		Yes, might help with future reading comprehension – we'll be used to it so it'll be easier	sometimes like if we we learn something and there mi it might be sometimes we have to read it might be a reading comprehension about bees with the answers so we like we used we'll be used to it so it'll be easier for us	THEME – learning about learning – associated with how 'learning' may be helpful in a school test rather than wider in 'real' life
Change?	Summary at end of lesson – people can come out and random groups can show everything you've done Write everything down on a big sheet	Share ideas at the end of the lesson Big sheet – at end of week, write everything you've done and 'we bring it all together and show everyone' (L) 90 Random groups share work At end show everything you've done		THEME – peer learning THEME – voice – good suggestions about how sessions could be improved THEME – practicalities of school - I didn't do this – how to embed and enact children's suggestions in the everyday lessons?

Example of Stages of Analysis: Post-Project Interview Analysis (first round).

Questions asked around:	Themes to look at:
○ The project – participants views, observations and comments ○ What the participants view as important within the project ○ What have they done in the project that has made them feel good about themselves ○ Group work ○ Learning about learning ○ Positive learning experiences ○ Learning in school ○ EE and the curriculum ○ Participants views about EE and the curriculum	○ Outdoor learning* ○ Active/practical learning* ○ Engagement ○ The artificial nature of school life ○ Creativity ○ Play vs learning = why is school so stifling? ○ Emotions = Fairness, Empowerment, Ownership ○ Power dynamics e.g. the incompetent child vs the competent adult ○ Thinking skills ○ Politics and pedagogy

* data supports previous research which demonstrates the benefits of hands on/outdoor learning and I will discuss these areas as they (unsurprisingly) are clear themes.

Other themes to explore:

- Thinking skills are vital to EE yet despite being 'done' in the school the children really struggled – much to the teachers' surprise. Lack of critical thinking ability, lack of opportunity for creativity and the oppressive nature (simply boring our children into submission) of primary education in England are key educational and political issues which impact how children are able to engage with environmental issues.

Examples of Initial Notes from Transcriptions.

Compiled data for themes throughout project – Thoughts about learning

Pre-project children: orange 2 (25%) = directly from data purple = my thoughts

Thoughts about learning:

'Not all the time the teacher doing things' (MR). 'You can learn a lot outdoors' (N).

Fun and interaction are things that improve their learning (PN).

P/N explain learning in school is when a teacher 'tells us a subject and loads about it' (PN). The teaching rather than learning focus is demonstrated here.

Missing information at the beginning of the lesson makes a big difference to O's engagement in lessons – once a week he has an individual music lesson which means he is out of class for the first 20 minutes of the lesson; missing this section of the lesson makes it difficult for O to engage with the rest of the lesson and he feels he doesn't get anything done on that afternoon.

The children are quite clear with some of the things that hinder their learning – missing information, distractions, other people's disruptive behaviour, feeling sad, not being given clear instructions, being kept in at playtime and not getting a full break, not being able to calm down (when upset), fighting, waiting for help. The children recognise that feeling different emotions influences their learning. Fear of being laughed at, being pestered by others and feeling bored are all noted as things that hinder learning. Interestingly the children highlight that 'different adults with different ideas' (MR) hinders their learning – a factor mentioned by X who says that the children struggle if they have lots of different adults.

Group work:

'Who you are with affects the amount of work that you do' (S?). 'It's better if you are not with annoying people' (S).

R enjoys working with different people as she 'like to learn with new people' and to 'make friendships', whereas O prefers not to work with his friends because he feels he gets more work done if he is with other people.

T, who often prefers to work alone as he gets frustrated by people not sharing and can do his own thing without having to listen to others, thinks paired work is better than group work.

Fundamentally, who you are with affects the amount of work done – but the reasons for the impact of the group on the learner is very individual. The children have wide range of views about how to create a group for group work, from preferring working with friends to choosing to work alone. While some children find group work stressful, with squabbles and their ideas 'being spoilt' (T) others find it fun and a helpful way to share and develop their ideas and thoughts (R).

How the groups are chosen seems to be a bit of a minefield. Some like to choose themselves so they can work with specific people, others prefer the teacher to allocate groups because they prefer to work with different people, it is more interesting to work in groups that are a mixture of boys and girls. Some children express that they prefer to work with friends (because they can ask them to settle down when things start to get silly, something they wouldn't do if with others, some prefer not to work with friends because they are less likely to get silly in the first place).

Throughout the comments there is one strikingly consistent theme – the children want to work with people who will enhance their work.

Learning strategies.

The school has a policy of the children being put into working partner pairs, with the pairing changing throughout the year. N finds it helpful when she is paired with a 'clever person' (N is a 'high-achiever') whilst S finds it unhelpful to be paired with someone who is not 'as clever' because she feels she does all of the work and carries them.

They talk about fact finding and interactive lessons as helpful activities. They also say an 'interactive' teacher is helpful. They enjoy games (TTrockstars is talked about by all of the children) and having fun.

Although sometimes it is embarrassing, the children will often ask for one-to-one help if they are stuck.

The children are familiar with a range of strategies to support their learning – although many of the strategies mentioned are memory aids – acronyms, paired words and songs for example, and the children talk about how they 'make links' to help them remember things; this fits with the repeated message that the children need to get things stuck into their heads. Choice is important and helpful to the children, as is having access to different explanations for the same idea.

The children love to share information – if they know something that is related to the lesson they like to tell it to the person sitting next to them; (Q and?) proudly share how information can move along the rows in class and even continue to circulate during playtime. The way children exchange information can be a powerful aid to teaching and learning; peer learning is important to the group.

The children recognise the effect emotion has on their learning and have strategies that they use when feeling upset, frustrated or angry, U for example will go for a walk or move to sit with his friends if he is feeling upset – these coping strategies do not always fit with the school behaviour policy and there is a tension between how the children deal with their emotions and how their behaviour is perceived by the other children and adults.

Helpful teacher:

'you can even chat with her' (L).

The children understand a helpful teacher to be one that 'helps us learn' (S) but often the anecdotes they give are actually the teacher telling them things – going back to Z's comment that teachers restrict themselves because they always want to teach (Z).

The children prefer teachers who do not shout but interacts positively with them. A teacher being 'too strict' is almost totally counterproductive to the learning environment. All of the children describe the 'strict' teacher as unhelpful – with the exception of N who explains that the notoriously strict teacher is really helpful because she tells them 'what to write' (N756) so they know they are getting it right.

Having a teacher that lets the children develop their own ideas rather than telling them what to do is really helpful for the children. Although the children can list ways the teachers can support their learning, they would like the teachers to ask the children how they can support them better in their learning. Although the children are not taught explicitly about how they learn (learning about learning/meta-cognition) they all recognise things that help and hinder their learning and would like the teacher to ask how to best support them. The children comment that being told off is unhelpful – which may be because they already know the behaviour that results in a telling off is inappropriate; classroom observations indicate that the children do recognise when their behaviour is unacceptable. Being told off when they genuinely don't believe they have done anything wrong is catastrophic for learning. Allowing time for a conversation between the adult and the child is helpful for understanding behaviour.

Purpose:

Immediate objectives are around; completing curriculum objectives and getting things 'right'; to get something done as quickly as possible so they can go outside early'; 'to 'store stuff in your brain' (N); 'to remember things' (NP); to 'get it stuck in your head' (L); and to show the teacher you can do something. Learning is very much associated with remembering things and demonstration of what you have remembered.

The children see learning in school as something they need for the future, when they are older, and 'to get a job' (R). If the children don't see how the learning has a direct relevance to their future lives they are less enthusiastic to engage, for example, L says in a particular maths lesson ' I didn't know we had to do that, it's not something we need in life' (L).

Getting things right is a major trope throughout the children's discussions of their learning in school, with revision, recap and rehearsal repeated throughout. The end product of a learning activity (outside of P.E.) is almost always something physical; other essential skills such as mature social skills are not evaluated throughout any of the teaching and learning (again with the possible exception of P.E.).

Appendix 6: Examples of Information Letters and Consent Forms used in the Main Fieldwork Stage.

Appendix 6a: Letter for the Children (Main Fieldwork Project)

School of Education
University of Sheffield
241 Glossop Road
Sheffield S10 2GW

16th April, 2019.

Research Project title: How do children in an English primary school experience sustainability education?

Hello, my name is Anne-Marie and I'm from Sheffield University.

I am interested in how children experience sustainability education activities in school. Sustainability education tries to help us understand how we can live and work together in a way that does the least damage to our planet. Mrs Carder has given me permission to come to your school and work with you to help me understand how you experience sustainability education activities. During your class lesson time, we will investigate how to look after our environment (because this is an important part of sustainability education); more specifically we will look at bumblebee conservation.

Bumblebees are struggling and each year fewer and fewer of them can be found buzzing between flowers, sipping nectar and collecting pollen. Mrs Marsham and Mrs Lathbury have said during the summer term, we can have time each week to investigate what is causing the bees so much trouble and to see what we can do to help.

When we are looking at how to help our bees, I would like to talk with you about what you have found, the activities you are doing, and how you feel about the activities. I would like to tell other people about your ideas and experiences because I believe understanding your experiences will help improve sustainability education in primary schools.

After we have finished the bumblebee conservation activities, I would like to write up what we have done, and your thoughts and ideas, and submit this to my University as part of my coursework. I will not use your name, or your school's name, and all the information you share will be kept securely. It is likely that the information you share with me in this research project will be useful in answering even more questions so I am also asking your permission to save your information so that it can be used again in the future.

If you would like to share your ideas and the things you have enjoyed, or not enjoyed, with me then please tick the boxes on the attached consent form so that I will know you are happy to talk with me about your ideas and are happy for me to share your thoughts and ideas with other people. You don't have to talk to me about your thoughts or your work, and if you don't want me to make notes about what you are doing, then I won't. If you only want to share some of your ideas with me that is fine too. If you change your mind and decide you don't want me to use the things you have told me, or the things that you have made, you don't need to give me a reason, just tell me or your teacher and I will not use the information you have shared.

You will be given a copy of this letter and a copy of your signed consent form to keep.

Thank you.

Anne-Marie Elliott

Appendix 6b: Letter for the Children (Main Fieldwork Project)

Consent Form for Children.

Research Project Title: How do children in an English Primary School Experience Sustainability Education?

Please tick the boxes if you agree with the following statements:

I have been told about and understand the bumblebee project.	
If you have not been told about the bumblebee project, or if you have any questions please talk to Anne-Marie before answering the following questions.	
I have been able to ask questions.	
I understand my real name will not be used.	
I am happy to talk with Anne-Marie about the bumblebee project.	
I am happy to have my photograph taken.	
I am happy to be filmed when I am doing activities.	
I am happy for Anne-Marie to look at my work and to use it to help her understand my experiences and ideas.	

Please turn over…

I can ask at any time for my work not to be used and I don't have to say why.	
I am happy for my words to be used in publications, in lessons and lectures, in reports and on the internet – I understand that my name will not be used in these pieces of work.	
I am happy for other researchers to have access to my anonymised information and that they can use it in publications, reports, lessons and lectures and on web-pages, but they must agree not to use my name or the name of my school.	
I am happy for the University of Sheffield to own and store my information safely during the time Anne-Marie completes her project.	
I would like Anne-Marie to destroy my information after 5 years.	
OR	
I am happy for the University of Sheffield to keep my anonymized data in its information store (the University archives) so that it can be used in similar, compatible research, if my information would help.	

Name of Participant _____ Signature _____ Date _____

Name of Researcher _____ Signature _____ Date _____

Contact details for further information:

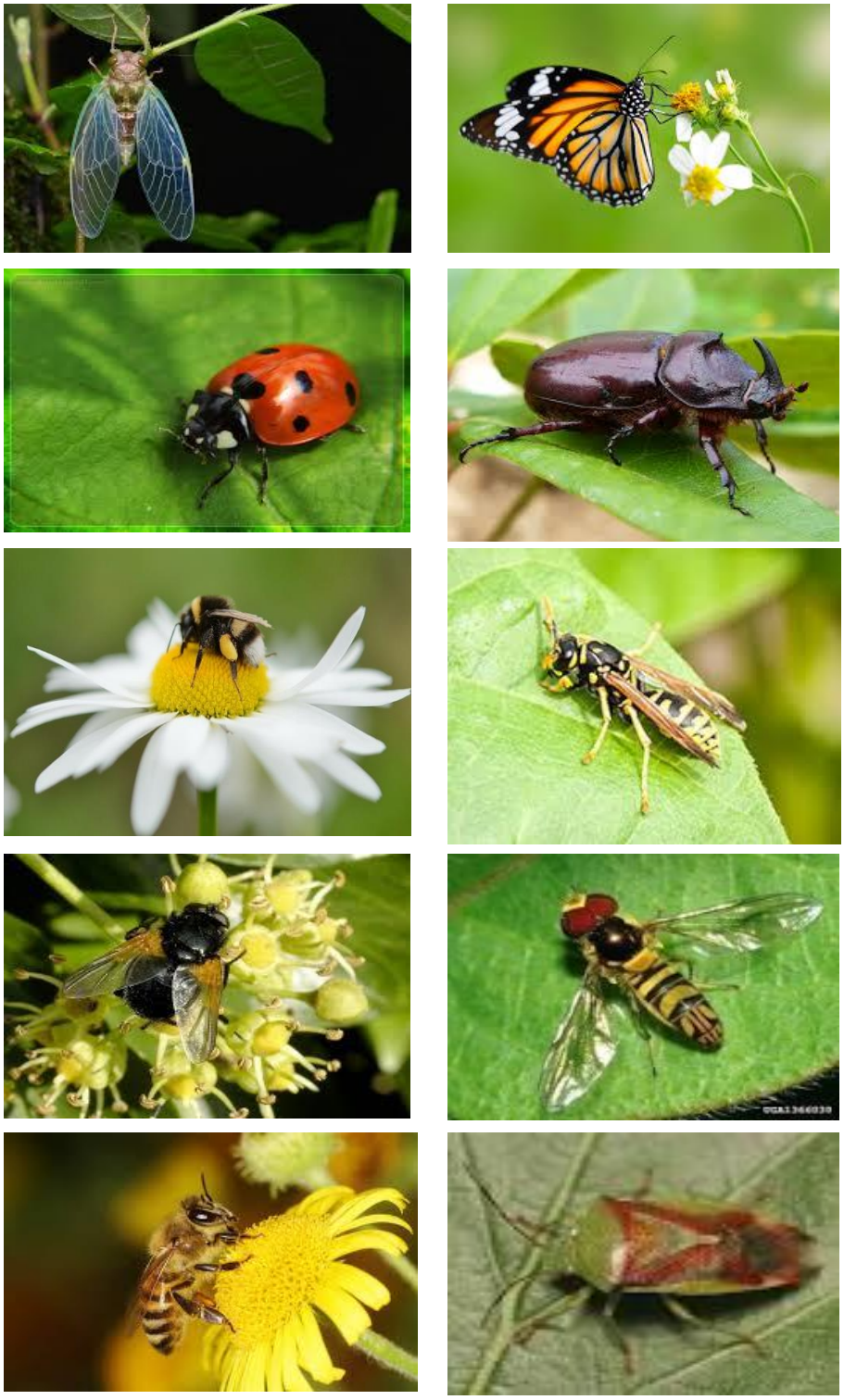
PhD Research Student: Anne-Marie Elliott (aeliott2@sheffield.ac.uk)

PhD Supervisor: Dr Caroline Hart (School of Education, University of Sheffield, 241 Glossop Road, Sheffield S10 2BW / c.hart@sheffield.ac.uk).

Head of Department: Professor Elizabeth Wood ((School of Education, University of Sheffield, 241 Glossop Road, Sheffield S10 2BW / e.a.wood@sheffield.ac.uk).

Appendix 7: Photographs of Insects Used in Pre-Project Interviews and the Children's Responses.

Appendix 7a: Photographs for Insect Identification.



Appendix 7b: Table to show children's recognition of insects in photographs.

	Lacewing	Butterfly	Ladybird	Rhino beetle	Bumblebee	Wasp	Bee mimic	Hover fly	Honeybee	Shield bug
Cullum	x	R	R	#	P	#	P	x	P	x
Davies	x	x	R	P	R	P	x	x	x	x
Mason	x	R	R	P	R	R	x	x	x	P
Wilkes	x	R	R	P	P	R	x	x	P	x
Willughby	x	R	R	R	R	R	x	x	P	x
Bryony	x	R	R	P	R	R	x	x	x	x
Gwynne	x	R	R	P	R	P	x	x	x	P
Heather	x	R	R	#	#	#	x	x	x	x
Ivy	x	R	R	P	P	#	x	x	P	x
Violet	x	R	R	P	x	R	x	x	P	x
R = recognised P = recognised with prompts x = did not recognise # = interview partner answered										