How might home practices be impacted by children's engagement with multimedia environmental education at school?

Victoria Emma Circus

170244370

Under supervision of Dr Caroline Oates, Dr Mark Blades (Psychology), Dr Panayiota Alevizou in collaboration with Project Earth Rock

Sheffield University Management School, Faculty of Social Sciences

A thesis submitted for the award of Doctor of Philosophy

May 2022

Funded by the Economic and Social Research Council, United Kingdom

Contents

List of figures

List of tables

Declaration

I hereby declare that this thesis is my own work and has not been submitted for another degree, either at The University of Sheffield or elsewhere.

Victoria Emma Circus

Acknowledgements

I would like to thank my supervisors Dr Caroline Oates, Dr Mark Blades and Dr Panayiota Alevizou for sharing their wisdom, understanding and patience throughout this project. I thank Jess Gold for her continued interest and generosity in contributing the environmental educational resource 'Project Earth Rock' at the heart of this project. I would also like to thank my examiners Professor Fraser McLeay and Dr Pallavi Singh for their thorough consideration of my thesis and their suggested improvements.

I would like to thank the teachers who selflessly gave up their already limited time to prepare and teach Project Earth Rock. Without them, this project could not have taken place. Thank you also to all of the wonderful children and their families who I had the pleasure to spend time with during this project. My curiosity and perseverance were continually fuelled just by hearing what you have to say!

Thank you to my own family, especially my Mum, Dad and grandparents, for everything they have done over the years to help get me here, to my auntie for the encouragement, and to James' family, in particular Claire, who saved the day (as always!) with my pilot study, and to Ali for the love and support. Thank you to my brilliant friends for their support and pride, including Katy and Faye, but especially Caroline, who took me under her wing, and has been my supportive cheerleader from beginning to end. Thank you for being so wonderfully generous with your kindness, wisdom and friendship. Thank you also to Teddy and Suzie for your company when I needed it during the final few months.

Most of all I would like to thank my incredible partner James for his endless love and support in so many ways. This achievement is ours as I truly could not have done it without you.

Abstract

Given the potential of music and artwork to engage people in environmental issues and learners in educational settings, and the lack of research on how primary school children engage with environmental education, this thesis aimed to explore the impact multimedia environmental education had on primary school pupils, their families and the environmental practices they carried out within the home using qualitative methods and social practice theory. Pupil engagement and underlying factors that helped or hindered any process of change were also studied. Observations of lessons and semi-structured interviews were conducted with 21 Key Stage 2 pupils, aged between seven and 12 years old, from four primary schools across Essex, Gloucestershire and Dorset in the UK. Interviews were also conducted with pupils' families and teachers. Findings showed how pupils engaged with the multimedia environmental education programme in different ways, including actively, passively and not at all, and although pupils experienced some difficulties with the content, the songs and animations were engaged with positively, with pupils enjoying them and remembering their environmental lessons as a result. Different strategies were used by family members when discussing and actioning the environmental education, namely nagging and asking of permission by children, with family members both supporting and resisting requests, such as via 'counter nags'. Limited impacts were found on practices within the domains of travel, energy and waste management, with numerous underlying factors impacting any process of change. By applying social practice theory to explore how primary school pupils engaged with multimedia environmental education, the impact this education had on families' environmental practices in the home and underlying factors that impacted any process of change using qualitative methods, this thesis contributed to theory, literature, methodology and environmental education practitioners and policy. Avenues for future research, limitations, and the impact of COVID-19 are discussed.

Chapter 1: Introduction

1.1 Chapter introduction

This thesis focused on UK primary school children and their families, and whether these children receiving multimedia environmental education at school had any impact on energy, water, food, waste and travel practices in the home. The focus of this thesis aimed to help address broader environmental issues. Section 1.2. discusses the context for the research, of needing to address environmental issues, with a critical discussion of how a wealth of previous research has tried to do so using individualistic psychological models and constructs of behaviour. Section 1.2. also introduces an alternative model, of social practice theory, and how it can be applied to help understand and address environmental issues. Section 1.2.1. explains the role of education in addressing environmental issues, and provides context of the UK education system at the time of the research in 2017-22. Section 1.2.2. critically discusses the role children and their families might play in helping to address environmental issues within households. The aim and objectives of the thesis are discussed in section 1.3. followed by a chapter-by-chapter outline of the thesis structure in section 1.4.

1.2. Addressing environmental issues

The key justification for carrying out the research was to help address environmental issues, by focusing on education and children and their families. Environmental issues were understood in this thesis to be issues that affected the natural environment, and have been defined and deconstructed in numerous ways. The Brundtland Commission's (1987, p. 16) definition of sustainable development as 'meeting the needs of the present without compromising future generations to meet their needs', although somewhat dated, was relevant to this thesis as the research was concerned with environmentalism across multiple generations. The United Nations' 17 Sustainable Development Goals (United Nations, 2021) included goals relevant to the environment such as climate action. Models of sustainability like the 'Triple Bottom Line' (Elkington, 1998; 2004) typically include a harmony between economic, social and environmental considerations. Raworth (2012) explained that in order to live safely on Earth, humanity must live within specific boundaries of different natural Earth systems such as climate change, to avoid reaching a tipping point that would lead to irreversible consequences.

A main cause of climate change according to the European Union's Energy, Climate Change and Environment group (2021a) is from rising greenhouse gas (GHG) emissions that contribute to global warming. The Intergovernmental Panel on Climate Change (IPCC, 2013) state that it is extremely likely that humans are the main cause of global warming. GHGs are emitted in to the Earth's atmosphere through practices such as the burning of coal, oil and gas, deforestation, livestock farming, the use of nitrogen fertilisers as well as products and equipment that contain fluorinated gases (European Union, 2021a).

Consequences of climate change are severe and far reaching, from melting polar ice shields and rising sea levels, extreme weather events, flooding, decreased availability and quality of water, risks to human health through illness and disease, impacts to the economy through damage to property and infrastructure and biodiversity loss (European Union, 2021b). The European Union (2021b, p. 1) warns how 'these impacts are expected to intensify in the coming decades', negatively affecting future generations in particular (Currie & Deschênes, 2016). Environmental activist Thunberg (2019, p. 40) urged world leaders at the World Economic Forum to 'act as you would in a crisis. I want you to act as if our house is on fire. Because it is,' indicating the severity of climate change and the need for urgent action.

In terms of global action being taken to mitigate climate change, the United Nations Environment Programme (UN Environment Programme, 2021) has departments dealing with 20 social and environmental (Raworth, 2012) topics, covering air, biosafety, chemicals and waste, climate change, disasters and conflicts, ecosystems and biodiversity, education and environment, energy, environment under review, environmental rights and governance, extractives, forests, gender, green economy, oceans and seas, resource efficiency, Sustainable Development Goals, technology, transport and water.

In the UK, during the time of this thesis, the government published a 25 Year Environment Plan (UK Government, 2019) detailing actions they were going to take to address certain environmental issues. The government committed to reaching ten goals by 2044, of achieving clean air and plentiful water, reducing the risk of flooding and drought, using resources from nature more sustainably and efficiently, enhancing beauty, heritage engagement with the natural environment, mitigating and adapting to climate change, minimising waste, managing exposure to chemicals and enhancing biosecurity. Through policy changes, the UK Government explained that their approach would influence decisions

‘at every level – from international agreements to everyday decisions by individuals’ (UK Government, 2019, p. 11), emphasising the need for individuals to act to address environmental issues like climate change.

Environmental psychologists have tried to prompt individuals to change their behaviour to help address environmental issues via numerous interventions. Strategies that are used to foster behaviour change might be informational (Steg, Van Den Berg & Groot, 2013; Steg & Vlek, 2009), where knowledge, awareness, norms and attitudes are targeted through the provision of information, goal setting, commitment, prompting and feedback (Steg, Van Den Berg & De Groot, 2013). Informational strategies address the model of knowledge-deficit, based on an assumption that individuals do not know enough about environmental problems or what to do about them (Schultz, 2002). Researchers have shown, however, that information provision on its own is not particularly effective at encouraging pro-environmental behaviour change (Schultz, 1998; Staats, Wit & Midden, 1996).

Behaviour change strategies can also be structural (Steg & Vlek, 2009), where the circumstances that influence decisions are targeted such as the provision of facilities and resources (Steg, Van Den Berg & De Groot, 2013) that might underpin certain practices (Shove, Pantzar & Watson, 2012) like recycling and the requirement of recycling bins. Distinctions have also been made between ‘soft’ and ‘hard’ measures (Steg, Van Den Berg & De Groot, 2013, p. 224), with informational strategies considered softer approaches to behaviour change, and harder measures including using technology, incentives and penalties to promote change.

Intervention-based pro-environmental research has been criticised as being short-term (Abrahamse, Steg, Vlek & Rothengatter, 2005; Dwyer, Leeming, Cobern, Porter & Jackson, 1993), lacking properly documented theoretical underpinnings when evaluating its effectiveness (Matthies, Klöckner & Preißner, 2006; Staats, Harland & Wilke, 2004; Steg, Van Den Berg & De Groot, 2013) and being only ‘part of a solution to environmental problems’ (Steg, Van Den Berg & De Groot, 2013, p. 230). Combining both informational and structural strategies may be a more effective approach to encouraging pro-environmental behaviour (Steg, Van Den Berg & De Groot, 2013), such as by telling people what types of materials can be recycled and by providing corresponding recycling bins.

Much research within environmental psychology relies on the 'ABC' model of pro-environmental behaviour change (Azjen, 1991; Steg, Van Den Berg & De Groot, 2013), where 'for the most part, social change is thought to depend upon values and attitudes (the A), which are believed to drive the kinds of behaviour (the B) that individuals choose (the C) to adopt' (Shove, 2010, p. 1274). Indeed, Shove (2017) in a Social Change Climate Change Working Party lecture highlighted some of the flaws of the ABC model of pro-environmental behaviour change often used in fields like environmental psychology, where attitudes are seen as influencing behaviour and creating change. ABC models place too much emphasis on individual choice and action (Brown, 2017; Scott, Oates & Young, 2015), and ignore the broad practices that take hold in society and how they might change (Shove, 2010).

ABC models also overlook the role of governments in organising society and how they have the power to provide more sustainable ways of living, such as through infrastructure (Steg, Van Den Berg & De Groot, 2013; Steg & Vlek, 2009). Governments instead often emphasise individual responsibility (UK Government, 2019). Policy is designed around individual ABC models of pro-environmental behaviour, placing pressure on individuals to act more sustainably in their lifestyles, from saving energy at home (UK Government, 2021b) to encouraging cycling and walking as more acceptable modes of transport (UK Government, 2017b), despite lack of infrastructure like safe cycle lanes (Shove, 2017). According to Shove (2010), the focus on personal, individual free choice works on the presumption that 'environmental damage is a consequence of individual action and that given better information or more appropriate incentives, damaging individuals could choose to act more responsibly and could choose to adopt pro-environmental behaviours' (Shove, 2010, p. 1275). Hence the focus on individualistic ABC models in government policies. Debates in the literature have argued whether behavioural models like the ABC model (Whitmarsh, O'Neill & Lorenzoni, 2010) or more practice-based models (Shove, 2011) are better suited for governments to address and encourage pro-environmental behaviour change (Chatterton, 2011).

ABC models that dominate climate change policy (Shove, 2017) also often focus on small, less-impactful behaviours (World Wide Fund for Nature, 2009), and rely on people feeling encouraged to be more environmentally-friendly, such as through information (Schultz, 2002), with research that relies on these models not necessarily offering an understanding

of what drives unsustainable behaviours in society. Carrington, Nevillle and Whitewell (2010) pointed out how behaviour does not always follow intentions that are predicted by attitudes. Blake (1999) too identified a value action gap, where a person may hold pro-environmental values but may not act on them. These studies undermine the linear process of ABC models of pro-environmental behaviour change and suggest that underlying factors interrupt intentions and values to act in a pro-environmental way.

Another approach to encouraging pro-environmental change, and the theoretical approach that this thesis drew upon, is to focus instead on 'practices', or the routinised activities or habits of people (Inglis & Thorpe, 2012; Reckwitz, 2002) that are resource intensive, how these practices take hold in society over time (Giddens, 1984) and how they might be reconfigured and change to be more environmentally friendly and sustainable (Shove, 2017) following education about these practices. A critical discussion of social practice theory and its relevance to this thesis can be found in section 2.3.4.

1.2.1. Utilising education

This thesis focused on education as one avenue to addressing environmental issues. Education should be active (Dewey, 1986), with learners encouraged to develop their intelligence, character, critical thinking (King, 1947), resilience, confidence, self-motivation and social skills (All Party Parliamentary Group on Social Mobility, 2014), as education itself is a social practice (Dewey, 1900). Education should be about more than passing exams (Biesta, 2009; Easton, 2014) and should help develop citizens that are educated, prepared for later life and equipped to secure a sustainable future for themselves (Davis, 1998; 2010; UK Government, 2013).

The research for this thesis took place in the educational setting of four primary schools in the three southern counties of Essex, Gloucestershire and Dorset in the United Kingdom. Primary school is one of the five stages of education in the UK, after early years and before secondary, further education and higher education (UK Government, 2017). Primary education in England includes infant school or Key Stage 1 (KS1) for mixed pupils aged between 5 and 7-8 years old, and junior school or Key Stage 2 (KS2) for pupils aged from 7-8 and up to 11-12 years old. KS2, and the corresponding school year groups of Years 3, 4, 5 and 6, were the targeted age group for this thesis as the environmental educational

intervention (section 3.4.3. and Appendix 5 for details) was developed with the help of KS2 pupils and teachers, and was aimed at this age group. The impact of environmental education has also been less studied with KS2 pupils compared to older students (Cullingford & Blewitt, 2013; Grønhoj & Olander, 2007; Jones, Delby & Sterling, 2010; Moore, 2005a; 2005b), despite children being a suitable audience for environmental messages (Strong, 1998; Uzzell, 1999), and playing a key role in traditional models of socialisation (Brim, 1966; Ekström, 1995; Grønhøj & Thøgersen, 2009; Kuczynski & Parkin, 2007; Maccoby, 2007; Watne & Brennan, 2011) and the reverse eco-socialisation of older generations (Gentina & Muratore, 2012; Gentina & Singh, 2015).

In the UK, state funded community primary schools follow the National Curriculum, a framework of compulsory topics. Foundation, voluntary, free schools and academies all have more independence in what they teach (UK Government, 2017a), as well as private schools. State-funded schools should 'offer a curriculum which is balanced and broadly based' (UK Government, 2013, p.5) in line with Section 78 of the 2002 Education Act, which 'prepares pupils at the school for the opportunities, responsibilities and experiences of later life' (UK Government, 2013, p.5). According to this guidance, the National Curriculum is only one aspect of the school's broader curriculum (UK Government, 2013). The aim of the National Curriculum as stated by the UK Government 'provides pupils with an introduction to the essential knowledge that they need to be educated citizens' (UK Government, 2013, p. 6).

At KS2, core subjects of English, maths and science must be taught, as well as the foundation subjects of art and design, computing, design and technology, foreign languages, geography, history, music and physical education, as well as a requirement to teach religious education. At the time of the research for this thesis there was no mention in the KS2 National Curriculum that pupils should learn about environmental issues, despite environmental education aiming to equip learners with the skills, knowledge and attitudes they need to have a sustainable future (Davis, 1998; 2010). Primary aged children in the UK did not receive any compulsory education on environmental issues (UK Government, 2013). This oversight arguably contradicts the 2002 Education Act stating that school curricula should fully prepare pupils for later life, given the environmental impacts children are likely to face in their future (Currie & Deschênes, 2016). Environmental education activist groups

like Teach the Future (https://www.teachthefuture.uk/) and Fridays for Future (https://fridaysforfuture.org/) demonstrated a demand for environmental education through the support they received for their protests and absence from school during the time of this thesis (Burns, 2020). Environmental activist Thunberg (2019) discussed the focus on children addressing environmental issues, commenting 'I've learnt that no one is too small to make a difference' (Thunberg, 2019, p.27). This youth action movement provided an important backdrop for this thesis exploring whether children might be able to influence their parents' environmentalism, as within this movement, younger generations were acting as change agents against adults, including world leaders (Thunberg, 2019).

An extra-curricular environmental education programme called 'Project Earth Rock' (https://www.projectearthrock.com) was used as the intervention in the research for this thesis to explore pupil engagement and impact on practices in the family home. The programme aimed to educate KS2 pupils on topics including saving energy and water, waste management, carbon footprints, reducing meat consumption, sustainable transport and growing food. Project Earth Rock delivered its messages through songs and animations. The researcher collaborated with Project Earth Rock because their programme was aimed at the understudied primary school age group of children (Grønhoj & Olander, 2007), in terms of how they might engage with and how their practices are potentially impacted by environmental education. In particular, the multimedia methods used in the programme were of interest in the research, given that the educational potential of multimedia to engage pupils in environmental issues has also been understudied (Kagan & Kirchberg, 2016). Multimedia has however been found to engage people in other contexts, from environmental advocacy where famous musicians have encouraged pro-environmental action through the lyrics in their music (Publicover, Wright, Baur & Duinker, 2018) to social movements (Pepermans & Maeseele, 2017), and in non-environmental educational settings of language learning (Ara, 2009; Engh, 2013; Morales Neisa, 2008). Therefore, whether the multimedia components of the environmental education resource used in the research could engage learners in similar ways, given this previous research in other contexts, was explored. The researcher observed the Project Earth Rock content being delivered by teachers to KS2 pupils during lessons in school classrooms and interviewed both pupils and teachers after the lessons. Some of the school-based fieldwork was disrupted due to impacts from the COVID-19 pandemic and subsequent school closures in 2020. The impact

of COVID-19 on the research is discussed further in section 7.7. Project Earth Rock is also discussed in more depth in section 3.4.3. and details of each lesson are provided in Appendix 5.

There are several justifications for focusing on education to help address environmental issues. Quality education is included as the fourth goal of the Sustainable Development Goals (United Nations, 2021), emphasising the role education can play in addressing global environmental issues. Primary education can also be seen as part of the early formative years for many children, when they are being socialised and taught how to live respectfully in their society and culture (Brim, 1966; Grønhøj & Thøgersen, 2009; Maccoby, 2007). Given the key role that children play in socialisation models (Brim, 1966; Ekström, 1995; Grønhøj & Thøgersen, 2009; Kuczynski & Parkin, 2007; Maccoby, 2007; Watne & Brennan, 2011), and how children are considered by environmental researchers to be a suitable audience for environmental messages (Uzzell, 1999), given their common-sense approach to environmental concern (Strong, 1998), they were selected as a suitable age group for the research. The majority of researchers who have studied the impact of environmental education on learners have been concerned with older children, often students in non-compulsory higher education institutions (Cullingford & Blewitt, 2013; Jones, Delby & Sterling, 2010; Moore, 2005a; 2005b). Primary school aged pupils have been ignored in such research (Grønhoj & Olander, 2007), and are likely to be at a different stage in their cognitive and moral development (Kohlberg, 1976; Piaget, 1932), compared to older students, which may impact how they receive environmental messages. Indeed, previous research (Boyes & Stanisstreet, 1994) on children aged between 11 and 16 found that even the older children were prone to misconceptions and confusion about environmental issues. This thesis aimed to fill a gap in the literature by studying how KS2, primary school children aged between seven and 12 years old engaged with multimedia environmental education and how (if at all) it might have impacted them, their family and their practices in the home.

1.2.2. Focusing on children and their families

Another avenue for addressing environmental issues was focusing on children and their families. Family has been defined as including one or more children (Murdock, 1962). Children might believe a couple only constitutes a 'family' if they have children (James, 2013) reflecting their egocentric worldview (Piaget, 1950). Although there are other

definitions of family that include those that do not have children (Berns, 2015), for this thesis, the definition of family that was used included parents and children (James, 2013; Murdock, 1962). This was because how primary school children engaged with and were potentially impacted by environmental education was the focus of the research. Given that families raise children and socialise them to fit in to their society and culture (e.g. Brim, 1966; Grønhøj & Thøgersen, 2009; Maccoby, 2007), defining what is meant by the concept of family in social research is important, as such definitions can 'affect the functions that families perform, the roles its members play, and the relationships its members have with one another' (Berns, 2015, p.85).

Including children within the definition of family for this thesis was also important as 'the conduct of family life and personal relationships has profound consequences for environment and sustainability issues' (Jamieson, 2016, p.336) as families can have significant household carbon footprints (Druckman & Jackson, 2008) that contribute to GHG emissions and the use of natural resources (Jamieson, 2016). The researcher focused on whether a multimedia environmental education programme might impact families' energy, water and food practices (Evans, McMeekin & Southerton, 2012; Foden, Browne, Evans, Sharp & Watson, 2018), as well as less studied travel and waste practices (O'Neill, 2015). Demonstrating Jamieson's (2016) point about families and environmental issues, Druckman and Jackson's (2009) analysis of UK household CO2 emissions found that emissions came from goods and services purchased by households, including fuel, heating and activities relating to recreation and leisure. The Project Earth Rock programme also referenced the practice domains of energy, water, food, travel and waste in its songs, animations, discussions and activities, in terms of encouraging children's practices to be more sustainable. For example, the lessons called 'Power Challenge' and 'Water Story' advocated saving energy and water, 'Compost and Grow' and 'Meat Reducer' encouraged pupils to grow their own food and reduce their meat consumption, 'Transportation' and 'You Don't Have To Fly' advocated sustainable transport and the avoidance of flying and 'Disposable' encouraged pupils to practise responsible waste disposal. Many of these lessons had activities that pupils took home to their families as homework tasks, such as energy saving diaries, water use logs and food menus containing minimal meat dishes.

The researcher conducted research in family homes in order to observe and interview families about their practices in the home and whether and how the environmental education pupils received at school might have impacted these practices. Some family-based data were collected via telephone interviews due to the COVID-19 pandemic in 2020 affecting the proposed methods for the research. The impact of COVID-19 on the research is discussed further in section 7.7.

1.3. Thesis aim and objectives

As focusing on education and family can be seen as two routes to addressing environmental issues, this thesis will bring education and family together to explore whether an environmental educational intervention can impact families' environmentalism. The aim of this thesis was to explore the impact of multimedia environmental education on children and their families as a means of addressing environmental issues. 'Impact' was defined as any effect or change that occurred as a result of the environmental education and its influence, similar to definitions used in a previous study on the impact of environmental education (Fu & Liu, 2017). This definition of impact included any effect or change with the pupils, their family and the family practices. In this sense, impact was understood to mean any effect or change to pupils when they engaged with the environmental education at school, and to them and their families in the family home. To address shortcomings in previous pro-environmental research where properly documented theoretical underpinnings were not included when evaluating the effectiveness of interventions (Matthies, Klöckner & Preißner, 2006; Staats, Harland & Wilke, 2004; Steg, Van Den Berg & De Groot, 2013) this thesis explored impact theoretically, by drawing upon extensions of social practice theory (e.g. Reckwitz, 2002; Shove, Pantzar & Watson, 2012), including home practice theory (Foden, Browne, Evans, Sharp & Watson, 2018; Gibson, Farbotko, Gill & Waitt, 2013; Lane & Gorman-Murray, 2011), explained in sections 2.3.4. and 2.3.5 respectively.

The objectives of this thesis mapped on to the following three research questions:

- **Research Question 1 (RQ1):** How (if at all) do pupils engage with multimedia environmental education at school?

- **Research Question 2 (RQ2):** Who (if anyone) in the family is discussing and actioning the environmental education, how (if at all) and what is the outcome (if there is one) on different practice domains (i.e. energy, water, waste, food, travel) at home?
- **Research Question 3 (RQ3):** Which underlying factors help or hinder environmental education to engage pupils and have an impact on home practices (i.e. energy, water, waste, food, travel)?

Addressing these research questions involved studying how primary school children engaged with a multimedia environmental education programme delivered in school by their teacher. Studying engagement helped to ascertain whether any messages within the environmental education were remembered, recalled, evaluated and subsequently discussed and/or actioned in the family home. Whether a process of change took place within the family home following the child's exposure to and potential engagement with environmental education at school was explored in terms of whether family members influenced different environmental practices relevant to energy and water use, waste management, food and travel (Druckman & Jackson, 2009, Evans, McMeekin & Southerton, 2012; Foden, Browne, Evans, Sharp & Watson, 2018; O'Neill, 2015). Which family members discussed or actioned pro-environmental practices mentioned in the education was studied, as well as how they were actioned or discussed, via different strategies of influence (e.g. Gentina & Muratore, 2012; Gentina & Singh, 2015; Palan & Wilkes, 1997) like pester power and nagging (e.g. Bridges & Briesch, 2006; Henry & Borzekowski, 2011). Which factors helped or hindered the process of environmental education (Uzzell, 1999) having an impact or not on practices was also studied.

1.4. Thesis structure

Chapter 1: Introduction introduces the context and justification for the research and the aims, objectives and structure of this thesis. Chapter 2: Literature review presents a review of education and family-based research, practice theory literature and the research questions and theoretical framework for this thesis. Chapter 3: Methods discusses philosophical underpinnings to the qualitative approach and research methods used for school and family-based fieldwork for this thesis. The fieldwork strategy is presented followed by an account of a pilot study. The remainder of Chapter 3: Methods is in two

sections relevant to data collection methods in schools and family homes, which are followed by a description of the data analysis process and ethical considerations. Chapter 4: School-based findings and Chapter 5: Family-based findings present the research findings in relation to the three research questions which explored children's engagement with environmental education at school, the impact of environmental education on home practices and factors influencing this impact. Chapter 6: Discussion provides a discussion of the findings in relation to the literature and theoretical underpinnings, as well as an updated theoretical framework. Chapter 7: Conclusion considers the contributions of this thesis and the implications of the research findings for theory, literature, methodology and environmental education practice and policy. This final chapter also discusses limitations and potential future avenues of research as well as the impact of COVID-19 on the research.

1.5. Chapter conclusion

Given the context of the research, of a lack of compulsory environmental education in UK primary schools, of emerging youth action on environmental issues and the seriousness and growing urgency of the consequences of climate change, this thesis aimed to address environmental issues through the avenues of education and family, by studying primary school children's engagement with environmental education at school and whether and how this impacted the practices within the home they shared with their family.

Chapter 2: Literature review

2.1. Chapter introduction

Chapter 2: Literature Review presents a review of the relevant literature that this thesis drew from and to which it contributed to in Chapter 6: Discussion (also see section 7.3.). Section 2.2. presents educational literature on pupil engagement in section 2.2.1. and research on environmental education and any impact it might have on learners and their families in section 2.2.2. Section 2.2.3. discusses the role multimedia, including music and artwork, might play in engaging pupils with their education and people with environmental issues. Section 2.3. presents literature on families and practices. Section 2.3.1. discusses socialisation influences within families and section 2.3.2. presents literature on the different strategies children use to influence their parents. Section 2.3.3. discusses research and theories of 'bringing school home', when learners and their families are impacted by school-based interventions. Section 2.3.4. applies social practice theory to understanding families. In section 2.3.5. how such theories might be useful in understanding and navigating household environmental issues is discussed, including practices within the 'domains', defined here as areas of household sustainability, of food consumption, water and energy use, travel and waste management. Section 2.4. explains the research questions and theoretical framework based on social practice theory underpinning this thesis, and 2.5. concludes this literature review chapter.

2.2. Education

2.2.1. Pupil engagement

Engagement is an important precursor to learning (Cumming, 1996; Zyngier, 2008) and can predict academic achievement (Finn & Rock, 1997). Definitions of engagement typically refer to an array of intertwined psychological constructs that explain how children feel, think and behave in school (Fredricks, Bluemnfeld, Friedel & Paris, 2005) indicating that engagement consists of emotional, cognitive and behavioural components respectively (Finn, 1989; Zyngier, 2008). Emotional components of pupil engagement concern the positive and negative values, interest and feelings pupils experience toward their school, their class and their teacher (Zyngier, 2008), such as feeling happy that they have a lesson with their favourite maths teacher. By contrast, cognitive components of engagement refer

to motivation, effort, psychological investment and the strategies used by the pupils (Zyngier, 2008), such as finding maths a challenging subject and asking for help from the teacher. Behavioural components feature in most definitions of pupil engagement when engagement is studied as part of the learning process (Murray, Mitchell, Gale, Edwards & Zyngier 2004; Smith, Butler-Kisber, LaRoque) and involve pupils 'doing the work, following the rules, persisting and participating' (Zyngier, 2008, p.1769). Behavioural engagement would encompass the behaviour of a pupil in a maths lesson, for example completing activities and participating in discussions. Some researchers operationalise behavioural engagement in to a measurable scale (Dornbusch & Steinberg, 1990). At times, pupils may appear to be actively engaged in their learning, but are instead ritualistically engaged or passively compliant (Schlechty, 2002), reflecting the notion of 'following the rules' (Zyngier, 2008, p.1769). This research (Schlechty, 2002; Zyngier, 2008) implies a distinction between active and passive behavioural engagement.

A model of pupil engagement by Finn (1989) combined cognitive, behavioural and emotional components of engagement, breaking down engagement into behavioural participation and affective 'identification', encompassing the pupil's feelings of belonging and valuing the outcomes of education. Another definition of student engagement (Vibert & Sheilds, 2003, p. 237) defines engagement as learners journeying on 'a continuum, ranging from relatively rational and technical approaches to those that are more constructivist, to those reflecting a critical democratic worldview', reflecting developments in pupils' learning and understanding. Children taking a critical approach to their education is seen as an important component of engagement (Vibert & Sheilds, 2003).

Defining what engagement is has methodological implications, such as questioning what intuitively feels like and appears to be engagement (Newman, 1986), but may simply be ritualistic, passive compliance (Schlechty, 2002), as discussed in the pilot study (see section 3.5.). Conceptualising engagement as an abstract continuum of understanding (Vibert & Sheild, 2003) presents a challenge for researchers when studying what engagement might look like in the field of the classroom (Hammersley & Atkinson, 2007).

Some research has been conducted on how pupils engage with environmental education (see section 2.2.2.), with limited research carried out on pupil engagement with multimedia environmental education, as many environmental education programmes do not utilise

multimedia (Kagan & Kirchberg, 2016). In order to fill this gap, this thesis will explore whether pupils engage with an environmental education programme through classroom observations of lessons. If pupils are found to engage with this programme, how they engage will be explored in terms of behavioural, emotional and cognitive engagement components found in most models of pupil engagement (Finn, 1989; Fredricks, Bluemnfeld, Friedel & Paris, 2005; Zyngier, 2008). Pupils are often left out of discourses about engagement (Zyngier, 2008), so pupils will also partake in interviews about whether and how they engaged with the environmental education programme delivered in their lessons. Discussing pupil engagement with pupils will also help to clarify whether and why pupils might appear (Newman, 1986) to be ritualistically engaged, passively compliant (Schlechty, 2002) or following school rules (Zyngier, 2008) in observations, as they will have the opportunity to provide explanations for what the researcher observed in their lessons.

As well as the pupils themselves, engagement can be influenced by teachers, parents and school practice (Willms, 2003), and so interviews with teachers and parents will also be included in the research. How teachers deliver the environmental education (Ham & Sewing, 2010; Uzzell, 1999) and whether this might impact upon pupil engagement will be explored through observations and interviews, in terms of whether there is any link between what teachers said or did in lessons, and how pupils engage with and are impacted by these lessons, for example their memory of lessons.

This thesis will also explore underlying factors, including barriers and facilitators to pupil engagement with multimedia environmental education, given that little research has been conducted on which factors might affect how pupils engage with environmental issues through their education, in particular when delivered through multimedia, and whether there are any related issues with this delivery. Identifying barriers and facilitators to how pupils engage with environmental education is crucial, given that this could help them or hinder them from discussing or actioning the education with family members, and thus influence the impact it might have on practices within the home (see theoretical framework in section 2.4.). Some research has identified how pupils' perceptions of barriers that might hinder their educational or career aspirations, as well as perceived family support, were associated with pupil engagement with school generally (Kenny, Blustein, Chaves, Grossman & Gallagher, 2003). Research on specific subjects like physical education (Chalkley, Routen,

Harris, Cale, Gorely & Sherar, 2018) identified barriers and facilitators relating to the programme and how it was implemented, such as unfamiliarity with technology (Bodsworth & Goodyear, 2017), as well as factors relating to the school climate. Research on computer programming (Kellher, 2009) found the barrier of lack of interest in the subject impacted engagement. This previous research, although not related to environmental education, provides insight in to how barriers and some facilitators relating to school and specific lessons are associated with or can impact how pupils engage with programmes and content. Whether specific barriers relating to the multimedia delivery of environmental education impact pupil engagement or if music and animation helps facilitate engagement remains to be seen. Given the potential of music and artwork to engage people in environmental issues (e.g. Pepermans & Maeseele, 2017; Publicover, Wright, Baur & Duinker, 2018), how multimedia impacts pupil engagement and any underlying factors will be explored as part of the research questions for this thesis (see section 2.4.).

2.2.2. Environmental education

Environmental education can refer to sustainability education and education for sustainable development. Common to these labels is the aim of engaging learners in environmental or sustainability issues with a basis of authentic science (Jordan, Gray, Zellner et al., 2018). This thesis will refer to all such programmes as environmental education for simplicity. Environmental education can be defined as education that encourages learners to strive toward the goal of sustaining the planet and its resources for future generations, by producing well informed and environmentally active adults (Neal & Palmer, 2003). Environmental education can equip children with the necessary skills, knowledge and attitudes required to achieve a more sustainable future (Davis, 1998; 2010) and instil an ecological worldview in them (Dunlap, 2008; Lee, 2014). Effective environmental education needs to be tangible to learners, as suggested by the United Nations' Educational, Scientific and Cultural Organization (Hanley, 2004) as tangibility, as opposed to education that is more abstract, can help to engage and inform learners (De Bérigny, Gough, Faleh & Woolsey, 2014). Teachers need to play an important role in environmental education, as facilitators and consultants, not merely providers of facts (Uzzell, 1999), as pupil engagement at school can be influenced by teachers, as well as by school practice (Willms, 2003). The awareness and interest of teachers as well as the school climate can play a crucial role in gaining access

to schools when conducting research on the impacts of environmental education (Strong, 1998). How educational programmes are implemented and the school climate can also act as a barrier or facilitator to pupil engagement (Chalkley, Routen, Harris, Cale, Gorely & Sherar, 2018). How teachers deliver multimedia environmental education, in terms of whether they act as facilitators and reflect a supportive school climate that helps to engage pupils, or whether they merely provide facts to pupils without the underlying support of the school climate will be considered as part of exploring pupil engagement for this thesis. Previous educational research exploring the role teachers play in pupil engagement has been based on recommendations from research (Uzzell, 1999), or has been conducted with school life generally (Willms, 2003) or on subjects unrelated to environmental education (Chalkley, Routen, Harris, Cale, Gorely & Sherar, 2018). Pupil engagement following teacher delivery of with multimedia environmental education has not been previously studied.

Uzzell (1999) described environmental education as the key that unlocks the door to families becoming more environmentally friendly and outlined an action competence framework on which to build programmes, based on 'a way of thinking about and taking people through each stage of problem identification and solution generation' (Uzzell, 1999, p. 401). Uzzell's (1999) understanding of environmental education encouraged pupils to acquire learning, develop concern and find solutions. Frameworks for environmental education like Uzzell's can provide learners with a hands-on and tangible (Hanley, 2004) approach of engaging with environmental issues, providing 'an enhanced role for pupil discussion and participation in environmental action' (Bonnett & Williams, 1998, p. 159). Another environmental education programme that is based on a similar 'hands-on' (Hanley, 2004; Uzzell, 1999) framework that is student-led and outlines a learning and action process in which learners engage with environmental issues (O'Neill, 2015) is the Eco-Schools Programme (https://www.eco-schools.org.uk/). This programme has had global reach having been taught across 67 countries and aims to educate primary school pupils on topics of biodiversity, energy, global citizenship, healthy living, litter, marine life, school grounds, transport, waste and water. As part of the framework of Eco-Schools, pupils first form an 'Eco-Committee', then they carry out an environmental review of their school. From this review, they make an action plan, monitor and evaluate, link to the curriculum, inform and involve others and produce an 'Eco-Code'. The impact of the Eco-Schools programme on learners as well as their families has been researched (e.g. O'Neill, 2015), and is discussed

below. Although the Project Earth Rock programme is not structured around an explicit framework like Uzzell's (1999) action competence framework or the Eco-Schools framework, each lesson provides opportunities for pupils to discuss and action a range of environmental practices (Bonnett & Williams, 1998), and is arguably hands-on (Hanley, 2004) when content is taken home in the form of homework tasks. The multimedia potential of Project Earth Rock was why this programme was used as the intervention in this research, despite it not being based on an explicit environmental education framework.

In terms of how pupils might engage with environmental education that has not been delivered through multimedia, research has found that environmental education can engage learners cognitively (Ballantyne, Fien & Packer, 2001), and have a positive impact on their knowledge, concern and awareness of environmental issues (Armstrong & Impara, 1991; Grodzinska-Jurczak, Bartosiewicz, Twardowska & Ballantyne, 2010; Strong, 1998). Programmes have also been shown to influence learners' willingness to engage in practices, such as the saving water (Ballantyne, Fien & Packer, 2001; Fu & Liu, 2017). This research did not identify any actual impact on practices following engagement with environmental education.

Studies of children aged 11 to 16 years old and their understanding of environmental issues like the greenhouse effect (Boyes & Stanisstreet, 1994) show that they have a good understanding of some issues, however despite children being regarded as a suitable audience for environmental messages (Uzzell, 1999) they can be prone to misconceptions and confusion, even when older (Boyes & Stanisstreet, 1994). This age-related difficulty in understanding is a barrier to children engaging with environmental issues. Boyes and Stanisstreet (1994) found that children understood environmental issues by categorising environmental actions into a dichotomy of friendly or unfriendly, and were less likely to make links between causes and consequences. Another study found that younger children tend to understand simpler environmental issues, such as pollution, with older children able to comprehend more complex environmental issues (Strong, 1998). Research by the Henley Centre in 1994 found that children's understanding of environmental issues was not considered by them to be political, radical or controversial. As Strong (1998, p. 350) explains, 'for them, being concerned about the environment is simply a common-sense reaction to the present situation.' Environmental issues have arguably become more

political to children during the time of this thesis, as suggested by Thunberg (2019, p. 136) when referring to the lack of action by politicians, journalists or business leaders on GHG emissions at a climate strike, 'let us be children. Do your part, communicate these kind of numbers instead of leaving that responsibility to us. Then we can go back to 'being children''. How children engage with and understand current environmental issues and whether engaging with such issues is 'common sense' for them, needs exploring and questioning.

Limited research has identified underlying factors that impact children's engagement with environmental education. One study exploring the impact of environmental education on primary and secondary school aged children hypothesized from its findings that enjoyment, connected with the age and interests of learners, providing support and including parents may have been contributing factors to how children were impacted (Ballantyne, Fien & Packer, 2001). These factors were speculative, however. Ballantyne, Fien & Packer (2001) did find in their study that emotionally charged material, such as information about pollution harming wildlife in particular helped to engage the older children, helping them to emotionally engage (Finn, 1989; Fredricks, Bluemnfeld, Friedel & Paris, 2005; Zyngier, 2008) with the programme.

When learners engage with environmental education, awareness and pro-environmental attitudes can sometimes spread to their family members (O'Neill, 2015) when such education is discussed and actioned at home, impacting practices like waste management and saving water (Ballantyne, Fien & Packer, 2001; Fu & Liu, 2017; Grodzinska-Jurczak, Bartosiewicz, Twardowska & Ballantyne, 2010). O'Neill (2015) found that the Eco-Schools programme had some impact on sustainable practices in the homes of primary school children in Ireland. Children had a sense of ownership over their behaviour and applied their learning in practical, hands-on ways. Grodzinska-Jurczak, Bartosiewicz, Twardowska & Ballantyne (2010) found that three quarters of primary school pupils discussed a school-based waste management programme with their parents, with a third of pupils actioning their learning by making changes to their waste management practices at home. Knowledge of environmental waste issues from the programme was correlated with pupil enjoyment. This research (Grodzinska-Jurczak, Bartosiewicz, Twardowska & Ballantyne, 2010; O'Neill, 2015) suggests that environmental education can have a wider reach beyond just the

learner, and extend to other family members and the practices they perform. Research on how multimedia environmental education might be brought home by learners to influence family members and a range of difference practices is limited, in terms of whether the multimedia delivery plays a particular role to facilitate change, or acts to hinder this transfer of knowledge and action. Research on how other school-based interventions, not relevant to environmental education, have been 'brought home' by learners (e.g. Ayadi, 2008; Grönhöj & Bech-Larsen, 2012) is discussed in section 2.3.3.

In terms of children applying the environmental education they learn at school in the home with their families and increasing the impact of such programmes, both parents and children need to be willing to be influenced by the education (Uzzell, 1999). The social context of the family must help facilitate participation and change (Uzzell, 1999), and so it is crucial that families support (Ballantyne, Fien & Packer, 2001) children in their engagement with environmental education and facilitate changes at home, such as through active communication. As Satchwell (2013) notes, learning and practising sustainability at school does not necessarily translate to action in the home.

Despite environmental education programmes having impact on learners and their families in the home (Ballantyne, Fien & Packer, 2001; Fu & Liu, 2017; Grodzinska-Jurczak, Bartosiewicz, Twardowska & Ballantyne, 2010; O'Neill, 2015), at the time of this thesis, such programmes were not compulsory for schools to teach in the UK (see section 1.2.1.)., as environmental education was not part of the National Curriculum (UK Government, 2013). Instead, 'support from school leaders and active involvement from staff, as well as a long-term commitment and the willingness to involve students in decision-making' is required for programmes to be successfully implemented, as stated on the Eco-Schools website (https://www.eco-schools.org.uk/). The delivery of programmes and their longevity relies on the intrinsic interest, input and competence of teachers (Ham & Sewing, 2010; Uzzell, 1999). This caveat supports previous research of the need for teachers to facilitate programmes effectively and to have support from the school (Strong, 1998; Uzzell, 1999; Willms, 2003).

In a study exploring the barriers to environmental education being taught in schools in an extra-curricular capacity, teachers cited a lack of time in the school day and for lesson preparation, lack of funding and lack of instructional materials to deliver the education

(Ham & Sewing, 2010). Exclusive focus on the science underpinning environmental education and feelings of incompetence from teachers were other barriers (Ham & Sewing, 2010). Ham and Sewing's (2010) research provided insight from a teacher perspective about the difficulties of teaching environmental education in schools, and identified the importance of a prescriptive framework and instructional materials for teachers to follow. Teachers in the school-based fieldwork for this thesis were given prepared and timed lesson plans and materials as part of the Project Earth Rock programme. Whether this made them feel more competent to deliver the messages of the programme to pupils, and whether this impacted on pupil engagement will be explored.

Unlike the environmental education programme (https://projectearthrock.com/) used in this thesis, most programmes do not necessarily utilise the potential power of multimedia, including music and artwork (Kagan & Kirchberg, 2016) to engage pupils. Some studies have shown that audiovisual elements that secondary school pupils used in presentations during an environmental education programme helped engage pupils and provided enjoyment (Ballantyne, Fien & Packer, 2001). This suggests that forms of multimedia might help provide joy and thus engage pupils in environmental messages, however this research was conducted with older students and the audiovisual components were only part of presentations. How the mixture of songs and animated artwork might impact pupil engagement with environmental education needs further study with primary school age children (Grønhoj & Olander, 2007), and formed a key component of the research questions for this thesis (see section 2.4.). The use of such media in other contexts and educational settings is discussed in section 2.2.3.

2.2.3. The role of multimedia

Multimedia can be defined as a combination of graphics, music and videos within the same programme (Rohwedder & Alm, 1994). The flexibility and enjoyment of songs (Millington, 2011) makes music a useful and effective teaching tool in educational settings such as language learning (Ara, 2009; Engh, 2013; Morales Neisa, 2008). Songs, musical games and rhymes can all appeal to children's learning styles by presenting fun and natural opportunities that 'do not make them conscious that they are learning' (Ara, 2009, p. 167). Similarly, using music in language learning can help relax learners and remove any affective barriers, like feelings of anxiety or low self-confidence (Krashen, 1982) that may hinder their

ability to engage with their education (Coe, 1972; Claerr & Gargan, 1984; Merriam, 1964; Wilcox, 1995). Music can have lasting effects on long-term memory (Hallam, Price & Katsarou, 2002) by helping with memory storage, retrieval and recall (Brown & Perry, 1991; Fonseca Mora, 2000; Wilcox, 1995) and can connect learners to real life situations (Ramsey, 2002). Music can also help communicate complex topics, provide pleasure and normalise pro-environmental behaviour (Publicover, Wright, Baur & Duinker, 2018), such as when used to inspire transformative environmental action, from advocacy (Publicover, Wright, Baur & Duinker, 2018) to social movements (Pepermans & Maeseele, 2017). When used in the classroom, language learning songs can help foster a sense of community (Lake, 2003; Lems, 1996) and enhance social harmony (Huy Le, 1999).

As well as music, artwork may be an effective medium to help primary school children understand ambiguity, encourage innovative thinking and develop supportive cultural norms, given previous research (Eernstman & Wals, 2013). Art has been used effectively to engage the general public in issues like climate change (Jonze, 2018) such as by allowing people to have a direct and tangible experience of feeling an ice block melting, and exploring the emotions that arise as a result. Through such engagement with art, environmental education can become memorable to learners (Inwood & Taylor, 2012). Using artwork in education provides learners with an aesthetic experience that can help with transformative learning (Kokkos, 2010). Using art in environmental education might provide an innovative (Inwood & Taylor, 2012) and creative (Hansen, 2009) way to make teaching more experiential, participatory and original (Fragkoulis & Koutsoukos, 2018), and thus more tangible (De Bérigny, Gough, Faleh & Woolsey, 2014; Hanley, 2004).

Although extensive research has been carried out on the role of multimedia in contexts like language learning, limited research has been conducted on the role of music and multimedia in environmental education (Kagan & Kirchberg, 2016). How pupils might engage with the multimedia components of environmental education, in terms of emotional, cognitive and behavioural engagement (Fredricks, Bluemnfeld, Friedel & Paris, 2005; Finn, 1989; Zyngier, 2008) has not been studied before, and will be explored as part of the research questions for this thesis (see section 2.4.). As discussed in other contexts, whether the musical components help aid memory of environmental messages (Hallam, Price & Katsarou, 2002) and provide enjoyment to pupils (Millington, 2011; Publicover,

Wright, Baur & Duinker, 2018) will be explored. Whether the multimedia within Project Earth Rock acts to facilitate or hinder any impact on pupils, and any underlying factors to this process will also be identified. Previous research has found that how non-environmental education programmes were implemented were factors to their success in engaging learners (Kellher, 2009), as well as pupil interest in the subject (Chalkley, Routen, Harris, Cale, Gorely & Sherar, 2018). Whether pupil interest in music and animated artwork are influential factors to engagement will be explored.

As well as exploring the potential impact of multimedia environmental education on pupils, whether messages are discussed and actioned and home, and whether this has any impact on family practices will also be explored, given the limited previous research on this topic. Previous research has found that environmental education aimed at pupils in school has been shared with family members and had an impact in the home (Grodzinska-Jurczak, Bartosiewicz, Twardowska & Ballantyne, 2010; O'Neill, 2015), so whether the delivery of environmental education through multimedia impacts this process needs exploring.

2.3. Family and practices

2.3.1. Socialisation influences within families

To explore any impact of multimedia environmental education on families, what is meant by family and their practices first needs to be discussed. The family is considered an influential site and agent for the socialisation of children (James, 2013). As well as socialisation, families provide others functions such as reproduction, education, assignment of social roles, nurture and economic and emotional support (Berns, 2015). Families can also be defined by what they do in terms of their behaviours and practices (James, 2013). According to Giddens (1984), a family is a set of routinized practices carried out by the actors within the family. The idea of 'doing family' and a full explanation of social practice theory and its application to families is discussed in section 2.3.4. Family members often influence each other, either from parent to child, or child to parent, or bidirectionally between both family members (Ekström, 1995; Kuczynski & Parkin, 2007; Watne & Brennan, 2011). Influence may occur from family members to other family members' attitudes, opinions or behaviours, in terms of what they talk about and discuss and their actions, such as pro-

environmental attitudes, behaviours (Gentina & Muratore, 2012, Gentina & Singh, 2015) and practices (O'Neill, 2015).

Influence from parent to child is the typical model of socialisation, involving a process that instils social and cultural values, norms, knowledge, attitudes, behaviours and skills to younger generations (Brim, 1966; Gentina & Singh, 2015; Grønhøj & Thøgersen, 2009; Maccoby, 2007) allowing younger generations to act as autonomous consumers (Cook, 2004; Ward, 1974) of products and resources. Socialising younger generations to continue to use and consume certain resources has implications for sustainability and natural resource use (Jamieson, 2016). Berns (2015) saw the socialisation process from a bioecological perspective, with a focus on the relationship a person has with their environment and how this influences them and helps them to develop. In this sense, socialisation involves conformity to externally imposed social rules and expectations of others (Höppner, 2017).

Parents play the main role in socialising their children by 'bringing them up' and 'raising them' through a mainly one-directional process (John, 1999; Maccoby, 2007; Whitbeck & Gecas, 1988). Snyder and Purdy (1982) discussed traditional, unidirectional processes of socialisation from parent to child and how these reflect a behaviourist perspective where children's early years involve conditioning from adults. Traditional models 'present a socialisation process where the child is the learner and the socialization is unidirectional, from adults to children' (Snyder & Purdy, 1982, p. 263), failing to acknowledge any influence from child to parent.

Socialisation influences on children can also come from siblings (McCandless, 1969), grandparents (Moore & Rosenthal, 2016), other family members, child care, school, peers, media (Berns, 2015) and the wider community, and this influence may be dynamic and reciprocal. Socialisation outcomes can include values, attitudes, motives and attributions, self-esteem, self-regulation/behaviour, morals and gender role (Berns, 2015). Berns (2015) however did not consider whether socialisation processes might include an 'eco' aspect, where pro-environmental attitudes, values and behaviour are passed on between family members (Gentina & Muratore, 2012).

‘Eco-socialisation’ is a type of socialisation relating to environmental issues that can be defined as ‘the process of learning pro-environmental behaviours, through the acquisition of relevant skills, knowledge and attitudes’ (Gentina & Muratore, 2012, p. 162). Although giving insight into the process whereby one becomes ‘eco-socialised’ and the components involved in this process, Gentina and Muratore’s (2012) definition is based on psychological constructs. The idea that acquiring a certain attitude leads to behavioural change, similar, for example, to the Theory of Planned Behaviour (Azjen, 1991) has previously been challenged, with researchers finding an intention-behaviour gap (Blake, 1999; Carrington, Nevillle & Whitewell, 2010) in such a process, whereby an attitude might influence an intention, but this does not then always lead to behaviour change.

Uzzell (1999) also explored a type of ‘eco-socialisation’ in the family and identified factors that impacted the influence process from occurring. These included factors like communication between child and parent and how willing parents were to adopt the role of pupil, as opposed to expert in interactions. Gaining insight in to social interactions, as well as an understanding of socialisation processes, are relevant to studies of social practices (Halkier, Katz-Gerro & Martens, 2011), as these interactions provide insight into how practices are transferred and upheld over time (Giddens, 1984). Justifications for taking a social practice approach to studying the process of how children might influence their families following environmental education will be given as part of section 2.3.4.

Similar to a process of socialisation, Bandura and Walter’s (1977) social learning theory posits that people learn from others’ behaviour and that the family may provide plentiful opportunities for this learning. Models acting out pro-environmental behaviours and thus providing information (Steg, Van Den Berg & Groot, 2013; Steg & Vlek, 2009) about how to act can be effective at influencing other people’s behaviour (Aronson & O’Leary, 1982). Family norms may also play a role in pro-environmental behaviours, as the opinions and behaviours of others can foster pro-environmental behaviour (Cialdini, 2003; Cialdini, Kallgren & Reno, 1991), with people wanting to act in line with information about others’ behaviours (Goldstein, Cialdini & Griskevicius, 2008). Many of these theories and those relating to socialisation have been criticised as being outdated (Höppner, 2011), and can be considered simplistic in terms of attempting to explain complex human behaviour in a changing world through the copying of other people’s behaviour. If such theories

adequately explained behaviour, then through the modelling of environmental activists like Thunberg (2019), people around the world would want to act in line with her behaviour and would also behave as pro-environmentally as possible. However, this is not the case, as people, including families, as the focus of the research, continue to engage in resource intensive practices (Druckman & Jackson, 2009; Jamieson, 2016; Shove, 2017).

Socialisation is not always a one-directional process. Socialisation within a family can often be interactive (Ekström, 1995) and bidirectional (Kuczynski & Parkin, 2007; Watne & Brennan, 2011). The traditional one-directional process of socialisation from parent to child can happen in reverse, when younger generations influence their parents (Ekström, 2007; Foxman, Tansuhaj & Ekström, 1989; Grossbart, Hughes, Pryor & Yost, 2002). This reversal of socialisation processes has been called 'reverse socialisation' (Gentina & Muratore, 2012; Gollety, 1999; Ritzer, Kammeyer & Yetman, 1979; Singh, Sahadev, Oates & Alevizou, 2020). Younger generations may have acquired skills, knowledge and experience that their parents lack (Ekström, 2007), from peers or their school, and when they influence their parents with such skills, knowledge and experience, they transfer patterns and knowledge of consumption in the process (Gentina & Muratore, 2012).

A reverse socialisation process has been studied in the context of environmentalism, and whether younger generations can influence their parents to be more environmentally friendly in their attitudes and behaviours (Gentina & Muratore, 2012; Gentina & Singh, 2015). Studies of adolescent children who are effective at influencing their family members rely on sophisticated strategies of influence (Gentina & Muratore, 2012; Gentina & Singh, 2015). Adolescents' environmental concern has been found to play an influential role on parents (Singh, Sahadev, Oates & Alevizou, 2020). Little research however has been conducted with younger, primary school aged children and whether a process of environmental change in the family might be sparked by multimedia environmental education delivered at school.

Much of the research mentioned in this section (2.3.1.) takes the perspective that children influence their parents through socialisation processes. Such a perspective focuses on individuals and how they impart their individually acquired environmental knowledge and skills to others by a 'process of learning pro-environmental behaviours, through the acquisition of relevant skills, knowledge, and attitudes' (Gentina & Muratore, 2012, p. 162).

Although not including all models of socialisation, such models, also mentioned in section 1.2. (e.g. Ajzen, 1991), consisting of attitudes, behaviours and choices, are often problematic (Shove, 2010; 2017), as people can often be inconsistent (Peattie, 1999), as the antecedents to behaviour that are frequently studied often do not predict subsequent behaviour, as the 'intention-behaviour gap' (Blake, 1999; Carrington, Neville & Whitewell, 2010) demonstrates. These models of human behaviour also focus on the micro level of individuals (Kilbourne & Beckmann, 1998), their experiences (Giddens, 1984) and how individuals might influence each other, and not on the much-needed broader understanding (Kilbourne, McDonagh & Prothero, 1997; McDonagh, Dobscha & Prothero, 2012; Reid, Sutton & Hunter, 2010) of resource intense practices themselves and what drives their performance (Shove, Pantzar & Watson, 2012) to take hold on society over time (Giddens, 1984; Shove, 2010) on a more macro level.

2.3.2. Strategies used by children to influence their parents

Children can influence their parents in numerous ways and via different strategies, such as by sharing skills that they have acquired. Ekström (2007) found in interviews, that 'children' aged between 13 up to 30 years old influenced their parents when using technological products by providing information and showing their parents how to use products. Children might also teach parents traits like patience, forgiveness and a sense of wonder (Wonderopolis, 2020).

'Pester power' (Bridges & Briesch, 2006) has been defined as how children make use of nagging as a strategy to influence their parents. The term 'nag factor' has also been used by some researchers (Bridges & Briesch, 2006; Henry & Borzekowski, 2011). Research into nagging has been carried out in the context of children making purchase requests of food or products to their parents, a different context to children wanting to influence their parent's environmentalism. Only limited research has been conducted on how KS2 children aged between seven and 12 years old use pester power to influence their parent's environmentalism (O'Neill, 2015).

Henry and Borzekowski (2011) studied nagging requests made by three to five-year-olds following advertising. Henry and Borzekowski (2011) defined nagging as a child asking four

or more times for an item and operationalised nagging on a scale of zero (never) to ten (all the time) by asking mothers how often their child nagged them. Henry and Borzekowski (2011) recognised that this type of persistent nagging may elicit frustration and cause stress for both child and their parents, resulting in it being an ineffective strategy. Nagging was common, even in children as young as three and children nagged more as they got older. Whether primary school children might use nagging as a strategy to transfer messages of multimedia environmental education to their parents, and whether this strategy similarly elicits frustration and stress for parents and children have not been researched before, and will be explored as part of the research questions for this thesis (see section 2.4.).

Henry and Borzekowski (2011) identified three types of nagging, including juvenile nagging, nagging to test boundaries and manipulative nagging, with the later used by children more frequently as they got older. Within each three categories of nagging, subcategories were identified. Juvenile nagging involved the child constantly repeating or asking for items, whining, mild physical reactions such as stomping feet, making fists and grunting. When the child nagged to test boundaries, they would put items in the shopping cart even if the mother had said no, have a tantrum in public or ask other family members for the item. Manipulative nagging involved flattering the mother, professing love or hate for the mother and saying that other children had the item. In terms of how parents reacted to nagging as strategies of influence from their children, Henry and Borzekowski (2011) found that mothers viewed nagging interactions as interactions of conflict and talked of battles, losses and victories with their children. Mothers dealt with nagging using strategies they described as being either good or bad, in terms of how effective they were at resolving conflict. Such strategies included ignoring, giving in, yelling, distracting, calm consistency, avoidance, limiting commercial exposure, rules and negotiation, allowing alternative items and explanation. Some of these strategies, such as limiting commercial exposure, are directly relevant to purchasing products, and potentially less relevant to environmental practices. Strategies were also grouped as reactive or proactive depending on who was considered to be in control of the situation. Parental reactions to how children might try to influence them about environmental issues will be explored as part of addressing the research questions for this thesis (see section 2.4.).

Other research has also studied how parents react to purchase requests. Lawlor and Prothero (2011) found that parents reacted to interactions with their children in ways of agreement, refusal, procrastination or negotiation, and how the children understood these reactions to be part of a 'good natured "game"' (Lawlor & Prothero, 2011, p.561). How parents might react if their children make requests to change their environmental family practices needs exploring.

Pedersen, Grønhøj and Bech-Larsen (2012) found that the children in their study aged 11 years old used direct demands as one communication strategy to influence their family following a family healthy eating intervention. In other research with seven to 11-year-olds, the strategies of sharing skills and making direct demands to parents were described by the researchers as 'good natured' (Lawlor & Prothero, 2011, p.561) and sophisticated given the age and development level of the children involved in the research. Similarly, Nash and Basini (2012) found that five to 11-year-old children and their parents saw purchase requests as positive, playful and entertaining games.

Following a family healthy eating intervention, parents had to decide whether to honour their children's demands or not (Pedersen, Grønhøj & Bech-Larsen 2012). This finding indicates that the parents were in control when deciding to accept or deny the children's request, in line with traditional models of socialisation from parent to child (Brim, 1966; Gentina & Singh, 2015; Grønhøj & Thøgersen, 2009; Maccoby, 2007). The parents also saw socialisation efforts of encouraging healthy-eating habits in their children as a continuous, often conflict-ridden struggle (Pedersen, Grønhøj & Bech-Larsen 2012), which is a negative interaction outcome similar to that of nagging, because children and parents saw such interactions as conflict. Pedersen, Grønhøj and Bech-Larsen (2012) also found children influenced their family's eating practices more cooperatively, through contributing ideas and sharing knowledge. Children acknowledged their secondary role when it came to food buying and preparation indicating that children were less involved with food related decisions in the family compared to parents, with parents being the main caretakers and food providers (Pedersen, Grønhøj & Bech-Larsen 2012). Generational power dynamics between children and parents, as well as spouses and siblings, have been studied in families (French & Raven, 1959; Recchia, Ross & Vickar, 2010) in terms of how such dynamics might

contribute to conflict and resolution strategies and whether a party gets what they want. Distinctions have been made between constructive and destructive conflict (Deutsch, 1973) in families, with constructive strategies involving problem solving (Cummings, Faircloth, Mitchell, Cummings & Schermerhorn, 2008) and compromising (Forgatch, 1989; Ram & Ross, 2001; Stein & Albro, 2001; Vuchinich, 1999). More destructive strategies are less likely to result in a resolution agreed to by both parties (Forgatch, 1989; Stanley, Markman & Whitton, 2002), and might involve 'making the other yield to one's own position through disagreements, accusations, or persuasive contentious arguments,' (Recchia, Ross & Vickar, 2010, p. 606).

Research conducted on purchasing requests may differ from how children attempt to influence their parents' environmentalism. If children have an explicit vested interest in getting a product that they desire, they may be more persistent in their strategy, eliciting frustration and stress from parents (Henry & Borzekowski, 2011). When children are trying to get their parents to adopt more pro-environmental practices, children may use different strategies with a range of different outcomes. As Matthies and Wallis (2015) note, child and parent relationships have not been extensively study in the context of the sustainability in the family home.

Ekström (2007) discussed some potential explanations as to why children in recent decades might have more influence in the family than in the past. Ekström (2007) speculated that work commitments may mean that parents have less time with their children and through feelings of guilt, allow their children to play an influential role in decision making in the family (Raju, 2018). Ekström (2007) also speculated that families having children later on in life, when they are perhaps more financially secure, as well as having less children on average than previous generations, may also allow their children more influence in the family. Other studies indicate a trend that parents are spending more time with their children in recent decades compared to the 1960s (Gauthier, Smeeding & Furstenberg Jr., 2004; Sayer, Bianchi & Robinson, 2004) and that children's influence on decision making in the family depends on certain factors, like their age (Martensen & Grønholdt, 2008) and whether issues directly affect them (Foxman, Tansuhaj, & Ekstrom, 1989), not necessarily

just the time commitments of their parents. This research indicates that decision making in the family is influenced by multiple factors.

The developmental age of the children in these studies must also be considered to understand why children tend to use the strategy of nagging their parents. Piaget (1932) found that from ages four to 10, children understand rules and see punishment as an inevitable outcome if they are not followed. Children's awareness of the rules and perhaps wanting to avoid punishment may provide an explanation as to why children might nag their parents to do something they see as 'good' or 'right'. According to Kohlberg (1976), most children below nine years of age are in the first stage of moral development, where obedience is the norm. Kohlberg (1976) said that rules are followed in this early stage when the rules also fulfil one's own interest, which may explain why children tend to nag when making purchase requests to their parents, as the products are likely to be something that they personally want. Whether children might nag their parents to be environmentally friendly has not been studied before, but given that research has shown how children can dichotomise environmental actions in to 'good' and 'bad' (Boyes & Stanisstreet, 1994), it could follow that children, in the early stages of moral development (Piaget, 1932; Kohlberg, 1979) are motivated to nag parents to be environmentally friendly, if such action is perceived as morally good and right, following their engagement with environmental education. The strategies children might use to influence their parents' environmentalism will be explored, as part of addressing the research questions for this thesis (see section 2.4.).

Older, adolescent children make use of sophisticated persuasive techniques when influencing their parents in purchasing decisions. In their study with adolescents aged between 12 and 15 years of age, Palan and Wilkes (1997) identified seven strategies of bargaining, expert, persuasion, legitimate, directive, emotional and request that adolescents used to influence their parents, as well as different parental response strategies. Gentina and Singh (2015) found that adolescents, in their study aged between 13 and 18 years, also used bargaining strategies to influence their parents' environmentalism. These bargaining strategies included striking deals involving money. Adolescents also used reasoning, explained as 'use of logical arguments intended to reach an agreement with parents'

(Gentina & Singh, 2015, p.7590) which can be considered a more sophisticated strategy to nagging, given the children's adolescent age. Gentina and Singh found the success of the influence was dependent on parental style and culture. A common theme within this research (Gentina & Singh, 2015; Palan & Wilkes, 1997) that spans nearly two decades is how parent response is key to the success of children's influence. How parents respond to potential strategies of influence from children following their engagement with environmental education has not been explored before. Whether parents, similar to this previous research (Gentina & Singh, 2015; Palan & Wilkes, 1997) act as the gatekeepers for allowing children to have influence on the family's environmental practices will be explored in this thesis, as part of addressing the research questions (see section 2.4.). Gentina and Singh (2015) also found that adolescents used persuasive strategies. The adolescents that used unilateral, non-reciprocal strategies of persuasion from them to their parent were the least effective at influencing their parents' environmentalism. Of the adolescents who used nagging techniques, their parents tended to have strict, authoritarian parental styles. Gentina and Singh (2015) found that in Western individualistic cultures, 'where parents value egalitarian relationships and self-expression (i.e. exhibiting the traditionally Western warm parental style), adolescents know that it is effective to use bilateral strategies, which promote mutual discussion and agreement, such as bargaining and expert power' (Gentina & Singh, 2015, p.7592).

Some studies have found that even by the age of five years old, children can make use of sophisticated negotiation strategies to persuade their parents to fulfil their demands (Kuczynski & Kochanska, 1990, Kuczynski, Kochanska, Radke-Yarrow & Girnius-Brown, 1987; McNeal, 1992; Valkenburg & Cantor, 2001), particularly if negotiation plays an important role in family communication. Kuczynski and Kochanska (1990) claimed that children as young as three years can also use relatively sophisticated strategies relative to their age and development. Although behaviours such as defying parents and throwing tantrums might be considered common to most three-year-olds, children of this age are able to provide explanations, excuses and compromises for why they have not carried out what has been asked of them (Kuczynski & Kochanska, 1990), strategies that Kuczynski and Kochanska, (1990) considered to be sophisticated for the age of the children in their study. Other research has shown that children aged three can persuade their parents to fulfil their own

wants (McNeal, 1992), suggesting a development of emerging sophisticated understandings of how children influence their parents, even at a young age.

As well as from child to parent, family members' influence can be bidirectional and reciprocal between children and parents where strategies of negotiation, and co-construction (Kerrane, Hogg & Bettany, 2012) are used. In interactions that took place during food shopping trips, children told their parents which foods and meals they wanted (Nørgaard, Bruns, Christensen & Mikkelsen, 2007) and engaged in respectful and cooperative negotiations 'imbued with care, love, and a mutual wish to maintain a good mood' (Gram, 2015, p. 187). Lawlor and Prothero (2011 p.561) found that children saw interactions positively, and understood the reasons behind their parents' reactions of agreement, refusal, procrastination or negotiation. Both Gram (2015) and Lawlor and Prothero (2011) challenge previous negative assumptions that children's purchase requests to parents merely involve 'pester power' type strategies that focus on 'who wins' outcomes. Pedersen, Grønhøj and Bech-Larsen (2012) found that following a family healthy eating intervention, one of the strategies that children used to influence their family was the use of cooperative and helpful strategies.

These studies, although centred around purchasing and food behaviours, provide insight into the interactions and strategies children use to influence their parents, and show that such interactions are not always 'pester power'. When children try to influence their parents' behaviour, these interactions, based around the purchasing of food and other goods, are more like a cooperative negotiation (Gram, 2015). In food and purchasing related situations, children may be more mindful of getting an item they want, whereas in this thesis, the topic of concern is the environmental practices of families following engagement with environmental education. A subtle versus direct use of strategy (Lawlor & Prothero, 2011) used by children to influence family members is similar to the distinction found in Pedersen, Grønhøj and Bech-Larsen's (2012) study on a family healthy eating intervention. Children engaged either in more cooperative and helpful strategies or in more direct demands. This research relates to food or purchase requests, and so may not be relevant in terms of how children might attempt to influence their parent's environmental practices.

2.3.3. Bringing school home

Researchers have looked at how the contexts of school and home are crossed and the borders merged, including by homework tasks set at school yet carried out at home and by general communication about the school day between family members. This section also considers research on spillover and discusses how an environmental education programme taught at school might or might not 'spill over' to practices carried out in the home. The barriers and facilitators for schoolwork being actioned in the home or not, and children influencing their families from knowledge acquired at school is also considered, given that whether the parent allows the child to educate them was a factor in Uzzell's research (1999).

Schools socialise children and exert influence over them through education (Berns, 2015). Gentina and Muratore (2012) recognised that children may influence their parents from certain skills learnt at school, including environmentally friendly skills. Gentina and Muratore (2012) looked at different parental styles and cultures and how these factors influenced whether younger generations, in their case adolescents, could influence their parents' environmental attitudes and behaviours. Gentina and Muratore (2012) found that the adolescents with stricter, more authoritarian parents who were from a more collectivist culture were less able to influence their parents. This finding implies there are differences in how parents react or resist environmental influences from their child that are brought home from school.

Other researchers have looked at how children bring knowledge home following interventions and campaigns delivered at school. Pedersen, Grønhøj and Bech-Larsen (2012) studied how children influenced their parents following a healthy eating campaign delivered at school. In Pedersen, Grønhøj & Bech-Larsen (2012), barriers for the healthy eating intervention being actioned in the home were found to be time and cost. Other barriers included motivation and inspiration, barriers perhaps specific to cooking, in particular cooking healthy family meals. Ayadi (2008) found a reverse socialisation effect in the home between child and parent from a healthy eating intervention delivered at school. Both Pedersen, Grønhøj & Bech-Larsen (2012) and Ayadi (2008), in contrast to Gentina and Muratore (2012), did not find resistance specifically from parents.

Other studies have looked at how families might support their children with their schoolwork in the home, with certain topics like mathematics (Jay, Rose & Simmons 2018; Rose, Jay & Simmons, 2014). Mathematics has been considered a difficult subject for parents to engage in (Jay, Rose & Simmons, 2018), due to a heavy school-centred approach having negative effects on parents, and issues of confidence and ability with the subject. Jay, Rose and Simmons (2018) advocated a parental involvement approach to maths in place of distinguishing between school and parent-centred approaches to supporting children with their learning. The effectiveness of encouraging a 'parental involvement' approach to supporting children's learning from school to the home regarding environmental education has yet to be studied. Rose, Jay and Simmons (2014) found their 'Everyday Maths' intervention got parents to have conversations with their children about maths in everyday settings. The parents moved from a teacher role to a learner role in collaboration with their child which helped to start conversations and alleviate some of the anxiety parents had around helping their children with maths. Similarly, in Uzzell (1999), when the parent was willing to fulfil the role of pupil, the child was more likely to be able to influence them.

Parental involvement in schooling can help with children's education (Comer & Haynes, 1991), so children 'bringing school home' to share with their parents may foster the children's learning. According to social learning theory (Bandura & Walters, 1977; Luszczynska & Schwarzer, 2005) support from family and peers is important to secure a change of behaviour, such as adopting new environmentally friendly practices. How competent families feel in supporting their children to adopt environmentally friendly practices from school remains to be seen. Ham and Sewing (2010) found teachers lacked confidence in delivering environmental education at school. Whether parents' confidence in facilitating environmental education in the home impacts any process of change needs to be investigated.

Research on spillover, defined as 'an effect of an intervention on subsequent behaviors not targeted by the intervention' (Truelove, Carrico, Weber, Toner, Raimi, & Vandenbergh, 2014, p.128), often focuses on transfer across domains, such as waste behaviours and energy conservation (Poortinga, Whitmarsh, & Suffolk, 2013; Thøgersen & Ölander, 2003) and between contexts like work and home (Uzzell & Räthzel, 2018; Verfuerth, Gregory-

Smith, Oates, Jones & Alevizou, 2021). Researchers have used social practice theory to understand spillover (Nash, Whitmarsh, Capstick, Hargreaves, Poortinga, Thomas, Sautkina, & Xenias, 2017; Uzzell & Räthzel, 2018) and the elements that make up a social practice (Shove, Pantzar & Watson, 2012). Whether some form of spillover takes place between practices learnt in the context of school and carried across to the home will be considered in this thesis, given the research questions explore impact from school to home (see section 2.4.).

'Bringing school home' can also be seen as a crossing between institutional logics (Thorton, Ocasio & Lounsbury, 2012) or borders (Clark, 2000). Studying the influence of content learned by children at school in the home can be compared to work family border theory and how people switch between work and family, how these domains are integrated, segmented, created and managed (Clark, 2000). Societal institutions function according to different logics (Thornton, Ocasio, & Lounsbury, 2012) and the borders (Clark, 2000) between these institutions can foster or prevent the transfer of practices between these places. Such activities as homework tasks and general communication about the school day may allow for 'border crossing' (Clark, 2000) between school and home, as parents do not typically attend school with the child and school does not typically occur at home for most children, pre-COVID-19. Communication about school and homework from school are similar to Clark's (2000) notion of permeations between borders, similar to the elements of 'insights from work' and 'work brought home', where elements from other domains enter each other (Hall & Richter, 1988). Clark (2000) says that when borders are flexible, and permeability occurs, then blending of borders occurs. As Jay, Rose and Simmons (2018) advocate, an approach of parental involvement in both school and home might help overcome the borders and associated barriers to influence occurring between school and home, allowing children to feel more supported in their learning, whether that be environmental education or any other subject.

2.3.4. Social practice theory

Social practice theory originates from practice theory; one approach within the context of social theory and understandings of knowledge, structure, action and modernity (Inglis & Thorpe, 2012) which has its roots in structuration theory. From the 1970s both Giddens

(1979) and Bourdieu (1977) presented accounts of how society was structured with a focus on social practices. Giddens and Bourdieu argued that previous accounts from Marx (2000, [1852]) and Parsons (1937) focused too heavily on objective social structures, such as class, and how these influenced action. According to Giddens and Bourdieu, the accounts of Marx and Parsons also focused much less on how society might transform. Other accounts such as those from Weber (1930) and considerations of symbolic interactionism and Rational Choice Theory (Inglis & Thorpe, 2012) were seen to focus too heavily on the micro level of individual actors and how their actions and interactions are maintained and transformed over time. Giddens (1979) and Bourdieu (1977) as the founders of practice theory, focused instead on practices as the new unit of analysis, defined as everyday activities that are routinized. In this sense, social practice theory focuses on activities (Holland & Lave, 2009). As Giddens stated (1984, p.5), 'the basic domain of study of the social sciences … is neither the experiences of the individual actor, nor the existence of any form of social totality, but social practices ordered across space and time.'

Other accounts such as those from Weber (1930) and considerations of symbolic interactionism and Rational Choice Theory (Inglis & Thorpe, 2012) were seen to focus too heavily on the micro level of individual actors, much like socialisation theories (see section 2.3.1.), and how their actions and interactions are maintained and transformed over time. This understanding allowed them to account for how individuals or social actors create and are created by social order, how social order exists and how society functions and how the interactions between practices lead to practices being performed, repeated and transformed (Inglis & Thorpe, 2012). Practice theory interprets social structure and society not to be entities in themselves, but as a set of intertwined practices that have become routine through their repetition (Reckwitz, 2002).

Most research on sustainable consumption has focused mainly on the micro level, in terms of individuals and their behaviours (Kilbourne & Beckmann, 1998), with a broader understanding needed (Kilbourne, McDonagh & Prothero, 1997; McDonagh, Dobscha & Prothero, 2012; Reid, Sutton & Hunter, 2010). Until recent years, there was little research on everyday environmental practices and consumption routines occurring in households (Connolly & Prothero, 2003; McDonagh, Dobscha & Prothero, 2012; Reid, Sutton & Hunter, 2010).

Practices can be understood to be the activities of a person that become routine (Inglis & Thorpe, 2012), such as showering or watching television. There are many examples of specific social practices carried out within society, which might involve 'a way of cooking, of consuming, of working, of investigating, of taking care of oneself or of others, etc.' (Reckwitz, 2002, p.249-50). Considering these social practices, it is 'the practice itself, rather than the individuals who perform them or the social structures that surround them, thus becomes the core unit of analysis' (Hargreaves, 2011, p. 82). This is in contrast to socialisation theories, that focus on individuals and how they might, given certain circumstances, impart relevant values, norms, knowledge, attitudes, behaviours and skills to each other. Giddens (1984) recognised that practices themselves might involve particular skills, knowledge, rules and resources. The elements that make up a practice and help drive its performance are discussed below.

Both mind and body can be considered instrumental to the embodiment of practices (Inglis & Thorpe, 2012) in terms of how practices become physically tangible when acted out in society, like an individual learning to ride a bicycle. Recognising a social element of the performance of practices, Halkier, Katz-Gerro and Martens (2011) argued how practices are often carried out alongside social interactions, as they do not exist in a social vacuum, and must originate from somewhere and be passed on through society. In this sense, practice theory can be considered similar to socialisation theory, in terms of requiring a social element to pass on either practices, or the constructs involved in socialisation processes. However, with practice theory, the practices are the unit of analysis (Hargreaves, 2011), as opposed to the individuals in socialisation theories.

There are debates in the field of sociology around what exactly constitutes a practice, and whether practices relate to stable routines, or iterative reputations that change slightly each time they are performed (Schäfer, 2013). Reckwitz (2002) argued that a practice is a routinized behaviour where several interconnected elements come together, including, 'forms of bodily activities, forms of mental activities, "things" and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge' (Reckwitz, 2002, p.249). These imply that practices are made up of underlying components. Another account of what constitutes a practice (Shove, Pantzar & Watson, 2012), and the chosen understanding used for this thesis as it has been applied to resource

intensive environmental practices (Shove, 2017) is presented in figure 2.1. and discussed in section 2.3.4. Another debate in the literature is concerned with the implications of how practices might interact when researching the everyday (Martens, 2012; Martens & Scott, 2017). Certain methods like ethnography align methodologically with practice theory (Halkier & Jensen, 2011; Lynch, 2001) in terms of studying people's practices. Martens (2012) however questions how interviewing itself as a practice might interact with other practices being carried out during ethnography, thus having methodological implications and impacting research. Participating in school lessons, completing homework and having family discussions are social practices themselves that will likely interact with the energy, water, waste, travel and food practices (see section 2.3.5.) that are the main focus of this research. Phipps and Ozanne (2017) suggested that it may be difficult to discuss practices as, through them becoming routine, they are learned and either 'forgotten', like the routine of having a shower, or the automaticity of riding a bike. Therefore, to study practices in families, there may be some methodological challenges when asking families to unpick routinized, learned and embodied practices. Other debates (Reckwitz, 2002; Shove, 2016) argue about where the boundaries lie between what is and is not included as a material underlying practices, as according to Shove, Reckwitz's understanding of materials needed to perform a practice relating to energy use would include anything from the national grid to oxygen, and would thus be too broad.

Social practice theory extends the original justification for the emergence of practice theory, as social practice theory 'de-centres individuals from analyses, and turns attention instead towards the social and collective organisation of practices' (Hargreaves, 2011, p.79), and of shared agreement of practices (Barnes, 2005) within society. Like practices, social practices can also be seen as 'routinized behaviours' (Reckwitz, 2002) representing a nexus of doings and sayings (Schatzki, 1996; Evans, McMeekin & Southerton, 2012), with people acting as the 'carriers' of practices (Reckwitz, 2002). Social practice theory includes the study of how practices have changed over time across society (Giddens, 1984) and how behaviour changes through practices and their development (Warde, 2005).

Social practices have been deconstructed in different ways by Schatzki (1996; 2002) and his elements of practical understanding, rules, teleoaffective structure and general understanding. Practical understanding was defined by Schatzki (2002) as the abilities

needed to perform, identify, prompt and respond to a practice, and rules included principles and instructions that guide people in performing practices. Practical understanding and rules can be understood as the elements that provide 'know-how' to perform a practice, like knowing how to turn on and off a shower, and knowing that you must be undressed to have a shower effectively. Schatzki (2002, p. 80) discussed how teleoaffective structure relates to the 'normativity' and acceptability of practices and the different tasks, projects, emotions and moods that must be involved to perform them. Finally, Schatzki (2002) understood general understanding to be properties that were common to many practices and shape how practices are performed. These final elements help to understand how practices are repeated over time and across society, for example, it being considered normal and acceptable to shower every day, and how this common knowledge reinforces why people might then tend to shower every day.

Shove, Pantzar and Watson (2012) also deconstructed practices, breaking them down in to three elements of meanings, competences and materials (see Figure 2.1), configured in such a way to drive the performance of the practice. Meanings include ideas, aspirations and symbolic meanings (Shove, Pantzar & Watson, 2012) explaining why someone might act out a social practice, such as wanting to get clean, feel fresh or relax by taking a shower (Shove, 2017). Materials include things, technologies, tangible physical entities and the 'stuff' of which objects are made from, and competences include skills, know-how and technique (Shove, Pantzar & Watson, 2012). Using the example of showering again, materials might include the shower equipment, hygiene products, water and energy needed to heat the water. Competences would involve knowing how to use those materials in an appropriate way to shower properly and satisfy the meanings behind taking that shower, including how to turn the shower equipment on, how to adjust this equipment to make the water a pleasant temperature and how to clean one's body adequately using the hygiene products available.

As demonstrated with the example of showering, a person needs to combine all three elements of meanings, materials and competences (Shove, Pantzar & Watson, 2012) in order to perform the social practice of taking a shower. If a person were to buy a completely different style of shower based on brand-new technology, they would need to develop their competence in knowing how to use this new material in order to satisfy the meaning of

getting clean. This demonstrates how the connections between the underlying elements of social practices, and how these connections come to be made, sustained or broken affect whether new practices emerge and whether existing practices remain, change or disappear entirely (Shove, Pantzar & Watson, 2012). Social practices relating to hygiene habits have changed drastically over time (Giddens, 1984; Shove, 2017) because of the connections between meanings, materials and competences breaking down, resulting in practices that were once commonplace, like public bathing, disappearing. These breakdowns and changes to practices over time on a macro, societal level, cannot possibly be adequately explained by small groups of individuals imparting constructs like attitudes to each other.

Figure 2.1. Model based on Shove, Pantzar and Watson (2012)'s conceptualisation of the three elements underlying social practices

This concise and tangible understanding of social practices was the model used in this thesis to understand the resource intensive practices of families (Druckman & Jackson, 2009; Jamieson, 2016), given its extensive application to environmental practices and how the elements might be reconfigured to be more environmentally friendly (Shove, 2017). Shove, Pantzar & Watson's (2012) conceptualisation was also used because of its simplicity (Schatzki, 2002) and tangibility in terms of studying the three underlying elements of practices in the field of a classroom and family home setting (Hammersley & Atkinson,

2007), and how connections between these elements conceptualise stability and change within families (Shove, Pantzar & Watson, 2012). Compared to Schatzki's (2002) more abstract conceptualisation, the researcher could easily incorporate Shove, Pantzar and Watson's (2012) elements of social practices as topics within her interview schedules when asking families about their practices, why they perform them and what helps or hinders their performance, relating to meanings, materials and competences.

In terms of the elements presented in Figure 2.1., Shove (2016) discussed resources in particular, and their role in material practices, like those that are energy intensive. Certain elements, like the infrastructure and resources needed as materials to perform a social practice, might act to hinder it. For example, if there is a lack of safe cycle lane infrastructure, and roads are instead designed around fast-moving cars, then this may prevent someone who wanted to perform the social practice of cycling (Shove, 2017). By contrast, a city that has a network of safe cycle lanes is more likely to encourage the practice of cycling through the provision of necessary materials. These underlying resources and infrastructures help to drive or hinder the performance of practices, and again, occur on a macro, societal level, beyond individuals.

The meanings underlying social practice theory also act as a motivating element in their performance. Competences and the skills that might need to develop to perform a practice are another underlying element that determines their performance. Researchers have presented models of social practices, like showering, and how the configuration of the different elements, like the acquisition of a new power shower, might affect their performance (Balke, Roberts, Xenitidou & Gilbert, 2014). Understanding the elements underlying certain practices, such as those that are resource intensive, and how they might be reconfigured (Shove, 2017) can help provide insight in to how practices might change over time (Giddens, 1984) to become more sustainable.

Studies have applied practice theory to address environmental issues. Hargreaves (2008) brought together social practice theory with eco-socialisation in a study on pro-environmental behaviour in the workplace. Hargreaves identified a process of eco-socialisation taking place whereby workers had an influence on social interactions and restructured their practices by introducing an 'environmental discipline' (2008, p.237) to their practices. Hargreaves demonstrated how individuals might have an influence on

collective practices through a process of eco-socialisation. Hargreaves (2011, p.79) justified the application of social practice theory to pro-environmental behaviour change and how 'social practice theory de-centres individuals from analyses, and turns attention instead towards the social and collective organisation of practices' which Hargreaves (2011 p.79) defined as 'broad cultural entities that shape individuals' perceptions, interpretations and actions within the world'. Evans, McMeekin and Southerton (2012) discussed practice theories in the context of sustainable consumption and how practices defined as 'routinized behaviours' (Evans, McMeekin & Southerton, 2012; Reckwitz, 2002) represented a nexus of connected doings and sayings (Evans, McMeekin & Southerton, 2012; Schatzki, 1996).

Studying families and what they do and say (Evans, McMeekin & Southerton, 2012; Schatzki, 1996) in terms of their practices is important to address environmental issues like climate change, as pro-environmental behaviour that benefits or reduces harm to the natural environment (Steg & Vlek, 2012) and impact-oriented sustainable consumption (Fischer, Böhme, & Geiger, 2017) are needed. Therefore, studying the practices of families living in households is a necessary step in addressing these environmental issues (Gibson, Head, Gill, Waitt, Carr, Farbotko & Stanes, 2013).

Studying the practices of families is also necessary as families can be defined by what they do (James, 2013) when they are 'doing family' (Morgan, 2011, p. 6) by performing family practices that help shape their collective identity, such as family traditions like visiting Disneyland every summer (Epp & Price, 2008). Family practices have been studied in terms of how they might change or become disrupted, usually following significant events like divorce or having a baby (Phipps & Ozanne, 2017). Potential disruptions to family practices from educational interventions have received little attention.

Social practice theory can be applied to the study of families to explore the negotiations that take place in the home, particularly when accounting for socialisation processes and social interactions (Halkier, Katz-Gerro & Martens, 2011), like communication in the family. Studies of family practices such as Epp and Price (2008) look at social practices as a way of understanding families (Morgan, 2011), like how they take regular holidays. Looking at family practices provides a perspective of family life as being active, consisting of 'a set of activities' by which family members can be thought of as '*doing* family' (Morgan, 2011, p.6). James (2013) too suggested that families can be defined by what they do. Morgan (1996)

used the term ‘family practices’, but warned researchers of the issue of circularity when defining families by their family practices and defining family practices by the family members involved (Morgan, 2011). For this thesis, the term ‘home practices’ (Foden, Browne, Evans, Sharp & Watson, 2018; Gibson, Farbotko, Gill & Waitt, 2013; Lane & Gorman-Murray, 2011) was used in order to avoid this issue, as it instead focused on the environmental impacts of practices carried out by families, instead of the identity component of family practices (Morgan, 2011).

According to Morgan (2011), a family practice perspective sees family life as encompassing the everyday, including significant life events, and the mundane and regular day to day activities. Family practices can be seen as fluid and flexible in terms of who is involved in certain family practices and when, and the overlapping of family practices and other types of practices. Morgan (2011) suggested that these different perspectives of family practices, as active and every day, should be considered together. Family practices can often also have a ‘taken-for-granted’ quality with Morgan giving the example of family members not needing to ask permission to do things that people who are not in their family might need to, such as looking inside the family fridge.

Like Morgan (2011), Cheal (2002, p. 12) defined family practices as ones that consist ‘of all the ordinary, everyday actions that people do, insofar as they are intended to have some effect on another family member’. Morgan challenged this definition as family practices are not always ‘orientated towards family members’ instead they may be ‘carried out with reference to some other family member’ (Morgan, 2011, p.10). This implies an intrinsic social quality to family practices, and how family members performing a social practice in isolation, such as cooking a meal for themselves or dealing with the recycling cannot be considered as true ‘family practices’.

Morgan (2011) cautioned researchers investigating family practices, to be reflexive, as researchers have experience of being in a family themselves. ‘Reflection on the nature of practices and how they are defined may provide for a useful opportunity for the researcher to understand how he or she shapes what is being observed’ (Morgan, 2011, p.8). Congruence is needed between what the researcher is observing and what families are experiencing as they perform their family practices (Morgan, 2011), which has methodological implications in terms of documenting practices as they are performed. Not

all family practices are performed within the family home, many may be performed away from the home, out and about or on holiday (Morgan, 2011). Family practices may also be more or less routinised (Morgan, 2011). Morgan's understanding of family practices sometimes not being embedded in routine, such as the practices that might take place following family transitions like divorce, challenges the understanding of more broad social practices being defined as routine (Inglis & Thorpe, 2012; Reckwitz, 2002). Morgan (2011) also cautioned researchers studying family practices to bear in mind that families themselves may often reflect upon, examine and monitor their own family practices, such as when seeking advice on being a 'good' parent and acting on such advice, thus changing the performance of certain practices. Whether families might scrutinise existing family practices following an educational intervention, and any outcome this might have by changing existing practices (Epp, Schau & Price, 2014) or establishing new ones, will be considered in this thesis by addressing the research questions (see section 2.4).

Epp and Price (2008) considered the components of family practices, like family traditions, everyday interactions and communication and rituals. Exploring family practices and studying families acting out the 'everyday' is crucial in ascertaining whether environmental education can have a real-world impact on family practices. Practice theory is a useful lens to study families as it can help researchers to explore the interactions and negotiations that take place as families navigate certain issues, particularly over time and through change (Giddens, 1984). Whereas studies of socialisation influences (e.g. Gentina & Muratore, 2012; Gentina and Singh, 2015) tend to focus more on individuals and imparting psychological constructs like attitudes.

Phipps and Ozanne (2017, p.3) write about practices being disrupted, and how when this happens, the 'taken-for-granted nature' of routines is challenged. Giddens (1984) too wrote about the unease experienced by having routines disrupted and how this unease threatens the idea of ontological states of security where events in one's life feel continuous, and uninterrupted. This thesis will consider whether families experience unease if their family practices are disrupted by children's engagement in environmental education. Epp and Price (2008) also discuss changes in family practices that might come from life events like getting divorced or having a baby. Children engaging in environmental education at school might not be considered by families as a significant life event to the same magnitude as ending a

relationship or becoming parents. Nevertheless, exploration of if (and how) family practices are disrupted by an environmental education programme at the children's school will be carried out in this thesis. The changing nature of families due to marriage, childbirth and death, and economic situations and culture, means that families are always in a process of transition (Berns, 2015; Morgan, 2011). Transitions within the family may challenge the 'taken for granted' quality of family practices (Morgan, 2011) such as when a new partner is brought in to the family and encouraged to be seen as 'one of the family' or when a divorce takes place, breaking ties within the family and thus impacting taken for granted practices (Morgan, 2011).

Halkier, Katz-Gerro & Martens (2011) stressed the need to include social interactions and socialisation processes in studies of social practices, as social interactions allow people to share knowledge of their practices. This thesis will consider the social interactions between family members that make up everyday family life and the negotiations surrounding family practices regarding environmental practices (Barnes, 2005).

2.3.5. Home practices

Studies of 'home practices' apply social practice theory to household sustainability issues (Foden, Browne, Evans, Sharp & Watson, 2018; Gibson, Farbotko, Gill & Waitt, 2013; Lane & Gorman-Murray, 2011), given that the activities that families carry out may have consequences on the natural environment (Jamieson, 2016). Research on home practices is concerned with the dilemmas and contradictions that families face in navigating issues of household sustainability. This thesis aims to research whether such dilemmas and issues are raised by an educational intervention targeted at the children in the family, and whether such dilemmas and issues are discussed and actioned as a family, if the children engage with the intervention and carry home such messages. Using home practice theory as a theoretical model for understanding how families might navigate household environmental issues following an educational intervention aligns with the justifications in section 1.2.2. of focusing primarily on family, as well as education, to help address environmental issues.

As Gibson, Farbotko, Gill and Waitt (2013) noted, 'household sustainability is rife with contradiction and uncertainty' and families face dilemmas and trade-offs when navigating how to be sustainable as a family (Gibson, Farbotko, Gill & Waitt, 2013, p.1). In terms of

how families might navigate everyday sustainability dilemmas, practices like food shopping and waste management might become relevant. Gibson, Farbotko, Gill and Waitt, (2013, p.1) considered how families might question, 'is it worse to use plastic supermarket bags for bin liners, or to take reusable green bags to the supermarket but then buy dedicated bin liners?' Gibson, Farbotko, Gill and Waitt (2013) also questioned, who in the family undertakes the task of considering and acting upon these dilemmas? The roles different family members play in navigating environmental issues following education are not often researched, and it is not clear whether one family member takes the lead or whether the family unit all play a collaborative role in navigating environmental issues. Research has explored the gendered roles of practice performance, such as women tending to take charge of recycling practices (Oates & McDonald, 2006) and men being more involved in energy bill management (Brounen, Kok & Quigley, 2013). However, the complexity of navigating environmental issues as a whole family has yet to be studied.

Scott, Oates and Young (2015) reviewed literature on household environmental action, decision making in the family and individual environmental action. They conceptualised family members involvement in adopting and practising environmental actions, including decision making processes and strategies, communication, maintenance and repetition of environmental actions and other influential factors including types of activity and individual, household and situational characteristics. Some of the influential factors Scott, Oates and Young (2015) identified potentially relevant to this thesis included socialisation influence in the home, knowledge for action, time pressure and availability, resources and quality of relationships. Decision making strategies included experience, legitimate, coalition, emotion and bargaining, similar to certain strategies children use on parents when making purchase requests (see section 2.3.2.). Scott, Oates and Young (2015) also noted how the adoption and practise of environmental actions can be done both individually and as a shared role in families, and how the maintenance and repetition of action can be done through incorporating actions in to routines and habits and by family members self-organising. Scott, Oates and Young, (2015) only identified recycling and composting as a practice mentioned in their literature review, with domains of energy use, water use, food and travel not mentioned in this literature.

Gibson, Farbotko, Gill and Waitt (2013) provided examples of tasks, items and practices across the domains of energy use, water use, food and travel that may provide a dilemma for families. Issues that needed to be addressed included clothing, food and food storage, water, warmth and hot water, toilets, laundry, furniture, plastic bags, transport, technology and communication and gardening, as well as special occasions and life changing events like having a baby, retirement and death. These examples extend the 'nexus' of water, food and energy that is often the focus of home practice research, where these three domains are brought together for study (Evans, McMeekin & Southerton, 2012; Foden, Browne, Evans, Sharp & Watson, 2018). However, the list of issues provided by Gibson, Farbotko, Gill and Waitt, (2013), is not comprehensive in terms of accounting for all of the challenges regarding sustainability that families might have to navigate, nor does it highlight any particularly contentious issues that families have to face, such as some of the practices mentioned in the environmental education resource, like reducing flying to foreign holidays.

Hall (2015) noted how families might discuss environmental issues and act out sustainable behaviours, but not formally define these issues and behaviours as 'sustainable'. O'Neill (2015) found that households tended to practise sustainable consumption by performing sustainable practices, but not necessarily through concern for the environment. Given the tendency to forget the details of practices once they have been learned and become automatic and embodied (Phipps & Ozanne, 2017) it may be difficult for families and researchers to unpick certain practices, discuss or study them, presenting methodological difficulties. This issue was addressed in this thesis by asking families about their practices and the objects involved in their performance, as a way to try and unpick practices (see section 3.7.2.).

Waitt, Caputi, Gibson, Farbotko, Head, Gill and Stanes (2012, p.52) said, 'people do not generally think of consuming energy, but about driving to work, picking up the kids, and warming or cooling their house' and practices linked to routines. For many families, they may think on an everyday practice level, and might not differentiate different practices in terms of the commodity or resource in use, like the energy, water and food required (Foden, Browne, Evans, Sharp & Watson, 2018). Shove (2017) emphasised the need to develop new ways of conceptualising and promoting transitions in environmentally significant ways of life, like patterns of food consumption, energy and water intensive habits

and making more sustainable options like cycling as a form of transport considered 'normal'. Given that people do not tend to think of their day-to-day lives in terms of the resources like energy and water that they use, (Waitt, Caputi, Gibson, Farbotko, Head, Gill & Stanes, 2012), practice theory instead considers resource intensive practices, like showering, how they take hold in society and impact the natural environment, and how practices might change through reconfiguration of underlying elements (Shove, 2017). Ritch (2018) highlights the interwoven nature of practices in everyday life. Ritch (2018) found that certain sustainable practices like recycling were often performed as part of the family routine, such as dropping-off the family's recycling on the way to school (Ritch, 2018). How families might want to incorporate new, more sustainable practices into existing routines following environmental education, and any barriers they may face will be explored in this thesis as part of the research questions (see section 2.4). Uzzell (1999) wrote how many major structural environmental problems faced by society have not been addressed. Druckman and Jackson (2009) suggested scrutinising the infrastructure involved in activities that emit CO2. Shove, Pantzar and Watson (2012) also make this point, regarding their notion of materials underpinning the performance of social practices, such as the requirement of safe cycle lanes to foster the practice of cycling (Shove, 2017).

In terms of the key practice 'domains' relevant to families, this thesis will look at the domains of energy use, water use and food consumption, as well as considerations of waste management and travel. The nexus of food, water and energy domains have been well-studied in terms of household sustainability (Evans, McMeekin & Southerton, 2012; Foden, Browne, Evans, Sharp & Watson, 2018). Also, the activities of heating, food consumption and washing oneself and clothing were found to be major contributors to household CO2 emissions (Druckman & Jackson, 2009), and so the domains of energy, water and food were of key interest in this thesis, in terms of how an environmental education programme might impact these domains. The study of home practice domains in this thesis will also include waste management and travel, given that similar studies of sustainability in the home following an educational intervention have included these domains (O'Neill, 2015). Food and catering, which often accumulate large quantities of waste, and recreation and leisure are areas of family life that are particularly CO2 emitting (Druckman & Jackson, 2009) and thus, of key interest to this thesis. The environmental education resource delivered to

children at school as part of this thesis (see section 3.4.3.) also mentioned practices from each of the five practice domains of food, water, energy, waste and travel.

Further research justifying the need to study these practice domains in relation to family sustainability following an educational intervention delivered at school will be presented in the remainder of this section, 2.3.5. This research also provides insight into the changing nature of social practices over time (Giddens, 1984) and any barriers or enablers that might encourage or restrict the practice from being carried out. This thesis focused on the five practice domains of food, water and energy use, waste and travel, and the configured elements of meanings, competences and materials (Shove, Pantzar & Watson, 2012) underpinning different practices within those domains. Project Earth Rock, the multimedia environmental education programme used in this thesis, encouraged children to adopt sustainable practices within these domains. The five practice domains of food, water and energy use, waste and travel are discussed below.

Food consumption was one practice domain on which this thesis focuses, as this household domain has implications for the natural environment. The aspects of food consumption considered in this thesis were meat consumption and eating locally produced food to reduce food miles, including families growing their own food, as these practices were mentioned in the environmental education programme. Globally, approximately 220 million tons of meat are consumed each year (The World Counts, 2021), and meat consumption is responsible for more GHG emissions (Food and Agriculture Organisation, 2006; Intergovernmental Panel on Climate Change, 2007) than all of the more visibly polluting transport sector combined (Steinfeld, Gerber, Wassenaar, Castel, Rosales, & de Haan, 2006). Therefore, eating meat is a crucial practice that has consequences for the natural environment. Plant-based diets have been shown to be more sustainable in terms of requiring less land and water to reproduce (Baroni, Cenci, Tettamanti & Berati, 2007; Stehfest, Bouwman, van Vuuren, den Elzen, Eickhout, & Kabat, 2009; Zollitsch, Winckler, Waiblinger & Haslberger, 2007).

The importation of fresh fruit that is out of season and unable to thrive in the UK climate is another common practice in the UK, with the UK being one of the largest markets in Western Europe for exotic fresh fruit (Hallam & Molina, 1988). Research has shown that 0.55% of all UK greenhouse gas emissions comes from the transportation of fruit and

vegetables, within the UK and from overseas (Garnett, 2006), with forecasts predicting this figure will increase (DEFRA, 2005). Families might purchase such food as part of the social practice of food shopping at a supermarket. Relying on foreign produce demonstrates how social practices regarding food have changed over time, what with 'ceaseless growth' in air transport (Graham, 2000, p. 109). In 2019, 45% of food consumed in the UK was imported from outside the UK (UK Government, 2020). Bingen, Sage and Sirieix (2011) considered the characteristics of people who committed to eating locally, and found that when confronted with barriers that threatened their commitment, people would problem solve and change their habits surround food shopping, cooking, storing and eating.

As Shove (2017) noted, consumer demand drives such trends and makes once exotic foods seem 'normal' to consume. Shove compared the food practices of Victorians with people living in the 21st century, in particular how much time and effort was invested in food preparation and how advancements to food processing has allowed people in the 21st century to cook food more conveniently. Studying changes to food practices over time also involves looking at the important underlying elements of meanings, materials and competences, and how they often work together and can become redundant as times change and technology improves. The underlying elements of meanings, resources and competences (Shove, Pantzar & Watson, 2012) that underpin less-sustainable food practices, such as the frequent consumption of meat as a family tradition (Epp & Price, 2008) might be reconfigured when a new, more sustainable food related practice or habit, like 'Meat Free Mondays' (https://meatfreemondays.com/) is established. Whether the multimedia environmental education resource, with its specific lessons targeting practices, such as 'Meat Reducer', disrupts (Giddens, 1984; Phipps & Ozanne, 2017) and subsequently impacts family practices in this way will be explored in this thesis as part of RQ2 (see section 2.4.).

Food consumption in the family symbolises moral values, duties, and valued experiences (Gullestad, 1995). Practices and meanings regarding food contribute to family identity and domestic life (Charles & Kerr, 1988; Grieshaber, 1997; Valentine, 1999). Homemade cooking, in particular relying on the competences and skills of cookery (Shove, Pantzar & Watson, 2012), may fulfil a role of representing family identity (Moisio, Arnould, & Price, 2004). Children are becoming more involved in the purchasing habits of their household

(Bandyopadhyay, Kindra & Sharp, 2015; see section 2.3.2.) which may lead them to influence family food shopping habits, potentially including suggestions of buying less meat and more local produce. Shopping and cooking food are both practices that require competences in certain skills to perform these in a more environmentally friendly way, such as making use of leftovers. Shove, Pantzar and Watson's (2012) model including meanings, materials and competences allows for consideration of what it takes to shop for, cook and eat food as social practices. Shove, Pantzar and Watson's (2012) model is relevant for studying the current food related practices of households and how households might reconfigure the elements of food-related practices to perform them more sustainably, like shopping for seasonal and local food that is more plant-based, growing their own food, cooking more efficiently, and avoiding food waste when eating.

Researchers have considered the practice of growing one's own food. Food preferences develop through associations with the contexts and consequences of eating certain foods (Birch, 1999). As Libman (2007, p.88-9) noted, 'positive interaction with and about vegetables builds positive associations with eating them and influences young people's food preferences. When young people grow food to bring home, they have an opportunity to carry positive interactions home from the garden'. When families are able to grow their own food at home, this helps address the sustainability of their food sourcing (Kortright & Wakefield, 2011). Lack of access to land on which to grow food and lack of the necessary gardening skills were identified as barriers by Kortright and Wakefield (2011). These barriers could be considered as materials and competences underlying the practice of growing one's own food, according to Shove, Pantzar and Watson's (2012) model. Whether similar barriers are identified in this thesis, following children's engagement with an environmental education resource that included a topic about growing one's own food, will be investigated.

Water use was one practice domain considered in this thesis as part of the research question exploring impact to practice domains within families (see section 2.4), as water use is a household domain that has implications on the natural environment when families wash themselves, kitchen items and clothing (Yates & Evans, 2016) or when they flush a toilet. Shove (2017) used the example of showering as a water-related changing social practice,

carried out by families that is resource intensive. Shove (2017) asked in her lecture, 'why do so many people pour so many litres of water over themselves to clean a few specks of dirt on such a regular basis?', highlighting how people do not always think in terms of the resources they use (Waitt, Caputi, Gibson, Farbotko, Head, Gill & Stanes (2012). Shove discussed social changes to bathing habits, and how seemingly private washing habits are not random, individual actions, but show trends in society over time, a concern of social practice theorists (Giddens, 1984).

According to Shove, (2017) showering is now considered a normal, essential, regular habit performed frequently, with these ideas reinforcing the performance of showering over time. For many, showering has become ritualised and intertwined with meaning, like being part of the routine of getting ready to go out, to freshen up or to unwind. Each time the practice is performed, it is reinforced, reproduced, recreated and sustained. Until a point is reached where one cannot separate the showering from the ritual of going out or freshening up. When people perform the social practice of showering, they integrate the three elements of meanings, materials and competences. To change social practices, these elements need to be influenced and reconfigured, so the practice becomes more sustainable (Shove, 2017).

As part of addressing the research questions for this thesis (see section 2.4.), this thesis will consider the water related practices families perform, what meanings underpin them, and what materials and skills are needed to perform such practices. This thesis will explore whether social practices regarding water use can be disrupted by knowledge from environmental education, leading to discussion and action in the family about changing less sustainable water related practices, or whether these practices are too ingrained and enduring to change.

Energy use was another practice domain that was considered as part of the research questions for this thesis (see section 2.4.) as this is one household domain that has implications on the natural environment, as discussed already regarding Druckman and Jackson's (2009) carbon emission analysis of households. Families are spending less time on domestic labour (Oates & McDonald, 2002). Given this finding, whether it is difficult to encourage families to stop using water and energy resource intensive appliances that save them the resource of time, to fulfil the meaning of being more environmentally friendly remains to be seen, and will be explored, as part of the underlying factors that may

influence change in families (see section 2.4.). Encouraging the performance of water and energy related practices like washing to be more pro-environmental through energy efficient appliance settings and only washing with a full load of clothing may be more effective, as suggested in the literature (Waddington, 2008).

The current research will explore the meanings behind different practices that consume energy and which materials and competences are needed to perform certain energy-related practices and whether environmental education can prompt changes to practices and reconfigure underlying elements. The management of energy bills may be gendered (Brounen, Kok & Quigley, 2013), so whether particular family members manage energy use and why they do so, will be considered.

Another practice domain relevant to this thesis was household waste management, as this also has implications on the natural environment. Research has been conducted on recycling in the home (Holbrook & O'Shaughnessy, 1988; Rokka, 2010), and how recycling may be intwined with other family practices, like performing it on the commute to school (Ritch, 2018). Oates and McDonald (2006) researched gender roles in the family regarding waste management practices and found that women tended to initiate and sustain recycling practices, much like other domestic labour tasks. Given recycling as an accepted, routinized and 'normal' (Shove, 2017) social practice, this thesis considered the underlying meanings behind the waste-related practices that families carry out, and the materials and skills needed. Scott, Oates and Young (2015) pointed out there is often a process involved in recycling and composting in the family home, with a separator, storer and remover performing the roles of separation, storage and removal of recycling and composting respectively. Whether the families in this research fulfil similar roles as they navigate waste management as a family will be explored.

Travel was the fifth practice domain investigated because people's travel behaviours have many implications for the natural environment, for example, the GHG emissions produced through aviation when families go on holiday, as well as fuel use when travelling to school and work and for leisure (Druckman & Jackson, 2009). Taking a family holiday as a social practice, like many other practices over time has changed over the years, due to greater travel opportunities and price decreases leading to growth in air travel (Graham, 2000). This thesis considered the meanings behind different travel related practices carried out by

families, such as holidays and commutes, and the competences and materials needed to perform these practices.

2.4. Research questions and theoretical framework

The overarching question for this thesis asked:

'How might home practices be impacted by children's engagement with environmental education at school?'

- **Research Question 1 (RQ1):** How (if at all) do pupils engage with multimedia environmental education at school?
- **Research Question 2 (RQ2):** Who (if anyone) in the family is discussing and actioning the environmental education, how (if at all), and what is the outcome (if there is one) on different practice domains (i.e. energy, water, waste, food, travel) at home?
- **Research Question 3 (RQ3):** Which underlying factors help or hinder environmental education to engage pupils and have an impact on home practices (i.e. energy, water, waste, food, travel)?

To address RQ1, this thesis studied whether primary school children engaged with multimedia environmental at school and whether they benefited from the education's potential to teach pupils about environmental issues, given the effectiveness of multimedia in other educational contexts like language learning, and the power of multimedia to engage people with environmental messages. As discussed in section 2.2.2. pupils require environmental education to develop the skills, attitudes and values necessary to have a sustainable future, but how, if at all, they engage with such education needs to be studied. The following questions will also be explored in relation to RQ1; how do pupils engage with the delivery of a multimedia environmental education programme? Do existing home practices in the family provide a feedback loop to engagement? Are there any lessons or activities that they engage with differently?

To address RQ2, the following questions will be considered; whether and how practices are impacted by the knowledge acquired by children engaging with environmental education and by discussion and action by family members in the home. Are new practices

established? Or are existing practices changed and the underlying elements reconfigured in some way? Are some less sustainable practices adapted? Are some practices impacted differently to others? Are specific strategies of influence used by different family members? Who is pushing for a change to practices in the family?

To address RQ3, questions such as the following will be explored; what factors facilitate or hinder engagement, discussion and action of environmental across the borders of school and home (Clark, 2000; Uzzell & Räthzel, 2018; Thorton, Ocasio & Lounsbury, 2012; Verfuerth, Gregory-Smith, Oates, Jones, Alevizou, 2021)? Are there key factors that underlie whether a change occurs, like communication, found in previous research? What other factors influence environmental education having an impact on home practices? What helps or prevents families from performing home practices, in terms of the elements of meanings, materials and competences underlying home practices?

The theoretical framework presented below (Figure 2.2.) outlines a model of how environmental education might have an impact on a hypothetical practice that has implications on the natural environment or is resource intensive that is performed by families. This theoretical framework will be reassessed in Chapter 6 in the light of the findings reported in Chapters 4 and 5.

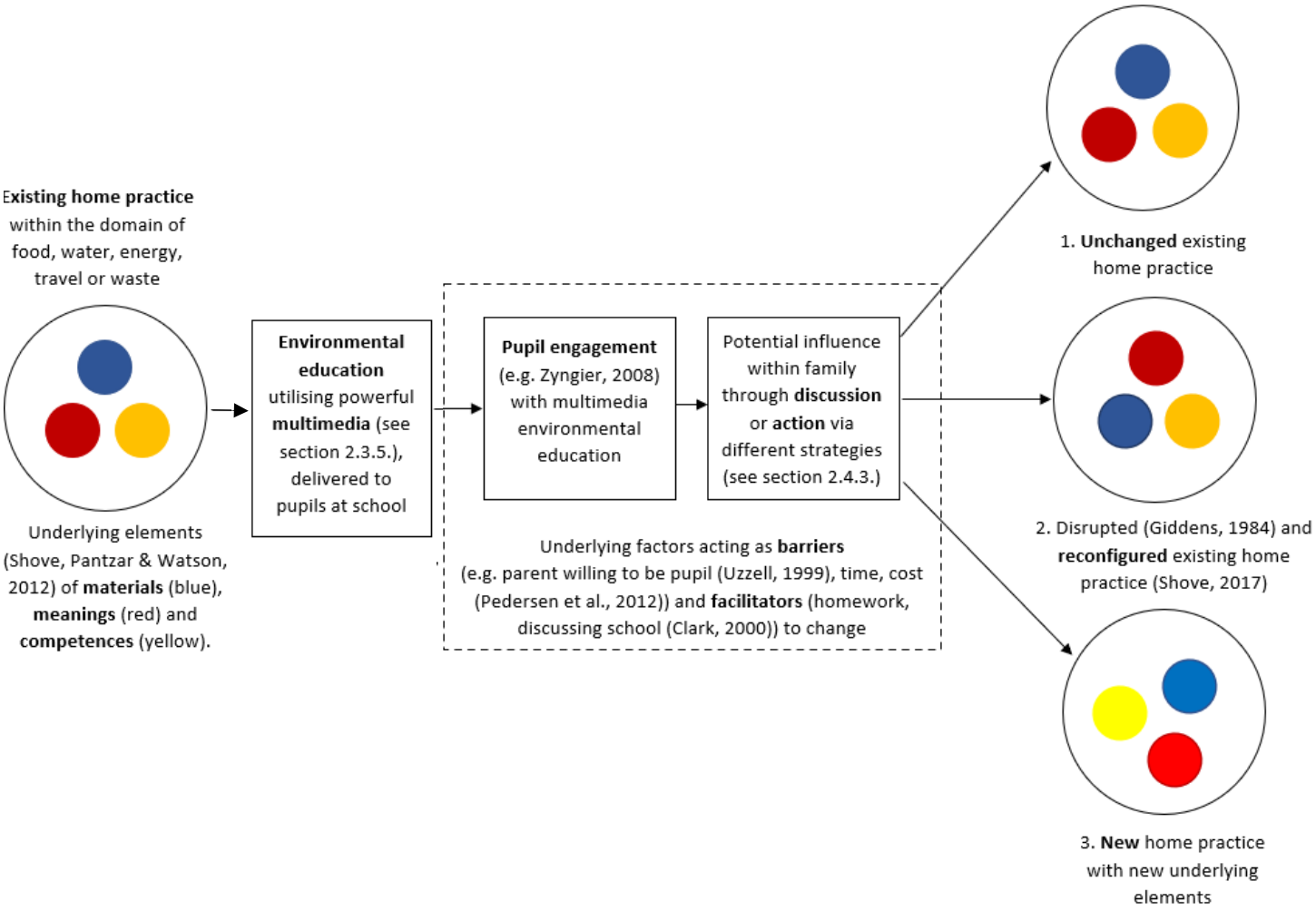


Figure 2.2. Theoretical framework for this thesis.

The model details a process of children receiving potentially powerful multimedia environmental education at school, possibly engaging with it, whether (and how) their education is discussed or acted upon in the family and the impact it might have on any existing practices within the domains of food, water, energy, travel or waste. Depending on individual families and how underlying factors might influence this process, over time, either the practice will remain unchanged, with the elements of meanings, materials and competences remaining in the same configuration, or these will be disrupted and reconfigured creating a change to an existing practice, or a new home practice might be adopted entirely. Depending on the topic taught in the educational programme, different practices within the domains of energy, water, food, waste and travel might be impacted or not.

2.5. Chapter conclusion

Given the educational benefits and potential power of multimedia environmental education to engage pupils in pro-environmental messages, this thesis will explore whether such education might have an impact on different family practice domains of energy, water, food, travel and waste, and the barriers and facilitators involved in the process. How this was explored and the research methods used is discussed in Chapter 3: Methods.

Chapter 3: Methods

3.1. Chapter introduction

This chapter describes the methods that were used in the fieldwork for this thesis. Section 3.2. discusses the philosophical underpinnings of the methods used in the fieldwork, in particular the alignment of ontology, epistemology and methodology and their implications for the research methods used. Section 3.3. justifies the qualitative approach taken and includes a discussion of quality in qualitative research and reflexivity. In section 3.4. the fieldwork strategy for the research is outlined, which details the multi-setting design of studying children at school and with their families in the family home. The recruitment of participants and multimedia environmental education intervention are explained in sections 3.4.2. and 3.4.3. respectively. In section 3.5. the pilot study preceding the main fieldwork is discussed. In section 3.6. the data collection methods for the school setting are outlined, including observations of lessons, pupil and teacher interviews and photographs of schoolwork. In section 3.7. the data collection methods for the family home setting are outlined, including family interviews and tours of family homes and photographs relating to home practices. In section 3.8. the approach to data analysis is explained, followed by a discussion of ethical considerations in section 3.9. and a conclusion in section 3.10.

3.2. Philosophical underpinnings

Social research is concerned with knowledge (Inglis & Thorpe, 2012) and philosophical considerations of ontology, epistemology and methodology. These considerations directly impact research design (Easterby-Smith, Thorpe & Jackson, 2015) and how research is conducted (Popkewitz, Tabachnick & Zeichner, 1979; Tuli, 2010) by forming a paradigm that a researcher conforms to (Denzin & Lincoln, 2000). Researchers need good methodological fit so that key components such as epistemology, methodology and research methods are internally consistent because they are so interconnected (Carter & Little, 2007; Edmonson & McManus, 2007). The terms research methods, methodology, epistemology and ontology are discussed in section 3.2.

Ontology considers the nature of reality (Tuli, 2010), existence (Hammond & Wellington, 2012) and social entities (Bryman, 2016). Two main branches of ontology in social research

are objectivism and constructionism (Bryman, 2016). Objectivism posits that reality, social phenomenon and meaning exist independently from people (Bryman, 2016; Tuli, 2010) and can be observed and discovered using scientific methods (Bassey, 1995). By contrast, a constructionist ontology assumes that reality, social phenomenon and meanings are a result of people and social processes (Bryman, 2016; Neuman, 2003).

A constructionist ontological approach was used to study multiple meanings of reality as constructed by social actors (Bryman, 2016). Taking this ontological stance, requires a consideration of the nature of reality (Bryman, 2016) and what can be considered as 'real' (Inglis & Thorpe, 2012). A constructionist ontology considers the nature of reality to be diverse and socially constructed by actors (Bryman, 2016). This ontology was therefore an appropriate approach to explore and study the experiences of different pupils and their families, and how, if at all, environmental education might have an impact upon them. The participants in this study all had different life experiences, lifestyles and family lives, and so taking a constructionist ontology was considered necessary to explore such differences.

Epistemology is a theory of what is acceptable knowledge (Bryman, 2016) and how we come to know and understand the world (Hammond & Wellington, 2012), and is concerned with questions like 'how do we know what we know? What counts as knowledge?' (Tuli, 2010, p.99). Branches of epistemology in social research include positivism and interpretivism or constructivism (Bryman, 2016; Tuli, 2010).

Positivism works from the belief that 'social observations should be treated as entities in much the same way that physical scientists treat physical phenomena' (Tuli, 2010, p. 98), using objective methods to reach a close understanding of reality (Ulin, Robinson & Tolley, 2004) where empirical facts exist separately from individual thoughts and ideas (Crotty, 1998; Marczyk, DeMatteo & Festinger, 2005; Neuman, 2003; Tuli, 2010). Positivistic perspectives believe that acceptable knowledge (Bryman, 2016) is gained through empirical observation or experiment of natural phenomena (Lincoln & Guba 2000; Neuman, 2003). Criteria of validity, reliability, objectivity, precision and generalisability (Ulin, Robinson & Tolley, 2004) help to assess the quality of research based on positivist epistemologies. Quantitative methodologies are often underpinned by positivism (Tuli, 2010).

The present research used an interpretivistic epistemology to explore and understand these different meanings of reality and what is real (Hammond & Wellington, 2012; Inglis & Thorpe, 2012; Easterby-Smith, Thorpe & Jackson, 2015). Taking a more positivistic 'one size fits all' epistemological approach to studying these different social worlds was unsuitable and restrictive because these social realities are so different in nature to the natural sciences (Inglis & Thorpe, 2012). Interpretivism is often associated with constructionist and qualitative methodologies (Bryman, 2016; Tuli, 2010). An interpretivist epistemology considers the nature of reality and knowledge as socially constructed, interpreted and experienced by people as they interact with each other and the world (Maxwell, 2006; Bogdan & Biklen, 1992; Guba & Lincoln, 1994; Merriam, 1988). The purpose of employing an interpretivist epistemology is to understand the nature of a phenomenon, not necessarily to generalise findings to a population, as with positivism (Farzanfar, 2005).

There are potential issues with trust and credibility when research is conducted based on interpretivism and the belief that knowledge is socially constructed (Tuli, 2010). The other minds problem can potentially undermine research based on an interpretivist epistemology. This problem posits that people can only ever directly experience their own mind, and cannot know what others experience (Epley, 2008). Researchers must rely on inferences about participants' minds (Epley, 2008). Relying on inferences to determine others' mental states accurately can be problematic, leading to miscommunication and misunderstanding (Epley, 2008). The researcher addressed this issue by clarifying ambiguous information with participants, using probes and open questions in interviews and avoiding the use of leading questions.

Qualitative research cannot be judged on the same rigorous criteria of validity, reliability, objectivity, precision and generalisability underpinning research conducted from a positivistic perspective (Tuli, 2010). However, explicit justifications of methodology, data collection and analysis processes can go some way to ensuring qualitative research is considered credible and authentic (Lincoln & Guba, 2000; Tuli, 2010), and of good quality (Mays & Pope, 1995, see section 3.3.).

Methodology is concerned with how knowledge might be gained (Tuli, 2010) and is underpinned by ontological beliefs about the nature of reality and epistemological considerations of theories of knowledge (Saranktakos, 2005; Tuli, 2010). Methodology also provides the rationale for the application of particular research methods, defined as the means thorough which data are gathered and analysed (Hammond & Wellington, 2012). For this thesis, the researcher wanted to ensure that the realities of family members in the home were accounted for, and so to ensure good methodological fit (Edmonson & McManus, 2007) and to explore (Larsson, Andersson & Osbeck, 2010) these multiple constructions of reality, qualitative methodologies were used in the research.

3.3. Qualitative approach

Qualitative research is concerned with gaining an understanding of the research problem within its unique context (Neuman, 2003; Ulin, Robinson & Tolley, 2004). Qualitative research aims to explore, discover and understand (Tuli, 2010), as qualitative researchers 'immerse themselves in a culture or group' (Tuli, 2010, p. 102). Qualitative approaches are typically underpinned by an interpretivistic epistemology and how there are multiple realities that are socially constructed and subjective to people (Asgedom, 2004; Bryman, 1984; Bryman, 2016; Guba & Lincoln, 1994; Krauss, 2005; Lincoln & Guba 2000; Tuli, 2010). Qualitative research encompasses 'the practical activities of generating and interpreting data to answer questions about the meaning of what their participants know and do' (James & Busher, 2009, p.3), with researchers typically making use of text data instead of numerical data (Carter & Little, 2007).

As reflected in the phrasing of the research questions for this thesis, qualitative methodologies are typically employed to address 'how' and 'why' questions (Agee, 2009; Saunders, Lewis & Thornhill, 2016). Reflexivity is a key component of doing qualitative research (Bryman, 2016), like how the researcher's own experiences of school and being in a family (Morgan, 2011) might influence the collection and analysis of data. The researcher continually reflected on her knowledge, values, biases, and presence (Bryman, 2016) in the research environment, questioning them in her field notes. Questions asked in interviews were deliberately open to avoid leading participants based on the researcher's prior

experiences. How the researcher reduced any impact from her presence, such as during observations in the classroom, is discussed in section 3.6.1.

There is no 'ideal' (Tuli, 2010, p. 99) or correct (Neuman, 2003) research methodology, including within qualitative research methodologies (Carter & Little, 2007). Each methodology has advantages and disadvantages (Schulze, 2003) in different research contexts (Cohen, Manion & Morrison, 2000; Silverman, 1997). Within qualitative methodologies, interviews and observations are common methods of data collection (Tuli, 2010), given their sensitivity to context (Neuman, 2003) and the space they provide for detailed descriptions of experiences and social phenomena (Tuli, 2010).
Researchers working from an interpretivist epistemology use observations, in-depth interviews and group discussions (Tuli, 2010).

To ensure qualitative research is of good quality, a prescriptive framework can be followed. Mays and Pope (1995) suggest a checklist to assess the quality of qualitative research. The research for this thesis met each item on this checklist, as outlined below in table 3.1.

Items assessing quality in qualitative research checklist (Mays & Pope, 1995)	**Reference to where this thesis addresses each item**
1) Explicit account of theoretical framework and methods used at each stage	• Section 2.4. Research questions and theoretical framework in Chapter 2: Literature Review • Sections 3.6. Data collection in schools and 3.7. Data collection in family homes in Chapter 3: Methods
2) Context clearly described	• Section 1.2. Research context in Chapter 1: Introduction
3) Sampling strategy clearly described and justified	• Section 3.4.2. Recruitment of participants in Chapter 3: Methods
4) Sampling strategy theoretically comprehensive ensuring the generalisability of the conceptual analyses (e.g. diverse range of individuals and settings)	• Section 3.4.2. Recruitment of participants in Chapter 3: Methods • Also see discussion on generalisability above.
5) Detailed description of how the fieldwork was undertaken	• Sections 3.4. Fieldwork strategy, 3.5. Pilot study, 3.6. Data collection in schools, 3.7. Data collection in family homes in Chapter 3: Methods
6) Ability for the evidence (e.g. fieldwork notes, interview transcripts, recordings, documentary analysis, etc.) and transcription to be independently inspected by others	• Section 3.8. Data analysis approach in Chapter 3: Methods • Chapters 4: Findings and 5: Findings presenting data
7) Clearly described and theoretically justified data analysis procedure and themes/concepts relating to research questions	• Section 3.8. Data analysis approach in Chapter 3: Methods • Chapters 4: Findings and 5: Findings
8) Repetition of analysis by others ensuring reliability	• Section 3.8. Data analysis approach in Chapter 3: Methods
9) Use of quantitative evidence to test qualitative conclusions where appropriate	• Not appropriate for this research.
10) Evidence of pursuing observations that contradicted or modified analyses	• Section 3.4. in Chapter 3: Methods (see details of follow-up study)
11) Sufficient and systematically presented evidence justifying interpretation of data	• Chapters 4: Findings and 5: Findings • Chapter 6: Discussion

Table 3.1. How the research addressed criteria for quality in qualitative research (Mays & Pope, 1995).

Good qualitative research practice with children in particular involves having clearly defined research objectives relevant and important to participants, having a well-designed topic guide piloted with children of the same age, and ensuring discussions take place in a relaxed environment, where all participants feel comfortable to share their views and feel actively listened to (Shaw, Brady & Davey, 2011). The fieldwork addressed each of these criteria.

Qualitative research generally involves personal contact between researchers and participants over a period of time (Ulin, Robinson & Tolley, 2004). Building rapport with participants can help provide rich depth and insight to the data (Tuli, 2010). Rapport building formed part of the interview process (e.g. see Appendix 7.)

Quantitative methodology based on a positivist epistemology is concerned with measurement of behaviour using standardised tools like questionnaires with structured questions (Tuli, 2010). 'ABC' models of pro-environmental change, critiqued in Chapters 1 and 2: Literature Review (see sections 1.2. and 2.3.4.), are typically based on quantitative methodologies, where psychological constructs such as attitudes and intentions to different pro-environmental issues are measured. However, there is often a gap between constructs like attitudes, intentions and actual behaviour (Blake, 1999; Carrington, Neville & Whitwell, 2010; McDonald, Oates & Alevizou, 2016).

The incongruity between what people say they will do and what they actually do (Belz & Peattie, 2012; McDonald, Oates & Alevizou, 2016) is often studied like a 'black box' (McDonald, Oates & Alevizou, 2016, p. 144) that needs to be understood and this incongruity fixed, usually within ABC models of behaviour deemed to be logical and rational, like Ajzen's (1991) Theory of Planned Behaviour. McDonald, Oates and Alevizou (2016) discuss how this intention-behaviour gap, often attributed to research participants, may instead be explained by the positivistic paradigm underlying research. When quantitative researchers deliberately request numerical data from participants, such as in questionnaires, often in response to overly hypothetical questions about behaviour whilst simultaneously exerting social norm pressure about environmental behaviours, people overstate their intentions compared to their actual behaviour. The problematic individualistic perspective that focuses heavily on psychological constructs dominates much climate change policy (Shove, 2017). ABC approaches also do not consider how social

practices take hold in society over time (Giddens, 1984; Shove, Pantzar & Watson, 2012) and how they might be changed and reconfigured to become more sustainable (Shove, 2017). Looking instead at the routinized behaviours, or 'practices' themselves, rather than focusing on the individuals that perform them (see section 2.4.3), and taking a qualitative approach where participants are able to more accurately (McDonald, Oates & Alevizou, 2016) discuss actual, recent behaviour, during observations or interviews that provide space for detailed descriptions of experiences and social phenomena (Tuli, 2010) and are sensitive to context (Neuman, 2003). Qualitative methods were used in the research for this thesis.

The researcher instead wanted to capture the unique experiences of children and families in terms of how they might have engaged with and were potentially impacted by the educational resource. Given the multidimensional nature of engagement, encompassing different behavioural, cognitive and emotional components (Finn, 1989; Fredricks, Bluemnfeld, Friedel & Paris, 2003; Zyngier, 2008) the researcher assessed (Larsson, Andersson & Osbeck, 2010) how children engaged with the resource, observing them without measuring their engagement with a predetermined construct (see section 3.6.1.). The studies breaking down different components of engagement discussed in section 2.2.1. in Chapter 2: Literature review were carried out in general educational settings, not relevant to multimedia environmental education, and so will not have fully captured how children engaged with such education. Through observations and interviews over time, the researcher aimed to fully capture pupils actual and recent behaviour (McDonald, Oates & Alevizou, 2016) when engaging with their environmental education lessons.

3.4. Fieldwork strategy

The fieldwork strategy for this thesis included employing a multi-setting design with participants from multiple schools and family homes and the use of a multimedia environmental education programme as an intervention to prompt potential changes to family practices. A timeline detailing the three different studies for this thesis is presented below in figure 3.1. and details of each stage in table 3.2., including the (1) pilot study, (2) main study and (3) follow-up study. The school and family-based fieldwork for each study is presented in dark and light grey boxes respectively.

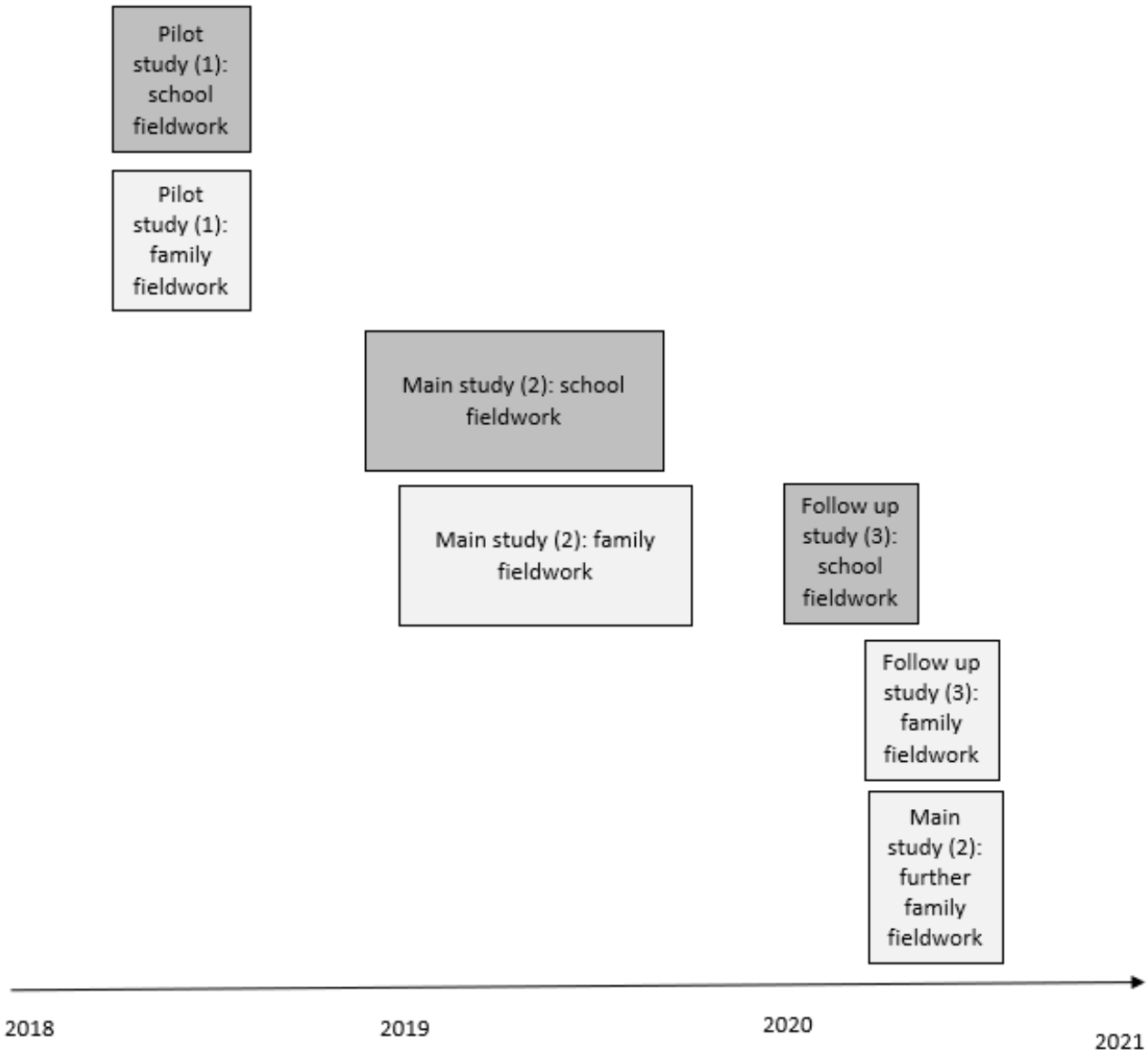


Figure 3.1. The stages of fieldwork for this thesis.

The purpose of (1) the pilot study was to implement and adapt the observation technique and interview questions in the pupil and family interviews and resolve any methodological issues before commencement of (2) the main study (Connelly, 2008; Jairath, Hogerney, & Parsons, 2000). The purpose of (2) was to gather a sufficient quantity of data over a duration of time (in the case of this research, one year and four months from start to finish) in order to adequately address the research questions for this thesis (see section 3.1) and assess whether the multimedia environmental education had any long-term impact on families after a duration of time had passed. The purpose of (3) the follow-up study was to test the findings and clarify themes from (3) in new school and family settings with new

pupils and families and to reach data saturation where no new themes were identified (Bryman, 2016).

In (1) the pilot study pupils received three of the environmental education lessons. In (3) the follow-up study pupils received two lessons. Pupils were supposed to receive three lessons in total, but the research was interrupted by COVID-19 (see section 7.7). In (2) the main study pupils received all 12 of the environmental education lessons covering all the topics in the resource, allowing for a full study of pupil engagement with environmental education. The 12 topics within this resource are discussed in section 3.4.3 and Appendix 5.

In (1) and (3) the family-based fieldwork was carried out via family interviews in the school playground and by telephone. The majority of the family-based fieldwork for (2) was carried out via family interviews in the pupils' family homes, to study families' practices and any impact the environmental education might have had on these. Some interviews had to also take place via telephone for (2), following the restrictions put in place by the UK Government and The University of Sheffield as a response to the COVID-19 pandemic (see section 7.7).

Fieldwork stage	School setting	Family setting	Environmental education topics	Timeline
(1) Pilot study	1 Eco-school in Essex	9 families interviewed at school playground	(1) Compost and Grow (2) Fossil Fools (3) Counting the Carbon	Jun-Jul 2018
(2) Main study	2 non-Eco schools in Gloucestershire	5 families interviewed and gave tours in own homes and over the telephone	(1) Power Challenge (2) School Council song (3) Disposable (4) Water Story (5) Fossil Fools (6) Counting the Carbon (7) Meat Reducer (8) Transportation (9) Compost and Grow (10) Small Grain (11) You don't have to fly (12) Rainforest song	Dec 2018 – Apr 2020
(3) Follow-up study	1 Eco-school in Dorset	6 families interviewed over the telephone	(1) Compost and Grow (2) Fossil Fools	Jan 2020 - Apr 2020

Table 3.2. Details of fieldwork for the pilot, main and follow-up studies.

3.4.1. Multi-setting design: schools and family homes

To address the research questions (see section 2.4.), a multi-setting design was used as part of the fieldwork strategy in schools (see section 3.6) and family homes (see section 3.7). Given the researcher's ontological, epistemological and methodological positions of constructionism, interpretivism and qualitative methodologies respectively, the following research methods were selected. KS2 primary school teachers first delivered lessons from a multimedia environmental education programme (see section 3.4.3) to their pupils. These lessons were observed by the researcher who took observational field notes (section 3.6.1.)

and photographs of the pupil's schoolwork (section 3.6.2). The researcher also interviewed pupils (section 3.6.3) and their teachers (section 3.6.4) to address the research question exploring pupil engagement with the environmental education programme.

The researcher then studied pupils and their families in the family home to explore any impact the education might have had on home practices, defined as the application of social practices to household sustainability (Lane and Gorman-Murray, 2011; Gibson, Farbotko, Gill & Waitt, 2013; Foden, Browne, Evans, Sharp & Watson, 2018). The pupils and their families took part in a group interview (section 3.7.1.) and then showed the researcher any relevant objects during a tour of their family home (section 3.7.2.). Relevant objects included smart meters, vegetable patches, shower timers, soy milk and recycling bins, which the researcher photographed to use as additional visual data (Bryman, 2016; Shaw, Brady & Davey, 2011) and evidence to explore the home practices of families for the domains of water and energy use, food, travel and waste management (Druckman & Jackson, 2009; Evans, McMeekin & Southerton, 2012; Foden, Browne, Evans, Sharp & Watson, 2018; O'Neill, 2015), and any impact from the pupils' environmental education at school.

The multiple forms of data collected in schools and family homes as part of the fieldwork strategy converged to complement each other and address the research questions collectively. In schools, the lesson observations and how pupils appeared to engage in their lessons from the perspective of the researcher and the photos of schoolwork that she took would be discussed in the pupil interviews, where pupils would share their thoughts on the lessons and how they engaged with them. In family homes, how pupils engaged with their lessons following the school-based fieldwork would be discussed in the family interviews, such as the intentions that pupils formed to discuss and action practices mentioned in their lessons. Photos of material objects relating to family practices would also prompt further discussion, building on what was said in the family interviews, before the tours of the home took place.

The multi-setting design of conducting fieldwork in both school and family home settings was considered an effective strategy to address the thesis' research questions and explore (1) pupil engagement with the environmental education resource, (2) which family members, if any, were discussing or actioning the education, how they did so, and any outcome on home practices, and (3) any underlying factors that might impact pupil

engagement or discussion or action of the education in the family home. Further details of the school and family home-based fieldwork can be found in sections 3.6 and 3.7 respectively. The findings from each fieldwork setting are presented in Chapter 4: School-based findings and Chapter 5: Family-based findings. Findings from these two settings are brought together for discussion in Chapter 6.

3.4.2. Recruitment of participants

A key consideration when recruiting pupil participants from schools was gaining access to gatekeepers (Morrow, 2008), such as interested teachers (Strong, 1998). Originally, following discussions with the researcher's supervisors and the collaborative partner who was based in London in the UK, the schools for this thesis were going to be recruited in London. The researcher compiled a list of contact details for primary schools in London from their publicly accessible websites. The researcher attached information sheets and consent forms (see Appendix 2 for an example) to a personalised email inviting schools to participate in February 2018 and then September 2018, and followed up these requests via email two weeks later and with telephone calls. Of the 24 schools contacted, three responded declining to participate due to a lack of time and resources to support the delivery of the 12 environmental education lessons.

At this stage, the researcher decided to utilise her different networks to access school gatekeepers directly via convenience sampling (Jairath, Hogerney, & Parsons, 2000). For the pilot study, the Office Manager in a school in Essex was a family friend of the researcher. For the main body of fieldwork, the collaborative partner for the project knew a primary school teacher in Gloucestershire. This teacher worked in partnership with another teacher at a different school in Gloucestershire that was also recruited to take part. For the follow-up study the researcher knew a teacher in Dorset through volunteer work with a gardening charity that worked with schools in Dorset. As discussed in previous research (Strong, 1998), the awareness and interest of the teachers in environmental issues helped the researcher gain access. Through these contacts, the four schools across Essex, Gloucestershire and Dorset were recruited for the pilot study, main study and follow up respectively.

The schools that were recruited were deemed 'typical' (Bryman, 2016) and commonplace (Yin, 2009) by the researcher, which would help the research findings to be transferrable

and useful to other primary schools in the UK. The schools in Essex and Dorset were both Eco-Schools, which was considered typical and commonplace given that 70% of all schools in the UK were registered with Eco-Schools in 2013 (Keep Britain Tidy, 2013). A more up to date figure of the number of schools involved in the Eco-Schools programme was not available at the time of the research. Given that the notion of a 'typical' sample can be problematic (Bryman, 2016) and several different types of primary school exist (UK Government, 2017), the research also relied on a recruitment criteria when checking the schools' publicly-accessible websites to ensure they were appropriate to take part in the fieldwork. The criteria included the content of environmental education at the school, the presence of a school council and serving meat in the canteen. The four schools recruited for the research met these criteria.

KS2 pupils, aged between seven and 12 years old (UK Government, 2017) in primary school Years 3, 4, 5 and 6, were selected as the most appropriate age group for the research for this thesis, given the lack of research on the impacts of environmental education on this age group (Grønhoj & Olander, 2007) compared to older, university-aged students (Cullingford & Blewitt, 2013; Jones, Delby & Sterling, 2010; Moore, 2005a; 2005b). Their common-sense and therefore suitability as an audience for environmental messages (Strong, 1998; Uzzell, 1999), further makes this age group appropriate for the research, as well as the Project Earth Rock resource having been designed with the help of KS2 pupils and their teachers. This research, acting as the multimedia environmental education intervention, was therefore ideally placed to engaged this age group and their level of understanding of environmental issues. However, given the stage such children will have reached with their cognitive and moral development (Kohlberg, 1976; Piaget, 1932), and with even older children being prone to misconception and confusion over certain environmental topics (Boyes & Stanisstreet, 1994), it was not assumed that this age group of children would engage well with all topics of the resource, including potentially more complex (Strong, 1998) and abstract topics. Therefore, studying how they engaged with the different environmental topics within the multimedia resource was a crucial component of the fieldwork strategy.

To recruit children and their families for the family-based fieldwork, family information sheets and consent forms with a cover letter (see Appendix 2) were given to the teachers

and then sent home to parents. This information was titled ‘the impact of environmental education in the home’, which could have resulted in social desirability bias (Grimm, 2010) whereby families with existing interest in environmental issues chose to partake. However, when parents were asked their reasons for wanting to partake in the research, reasons included wanting to help with educational research, given the educational professions of several of the parents. The environmental nature of the research was not cited as a reason for parents wanting to take part.

Parents who were interested in their child or themselves taking part in the research returned their completed consent forms to their child's teacher. Where parents had indicated that they were willing to partake in family visits, a second information sheet and consent form was distributed to them via their children. This pack asked parents whether they would like to meet in the school playground in person to schedule the home visits or speak over the telephone. Parents then indicated their availability for either a meeting or a telephone call, and provided their telephone number in a sealed envelope. Their child then gave this back to the researcher.

For the pilot study, 33 families were contacted and nine families agreed to take part in the pupil observations and interviews, and four to take part in family interviews in the school playground. For the main body of fieldwork 53 families were contacted and five families agreed to take part in pupil observations and interviews and three to take part in family visits to the family home. For the follow up study six family parents agreed to take part in pupil observations and interviews and five to take part in telephone interviews. All families were assigned a family number to anonymously identify them. See table 3.3 for details of the participants in each family that took part in the research, including their gender and age group where this information was collected, which stage of the fieldwork participants were recruited for, and what school the pupils attended.

Family Number	Participants	Gender (and age group if known)	Fieldwork stage	Corresponding School
Pilot Study Family 1	Pilot Study Pupil 1a	Male, Year 4	Pilot study	Essex school (Eco-School)
	Pilot Study Pupil 1b	Male, Year 4		
	Pilot Study Mum 1a	Female		
	Pilot Study Mum 1b	Female		
Pilot Study Family 2	Pilot Study Pupil 2	Female, Year 4	Pilot study	Essex school (Eco-School)
	Pilot Study Mum 2	Female		
Pilot Study Family 3	Pilot Study Pupil 3	Female, Year 4	Pilot study	Essex school (Eco-School)
Pilot Study Family 4	Pilot Study Pupil 4	Female, Year 4	Pilot study	Essex school (Eco-School)
Pilot Study Family 5	Pilot Study Pupil 5	Female, Year 4	Pilot study	Essex school (Eco-School)
	Pilot Study Mum 5	Female		
Pilot Study Family 6	Pilot Study Pupil 6	Male, Year 4	Pilot study	Essex school (Eco-School)
Pilot Study Family 7	Pilot Study Pupil 7	Female, Year 4	Pilot study	Essex school (Eco-School)
Pilot Study Family 8	Pilot Study Pupil 8	Female, Year 4	Pilot study	Essex school (Eco-School)
Pilot Study Family 9	Pilot Study Pupil 9a	Male, Year 4	Pilot study	Essex school (Eco-School)
	Pilot Study Pupil 9b	Male, Year 4		
	Pilot Study Mum 9	Female		
Family 1	Pupil 1	Female, Year 5, 9 years old	Main study	Gloucestershire School 1
	Dad 1	Male		
	Mum 1	Female		
Family 2	Pupil 2	Male, Year 6, 10 years old	Main study	Gloucestershire School 1
Family 3	Pupil 3	Female, Year 5, 10 years old	Main study	Gloucestershire School 1
	Mum 3	Female		
	Dad 3	Male		
	Sister 3	Female		
Family 4	Pupil 4	Female, Year 6, 11 years old	Main study	Gloucestershire School 1
Family 5	Pupil 5	Female, Year 5, 9 years old	Main study	Gloucestershire School 2
	Mum 5	Female		
	Dad 5	Male		
Family 6	Pupil 6	Female, Year 4	Follow up study	Dorset School (Eco-School)
	Mum 6	Female		

Family 7	Pupil 7	Male, Year 5, 10 years old	Follow up study	Dorset School (Eco-School)
	Mum 7	Female		
	Dad 7	Male		
Family 8	Pupil 8	Male, Year 3, 7 years old	Follow up study	Dorset School (Eco-School)
	Mum 8	Female		
Family 9	Pupil 9	Female, Year 4, 9 years old	Follow up study	Dorset School (Eco-School)
	Mum 9	Female		
Family 10	Pupil 10	Female	Follow up study	Dorset School (Eco-School)
	Mum 10	Female		

Table 3.3. Details of the participants involved in the pilot study, main study and follow-up study.

Requiring a gatekeeper to access participants, and going through schools and pupils to contact families may have impacted how many participants agreed to take part, as this was a less direct recruitment strategy than directly contacting members of the public if a gatekeeper was not needed. However, it was deemed necessary in order to recruit families whose pupils were receiving the multimedia environmental education lessons at school. Asking participants to have the researcher in the family home for the main study may have also felt intrusive for some people and thus impacted how many participants agreed to take part in the family-based fieldwork. In order for the researcher to immerse herself in the culture and group (Tuli, 2010) of families, and explore whether and how their practices were being impacted by their children's engagement with environmental education in the field (Hammersley & Atkinson, 2007), visiting families in their homes was considered necessary in addressing the research questions for this thesis (see section 2.4.)

3.4.3. Environmental education resource

An environmental education resource called 'Project Earth Rock' (https://www.projectearthrock.com) was used for the research. The programme used a mix of multimedia (Rohwedder & Alm, 1994), including musical songs and animated artwork among other classroom activities, and thus was deemed an appropriate resource to explore the potential of multimedia in engaging pupils with environmental issues, addressing a gap in the literature (Kagan & Kirchberg, 2016). See Appendices 3 and 4 for examples of the song lyrics and an animation still respectively.

The programme was developed with its creator and help from 28 UK primary schools. The programme content had links to the UK National Curriculum including the subjects: science, music, English, maths, geography, art and personal, social and health education (PSHE). In the pilot study school Project Earth Rock was taught as part of the pupils' PSHE lessons. In Schools 1 and 2 Project Earth Rock was taught as part of Geography lessons and in School 3, as part of the afterschool Eco-Club. The programme was commended in the Rushlight Awards for 2016-2017 and won an award in the Energy Institute's 'Communications' category in 2017.

To support teachers in feeling competent (Ham & Sewing, 2010) to deliver education about environmental issues, Project Earth Rock consisted of a prepared set of lesson plans, multimedia resources and activities for KS2 pupils for use by teachers. The resource covered 12 environmental topics such as saving energy and water, waste management, carbon footprints, reducing meat consumption, sustainable transport and growing food. Activities were carried out by teachers and pupils during the school-based fieldwork, including songs and animations, as well as discussions and the creation of an energy diary and menus. The resource also provided suggestions for additional activities, but these were not delivered during the fieldwork due to time constraints, as the average Project Earth Rock lesson was scheduled to last 85 minutes, longer than the average 60 minute lesson. Further information about the 12 Project Earth Rock lessons can be found in Appendix 5, including the topics, activities, messages of the songs and animations, suggested session duration and practice domains mentioned in the resource for each lesson. Project Earth Rock was a new resource to the schools, with the exception of School 1, who had sung a couple of the songs, such as 'Transportation', as part of their school assemblies.

3.5. Pilot study

In June and July 2018 a pilot study was carried out to help the planning and delivery of the research (Connelly, 2008) by addressing any issues with the research strategy. The researcher explored the observation technique, including note-taking, intended to assess behavioural, cognitive and emotional pupil engagement (Finn, 1989; Fredricks, Bluemnfeld, Friedel & Paris, 2003; Zyngier, 2008) and the proposed interview questions for pupils and parents, aiming to resolve any issues before the main body of fieldwork commenced (Connelly, 2008; Jairath, Hogerney, & Parsons, 2000).

The KS2 teacher from the pilot study school read the information sheet and signed a consent form. After being given access to the entire Project Earth Rock resource, including the lesson plans for all 12 topics, the teacher chose to deliver three sessions over a three-week period: (1) 'Power Challenge' (2) 'Fossil Fools' and (3) 'Compost and Grow' (see section 3.4.3 and Appendix 5). The reason for this selection was not discussed. The researcher observed each lesson being taught by the teacher and took field notes. After each session was taught, the researcher conducted individual and group interviews with KS2 pupils. Pupils were the same age as pupils who took part in the main study and follow-up study (Shaw, Brady & Davey, 2011) to ensure any methodological issues regarding age appropriateness were appropriately addressed. At the end of the school day, the researcher conducted individual and group interviews with the pupils' parents in the playground.

Draft interview schedules for both pupils and parents were tested with the researcher's PhD colleague and the Officer Manager of the pilot study school to obtain initial feedback and to amend any errors to question phrasing and order, and make any further changes before the pilot study began. Some questions were changed to be clearer and more tangible for the children, such as asking pupils for examples of how they were environmentally friendly at home with their families. A final interview schedule was used to ask pupils in the pilot study about their experience of the sessions, and about environmental friendliness within their family. Throughout the three weeks, this schedule was used flexibly and was changed as new questions naturally arose, such as the nature of the engagement observed during the lessons, and specific questions about the multimedia components of the environmental education sessions, which were not included in the initial draft interview schedule.

The researcher also spoke to the parents of the children in the school playground, asking them about their environmental practices at home and whether pupils discussed their schoolwork in the home. As part of these interviews, the researcher asked parents in week three of the pilot study to consider any potential methodological issues involved in home visits. No issues were raised by parents about the researcher conducting home visits.

After each lesson informal talks were held with the teachers, where they discussed how the lesson went and how they found teaching the lesson. These talks were not originally planned as part of the pilot study and were not audio-recorded, however, the researcher did note down what was discussed in her field notes as these discussions were relevant to

the research questions for this thesis. These talks provided useful insights and feedback on the resource, and so teacher interviews were incorporated to the fieldwork strategy for the main study, especially given the role of teachers in engaging pupils (Ham & Sewing, 2010; Uzzell, 1999; Willms, 2003).

The pilot study was useful in informing the research strategy and subsequent fieldwork. In particular, the pilot study provided insights in knowing which interview questions were and were not useful to ask pupils and parents, and also highlighted how there could be a discrepancy between what the children said and what their parents said. For example, one parent said how she did not have anything relevant to discuss about the family's energy use, however her two sons mentioned that the family actually had a smart meter, allowing them to monitor and reduce their energy use. Where such discrepancies were identified, these were followed up and explored further in subsequent fieldwork. Methodological changes were made to the fieldwork strategy following the pilot study and subsequent transcription and reflections. Changes were made to the researcher's interview style, to avoid the use of leading, biased or double-barrelled questions and to ensure questions were clear and concise, checking participants' understandings of certain terms used in interviews, such as 'environmental friendliness' and asking follow-up questions and open-ended questions with no particular response in mind (Bryman, 2016), like 'is there anything else?', when necessary. Such questions often elicited an insightful response by participants, such as further thoughts and feelings about the topic of their environmental education lessons. The pilot study also emphasised the importance of building rapport (Tuli, 2010) with participants to mitigate any power issues relating to the researcher being an adult, and the pupil participants being children. The researcher encouraged pupils to choose where to sit to be interviewed (Shaw, Brady & Davey, 2011) to ameliorate this issue.

The researcher sat where the whole class, including pupils involved in the interviews, and the class teacher could be seen, whilst not being disruptive (Shaw, Brady & Davey, 2011). For example, one male pupil involved in the interviews was singing along to one of the songs enthusiastically, as observed by the researcher because of where the researcher was sat. When asked in an interview if the pupil had enjoyed the song based on this observation, he responded that he felt he had to sing along to avoid being told off by the teaching assistant, suggesting a level of passive compliance with the rules as opposed to evidence of positive

engagement (Schlechty, 2002; Zyngier, 2008). Carefully choosing where to sit meant that the researcher gained insight in to such relevant findings.

The pilot study resulted in the researcher considering using more creative and engaging methods during her interviews for the main body of fieldwork. Such methods included incorporating drawings into interviews to shift the focus away from the children needing to verbally articulate themselves if they were not comfortable doing so (Shaw, Brady & Davey, 2011).

3.6. Data collection in schools

Data collection in schools for the main study and follow up study was necessary to address the research questions for this thesis. This section of fieldwork involved the researcher immersing herself in the natural classroom setting (Brewer, 2000; Bryman, 2016) to observe the delivery of the environmental education by the teachers to the pupils, to photograph the pupils' schoolwork, to interview them about their lesson and to interview their teacher about the delivery of the lesson.

For the main study, Teacher 1 invited the researcher to visit School 1 in December 2018 before the environmental education was delivered to meet and introduce the children to the research. The children in the main study were KS2, aged between nine and 11 years old. This provided an opportunity for the researcher to begin building a rapport (Tuli, 2010) with participants, observe the teacher delivering regular lessons and become acquainted with her style of teaching. In this sense, this initial visit, with no environmental education lesson, acted as a pre-intervention observation. Teacher 2 was unable to attend this initial visit. All 12 environmental education topics were then taught chronologically in the order they were prescribed in the resource booklet for teachers (see section 3.4.3. and Appendix 5) over 12 non-consecutive Mondays, and one Thursday as part of Geography lessons. The lessons were not taught consecutively as both schools had other commitments such as SATs exams, resulting in the main study school-based fieldwork commencing in January and finishing in June of 2019. The researcher visited School 1 in the morning from 10:40 to 12:15, and interviewed the children and Teacher 1 during their lunch break. The researcher visited School 2 in the afternoon from 13:30 to 15:15, and interviewed the children from School 2

towards the end of the lesson when the main activity was underway, and interviewed Teacher 2 after school.

For the follow-up study, Teacher 3 invited the researcher to visit School 3 in January 2019 before the environmental education was delivered to meet the children, build rapport (Tuli, 2010), introduce the study, and observe a typical lesson. Two lessons (see section 3.4.) were taught over two non-consecutive Wednesdays after school as part of the children's afterschool Eco-Club, which had members from across all school years. The children in the follow-up study were all KS2, aged between seven and 11 years. Pupils and Teacher 3 were interviewed together at the end of the second Eco-Club session to save time, as the research took place during an afterschool club. Three lessons were planned to be delivered in total, however the last lesson had to be cancelled due to COVID-19 restrictions (see section 7.9) and subsequent school closures.

3.6.1. Observations of lessons

In line with the interpretivist epistemology underpinning this thesis (Tuli, 2010), observations in the field (Hammersley & Atkinson, 2007) of the school classroom setting (Bryman, 2016; Fretz and Shaw, 2011) were carried out to determine how pupils naturally engaged (Shaw, Brady & Davey, 2011) with the environmental education resource at school. The researcher sat at the side of the classroom in schools 1, 2 and 3 to observe the majority of the class, including the teacher and any pupils who would be interviewed. The lessons were then taught by the teachers. Teachers 2 and 3 often taught them as the lesson plan dictated, but Teacher 1 often adapted the content and provided her own supplementary material like physical items and additional explanatory videos. Teacher 1 would occasionally ask the researcher for clarification on certain terms or meanings behind some of the content.

The researcher took field notes throughout the lessons, noting down what was being said by the teachers and pupils and reactions as evidence of engagement with the lesson. Observations were unstructured due to the nature of the research question (Shaw, Brady & Davey, 2011) about pupil engagement being explorative (Larsson, Andersson & Osbeck,

2010) with the researcher not having any preconception of how pupils might engage with the multimedia resource, given the lack of research in this area (Kagan & Kirchberg, 2016). To ensure however that data during observations were recorded purposefully (Shaw, Brady & Davey, 2011), and not at random, despite observations being unstructured, the researcher decided beforehand that she would focus her attention on the pupils who had consent to participate in the research, whilst occasionally observing the engagement of the class as a whole. As individual children were going to be the focus of the observation, consent (see section 3.9.) had been explicitly requested from the parents, in line with ethical guidelines (Shaw, Brady & Davey, 2011).

Observations were recorded by hand using a pen and notepad, with the researcher devising her own system of abbreviations (e.g. 'T' for teacher, 'P' for pupil) to ensure rapid note taking whilst immersed in the fast-paced observational context of the classroom (Shaw, Brady & Davey, 2011). The researcher also decided beforehand a strategy for minimising disruption and distortion to lessons due to her overtly observing lessons (Shaw, Brady & Davey, 2011) by sitting away from the children and choosing not to participate in any interactive components, such as the songs, so as to not influence how the children might have engaged with the lessons. As part of this observational strategy (Shaw, Brady & Davey, 2011) the researcher also chose not to intervene when children were behaving disruptively, and to instead observe the children behaving naturally (Shaw, Brady & Davey, 2011) when their lessons were being delivered. The researcher did not want to be perceived as another member of staff by the pupils, as this might have inhibited their responses in interviews when discussing their lessons, such as not wanting to be critical of the environmental education resource (Shaw, Brady & Davey, 2011).

3.6.2. Photographs of schoolwork

To further explore pupils' engagement with the multimedia environmental education beyond observations and interviews, the researcher photographed all schoolwork and homework associated with the lessons. Work included posters, menus, diaries, word and card sorting tasks, activity sheets and interactive demonstrations. Photographs provided the researcher with additional, visually captured data (Bryman, 2016; Shaw, Brady & Davey, 2011) to analyse alongside observational field notes and interview transcripts to determine how pupils engaged with the lessons. Photographs of schoolwork and homework were also

used on the cards for the card sorting task (see section 3.7.1), to act later as reflective prompts during interviews (Bryman, 2016). Pupils' schoolwork was anonymised by covering their real names over with a piece of paper detailing their pupil number, or if this was not sufficient, by removing their name using computer software to ensure pupils' work was not identifiable. Photographs never included the pupils themselves or their faces to avoid them being identifiable (British Educational Research Association, 2004).

3.6.3. Pupil interviews

Semi-structured interviews were carried out with pupils to gather further data on pupil engagement with the environmental education resource after the lessons they received. Interviews were chosen as an appropriate research method as they are commonly used when employing a qualitative methodology, align with the interpretivist epistemology underpinning this thesis, and allow for detailed descriptions of experiences (Tuli, 2010). Each interview lasted for 10 to 15 minutes and was audio-recorded to generate typed transcripts or text data (Carter & Little, 2007) for analysis. As interviews were semi-structured, interview schedules (Bryman, 2016; see Appendix 6) were used flexibly and openly, based on the insights gained from the pilot study. Questions were age appropriate (Morgan, Gibbs, Maxwell & Britten, 2002), and would typically first ask pupils whether they had discussed or actioned anything from last week's lesson with their family. The remainder of the interview included discussion of the lesson pupils had just received, and included their initial thoughts about the lesson, any barriers and facilitators to the practice(s) mentioned in the lesson (e.g. walking and cycling), their thoughts on the song, animation and other activities, whether their family engaged in the practice(s) mentioned in the lesson, whether they might discuss or action the lesson with their family, any perceived barriers or facilitators to discussion or action, as well as any additional follow-up questions from the classroom observation (Bryman, 2016). These interview questions helped to address the thesis research questions (Miles & Hubermann, 1994). An example interview schedule can be found in Appendix 6. The researcher encouraged children to be honest in their responses, and stressed that there were no right or wrong answers in an attempt to minimise any power issues between the children and the researcher (Shaw, Brady & Davey, 2011) that may have impacted the data. Encouraging honesty also helped mitigate any social desirability bias, that is, 'the tendency of research subjects to give socially desirable

responses instead of choosing responses that are reflective of their true feelings' (Grimm, 2010, p.2).

In School 1, when it became apparent that interviews would have to take place during the children's lunch break, the researcher decided to interview Pupils 1, 3 and 4, who were all friends and played together, in a group in following weeks, because they were giving up their free time to take part in the study. Pupils having discussions in their friendship groups may also be less daunting than if they are in a group of people they do not know as well (Shaw, Brady & Davey, 2011). The University of Sheffield's ethics committee approved this methodological change.

As well as obtaining consent from pupils' parents in advance, before every interview the researcher obtained opt in verbal consent (Shaw, Brady & Davey, 2011) from the pupils to be interviewed in their lunch break. In the main study, Pupil 2 asked to withdraw from the interviews after the first week because they took place over lunchtime. In two of the weeks, Pupils 3 and 4 had other commitments so did not take part in an interview those weeks. To reduce the impact of missing data, these pupils were asked about the lesson they had not discussed in their next interview, the following week. On four or five occasions, Pupil 5 did not seem comfortable just verbally articulating herself in a one-on-one interview, and so the researcher used drawings to supplement these interviews and to help her to feel comfortable in expressing her thoughts (Shaw, Brady & Davey, 2011) on the environmental education lessons. Sometimes Pupil 5 chose to draw something relating to the lesson she had received, but other times her drawings were unrelated, and instead, acted as a way for her to relax and take the focus away from a standalone interview with the researcher. Whilst drawing, Pupil 5 often discussed the lesson she had just received.

3.6.4. Teacher interviews

Semi structured interviews with teachers were included in the fieldwork strategy following insights gained from informal discussions with the teachers from the pilot study to explore how, if at all, pupils engaged with the education at school and to speculate the impact it might have on families and their home practices. Teacher interviews lasted about 15 minutes. In the main study, teachers were interviewed twice, once approximately halfway

through the 12 lesson programme and again once all the 12 lessons had been delivered. In the follow-up study, the teacher was interviewed once both lessons had been delivered.

In the main study, in the first interview, each teacher was asked their opinion of the lessons, about the lesson's messages and how the lessons were delivered, including the multimedia components. Teachers were also asked to discuss their teaching style and how they explained tasks, prompted discussions, got answers from pupils, gave feedback to their pupils, kept on track and to time, how they included everyone, how they added their own personal touches, how they praised or told off their pupils, and whether they taught the environmental education lessons in the same way that they taught their regular lessons. The teachers were then asked to comment on how they thought the children engaged with the lessons and whether they thought the children were likely to be discussing and actioning the content with their families at home.

In the second and last interviews for Teacher 1 and 2 in the main study, after all 12 lessons had been taught, teachers were asked their general thoughts on the lessons. To get the teachers to further reflect on the 12 environmental lessons they had taught, and to help engage them, hold their attention (Tinson, 2009) and facilitate discussion (Shaw, Brady & Davey, 2011) the researcher designed a visual card sorting task using 12 A5 cards for each lesson (see Appendix 8). Each card had the lesson title and the date it was delivered on as well as a print screen of the whiteboard slides used, the learning objectives if these were mentioned by the teacher, the song lyrics, a still of the animation, any activities that the children completed and had photographed as well as any supplementary materials that the teacher used to make the environmental education more tangible for pupils. Different cards were created for School 1 and 2 as different content was used by teachers and created by pupils in their lessons.

The teachers were asked to look at the cards and sort the cards in any way they wanted while thinking aloud. Sticky notes and a pen were also available if the teachers wanted to categorise the cards in any way, which they chose not to do. The card sorting task was open for the teachers to decide how they wanted to reflect on the lessons, in line with a qualitative and exploratory methodology (Asgedom, 2004; Bryman, 1984; Bryman, 2016; Guba & Lincoln, 1994; Krauss, 2005; Lincoln & Guba 2000; Tuli, 2010). As well as audio-

recordings of the interviews that included the card sorting activity, photographs were taken of the way the teachers arranged the cards.

3.7. Data collection in family homes

Conducting fieldwork in family homes was a necessary part of the research strategy to address the research questions for this thesis. The family-based fieldwork explored which members, if any, were discussing or actioning the environmental education, how, if at all, and the outcome on different practice domains as well as any underlying factors that may have helped or hindered the lessons have an impact on home practices. Studying multiple families and different family members, including the pupils, their parents and siblings aligned with the constructionist ontology underlying this thesis (Bryman, 2016). Studying participants in their own homes posed certain ethical issues, such as safety concerns for the researcher. These ethical issues are addressed in section 3.9.

3.7.1. Family interviews

For the main study, the researcher conducted family interviews in their homes, where she was immersed in the social world of the participants for periods of time (Bryman, 2016), approximately two hours per session. The first family interviews took place halfway through the 12 environmental education lessons (i.e. after the sixth lesson), and then again after the 12 lessons were completed. Final follow-up interviews were conducted over the telephone due to impacts of COVID-19 (see section 7.7.), between eight and nine months after the second interview.

The family interviews were conducted as a group. Families chose who would be present for the family interviews. Given the understanding that a 'family' consists of both parent and child (James, 2013; Murdock, 1962) typically, the pupil and at least one parent was present, but on occasion both parents were present as well as a sibling too. In order to try and mitigate any generational power dynamics between parents and their children (French & Raven, 1959; Recchia, Ross & Vickar, 2010), the researcher encouraged participates to be honest and acted as a facilitator in the interviews, encouraging all participants to share their views. This also helped to mitigate any issues with social desirability bias (Grimm, 2010). The researcher would ask individual family members to contribute at times, but mostly, family

members sparked off of each other (Wellington, 2015) when discussing topics. The researcher and family members sat in a circle to further mitigate any power dynamics, and to ensure everyone could be heard for the audio-recordings.

The first interview involved asking families about family life, including the activities and practices they collectively did together (Epp & Price, 2008), family dynamics, and their individual views on environmental friendliness. The child's general school life was then discussed, and how involved the family tended to be in the child's school life. Then home practice domains of water and energy use and waste management which related to the environmental education lessons that had been delivered to the children were discussed. The 'School Council' lesson that did not fit in to any obvious home practice domain was also discussed. Families were also asked to comment on their thoughts towards the upcoming lessons that had not been taught yet. An example interview schedule for the family interviews can be found in Appendix 7.

In the second family interviews, follow-up questions from the first interview were asked by the researcher, to elicit further information on certain topics. The remaining home practice domains of travel and food relating to the remaining environmental lessons were then discussed. The same card sorting activity (see Appendix 8) that had been used with the teachers was carried out at the end of the second family interview. The card sorting activity was designed by the researcher to help engage the children and keep their attention (Tinson, 2009) when reflecting on all 12 of their lessons. A photograph of how the children chose to arrange their cards was taken. For the follow-up study and the final interviews in the main study, to comply with social distancing measures following COVID-19 (see section 7.7.), family interviews were conducted over the telephone.

Inviting participants to conduct interviews in their own homes may have felt invasive and deterred potential participants from taking part. This issue was particularly prevalent in the main body of field work, resulting in only three families agreeing to take part in home visits. The researcher addressed this issue during the follow-up study, and she gave participants the option to be interviewed in the school playground before or after school or over the telephone, aiming to make the interviews more convenient for participants. This decision sacrificed being able to observe any objects relevant to the family's home practices,

however, sufficient data was collected during the home visits during the main body of fieldwork, as similar themes began to emerge within the data of families, reaching data saturation (Bryman, 2016).

3.7.2. Tours of family homes and photographs of household objects

As part of the family-based fieldwork, the researcher encouraged families to take her on a tour of their family home. The children led these tours, empowering them (McGee-Lennon, Wolters & Brewster, 2011) in their home and allowing them to 'describe and discuss their environment by physically exploring the setting … in the company of a researcher' (Shaw, Brady & Davey, 2011, p. 24). After the main interviews with the families had finished, the researcher asked to see any objects relevant to the interview content around the families' homes, in particular of different home practice domains of water and energy use, waste management, travel and food (Druckman & Jackson, 2009; Evans, McMeekin & Southerton, 2012; Foden, Browne, Evans, Sharp & Watson, 2018; O'Neill, 2015) and the underlying meanings, materials and competences underlying these practices (Shove, Pantzar & Watson, 2012). Walking around the families' homes to view and photograph (Shaw, Brady and Davey, 2011) objects of importance (McGee-Lennon, Wolters & Brewster, 2011) provided insight into the families' lives (Bryman, 2016; Scott, 1990) and their home practices like their recycling system or how families saved water and energy, and how these objects (Plowman, 2015) were used in the performance of practices. Viewing, discussing and photographing these objects also helped to mitigate any social desirability bias (Grimm, 2010), if participants overstated their engagement with certain pro-environmental practices in the family interviews. The researcher being taken on these tours and seeing these physical objects provided actual evidence of whether and how families engaged in different practices like growing their own food, recycling and saving water. Objects that were shown and discussed included smart meters, wood burners, water butts, washing lines and vegetable patches. The researcher never photographed any object that would personally identify participants. Photographing objects helped to elicit more information from participants about their practices and routines, when the researcher asked questions about the objects she was photographing. The interactions during the family tours were audio-recorded. These data, along with the audio-recorded family interviews where participants were sat

down together, were transcribed and analysed in order to generate findings to address the research questions for this thesis.

Tours of the family home and photos of practice-related objects have not before been conducted in research exploring the impact of environmental education at school on pupils and their families. Home tours have been used to study how stressful or restorative families find their home environment and as a way for participants to narrate details of different spaces and objects in the home that are meaningful to them (Saxbe & Repetti, 2010). How participants spoke about these spaces and objects was the focus of Saxbe and Repetti's (2010) study. The home tour method was carried out differently in this thesis. Like in Mateas, Salvador, Scholtz & Sorensen's (1996) study, when they used home tours and artefacts to understand typical activities relevant to the practice of using a computer, the subsequent information that objects elicited was the focus, rather than how objects were described. In this thesis the objects themselves were a crucial component of the theory underpinning the thesis, in terms of being material elements underpinning practices (Shove, Pantzar & Watson, 2012).

3.8. Data analysis

Data were prepared before analysis. Transcription is integral to qualitative research (Davidson, 2009; Lapadat, 2000) to help preserve data, making it 'permanent, retrievable, examinable, and flexible' (Lapadat & Lindsay, 1999, p. 80) and ready for analysis. Handwritten field notes from the observed lessons were typed into Microsoft Word documents. Audio recordings from the teacher, pupil and family interviews were listened to at least twice to help the researcher familiarise (Lapadat, 2000) and immerse herself in the data (Mason, 2002; Tuli, 2010). Any relevant insights or reflections (Davidson, 2009) by the researcher that helped address the research questions were noted down and referred back to during data analysis. Audio recordings were then listened to again, pausing every couple of seconds to transcribe what was being said and by whom as well as any non-verbal communication relevant to the research questions, such as laughter. The transcripts were then read through twice by the researcher to familiarise herself with the data (Braun & Clarke, 2006; Lapadat, 2000), making any corrections to typos where necessary, until an accurate typed transcript was obtained.

During transcription, any personal or identifiable information was removed from the dataset to anonymise and protect participants' identity (see section 3.9.2). Data were saved and backed up on a password protected computer and given appropriate file names. All data files were imported to the qualitative data analysis computer software NVivo 12 for data analysis.

In alignment with a qualitative methodology, qualitative data analysis was carried out on the prepared dataset. Qualitative data analysis involves studying patterns and themes and organising these in such a way to explain or make sense of the data (Cohen, Manion & Morrison, 2011). Analysing the data, searching for meaning and significance (Antaki, Billig, Edwards & Potter, 2003) helps to 'discover, explore and generate an increasingly refined conceptual description of the phenomena' (Rapley, 2011, p. 276). Stages of conducting a qualitive data analysis can include detailed reading, labelling, reviewing and refining of the data, and reflection by the researcher (Rapley, 2011).

For this thesis, Braun and Clarke's (2006) thematic data analysis was used to qualitatively analyse the dataset. Braun and Clarke (2006) recognised the numerous diverse, complex and nuanced approaches to qualitative data analysis and thematic analysis (e.g. Miles & Huberman, 1994; Boyatzis, 1998). Braun and Clarke's (2006) approach to thematic analysis aimed to simplify the process and be flexible for use with different theories and epistemologies, inductively or deductively. Braun and Clarke's (2006) approach was chosen to analyse the data for this thesis, given the researcher's experience of its flexibility with theory and epistemology, and its ease of use.

Thematic analysis can provide rich description of the data (Braun & Clarke, 2006). Thematic analysis involves 'the search for statements about relationships among categories of data' (Marshall & Rossman, 1999, p. 150). Themes depict important components within the data set in relation to the research questions (Braun & Clarke, 2006). Data collected in the pilot study, main study and follow up study were analysed separately. The findings from the main study were considered when analysing the data from the follow up study, with the aim of reaching data saturation where no new insights emerged (Bryman, 2016).

Similar to the stages of analysis suggested by Rapley (2011), the six stages of thematic analysis (Braun & Clarke, 2006) were 1) familiarisation with data, 2) generation of initial

codes, 3) searching for themes, 4) reviewing themes, 5) definition and naming of themes, and 6) production of a written report. In line with further recommendations for each individual stage by Braun and Clarke (2006), the following six steps were taken. First, the researcher became familiar with the data, through the transcription process, and by reading and re-reading the transcripts and field notes and viewing any photographs twice. Any initial ideas of codes were noted down at this first stage.

Second, initial codes were generated, using the qualitative analysis computer software NVivo 12. Going through the transcripts, field notes and photographs one by one, interesting features relevant to the research questions (see section 2.4.) were highlighted and coded using NVivo's 'node' function. Data was then continually collated for each code until the entire dataset had been initially coded. A sample of data analysis using NVivo can be seen in Appendix 9.

Third, codes were organised into potential themes. A theme was defined as capturing 'something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set' (Braun & Clarke, 2006, p. 82). All data were gathered relevant to each potential theme. These initial themes were shared with the supervision team and collaborative partner for inspection, and to help ensure the quality of the qualitative analysis (Mays & Pope, 1996).

Fourth, themes were reviewed in terms of whether they worked in relation to coded extracts and whether they represented the dataset. Thematic maps of the analysis were generated as part of this stage. Fifth, themes were named and defined, to tell an overall story of the analysis. Lastly, the analysis was written up into the findings for this thesis (see Chapters 4 and 5). As there was a large amount of rich data, the school and family-based findings were kept separate in Chapters 4 and 5. Illustrative extracts demonstrating the different themes were selected. The findings were then brought together in Chapter 6 and related back to the research questions to consider the process of environmental education at school and how potential engagement might have impacted whether the messages were discussed or actioned at home and any underlying factors that might have been relevant throughout the process.

3.9. Ethical considerations

Child participants under 18 years of age and school pupils protected by gatekeepers are classed as potentially vulnerable as there is doubt over their ability to provide informed consent voluntarily (The University of Sheffield, 2021). The research was therefore classified as high risk. Conducting fieldwork with vulnerable participants in schools and family homes posed ethical issues. These ethical issues of informed consent, anonymity of data and personal information, safeguarding and lone working are considered below, including details of how they were addressed throughout fieldwork.

Prior to fieldwork, ethical approval was obtained from The University of Sheffield's Ethics Committee (see Appendix 1). Any changes to the proposed research methods, including needing to do telephone interviews instead of face-to-face interviews in family homes following COVID-19 social distancing restrictions in 2020-21 were proposed and approved before being implemented. The researcher completed the module 'Researcher Ethics and Integrity' and partook in an ethics follow-up review with The University of Sheffield's Ethics Committee in May 2021 to discuss and evidence how such ethical issues had been addressed in the research.

3.9.1. Informed consent

When working with children, often 'several layers of permissions' (Shaw, Brady & Davey, 2011, p. 27) are needed from adult gatekeepers (Morrow, 2008), which can impact a child's ability to give consent freely (The University of Sheffield, 2021).

The pilot study determined the most efficient way of obtaining informed consent for the research and parental permission for the schools by an information pack sent home to parents via their children. These packs included a cover letter, an information sheet and consent form (see Appendix 2) to be read, signed and returned if participants consented to take part. The consent form was designed so that parents could consent to either their child taking part only or both them and their child taking part in the research.

Concerns around children giving consent freely were addressed by obtaining 'opt-in' verbal consent (Shaw, Brady & Davey, 2011) with the children themselves before conducting each interview or photographing their schoolwork. This meant that request for consent was

ongoing, as opposed to one off (Morrow, 2008). On several occasions, pupils had other commitments during their lunchtime so did not want to partake in an interview. One pupil chose to withdraw from interviews entirely as they did not want to miss their part of their lunchtime.

3.9.2. Anonymity of data and personal information

Measures were taken to protect the identity of participants and their personal information, in line with ethical guidelines (Morrow, 2008). Before photographs were taken of pupils' schoolwork, a piece of paper with an anonymised pupil number on was placed over their real names. When parents were asked to provide their telephone numbers in the information packs, for the researcher to contact them to arrange the family visits, a sealable envelope was provided to conceal their personal information. During home visits, photographs were only taken of objects relating to the families' environmental practices that would not make participants identifiable, such as milk cartons and vegetable patches. Where objects were relevant to the research, but would compromise the anonymity of participants, such as energy bills showing a reduction in usage over time, the researcher did not photograph these objects. Photographs never included any participants. When the teacher, pupil and family interviews were transcribed, any personal information like school names and local towns were removed from the transcript. As the funding body for this research - the Economic and Social Research Council (ESRC) - recommend sharing data via the UK Data Service for secondary use by other researchers, anonymising participants' data and personal information was important.

3.9.3. Safeguarding

Prior to fieldwork a certificate from the Disclosure and Barring Service (DBS) was obtained in December 2017 allowing the researcher to safely work with children (UK Government, 2021). This certificate was shown to the office staff of the schools involved in the research, prior to commencement of fieldwork.

The researcher attended a safeguarding course in October 2016 to understand safeguarding concerns and how to appropriately raise them. This training helped ensure the researcher and the children were not left alone in a room with closed doors at any time. Concerns over potential issues of favouritism with pupil participants, given that only certain pupils were

involved with the research interviews and home visits, were raised and addressed with the pupils' teacher as a result of this training.

3.9.4. Lone working

The researcher attended a lone-working course in January 2018 to understand the risks of conducting research alone. As a result, the researcher implemented a personal safety plan when attending the family visits. The researcher shared the address of the families with her partner, and gave an approximate time of completion, where she would send a message to say she had completed her interview. In the event that this message was not received, the researcher's partner was advised to make contact with her, and failing this attempt after 30 minutes, to contact the police. This personal safety plan was never actioned, but helped ensure the safety of the researcher when conducting family visits. The addresses of the families were destroyed after the home visits had all been conducted.

3.10. Chapter conclusion

To address the research questions for this thesis, ontological, epistemological and methodological philosophies that underpin the research methods of qualitative observations and interviews were considered throughout. The multi-setting fieldwork strategy meant data were collected from pupils, their families and their teachers in schools and family homes following delivery of an environmental education resource via observations, interviews, photographs and tours. During this fieldwork, ethical issues were appropriately addressed. Thematic data analysis helped to identify the themes presented in the following two chapters, Chapter 4: School-based findings, and 5: Family-based findings. The findings were split in this way due to them being so lengthy, and the school-based and family-based fieldwork addressing different research questions.

4. School-based findings

4.1. Chapter introduction

Chapter 4. School-based findings presents the school-based evidence for pupil engagement with multimedia environmental education. Thematic maps (Braun & Clarke, 2006) are presented throughout, detailing the dominant themes and subthemes presented in each section of this chapter. Within each section, dominant themes and subthemes are presented alongside illustrative quotes, photographic evidence and explanations. Where appropriate, illustrative quotes refer to the environmental education lesson (see section 3.4.3. and Appendix 5) being discussed and the age of the pupil participants. Throughout chapters 4 and 5, field note data from classroom observations are presented in italics, and quotes from interviews with pupils, teachers and family members presented in italics and quotation marks.

4.2. Pupil engagement in lessons

In response to RQ1 that asked, 'How (if at all) do pupils engage with multimedia environmental education at school?' Figure 4.1. presents a thematic map (Braun & Clarke, 2006) of the themes and subthemes presented in section 4.2. of how pupils engaged with their environmental education lessons at school.

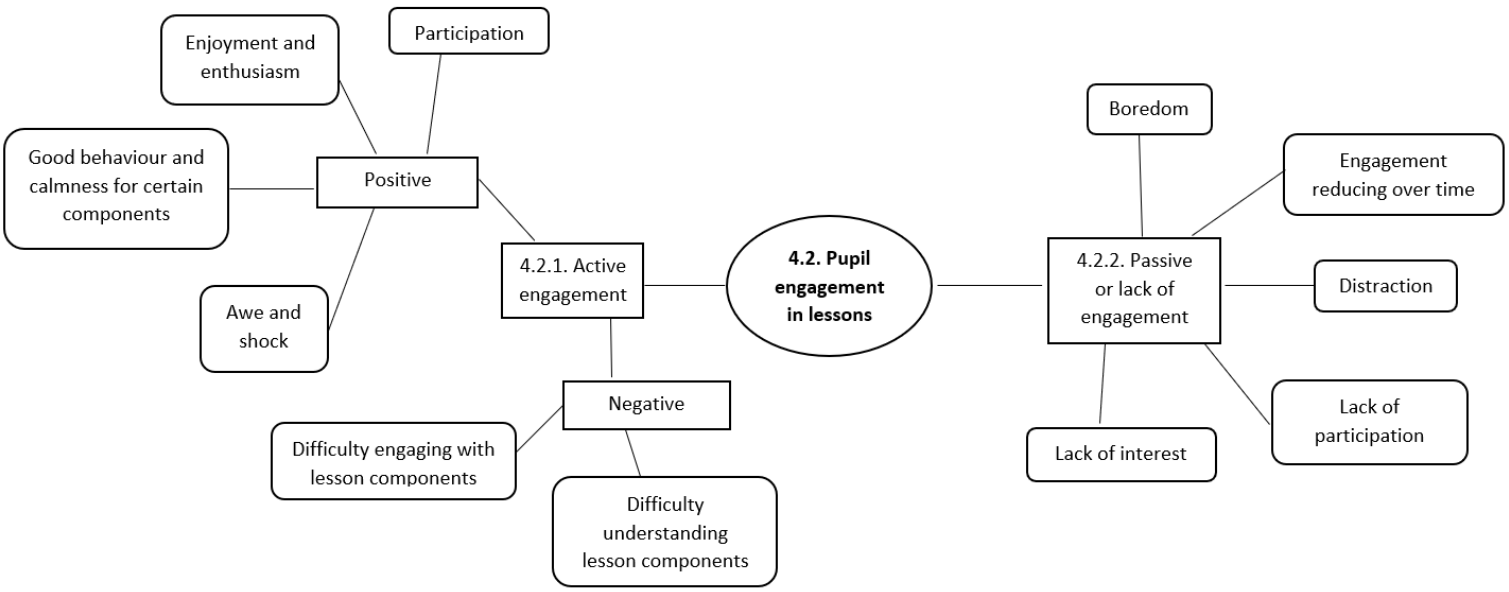


Figure 4.1. Thematic map detailing the themes and subthemes of pupil engagement with environmental education lessons.

For this research, pupil engagement encompassed behavioural, cognitive and emotional engagement (Finn, 1989; Fredricks, Bluemnfeld, Friedel & Paris, 2005; Zyngier, 2008) in their environmental lessons. These previous conceptualisations helped to guide the data analysis when exploring the further engagement types identified in this research. All class pupils and the entire lessons, including multimedia components of songs and animations, were observed by the researcher and discussed and reflected upon immediately after in interviews with pupils and teachers. Evidence of active engagement where pupils did actively engage and participate in their lessons is presented first, followed by evidence of passive or lack of engagement. Barriers and facilitators that influenced this engagement are presented in section 4.4.

4.2.1. Active engagement

Observations of the lessons and field notes being taken provided evidence of pupils being actively engaged with their lessons, either behaviourally, cognitively or emotionally. Themes of positive active engagement and negative active engagement were identified, with subthemes within each of these. Positive active engagement was defined by the researcher as active involvement when the pupils being observed in the research responded in a notably positive way to the lessons, and negative active engagement was defined as active involvement where pupils were challenged by the lessons and their content. These definitions extended conceptualisations within the literature (Schlechty, 2002; Zyngier, 2008).

A subtheme within positive active engagement was participation, where pupils involved themselves with the different components of the lessons. Pupils positively and actively engaged with the song, as evidenced in the researcher's field notes: *all 4 pupils singing along* (Power Challenge, School 1). As well as singing the song, pupils also voluntary chose to participate physically, despite this not being required of them, by *clapping with final song* (Power Challenge, Pilot Study School), or *one boy dancing a bit, another girl counting* (Power Challenge, School 2), or *a little bit of swaying/movement for the last sections "do do dos"* (Power Challenge, School 2). One pupil who played guitar said in an interview how

'sometimes when we do the lessons I try and remember the chords that she's playing' (Pupil 1, 9 years old). Pupils also engaged positively and actively when they participated in class discussions, as evidenced in field notes, *lots of hands up – about 12 "saving energy"* (Power Challenge, School 1), *"why is it important not to waste electricity/energy", get in class + at home all the time" – with your neighbour. Again, lots of discussion* (Power Challenge, School 2, field notes). Pupils also displayed positive active engagement with activities within the lesson, as discussed by their teacher in an interview, *'Absolutely but they were excited about looking for recipes even a pupil who doesn't always engage and came up to me and showed me some really nice recipes he had found he was quite excited about'* (Meat Reducer, Teacher 1).

Other subthemes within positive active engagement were enjoyment and enthusiasm from the pupils. During the Power Challenge lesson, when singing the song, the researcher noted in field notes how children seemed to enjoy certain lyrics: *children giggled a bit at the tomatoes comment* in School 2, and also in the Pilot Study school, *"Grow tomatoes" – same girl smiled*. Enthusiasm was also evident during discussions, as seen here in field notes: *Teacher 1: "why cook with a lid on a pan?" Pupil 2's hand shot up – "conserve heat"* (Power Challenge, Pilot Study School), and during the songs, *"Pocket money" sung enthusiastically* (Power Challenge, Pilot Study School). Teacher 1 reflected on this enthusiasm when discussing her favourite lesson out of all 12, *'it is tricky to choose, I've loved, oh I did love this one, then it was a little bit to do with their enthusiasm'*, and how during certain activities, such as the creation of a poster about compost they were enthusiastic and eager to complete the activity, when she said *'but they really wanted to get that finished they were so full of enthusiasm'.* Excitement was another similar subtheme that was evident in the researcher's field notes, regarding the song, *class very excited at the end of the song* (Power Challenge, Pilot Study School), and animation: *some of the boys found noises of power stations shutting down funny – a bit excitable* (Power Challenge, Pilot Study School), as well as with certain activities, evident from an interview with Teacher 1, '*they were excited about looking for recipes'* (Meat Reducer).

Pupils also displayed good behaviour and a sense of calmness around certain activities which was classified as positive active engagement. This was evidenced regarding the songs and animations in field notes, *All listening very quietly, well behaved* (Power Challenge, Pilot

Study School), and *All paying attention, well-behaved* (Power Challenge, Pilot Study School), as well as with the activities, *making energy diary - quieten down* (Power Challenge, Pilot Study School).

Awe and shock were also identified as a further subtheme within positive active engagement. This was sometimes a reaction to class discussion within the lesson, as seen here about some people's practices regarding computer use, *some people leave computer on all night - a "what"* (Power Challenge). Awe and shock were also reactions to the animation at times, such as in Power Challenge when the power stations can shut down because people are saving energy, *A few "wows" with power station shutting down* (Power Challenge). There was a wide range of themes relating to how pupils actively engaged with the environmental education.

There was some limited evidence of negative active engagement too. Within the theme of negative active engagement, a subtheme of difficulty with the different components of the lesson was identified. Pupils had difficulties when they engaged with the song: *didn't always get the pace of song – sang ahead too soon – could have a karaoke style moving dot etc*. (Power Challenge), and *Pupils + teacher said it was quite quick* (Power Challenge). Pupils also had difficulty with understanding certain activities within the lesson: *one group struggling with what standby lights are* (Power Challenge).

4.2.2. Passive or lack of engagement

Evidence of passive and lack of engagement was also identified in the data, mostly from observations of lessons, as well as interviews with pupils and their teachers. Passive engagement was defined as basic involvement in the lessons, similar to conceptualisations in the literature (Schlechty, 2002), and lack of engagement was defined as no engagement at all. Both themes included different subthemes that are presented below.

A subtheme identified within passive engagement was boredom, as evidenced in field notes of observations, *Pupil 2 looked a bit bored through song-teaching video, singing a bit* (Power Challenge, School 1)*,* and *not that enthusiastic - some a little bored.* Linked to the theme of boredom was the subtheme of engagement reducing over time. The researcher made a note of this in her field notes, *attention waning?* (Power Challenge). Teacher 1 reflected on

her class's engagement after the first six lessons, when she said in her interview, *'I've been slightly disappointed really I guess at their engagement and maybe as time's gone on they've been less engaged I don't know if you would agree with that'.*

Distraction was another subtheme within passive engagement as evidenced here in the researcher's field notes, *playing with their hair, looking around* (Power Challenge) and when Teacher 1 says, '*there are times when they're just very chatty and you can't bring them together and actually today they did have some good ideas but they didn't want to listen to each other and that's often a problem'*. Although there was evidence of participation within positive active engagement, pupils physically participating sometimes acted as a distraction to them learning the messages of the lessons, *clapping along if they want – a bit distracting, some stopped singing* (Power Challenge). Aspects of the activities sometimes distracted pupils too, as seen in the researcher's field notes when pupils were making energy saving diaries, but seemed *more interested in colouring* (Power Challenge). Linked to the subtheme of distraction and contrasted with good behaviour and a sense of calm identified within the theme of active positive engagement, was the subtheme of misbehaviour. This is evidenced in the researcher's field notes when she notes some pupils misbehaving and being silly before the bridge of the song, *Some of the boys were singing "do do dos" before bridge a bit silly, pulling faces* (Power Challenge).

Within the theme of lack of engagement, the subtheme of lack of participation was identified. This was noted when only a small proportion of the class actively participated, therefore the proportion who did not participate were classified as not engaging. This is evident from the researcher's field notes when the teacher says that the class are going to carry on singing the song: *"Back to our song" – a bit of a groan, but then half (?) singing along. Teacher stopped "can't hear you" Replayed. Still only about half singing* (Power Challenge) and when the creator of Project Earth Rock asks at the start of the song teaching video, *"Are you ready to Project Earth Rock?" a few yeses* (Power Challenge).

Similar to lack of participation, considered evidence of lack of behavioural engagement by the researcher, lack of interest was also identified as a subtheme within lack of engagement. This theme was considered to be a lack of cognitive engagement by the researcher. Teacher 1 reflected on this in an interview, *'to be honest it's just keeping them interested which I found much harder for these lessons'.*

4.3. Outcome of engagement

There was evidence in the data for outcome of engagement, which was categorised as a subsequent effect of the pupils engaging in their lessons, identified in the interviews after their lessons in school as well as later on with their families. Only pupils that had signed consent forms from their parents took part in these interviews. These outcomes were on pupils' memory of the lessons, the opinions and judgements they formed, the understanding they gained from the lessons, the intentions they formed to discuss or action the education, and relevant action taken in school, as presented in the thematic map (Braun & Clarke, 2006) of figure 4.2. These outcomes of engagement were considered distinct from pupil engagement in lessons (section 4.2.). The researcher observed the pupils engaging in their lessons as they were happening, and so captured immediate evidence of different engagement styles through these observations. However, in their interviews, both in school, and at home with their parents, pupils had time between their lessons and these interviews to consider the lessons, their content and their multimedia delivery, thus these data were considered an outcome of engagement. Throughout section 4.3., as well as quotes from the pupils themselves, quotes from their parents are also included from the family interviews, as these interviews provided further insight in to different outcomes of pupil engagement, for example, when pupils remembered their lessons and discussed them at home with family members.

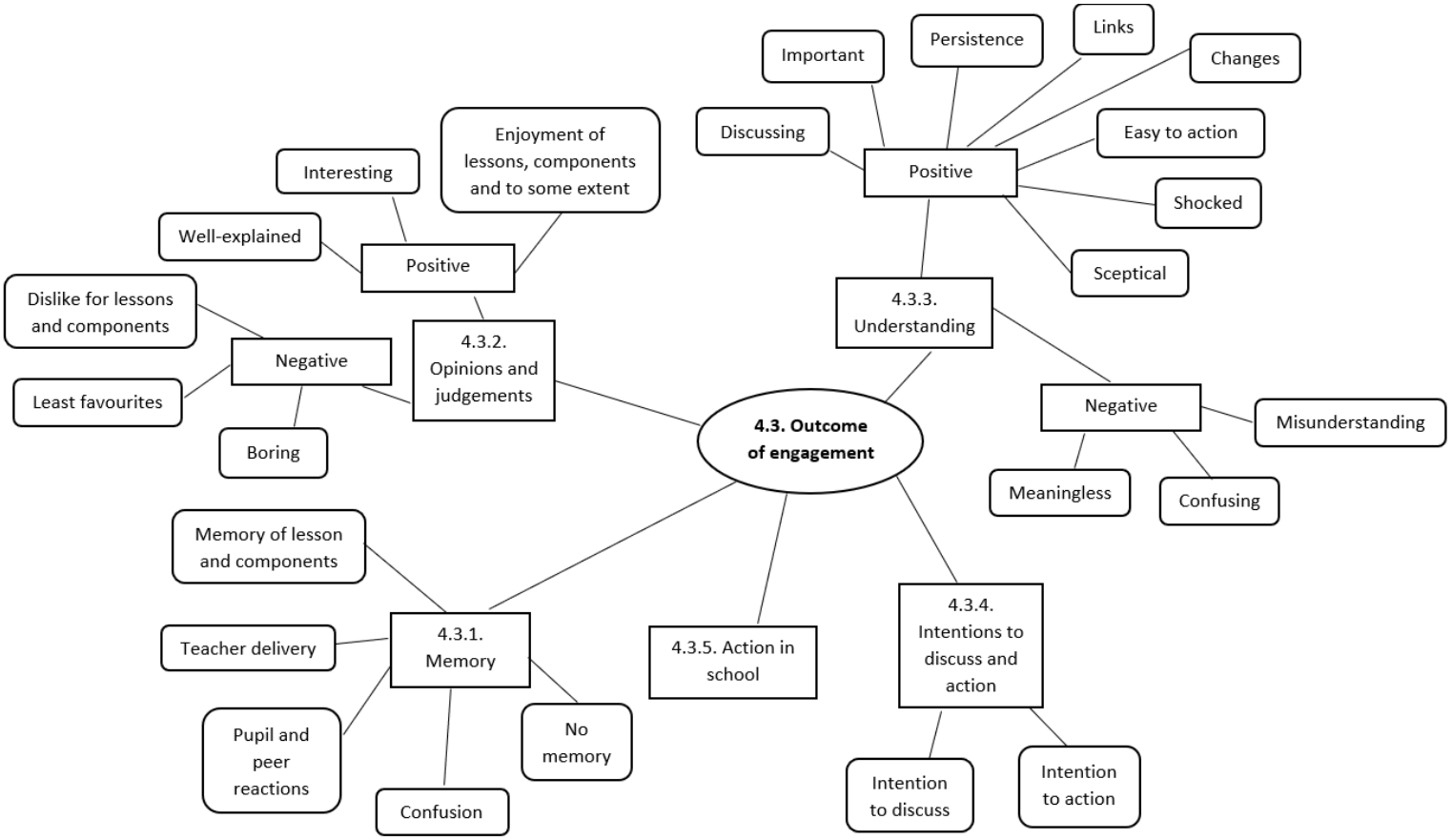


Figure 4.2. Thematic map detailing the themes and subthemes of outcome of pupil engagement with environmental education lessons

4.3.1. Memory

Memory of the lessons was one overarching theme. Subthemes were identified for memory of the different components of the lessons where pupils could remember and recall certain details of the topic, the animation, the song and the activities. There was evidence of pupils remembering the lesson, as seen here in the interview data, Pupil 3 (10 years old): *'erm Compost and Grow, I remember that one and I liked that song'* (Compost and Grow) and Pupil 1 (9 years old): *'the water one, the energy one, the school council one'* (Water Story, Power Challenge, School Council). During the reflective card sorting exercise where the children sorted all 12 lessons in to categories of their choice, remembering certain lessons was a category created by Pupil 5, as seen here in Figure 4.3.

Figure 4.3. Pupil showing memory of certain lessons during card sorting exercise.

Pupils pointed out their memory of certain lessons during the card sorting exercise, Pupil 4 (11 years old): *'I remember this one'* (School Council), and Pupil 5 (9 years old): *'I know this one'* (Meat Reducer). Teacher 1 agreed that the children remembered certain lessons, *'that really stuck with the children'* (Disposable), with parents also recalling memories of certain lessons, Dad 1: *'I said what are the topics and she could read off six of seven topics'.*

Memory of the songs was another consequence of engaging with them, as seen here when Pupil 3 (10 years old) recollects part of the story from the Water Story song (see Appendix 5): *'Oh yeah this one I remember the song because there was this girl and she went to our hotel and they said that the shower only comes on at 5:15 and when she was like a minute late, she got into the shower and there was no water.'* Pupil 4 (11 years old) similarly remembered the Water Story song, adding her own understanding, *'she came in to the shower and she missed the water, 'cause somebody would throw a bucket of water down the tap, because it just shows that they want like, in some countries water, like they value water a lot. And you can see that you can give money so that they can build taps and, 'cause some people don't have water*. Pupils demonstrated that they remembered the songs from the lesson by singing them, Pupil 1 (9 years old)*: [singing the tune of Transportation]*

'Transportation transporting the nation, to where we need to be each day', and Pupil 3 (10 years old): *[singing to the tune] 'Meat Reducer! You don't have to be a planet bruiser',* and Pupil 3 (10 years old): *[sings the tune of You Don't Have to Fly] 'You don't have to fly, you don't have to fly! Yes we do, no you don't.'*

The children also had memories of the animations, often prompted by animation stills in the card sorting exercise, as seen here, Pupil 3 (10 years old): *'I remember the animation for that one, because like one family wanted to go somewhere far, far away, and some, another family just walked out the door and went on holiday'* (You Don't Have to Fly*)*, and Pupil 3 (10 years old): *'Oh yeah yeah about the football Pitch or the tennis pitch'* (School Council).*'* Teacher 1 demonstrates how one of her pupils remembered the animation: *'the animation we saw with the giraffe that couldn't see it and he said no it's not that we want to show that it doesn't decompose and that obviously stuck with him from that activity'* (Disposable).

As well as having memories of the songs and animations, pupils also remembered the activities, Pupil 1 (9 years old): *'wait, is that the one where we wrote the letters? … Yes I remember that one'* (Small Grains), and Pupil 5 (9 years old): *'and then today we even, we even did like a paper and we worked out some maths of it'* (Counting the Carbon) and Pupil 1 (9 years old) talking about their compost poster: *'I did a compost bin'* (Compost and Grow).

Pupils had memories of how the lessons were delivered by the teacher, often when supplementary material was included to make lessons more tangible to pupils, as evidenced here, Pupil 3 (10 years old): *'I remember one of them the teacher brought in a nappy that's all I can remember'* (Disposable)*,* and Pupil 3 (10 years old): *'Oo! I remember the Compost and Grow one because she, er [Teacher 1], got a video from Youtube and, yeah … it was about bugs … yeah, and it was saying, er the different jobs to do … yeah I remember, yeah I remember that one well'* (Compost and Grow). Parents confirm pupils' memory of teacher deliver when they discussed the lesson at home, as seen here, Mum 3: *'I remember you coming home and talking about nappies'* (Disposable), which was a supplementary object brought in to pupils by Teacher 1.

Pupils remembered how they and their peers reacted to the lesson*,* Pupil 3 (10 years old): *'Oh that's the one about where [Pupil 1] was confused about'* (Fossil Fools) and Pupil 3 (10

years old): *'I remember [Pupil 1] and I were really surprised'* (Disposable), and Pupil 3 (10 years old): *'everyone started laughing'* (Disposable). Parents also remember the children's reactions, Mum 3: *'I remember you being quite shocked'* (Water Story), indicating that Pupil 3 shared her shocked reaction with her parents.

As well as evidence for pupils remembering the lessons and their different components, there was also a subtheme of confusion within memory, where pupils were confused about their memory of the lessons and the activities they did, Pupil 3 (10 years old): *'Oh yeah! We didn't write a poster, we did um a song or a comment, erm yeah'* (Rainforest Song), as well as the animations they viewed, Researcher: *'Yeah do you remember the animation for the flying one? It showed'* Pupil 5 (9 years old): *'was it like a bird?'* (You Don't Have To Fly), where a bird did not feature in that animation.

Some pupils could not remember certain lessons, Pupil 3 (10 years old): *[gasps] 'I can't remember them, I just can't remember them which is annoying me'* and Pupil 5 (9 years old): *'I can't remember that one'* (School Council), and Pupil 1 (9 years old)*: 'don't really remember that one'* (Small Grains). School Council and Small Grains were two lessons not specifically about environmental issues, so may have felt less relevant to pupils, and thus less remembered. This lack of memory for certain lessons is also pictured in Figure 4.4. by Pupil 5 when she created a label reading *do not remember* for the Water Story, Transportation and Counting the Carbon lessons during the card sorting exercise.

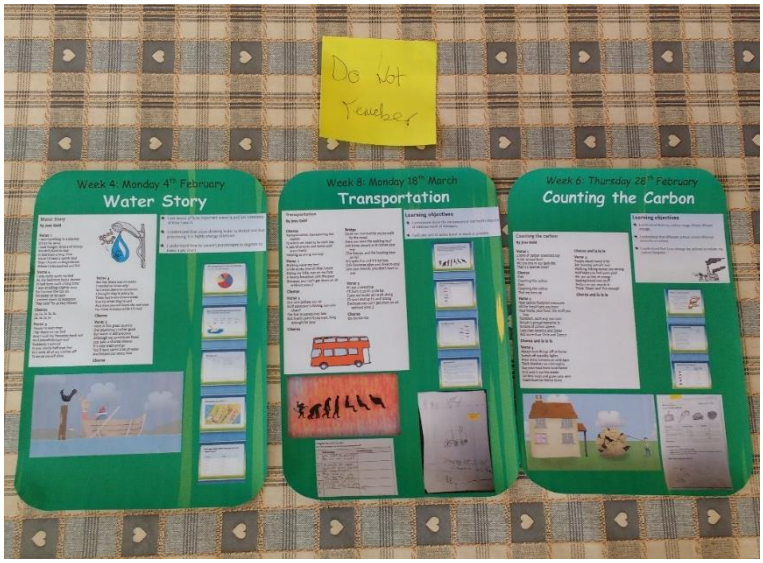


Figure 4.4. Pupil indicating lack of memory for certain lessons during card sorting exercise.

4.3.2. Opinions and judgements

Another theme within consequences of engagement was how pupils had opinions and judgements about different aspects of the lessons. These have been categorised during thematic analysis as positive and negative opinions and judgements. The definitions of these judgements are provided below.

Positive opinions and judgements included how pupils enjoyed the activities, considering them fun, as seen here, Pupil 4 (11 years old): *'it's like fun doing activities around it'* (Power Challenge), and Pilot Study Pupil 1a: *'It was really fun to, well, sing, and make what we would like with our diaries'* (Power Challenge). Enjoyment of the creative aspects of the lessons' activities was also evident: Pupil 4 (11 years old): *'this was my favourite one 'cause I like making stuff'* (Compost and Grow), and Pilot Study Pupil 1a: *'I did … like the creative parts where we made our diaries'* (Power Challenge).

As well as enjoyment of the activities, pupils similarly enjoyed the animation, Pupil 4 (11 years old): *'yeah I liked the animation'* (Meat Reducer), and Pupil 4 (11 years old): *'I liked that one about the giraffe, because, like a giraffe's really tall and it just shows how much rubbish'* (Disposable), because it was considered funny, Pupil 4 (11 years old): *'I liked the, the monkeys are funny, they were like reading newspapers, they're like, that's funny because that's never going to happen'* (Rainforest Song), and interesting, Pupil 1 (9 years old): *'it was interesting, mm'* (Power Challenge). The animation was also considered to be simple, which, here was a positive judgement, Pupil 4 (11 years old): *'it was nice and colourful and it was like simple, so it was like, like, easy to understand'* (Power Challenge).

Another outcome of pupils engaging with the lessons was enjoyment of the songs, Pupil 3 (10 years old): *'erm Compost and Grow, I remember that one and I liked that song'*, and Pupil 4 (11 years old)*: 'it was really good'* (Counting the Carbon), or just certain songs, Pupil 3 (10 years old): *'I preferred some of the songs to it'* or certain aspects of the song, Pilot Study Pupil 1a: *'and I did like the 'do do dos' part in the song'* (Power Challenge). This enjoyment was sometimes because the song was considered catchy, Pupil 4 (11 years old)*: 'with Transportation, I really liked the song because it was very catchy'.* The variety of the songs overall was also enjoyed, Pupil 4 (11 years old): *'well the songs were different tunes, and that's what made it like, it wasn't the same, it was like different every single lesson'.*

Pupils also enjoyed the homework from the lessons, as seen here when the researcher asks: *'what was it like sort of tracking your water use? Do you remember?'* Pupil 4 (11 years old) responds: *'Erm, it was, I enjoyed it'* (Water Story). There was also evidence for how pupils enjoyed the lessons generally, Pupil 3 (10 years old): *'Oh I like Meat Reducer'*, and Pupil 3 (10 years old): *'Small Grains! I loved Small Grains'.* Parents confirmed this enjoyment, Dad 7: *'he likes, he's enjoyed the classes'* (Compost and Grow and Fossil Fools), and Mum 5: *'yeah you like those lessons don't you?'* Pupils showed their enjoyment of certain lessons during the card sorting task, as seen with Pupil 3 in Figure 4.5.

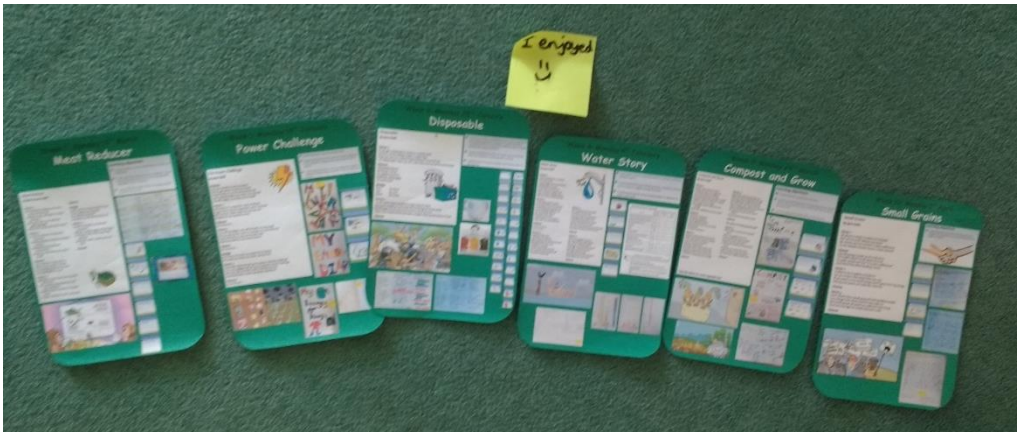


Figure 4.5. Pupil showing enjoyment of certain lessons during card sorting exercise.

The lessons were enjoyed to some extent, Pupil 1 (9 years old): *'I like that one a bit'* (Fossil Fools), and Researcher: *'did you like the lesson you just had with all the singing?'* Pilot Study Pupil 1b: *'yeah kind of'* (Power Challenge). Pupils preferred some lessons over others, as evidenced in the different categories created by pupils in the reflective card sorting exercise, as well as discussed in interviews, Pupil 4 (11 years old): *'there was some that that I preferred more than others',* and Pupil 4 (11 years old): *'that I was in to more than others'*. Pupils had favourite lessons, as mentioned by her Dad when Pupil 1 was doing the card sorting exercise, Dad 1: *'favourite is that one, so we're putting that one at the top'* (Disposable), as well as in interviews, Pupil 4 (11 years old): *'my favourite's Transportation'.*

The lessons were considered interesting, Pupil 5 (9 years old): *'I felt, it was quite interesting',* as seen in Figure 4.6. when Pupil 5 creates labels in the card sorting exercise indicating lessons were interesting to her.

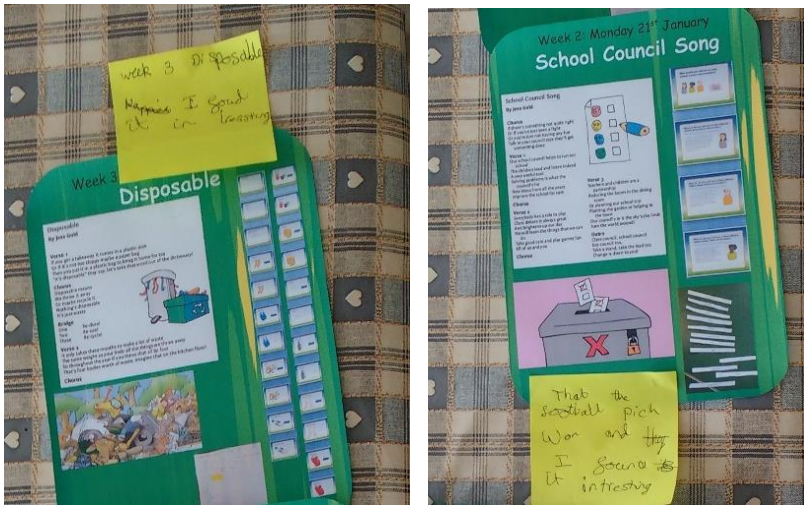


Figure 4.6. Pupil indicating how they found certain lessons interesting during card sorting exercise.

Certain lessons were also considered to be well-explained, as seen here: Pupil 4 (11 years old)*: 'I think it explained it the most'* (Counting the Carbon).

By contrast, negative opinions and judgements about the lessons included pupils disliking the activities and finding them boring, Pupil 4 (11 years old): *'those sheets I found quite boring 'cause you have to go on the internet and you have to keep looking and sometimes it doesn't always have the information that you need … so I lost a bit of interest'* (Fossil Fools), indicating how engagement waned over time.

Certain animations were also disliked, Pupil 3 (10 years old): *'some of the animations were er, really boring er because they just were and I just didn't enjoy them'.* These were sometimes judged as being too simple, despite simplicity being considered a positive component of the animations by some, Pupil 1 (9 years old): *'very, very simple and quite slow'* (Power Challenge), and Pupil 2 (10 years old): *'I kind of looked at and thought, like this is for Year 1 and 2'* (Power Challenge).

Some songs were thought to be too long, as suggested by the Pilot Study teacher during informal talks about the lessons, as documented in the researcher's fieldnotes, *20 mins - too long with song teaching. Attention span 15mins. What teacher said* (Power Challenge). Some songs were also not considered to be catchy, Pupil 4 (11 years old): *'whereas with the Rainforest, it wasn't that catchy. It was like soft'* (Rainforest Song). Pupils disliked certain lessons generally, Pupil 3 (10 years old): *'I didn't like the rainforest one'* (Rainforest Song).

This was further demonstrated in the card sorting exercise in Figure 4.7. where Pupil 3 shows how she does not like some lessons through the creation of labels saying so. Linked to the subtheme of disliking certain lessons is how pupils had least favourite lessons, as seen in the bottom tier of Pupil 1's card sorting exercise in Figure 4.7., which represented her least favourite lessons.

This dislike of certain lessons was for different reasons, as they were seen as being boring, Pupil 4 (11 years old): *'and one I didn't really like, and I found quite boring was erm, where is it? Yeah, Counting the Carbon. I found it quite boring, 'cause it was quite difficult to understand'* and strange, Pupil 1 (9 years old): *'that one was weird'*. Sometimes pupils disliked the lesson but enjoyed the song as seen during the card sorting exercise with Pupil 3 (see Figure 4.7.) when she writes *I liked that song but I didn't like the lesson* for the School Council Song and You Don't Have To Fly lessons.

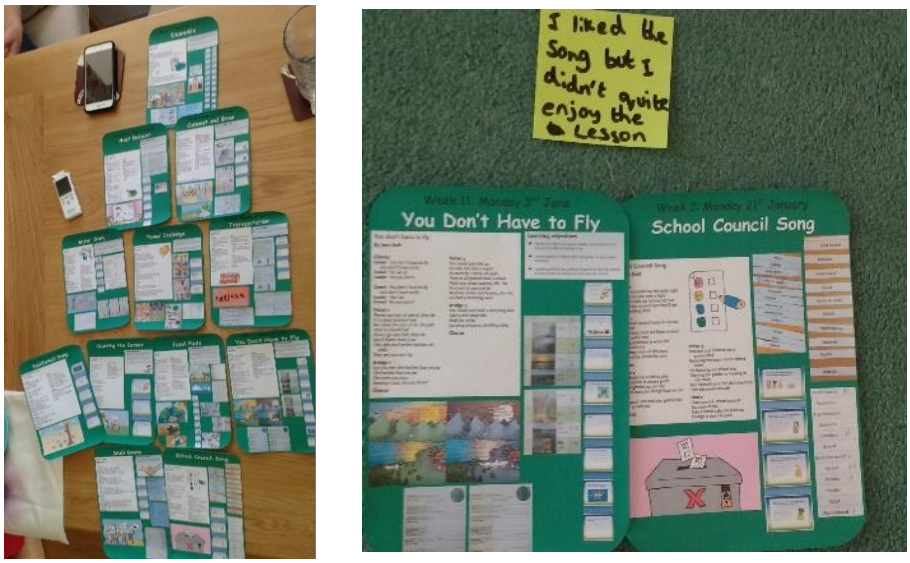


Figure 4.7. Pupil indicating how they favoured certain lessons over others, or only enjoyed certain aspects of the lessons during the card sorting exercise.

4.3.3. Understanding

Another theme within outcome of engagement was pupils' understandings of the lessons. These were categorised as positive or negative understandings during thematic analysis, in terms of the understanding pupils gained from the lessons as being positive and useful overall, or negative, useless or confusing.

Included in the subtheme of positive understandings was how pupils thought discussing issues would help, Pupil 4 (11 years old): '*if we actually really talk about it then it's, going to help'* (Counting the Carbon) and Pupil 4 (11 years old): *'I think it will definitely help, like if erm, people like you go around persuading people to save power, then, like, if everybody saves power then it will really* help' (Power Challenge). Pupils felt that the lessons and the activities would help spread awareness, as seen here: Pupil 4 (11 years old): *'Well I definitely think if I talk to them then they'll become more aware'* (Power Challenge). Linked to this is how pupils had intentions to discuss their education with family members (see section 4.3.4.).

The issues featured in the lessons were understood to be important, Pilot Study Pupil 1a: *'I thought it was very important that we had to turn off our technology when we left the room and make sure it's all off so it can save electricity'* (Power Challenge), and Pupil 4 (11 years old): *'it was quite shocking, and important'* (Counting the Carbon), as well as meaningful, Pupil 4 (11 years old): *'well all the songs in Project Earth Rock we've been doing in assemblies and things, erm, they all have like a meaning behind them'.*

Persistence was another positive understanding from the lessons, Pupil 3 (10 years old): *'I think they would listen if you like, kept on going like, kept on going on about it, they would actually listen after a while'* (Small Grains), indicating that persistent nagging could be influential in getting others to listen to the environmental messages of the pupils' education (see section 6.4.1. for a discussion). The understanding that collective change is needed was another theme, Pupil 4 (11 years old): *'I've always heard about global warming and things and like the rainforest and I thought, well that's not going to happen and that's for grownups to think about, when actually, it's everybody's thing',* and Pupil 4 (11 years old): *'it's like saying, if you stand alone, you can still persuade people'* (Small Grains). Also, how small actions could make a big difference, reflecting the sentiments of Thunberg (2019), Pupil 4 (11 years old): *'it's actually something that like, little differences can make a big difference'* (Water Story) and how the lessons themselves had encouraged change: Pupil 4 (11 years old): *'And it encourages us to help and do things differently'* (Counting the Carbon), that would affect the future, Pupil 4 (11 years old): *'I think because, in another like hundred years it could result in something really big'* (Counting the Carbon), reflecting the aims of environmental education (see section 2.2.2.). The actions mentioned in lessons were

understood to be easy to act upon, as seen here, Pupil 4 (11 years old): *'and it's really easy, to like … walk to school and all share a car'* (Transportation).

Changes in pupil's understanding was also evident, where lessons had got pupils to think about different issues, Pupil 4 (11 years old): *'I think the lessons, I really like the lessons, 'cause they made me think a lot'* and Pupil 4 (11 years old): *'it's good that we learn about it so that we can understand it more'* (Counting the Carbon). This change in understanding was confirmed by Teacher 1 who said, *'and you could tell the penny was dropping with some of them as well',* and how pupils' understanding had visibly changed in the lessons, Teacher 1: *'he didn't get was that it was about vegetables and he didn't realise he did in the end he got it that it was about resources'* (Meat Reducer). This quote demonstrates how one pupil's pre-existing understanding of the health concerns of eating meat was built upon to include environmental concerns too, following engagement with the environmental education lessons.

Similar to how pupils were shocked when positively and actively engaged in their lessons as they were happening, pupils were sometimes shocked when reflecting after their lessons in interviews, Pupil 1 (9 years old): *'it was shocking though'* (Disposable) and Pupil 4 (11 years old): *'it's just shocked me 'cause I never, I always thought about what I have and what I want, but then now it's made me think about what the world is like',* which provided pupils with an understanding of real-world issues.

Lessons provided pupils with new knowledge, Pilot Study Pupil 1a: *'I didn't know that we had to save it and keep it and not waste it too much but now I know we have to keep it and don't waste a lot'* (Power Challenge). Teachers agreed that lessons provided new knowledge, Teacher 1 said how *'I think on the whole it's giving us an opportunity to cover topics that we wouldn't ever have necessarily covered in school',* highlighting the lack of environmental education in UK primary schools. Pupils were interested by this new information, Pupil 4 (11 years old): *'Like I've never really heard of it before, so it was really interesting to learn something new'* (Counting the Carbon).

Pupils were sceptical and used critical thinking at times, such as here where Pupil 4 remembers the message of the lesson but chooses to make her own decision, Pupil 4 (11 years old): *'in the Easter, and that's going to take a long time but my view on it is, erm, I*

don't think I'm going to take like a ship instead of, do anything, erm, if I do go somewhere, I think I'm still going to take planes, but I will try and narrow down the times I go abroad' (You Don't Have To Fly), when the resource of time was emphasised in a lesson on sustainable transport when taking holidays. Pupil 4 had an alternative understanding of one of the animation messages, Pupil 4 (11 years old): *'and then, erm, it's, so it's like they're at a rock concert I think, erm and it's like saying, if you stand alone, you can still persuade people'* (Small Grains). Pupils also displayed an understanding of nuances, as seen in the researcher's field notes: *Some sophisticated understandings of saving energy - it depends on what you're using energy for e.g. need it in a theatre show, get to spend more time with people and learn how to be nice to each other* (Power Challenge). One pupil showed a nuanced understanding of saving energy during an interview, Pilot Study Pupil 1b: *'Erm, er, it depends what you're doing. Er, you might use lights on stage'.* This critical understanding of the education was categorised as a positive outcome of pupil engagement given that the literature discusses how children taking a critical approach to their education is an important component of engagement (Vibert & Sheilds, 2003), indicating active cognitive engagement (Finn, 1989; Fredricks, Bluemnfeld, Friedel & Paris, 2005; Zyngier, 2008), instead of passive compliance (Schlechty, 2002).

Pupils made links between lessons that shared similar content, as seen here with two pupils in an interview, Pupil 3 (10 years old): *'the monkeys were in another animation, I can't remember which one, but they were …'* Pupil 1 (9 years old): *'the meat one'* (Rainforest Song and Meat Reducer).

There was evidence that pupils understood the messages of the animations, Pupil 3 (10 years old): *'You can't see him because there's so much rubbish round him and like you could use that pair of goggles you could have send them to like a charity shop'* (Disposable), and Pupil 4 (11 years old): *'I think it was about people being greedy'* (Power Challenge), as well as the lessons more generally, Pilot study Pupil 1b: *'to not waste your power'* (Power Challenge).

To summarise, positive understandings as an outcome of pupil engagement with the environmental education resource included pupils perceiving the discussion of issues raised in the lessons as being helpful, how the issues were understood to be important and it being

important to be persistent. The actions suggested in certain lessons were understood to be easy to action too. Changes in pupils' understanding was also evident, in terms of the lessons getting pupils to think about certain issues. Other positive understandings included pupils being shocked by the lessons, being provided with new knowledge, pupils being sceptical and critical of messages and pupils making links between lessons and understanding the messages of the animations in particular.

By contrast to positive understandings, negative perceptions involved lessons being considered meaningless, Pupil 4 (11 years old): *'what it was about, it didn't really mean anything to me'* (Counting the Carbon). Pupils were unsure how lessons were linked, Researcher: *'so did you think this had any links to any of the other lessons or not really?'* Pupil 4 (11 years old): *'I didn't really know'* (Fossil Fools). They were also unsure how the lessons could help, Pupil 4 (11 years old): *'I didn't really understand how it could help'* (Fossil Fools).

Some lessons were considered confusing by pupils. Researcher: *'Any that were sort of confusing?'* Pupil 1 (9 years old): *[long pause] 'School Council'*, and Pupil 4 (11 years old): *'I find it quite confusing, quite confusing'* (Fossil Fools). There was a subtheme identified of difficulty in understanding lessons, Pupil 3 (10 years old): *'Oh I don't think I mentioned that because I just don't understand these bits'* (Power Challenge). Here, Pupil 3 explains how her lack of understanding meant she did not mention the lesson to her family. Also, Pupil 3 in the card sorting exercise: *'Fossil Fools, that's the one I didn't understand, so that's probably going at the bottom',* and Pupil 4 (11 years old) during the song-teaching video: *'some of the words, because like she said it really fast, you couldn't see the words on the screen, it's quite difficult at first, to understand what she was saying but then she said it slower, like when [Project Earth Rock singer] was teaching us, on the video, and then the words came up so I understood'* (Power Challenge), and Pupil 4 (11 years old): *'it was in song version, so it doesn't actually really explain, it just has a couple of, so if you had a sentence explaining one part of it, then it just has kind of words in that sentence, like the things we had to go through with [Teacher 1], and like because, it was kind of a bit difficult to understand'* (Power Challenge). This difficulty in understanding was evidenced in Pupil 3's card sorting task (see Figure 4.9.), where she created a category labelled *I didn't understand.*

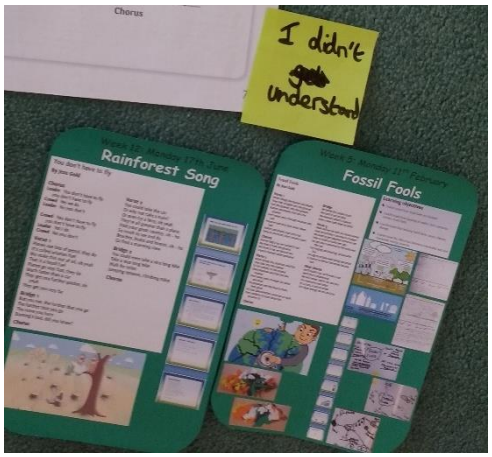


Figure 4.8. Pupil demonstrating how they did not understand certain lessons during the card sorting exercise.

There was evidence that pupils sometimes misunderstood messages of the lessons, considering pre-existing knowledge of health concerns instead of the intended environmental impacts of different diets. Pupil 5 (9 years old) confuses the intended message: *'The chicken's like got all fat in then I think why it was getting smaller because all it, the carrots had vitamins and everything in'* (Meat Reducer). This misunderstanding also took place with the Power Challenge animation, Pupil 5 (9 years old): *'And he wouldn't save the world because he wouldn't like help people and he wouldn't like care about people … like if I said he would push everyone out the way I wouldn't take care'*, and with the School Council Song lesson, Pupil 5 (9 years old): *'To be nice to be careful and like to play with others if they're not included'*, and Power Challenge, Pilot study Pupil 1b: *'I learned that you should play more technology'.*

4.3.4. Intentions to discuss and action

Another consequence of engagement was how pupils formed intentions to discuss and action their lessons. They made intentions to discuss lessons at home, as seen here, Pupil 4 (11 years old): *'Yeah I think I'm definitely going to say, oh, erm, like if my sister asks if we can put the heating up, I can just say oh just go and get a jumper on'* (Power Challenge), *'yeah, and 'cause we always leave our TV on standby, I can maybe say just turn it off, sometimes, especially on weekends, we don't really watch it, so, 'cause we have family time so we could just turn it off at the plug'.* These intentions were often about turning gadgets and items off, making reductions, and creating a new practice by putting a jumper on, a practice

referenced in the Power Challenge song. Pupils also had intentions to share the songs with their family, Researcher*: 'Are you going to maybe sing these to your parents, these songs?'* Pupil 4 (11 years old): *'yes'.* Pupils anticipated resistance from their family about discussing lessons, as seen here: Pilot Study Pupil 1a: *'Probably they'll say 'no way''* and Pilot Study Pupil 1a: *'My siblings will strop'* (Power Challenge). Intentions to action were also made by pupils following the lessons. Pupil 3 (10 years old) had an intention to save energy following a lesson on saving energy: *'how to turn the TV off properly and not just keep it on standby'* (Power Challenge), and Pupil 3 (10 years old): *'I think after today I might actually try and turn it off at the plug'.* Following a lesson about more sustainable transport, Pupil 4 (11 years old) says: *'I'm going to secondary school and erm, so erm, when we get into it [another pupil] will probably take me and my sister, because she already goes, and then we'll bring [that pupil] back home so it'll be like we share'* (Transportation), anticipating action and changes to her travel practices in the future. Pupil 3 recalls an inspirational sign that she passes by, Pupil 3 (10 years old): *'there's this sign that said, erm I think it said 'if you don't do something now then who will?' And I used to just ignore it and now every time I go to scouts, I'm like, yeah! I just keep on staring at it.'* Teacher 1 also confirmed that some pupils were likely to action the lessons at home, *'But then you probably get the odd one like [a pupil] I'm pretty sure that tonight will go home and say I want to have a go at being vegetarian 'cause he was really fired up about that'* (Meat Reducer). However, pupils' intentions to discuss and action their education did not always carry over to discussion and action in the home (see section 5.2.2. and 5.2.3.). Factors impacting the communication of environmental education are discussed in section 6.4.2.

Like intentions to discuss, there were intentions to action education and impact certain home practices. However, in contrast to anticipated resistance when pupils formed intentions to discuss lessons, pupils did not anticipate any barriers from family members when intending to action lessons at home, Pupil 4 (11 years old): *'I don't think there's any reason why we can't save power, 'cause I think it's really important, so, I'll definitely talk to them and see what they think, because I, I definitely think that they're going to erm, like, have the same view as me, and be like yeah, we should save power'* (Power Challenge).

4.3.5. Action in school

Another consequence of engagement was intentions to perform actions in school, perhaps as these were not up against the barriers (see section 4.4.2. and 4.4.3) that school to home transference of messages were. Also, the supportive climate of the school may have played a role in encouraging action in school. Pupil 3 (10 years old): *'And [Pupil 1] and I wanted to start an Eco Council and so [Headteacher 1] has ordered [Pupil 1] and I some litter pickers to start our own litter picker club, and when they come [Pupil 1] and I are starting a litter picker club.'* Action in School 1 was observed during Power Challenge and documented in the researcher's fieldnotes, *one pupil said they needed to turn off standby light on speaker. Another wanted to put coat on instead of heating.* However, in this instance the school climate was not supportive of the child's intentions to act, as the *Teacher didn't know what the answer was – had to put the heating up,* therefore not allowing the pupil to act on their request to turn the heating down.

4.4. Underlying factors of engagement

Underlying factors were identified that influenced engagement in the lessons and the outcome of engagement. These have been themed into facilitators and barriers relating to the children, and facilitators and barriers relating to the lessons, as seen in the thematic map (Braun & Clarke, 2006) Figure 4.9.

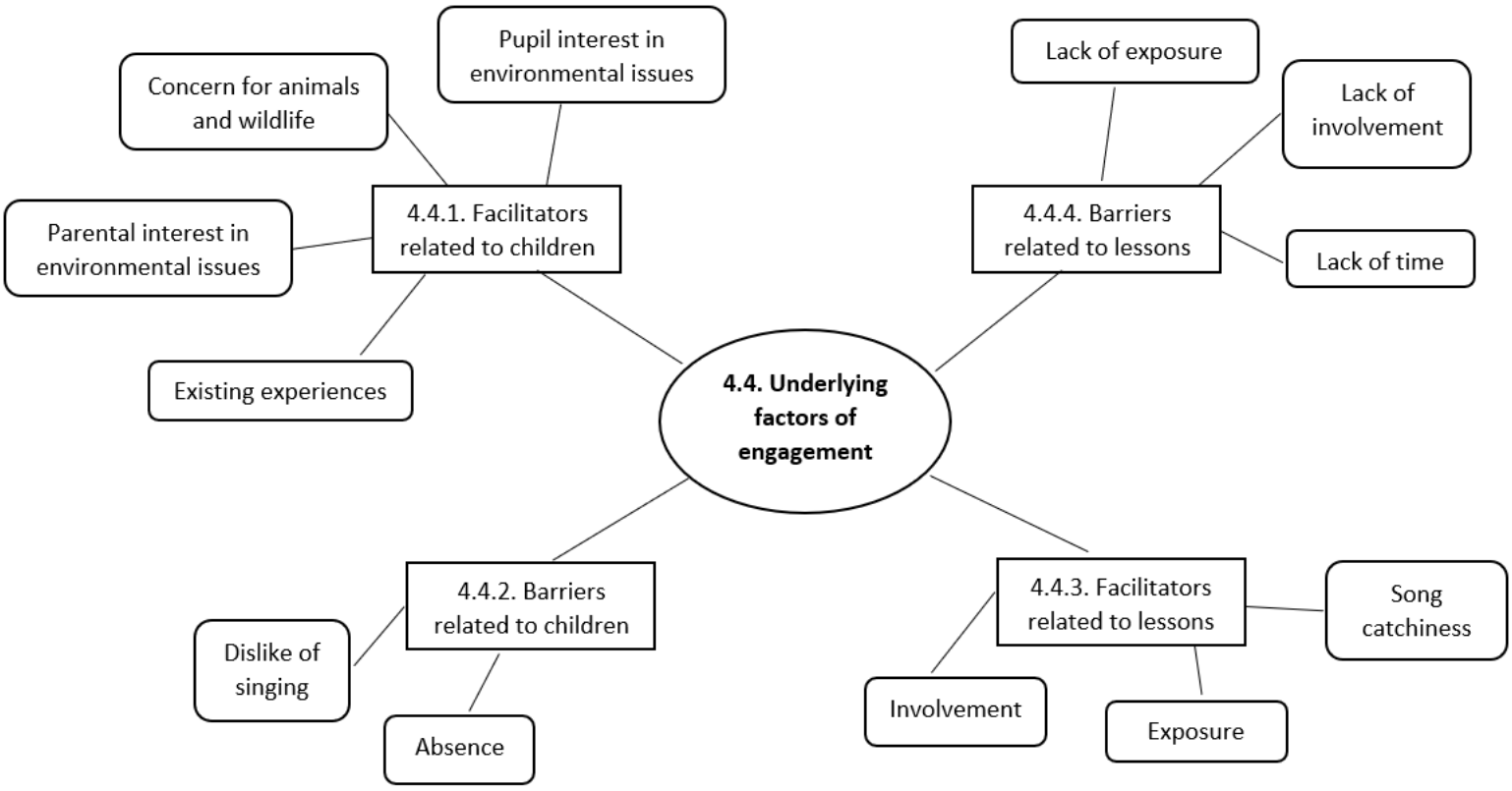


Figure 4.9. Thematic map detailing underlying factors that influenced pupil engagement with environmental education lessons

4.4.1. Facilitators related to children

Facilitators related to children included the children being interested in environmental issues generally, as seen here, Mum 9: *'just before she started Eco-Club at the start of the, erm term after Christmas, [Pupil 9] was getting a bit more aware of the environment*', as well as being interested in specific issues like palm oil, Mum 8: *'you probably didn't talk about erm, palm oil, and that's another thing he keeps on talking a lot about.'* Palm oil was not a specific topic in the prepared Project Earth Rock resource.

Having concern for animals and wildlife was another facilitator, when pupils discussed their understandings of environmental friendliness, Pupil 1 (9 years old): *'Like, not like hurting the animals by not using plastics'*, and when recalling the messages of lessons, Pupil 5 (9 years old): *'and how to save animals from the sea and stop putting like plastic in and it'll kill the animals'.* These understandings reflect some of the contemporary environmental issues children were concerned about, during the time of this thesis. Pupil 5 (9 years old)

emotionally engaged with the 'Disposable' animation: *'That one, I thought that because it was keep going down because it couldn't breath and all of those like, the tails, that's where people are just dumping it and so like I thought how it like died because it didn't come out I think it had like a glass and it and it was broken and it got stuck in its foot'* (Disposable). This emotional engagement prevented Pupil 5 from discussing this animation with her parents.

The children's parents being interested in environmental issues was another facilitator, Dad 1: *'I'm a geography teacher so I'm always quite interested in anything environmental as I teach it a little bit at school. I was really interested to find out that she's been learning about this sort of thing at school. So just kind of, yeah, see what she's been learning',* and how the children perceived that their parents would be interested, here based on the parent's profession and interest, *Dad 1: 'So you like to, so whenever she learns anything about geography she likes to come home and tell me as a geography teacher, you kind of feed back to that, feed those back to me, but, erm, particularly if, well some of the other topics if, some of the science'.*

Another factor was existing experiences impacting engagement, as seen here when Pupil 4 (11 years old) reflects on a lesson about travelling to other countries *'but I knew Egypt because my parents have been there'* (You Don't Have To Fly). Also, children were involved in recycling at home, Dad 7: *'you keep on track of the recycling, you keep your brothers in order about putting the right stuff in the right bins, don't you?'*

4.4.2. Barriers related to children

Barriers to engagement relating to the children included them disliking singing generally, Pupil 1 (9 years old), *'I don't like singing in front of my parents, unless I'm using my guitar'*, and their individual music taste differing to the style of the songs in the lessons, as seen here, where popstar Olly Murs is a particular favourite of Pupil 1's, Dad 1: 'we've been to see, so we've been to see you've seen Olly Murs'.

Practical barriers such as absence were also identified, where pupils missed activities like making the energy saving diary, Pupil 5 (9 years old): *'Yeah but I didn't do that because I was out with you'*, and missed the animation and whole lessons, *'I was out for the, and even the and whole lessons',* Pupil 3 (10 years old): *'I wasn't there for Counting the Carbon or*

Transportation', and Pupil 5 (9 years old): *'yeah I was out of the lesson'* (Counting the Carbon). Absence was mentioned in Pupil 3's card sorting exercise (see Figure 4.11) as a practical barrier affecting engagement. Given that some pupils were not physically present for their lessons, they did not have the opportunity to engage in any way with the content.

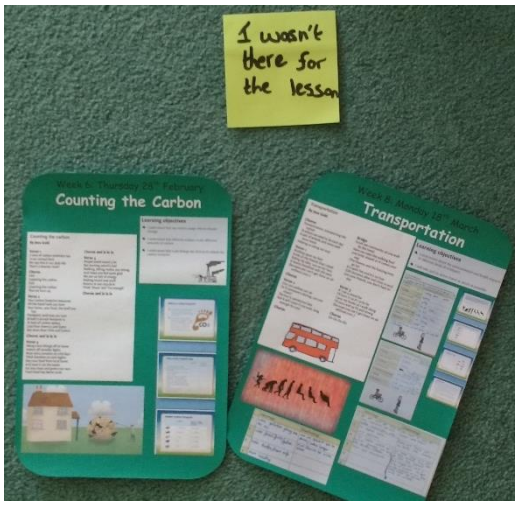


Figure 4.10. Pupil showing how they missed certain lessons during the card sorting exercise.

4.4.3. Facilitators related to lessons

Facilitators related to the lessons that affected children's engagement with them included how involved the children were in the lessons, as reflected upon by Teacher 1: *'So I think they're the ones that are most effective other ones were they do stuff so I think they loved it today because it was literally it straight into being creative'* (Rainforest Song) and Teacher 1: *'That one was probably the best lesson because they were more involved the whole way through there was more for them to do'* (Disposable). Disposable was also the lesson in School 1 where Teacher 1 brought in supplementary objects, like a disposable nappy and showed additional videos to pupils.

The level of exposure pupils had to the lessons was also another facilitator, such as when Teacher 1 discusses how some songs had been sung in assembly, prior to the research taking place: *'A few those were probably better I don't know if you would agree with that but I think they were stronger because we had looked at them already so it would probably be nice to go and do these as a whole school thing from now on and teach the others a bit of a message'.*

The songs being catchy was another factor, as well as it being an outcome of engagement, Teacher 1: *'the Meat Reducer song it was quite catchy they got into it the tune they liked the rhythm',* and how the teacher chose to adapt the lessons, Teacher 1: *'And some of them I've had to adapt add extra bits in just to try and keep them involved',* and Teacher 1: *'that really stuck with the children because they can relate to it I was able to bring things in and I think that help them a little bit'* (Disposable). Teacher 1's intention to enhance certain lessons by bringing in supplementary objects to foster pupil engagement was successful as pupils remembered these objects months later when interviewed, helping to make their education tangible in their minds (see section 5.2.1).

4.4.4. Barriers related to lessons

In contrast to facilitators related to the lesson, lack of exposure when learning new songs was a barrier to engagement, Teacher 1: *'Perhaps technical or just I guess the other problem is what is sung normally traditionally in school we would do it a few times over a few weeks but we're doing it as a one off and then leaving it*'. Lack of involvement was also a barrier, with the lessons being too passive for pupils, making it more difficult to keep them engaged. Teacher 1: *'Slightly cos they're not really the style that I do a lot more where they're busy doing whereas yeah as I said before there's less doing for them it's just keep to be honest it's just keeping them interested which I found much harder for these lessons'*.

Another barrier related to the lessons was lack of time, Teacher 1: *'we don't have time there is too much on the curriculum really at primary'.* Given this lack of time, aspects of the lesson were considered too time consuming to explain, as discussed here by the teacher, Teacher 1: *'Messages though they take a while to explain'* and the songs being too complicated, Teacher 1: *'Some of them are very wordy they're just not as engaged'.* Lack of time to teach environmental education was cited by schools as a barrier to taking part in the research (see section 3.4.2).

4.5. Chapter conclusion

Thematic analysis of the school-based data provided rich descriptions of the school-based findings (Braun & Clarke, 2006). School-based findings discussed how pupils engaged in their lessons when the researcher was observing them in the classroom. Engagement was

categorised as active and passive, or lack of engagement. From this engagement in the lessons, outcomes were identified, on pupils' memory, opinions and judgements, understandings, intentions to discuss and action at home with their families and on immediate action in school. Underlying factors that impacted pupil engagement with the resource were identified, including facilitators relating to the children, and barriers relating to both the children and to the design and content of the lessons.

5. Family-based findings

5.1. Chapter introduction

Chapter 5: Family-based findings presents the family-based findings for how the environmental education was discussed and actioned at home in terms of the topics being talked about within the family, or physical actions taken to implement them. Thematic maps (Braun & Clarke, 2006) are presented throughout detailing the dominant themes presented in each section of this chapter. Within each section, dominant themes and subthemes are presented alongside illustrative quotes, photographic evidence and explanations of the findings. Where appropriate, illustrative quotes refer to the environmental education lesson (see section 3.4.3. and Appendix 5) being discussed and the age of the pupil participants.

5.2. Discussion and action of education

This section presents evidence of how the environmental education was discussed or actioned and by whom, as presented in the thematic map (Braun & Clarke, 2006) of figure 5.1. Evidence of the lessons being discussed or actioned is presented, followed by evidence of uncertainty over whether the lessons were discussed and evidence that the lessons were not discussed or actioned.

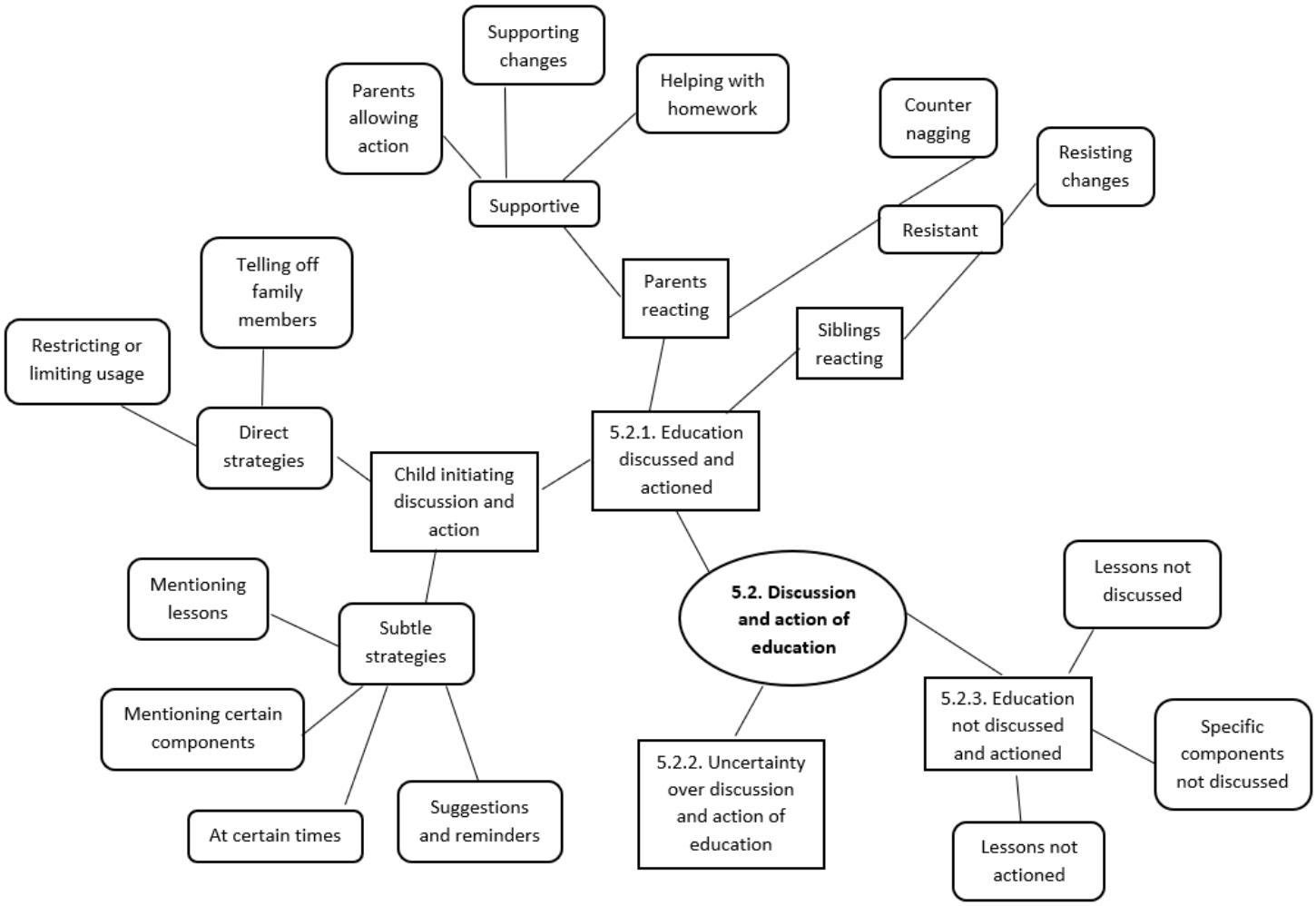


Figure 5.1. Thematic map detailing the dominant themes for discussion and action of environmental education.

5.2.1. Education discussed and actioned

Lessons were discussed to different extents. There was evidence from parents of children mentioning the lesson to their family, Dad 3: *'I remember her mentioning … her coming home and she mentioned something about Meat Reducer'*, and Mum 10: *'erm yeah she has, er with compost she mentioned what er, you can put in a compost heap and what you can't, er, things like that'* (Compost and Grow), and Dad 1: *'I think it was mainly [Pupil 1] talking about it as something from the lessons that she remembers looking at'* (Compost and Grow) and Mum 3: *'I definitely remember, er, the shower one, the water one, I definitely remember the, power one, definitely remember the compost one and, recently she mentioned about the meat one'* (Water Story, Power Challenge, Compost and Grow, Meat Reducer). Some

lessons were discussed to more extent than others, as evidenced here, Mum 3: *'she chatted briefly about the transport'* (Transportation) and Mum 8: *'and fossil fuels he mentioned as a passing comment but he wouldn't engage in too much of the conversation as he did for composting'* (Fossil Fools and Compost and Grow), and Mum 10: *'she talked about fossil fuels, um not so much that* (Fossil Fools). Some lessons were frequently discussed by children, as recalled by their parents, Mum 3: *'yeah and I remember you talking a lot about that one as well'* (Power Challenge) and Dad 1: *'that is the one you talk about most'* (Disposable).

As well as mentioning the topic of the lessons generally, specific components within the lessons, including the multimedia, were often discussed. The song was discussed, as seen here*, Dad 1: 'you told us about the song'* (Transportation). The song was often shared or sung to by children to their parents as seen here. Pupil 1 (9 years old): *'yeah I showed that to Mummy'* (Disposable), and Mum 5: *'you'll say, oh we did this song and then over the next couple of days she'll sing a song and then'* Researcher: *'oh what, the songs from the lessons?'* Pupil 5 (9 years old): *'yeah'.* This further indicates memory as an outcome of pupil engagement (see section 4.3.1.) with the lessons and the multimedia. Other components like the animation were also discussed, as when the researcher asked, *'did you mention the animations?'* Pupil 3 (10 years old) responds *'I mentioned that because of that'* (Power Challenge), and Dad 1: *'yeah you were telling us about it'* (Rainforest Song). Like with the song, the animation was also sometimes shared with parents, Pupil 1 (9 years old): *'yeah I showed Mummy that song and the animation'* (Disposable). The activities from the lessons were also discussed, in particular key details or moments from the lessons. Researcher: *'did you mention about the letter you wrote, that was similar to the-'*, Pupil 3 (10 years old): *'oh yeah! I showed you and Dad because, and Nanny'* (Small Grains) and Pupil 3 (10 years old): *'I think I told them about something that took 1000 years or something'* Mum 3: *'I remember you coming home and talking about nappies'* (Disposable). Disposable was the lesson where Teacher 1 brought in supplementary objects, including a disposable nappy, in an attempt to foster pupil engagement and make pupils education more tangible, which it appeared to do considering Pupil 3's memory of it.

The discussion of the lessons and their components was carried out using different approaches and at certain times. Children sometimes discussed the lessons when

performing relevant practices, Dad 1: *'Yeah at lunch we were having the same sort of conversation, and you brought up the veganism didn't you?'* (Meat Reducer), when Pupil 1 used the opportunity of having lunch and consuming food with her parents to discuss vegan eating practices. On occasion, the lessons were discussed with non-human family members, like pets, Pupil 1 (9 years old): *'and I think I spoke to [the cat] a few times'.*

Suggestions and reminders were subtle strategies used by children when discussing and actioning the education at home with their families. A suggestion of changing an existing practice to be more environmentally friendly can be seen here in respect to holidays, Pupil 4 (11 years old): *'that one I've talked about, erm, going on more holidays that are, like, you can drive* to' (You Don't Have to Fly) and saving water when brushing teeth, Pupil 4 (11 years old) talking about her Dad: *'I said well, you can like brush your teeth and then go downstairs which is normally always on the cold tap and just use the cold tap'* (Water Story). Another subtle strategy used by children was to ask their parents if they could action their lessons, as evidenced here, Mum 9: *'and [Pupil 9] in fairness did ask if we could have a compost outside'* (Compost and Grow), and Pupil 3 (10 years old): *'and then I remembered the disposable thing and I thought oh let's use that milk bottle … and so today I went outside with a bag … and I asked I said to Dad, Dad can I go and get something from the white bin bag to reuse?'* (Disposable). The milk bottle that Pupil 3 wanted to reuse when playing shops with her sister is pictured in Figure 5.2. Pupil 5 also asked her mother's permission to grow their own strawberries once again, Pupil 5 (9 years old): *'can we try it again?* (Compost and Grow). Here, Pupil 9 and Pupil 3 have to ask permission from their parents to action their education, and Pupil 5 has asked her parent to if she is allowed to start performing a once existing practice again.

Figure 5.2. Reused milk bottle that Pupil 3 asked her Dad's permission to play with

More directly demanding strategies were also used by children when they told family members off when they discussed and actioned the education. Pilot Study Pupil 1a: *'If I see them forget I'll turn it off and then go and tell them 'you forget to turn whatever it was off''* (Power Challenge), and Dad 1: *'you are better at turning lights off, and making me turn stuff off'* and Pupil 5 (9 years old): *'when I came home from this like when I done this … you guys were had the lights on and were you went out the room and you didn't turn them off and I shouted … 'don't [waste] electricity!''* (Power Challenge). This strategy of telling family members off was however short lived, as evidenced by Mum 5 when she responds, *'you did that for about two days and then you forgot poppet.'* Communication in the family is discussed in section 6.4.

The children often referred to restrictions and limitations to existing practices when discussing or actioning the environmental education. This can be seen when Pilot Study Pupil 1a suggests how his family could restrict their use of technology to save energy, *'could have a technology free month … we're not allowed to play any consoles, any iPads, and we have to keep it all off'* (Power Challenge). He says how this would include limitations to usage of gadgets, Pilot Study Pupil 1a: *'have, mm, five shows each every, every week. Erm, seven shows one day'* (Power Challenge).

In terms of who was involved in the discussion and practice of the lessons, children tended to initiate these conversations, Pupil 3 (10 years old): *'I just tell her'* and Pupil 1 (9 years old): *'I started it'* (Meat Reducer) and Dad 1*: 'Meat Reducer, you talked about that',* and Mum 10: *'the main thing was about compost, she came out with herself'* (Compost and Grow). This indicates that children choose to start these conversations about their education, without necessarily being prompted by parents. However, there was also sometimes uncertainty among family members as to who started such conversations: Dad 1: *'I can't remember who started it, I think maybe we were talking about this sort of stuff and yeah, we just ended up talking about it didn't we?'* Mum 1 agrees, *'yeah, yeah I can't remember who started it to be honest, was it you?'* (Meat Reducer). This suggests that discussions about topics featured in the children's environmental education lessons, such as veganism, were not always raised by children to intentionally discuss their education. Instead, the topic of their lessons may have come up naturally in conversation, such as when performing a related practice, like consuming lunch. This then provided children with an opportunity to discuss the relevant content of their lessons, as seen previously with this quote by Dad 1: *'Yeah at lunch we were having the same sort of conversation, and you brought up the veganism didn't you?'* (Meat Reducer). Such discussions did not always lead to changes within practice domains like food (see section 5.3.4.). Families may have discussed certain practices like veganism, but this did not always carry over to action, such as becoming a vegan family, with barriers to such action presented in section 5.4.1, such as reluctancy to give up existing practices. In this case, the lesson that was discussed in relation to veganism was about reducing meat only, not giving it up entirely, which may explain the lack of impact to the practice domain of food.

Other family members were involved in these discussions and actions in how they reacted to the child. These reactions have been divided into themes of supportive and resistant reactions, based on whether they support or resist the requests of children. Supportive reactions involved parents allowing children to action the lessons, as when Pupil 3 asked her Dad whether she could reuse a milk bottle in her and her sister's playhouse, Pupil 3 (10 years old) explains how: *'he said yes* (Disposable), as observed by the researcher on a home tour of Family 3's house and garden, when this waste-related material was photographed in figure 5.2. When Pupil 5 asked to try growing strawberries again, Mum 5 responds supportively *'we can do, definitely if you want to'* (Compost and Grow). Mum 5 then goes on

to say to Pupil 5, *'you could use some of your pocket money, when we go to [the garden centre], you could get some strawberry plants couldn't you?'* (Compost and Grow). Mum 5 suggests that Pupil 5 takes ownership to action her education, and uses her own material resource of money to purchase some plants to grow. Growing their own food was also a practice familiar to Mum 5 and Pupil 5, as the researcher observed noticeable growth to their plants in five months between two home visits, and photographed in Figure 5.3. Therefore Mum 5 and Pupil 5 can be considered competent at performing the existing food-related practice of growing their own food, making it more likely that they would both want to continue engaging in this practice following Pupil 5's environmental education on the topic.

Figure 5.3. Noticeable growth in chilli plants, demonstrating the competence of Pupil 5 and Mum 5 in growing their own food.

Similar to allowing children to action lessons, parents also showed support for changes to practices, as seen here when Pupil 4 (11 years old) explains her parents reactions to her suggestion of taking holidays that were more local, and thus proposing changes to her family's travel and holiday practices, '*but my Dad said that we should definitely do that, … my Mum said, well we can still go to both'* (You Don't Have to Fly). Here, her Mum and Dad support Pupil 4's request to take more local holidays, but her Mum says how they can still

go on holidays further away, suggesting some reluctancy on her part to change their travel and holiday practices, given her love of hot holiday destinations (see section 5.4.1.).

Another way family members supported the child in discussing and actioning the lessons was helping them complete their homework from certain lessons, including the energy-tracking diary from the 'Power Challenge' lesson and water-tracking worksheet from the 'Water Story' lesson. Dad 3 recalls how he was involved in the completion of Pupil 3's homework, when he asks: *'is that the one where she asked us how much, like how much time we spend on the computer?'* (Power Challenge), and Pupil 3 (10 years old) *'oh yeah I sat there and I asked all you lot … when I had a chart and I had to fill in'* (Water Story). Dad 1 was particularly supportive of Pupil 1's Water Story homework, helping her to complete a bar graph as additional work (see Figure 5.4), as well as filling in the water tracking table and questions on the worksheet from the lesson. He explains, Dad 1: *'I just said that I had a bill through recently and I showed her, 'cause I thought it would be quite useful for her to actually see an actual measurement of how much we are using, how much we've used, had changed over the 18 months since we've been in this place' (Water Story).* This involvement by Dad 1 shows how he tried to make Pupil 1's understanding from the 'Water Story' lesson and homework more tangible to the family's actual water-related practices, and the related costs of their water use. Although homework tasks like these had the potential to cross the borders of school and family homes, there was a lack of impact on water practices (see section 5.3.4.) which is discussed in section 6.5.

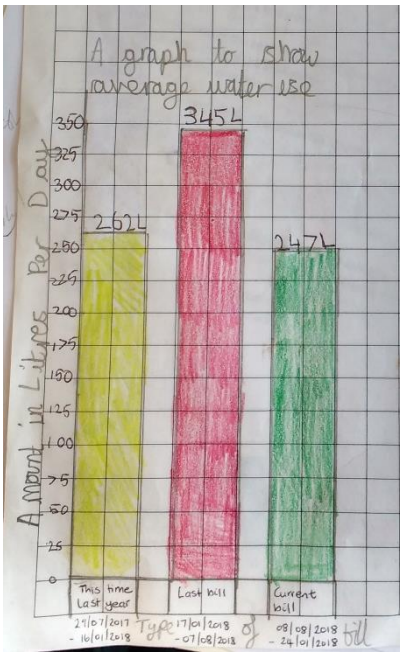


Figure 5.4 Dad 1's keen involvement in Pupil 1's water tracking homework.

Resistant reactions to when children discuss or action the lessons include negative responses from family members. Siblings in particular were resistant to actioning practices from the lessons, as seen here with Pupil 4 and her older sister. Pupil 4 (11 years old): *'so I turn it off and she goes in to her room and she's like, who's turned off my fish tank? And I said it's me, me because erm you're wasting electricity, and then she gets angry'* (Power Challenge). It was unclear whether Pupil 4's sister needed her fish tank to be on to keep her fish alive, or whether the energy being used was unnecessary. If she did need her fish tank to be on, this would explain her resistant reaction of anger. Resistance from siblings to save energy, and blame can also be seen here with Pilot Study Pupil 1a*: 'my sisters normally leave the light on normally all day long, or [Pilot Study Pupil 1b, his brother] leaves the tellie on upstairs by accident, or [he] doesn't put all of the console away, they need to start remembering to put stuff away before they leave the room and turn the lights off'* (Power Challenge). 'Counter nags' were also used where parents used environmental friendliness as an excuse to tell children off, Mum 3: *'[sibling 3] what have you been told about your shoes? It's not environmentally friendly to keep putting the hoover on is it?'* These counter nags were sometimes done in response to the child suggesting they action the lessons, as seen here where Pupil 3 (10 years old) suggests how, *'after today I might actually try and turn it off at the plug'* (Power Challenge), and Mum 3 challenges her by saying *'or maybe you should spend less time on your iPad try that one first*'.

Reasons explaining how the environmental lessons came to be discussed is presented in sections 5.4.2., 5.4.3. and 5.4.4. detailing specific facilitators and discussed extensively in section 6.4.1.

5.2.2. Uncertainty over discussion and action of education

A theme of uncertainty was identified, in terms of whether the lessons were discussed at home, demonstrated here, when the researcher and family members asked the children whether they had discussed the lessons, Pupil 5 (9 years old) responds: *'I think so',* and Mum 5: *'You think so'* and Pupil 5: *'Did I? About when they?'.* Pupil 3 (10 years old) also shows confusion about whether lessons were discussed: '*I have no idea',* and Pupil 1 (9 years old): *'I'm not sure'.* There was also uncertainty as to whether the song in particular

was discussed at home, evidenced here where the researcher asks whether the songs were mentioned, Mum 5*: 'yeah you did say poppet but you hadn't really.'* Where the children did recall that they discussed the lessons, there was sometimes a sense of uncertainty as to what was actually said, for example, Researcher: *'what sort of things did you say?'* Pupil 5 (9 years old)*: 'Er, can't remember',* highlighting issues of recall when recounting the content of discussions.

5.2.3. Education not discussed and actioned

There was evidence that certain lessons were not discussed nor actioned at home at all with certain families. Parents said their child did not discuss their lessons with them, Dad 3: *'no you never mentioned it [Pupil 3]*', and Mum 3: *'not in the lessons that you had that but*', and Mum 5: *'not really … sweetheart have you?*'. Children also recalled this lack of discussion, as evidenced here when asked by the researcher, Pupil 4 (11 years old): *'er don't think I did*', and Pupil 5 (9 years old): *'not really*', and Pupil 3 (10 years old): *'no'*. There is further evidence of this lack of discussion when parents are prompted by the researcher during a reflective card sorting exercise about all 12 lessons, Researcher: *'were there any that you recognise [Mum 5]? Of [Pupil 5] mentioning at all?'* Mum 5 responds: *'not really*', and in interviews, Researcher: *'I was just wondering whether she'd mentioned any of those lessons?*' (Compost and Grow and Fossil Fools). Similar to Mum 5, Mum 6 responds, '*Noo, no she hasn't*', and *Mum 3: 'I'm not aware that she came home and it mentioned anything like that'* (Water Story), and Dad 1: *'I don't remember you telling me about this one'* (Water Story). Parents from Families 1 and 3 say they cannot recall Water Story as a lesson being mentioned, despite evidence presented in section 5.2.1. that Mum 3 could remember Water Story being discussed, and evidence of them helping their children, proactively in the case of Dad 1, with the homework for this lesson. This lack of discussion of the pupils' environmental education lessons was due to a number of reasons, such as communication issues, with individual barriers presented in sections 5.4.1., 5.4.3. and 5.4.4. and discussed extensively in section 6.4.2.

Despite intentions to discuss the education (see section 4.3.4.), there was also evidence that specific components of the lessons were not discussed. The animations were sometimes not discussed by children, as seen here when the researcher asks parents if the animation was

talked about, Mum 5: *'No you didn't, no'* (Disposable), with Pupil 5 (9 years old) confirming this lack of discussion when she says, *'that's why I didn't want to show you because you would get all upset'* (Disposable). By contrast with instances where pupils forgot to discuss the lessons with their family, Pupil 5 purposefully chose not to tell her mum to protect her mum's feelings. Pupil 5 perceived that sharing information about the animation featured in the 'Disposable' lesson would upset her mum, as it showed a giraffe, a favourite animal of her mum's. This deliberate intention not to discuss the environmental education shows empathy from Pupil 5 for her mum, in not wanting her to be upset if she were to emotionally engage with a discussion of the 'Disposable' animation. Certain activities from the lessons were also not discussed, Researcher: *'did you talk about that at all with Mum and Dad?'* Pupil 1 (9 years old): *'No'* (School Council).

There was evidence for the children not actioning the lessons with family members, Mum 3: *'no she just talked about it more she didn't ask us to do things differently'* (Water Story). This discussion of the 'Water Story' lesson and homework, without any actions suggested by Pupil 3, may explain the lack of impact on water-related practices (see section 5.3.4.). Further evidence of the children not actioning lessons with family members is seen here when the researcher asks: *'you haven't really got anyone to sort of start growing new or-'* Mum 5: *'no'* (Compost and Grow), and Researcher: *'did that change anything?* Pupil 1 (9 years old): *'not really'* (Water Story).

5.3. Outcome on practice domains

This section presents evidence of the outcome of discussion and action of the education on different practices domains, defined as any changes to practices relating to water and energy use, food, waste management and travel, either new practices being established or existing ones being impacted, as well as evidence of no outcome on practice domains and other relevant outcomes. These findings are presented in the thematic map (Braun & Clarke, 2006) of Figure 5.5.

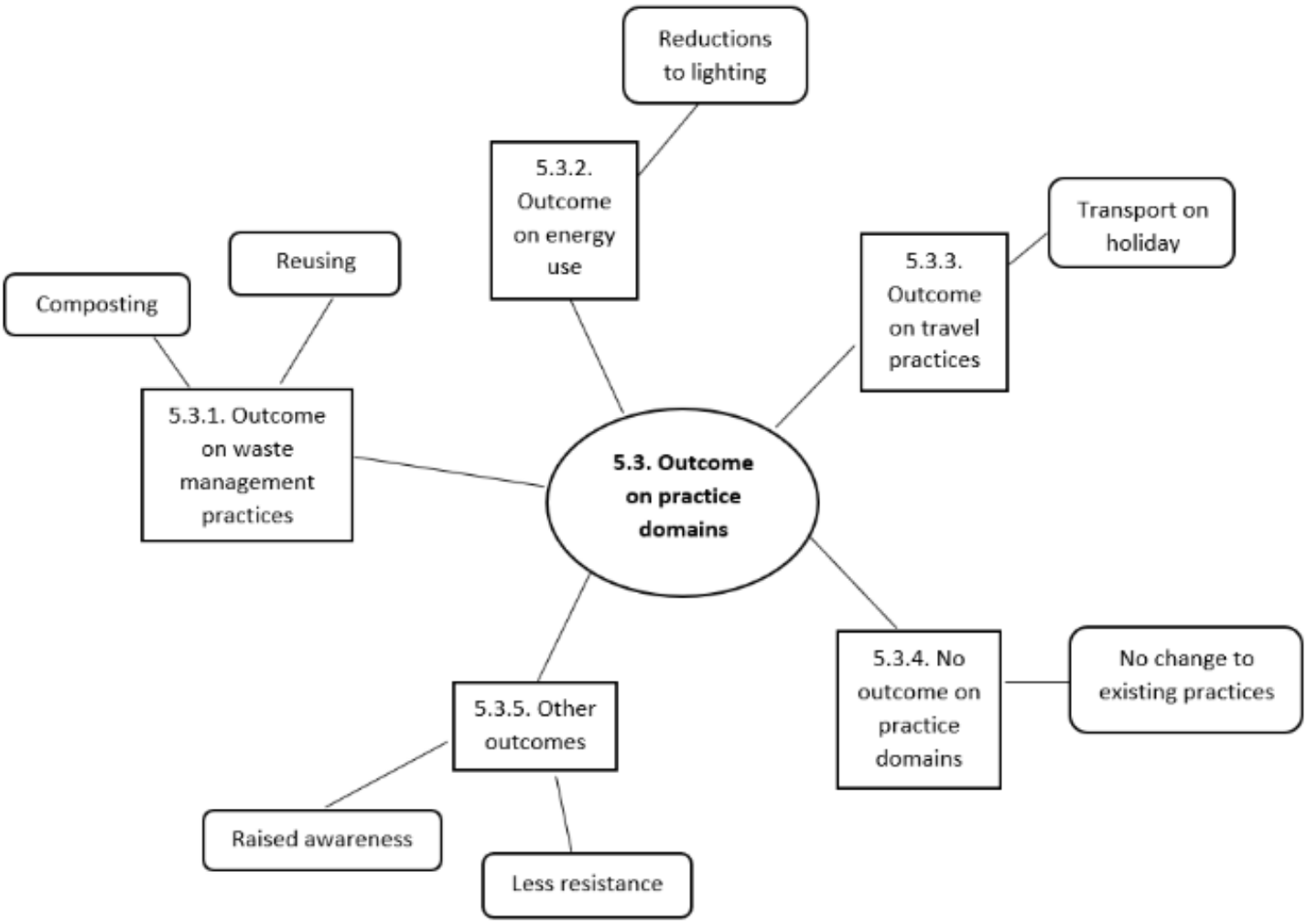


Figure 5.5. Thematic map detailing the dominant themes for outcome on practice domains.

5.3.1. Outcome on waste management practices

One outcome of children discussing and actioning the education within the domain of waste management was on composting practices, demonstrated here, Mum 8: *'he did [laughs] come back with some things, erm about compost and we started doing a little bit more composting at home'* (Compost and Grow). A subtheme of reusing waste was also identified, Pupil 3 (10 years old): *'this lesson I think I have tried to reuse some things'.* During the tours of the family home and photography of objects relating to relevant practices, Pupil 3 showed the researcher how she reused waste as a menu when playing with her sisters in their playhouse, as pictured in figure 5.6.

Figure 5.6. Pupil 3 and her sister reusing waste when playing.

Recycling waste was another outcome, Mum 3: *'they understand that process, it's like, I won't put it in that bag because it's going somewhere different to where that's going, they get that now, and I think that has helped, for sure'* and Mum 3: *'I think the, the recycling has changed quite significantly though as a family hasn't it? With the girls'.* Dad 3 agreed *'yeah maybe because like [Mum 3] says, it's more understood, what the point is, where it's, as opposed to, it just being a chore'.*

5.3.2. Outcome on energy use practices

Outcomes of the lessons on energy use practices involved reductions to lighting. Pupil 3 (10 years old): *'I feel like they've changed, I've like, I barely use my light anymore now, I just, there's another reason I'm not using my light, because like, it produces so much hot stuff, I can't'* and Pupil 1 (9 years old): *'used to turning lights off',* Dad 1 agreed with this new practice: *'yeah you are better at turning lights off, and making me turn stuff off'*, reflecting the influence of Pupil 1 on her own and her Dad's energy-related practices. These reductions to lighting and use of electricity are similar to the requests made to other family members, such as siblings (see section 5.2.1), and clearly reflect the messages of the energy-related lessons, where turning off gadgets when they were not in use, was a key message.

5.3.3. Outcome on travel practices

Outcomes of the lessons on travel practices can be seen here when the researcher asked Dad 1 if the family's decision to get a campervan was something that came from the lessons, he responded '*probably a bit of both, mainly my wife has been very keen to do something like that, she's, she had one of … she had a caravan and a campervan when they were growing up and they liked the holidays they had when they were, so they used to go on big long haul flights, they tended to go on those sort of holidays.'* This quote indicates that lessons had some impact on the holiday practices of the family, however there were also other motivators influencing their decision to buy a campervan in order to have more local holidays.

5.3.4. No outcome on practice domains

There was evidence of no outcome on practice domains following the children's lessons, with them choosing not to get their family to do anything differently. This can be seen here: Researcher: *'did she try and get you to do anything differently like turning off things?'* Mum 3 replies: *no'* (Power Challenge), and Researcher: *'did that change anything?'* Pupil 1 (9 years old): *'not really',* Dad 1*: 'No I don't think'* (Water Story) and Mum 1: *'erm, I don't think we've necessarily done anything different'.* Dad 1: *'not dramatically, no.'* Despite Dad 1 proactively supporting Pupil 1 with her Water Story homework, they did not mention any outcomes on water use practices. This is confirmed when Dad 1 says how the family's existing water-related practices have remained the same in a follow up interview nearly a year after Pupil 1 received the environmental lessons, Dad 1: *'[Pupil 1] still has a bath twice a week, erm, er, my wife tends to have a shower every day, whereas I don't tend to have a shower every day, so in terms of those big uses of water, that's kind of where we are with those.'* Factors explaining the lack of outcome on practice domains are presented in section 5.4.

5.3.5. Other outcomes

Other outcomes from children discussing or actioning the lessons with family included raised awareness which spanned multiple practice domains, for example, when Dad 1 says, *'but she's, yeah, I'd say she is more aware. More conscious of things'.* Mum 3 says how Pupil

3's raised awareness has impacted the family's waste management practices when she says Mum 3: *'now it means that when I say to you girls, can you do the recycling, you understand where that's come from,'* Researcher: *'yeah I remember you saying, that they don't sort of argue back now, they get it.'* Mum 3: *'not as much, it has been a long time and she has dropped off a bit, like they do … it, they understand, they see it as recycling but from rubbish … they understand that process, it's like, I won't put it in that bag because it's going somewhere different to where that's going, they get that now, and I think that has helped, for sure'.* New meanings had been established in the case of Pupil 3 that underpinned her performance of waste management practices.

Similarly, raised awareness had impacted energy use practices within the family, Mum 3: *'I noticed one thing is that I think prior to these lessons you would ask the girls could you turn the lights off and it would … be just a blasé thing, now I can turn around and say can you make sure that all of the back rooms are off, and there is never a sigh, that sort of a thing because they just get on and do it because they know we're not going to use it therefore will turn it off.'* She goes on to explain, Mum 3: *'because I think she's aware that it is energy that she is not using and a prior to these lessons she wouldn't have had that mindset it would be just like you are telling me to do something for the sake of telling me to do something but now I think her mindset is I'm not using that energy and mum has asked me to turn it off so I will turn it off'.* Again, this indicates how the environmental education lessons had provided new meanings to Pupil 3 that underpinned her energy-related practices. Linked to this is the theme of less resistance, in terms of children being less resistant when performing practices, as Mum 3 said how: *'there is never a sigh'* when she asks her daughter to perform an energy related practice.

5.4. Underlying factors of discussion and action

As presented in Figure 5.7. in a thematic map (Braun & Clarke, 2005), numerous factors were identified that influenced whether the lessons were discussed or actioned in terms of barriers that hindered discussion or action and facilitators that helped foster discussion and action in the family. Factors that unpinned engagement as well as discussion and action were also identified, as well as broader overarching factors.

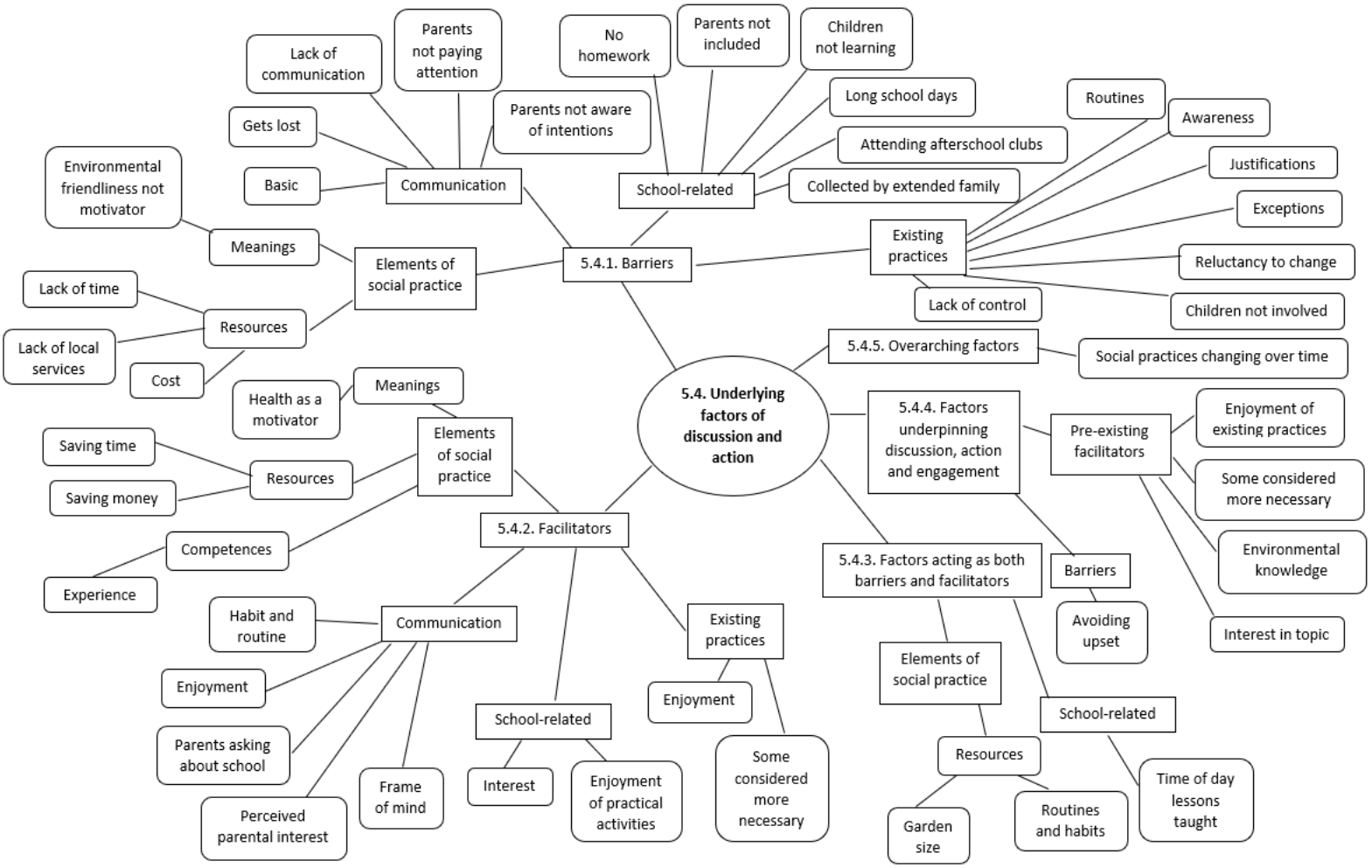


Figure 5.7. Thematic map detailing the dominant themes and subthemes for underlying factors of discussion and action.

5.4.1. Barriers

Barriers to discussion and action of environmental lessons and outcome on practice domains included factors relating to some elements underpinning social practices. Barriers relating to materials, resources and infrastructure included lack of time or it being too late in the day to discuss lessons, Mum 5: *'I think you know especially for [Pupil 5] as well the days so busy and then by the time I get home it's normally later than this so, it's if sort of there's so much to say so not all of it comes out it's like'*, and Pupil 4 (11 years old): *'Yeah and then I normally I forget and when I remember it's like bedtime and I'm in bed and then I don't really have time so.'* Lack of time was also considered a barrier for families when considering taking more sustainable holidays: Mum 3: *'I'm yeah it's the time it's the cost and*

the time that we get off you know as a country we don't get that much time off with children at the best of times I know a lot of people quite like a lot of time off but then we bulk it all into the six weeks but if we didn't do that we could make better choices instead'. Cost was another barrier and element of social practices, here relevant to using environmentally friendly transport for holidays, Mum 5: *'it's the cost it's as simple as that'.* Councils not providing services also presented barriers to families, as seen here, Dad 7: *'I know that some councils do offer that facility but er, ours don't'.*

Meanings, as another element underpinning social practices, also acted as a barrier to action, demonstrated here when Pupil 4 considers her family's holiday practices and why they take them, Pupil 4 (11 years old): *'it's my Mum that really likes and my big sister, she really likes like, erm, hot countries'.* Environmental friendliness was also not a key meaning or motivator for some families, as seen here when the researcher asked whether Mum 6 performs any practices she considered to be environmentally friendly, Mum 6: *'Erm, I dunno. I don't really think, it sounds awful, but I don't really think about it.'* This was the case when the researcher discussed saving power and avoiding using gadgets with parents from the Pilot Study School, as evidenced in fieldnotes: *Parents wanting their children to have a break from screens - for their health, but saving energy is an environmentally friendly bonus.* The motivator of health was considered more important than environmental considerations.

Other barriers, not related to the elements of social practices included children not being involved in existing practices, here, related to energy use and heating practices, Pupil 4 (11 years old): *'I don't know, I can't, I don't know really, at home I don't really think about whether the heating's on or off or not'.*

Communication issues also presented another barrier, as this was often basic, Dad 1: *'generally, she'll say 'I did maths, I did English', I always try, a general standard question I always ask is 'What have you learnt today?' or 'what's new today?', you're not always the best at coming up with answers to that'* and Mum 8: *'he's not, he's not the most chatty boy, unfortunately [laughs].'* The children too were aware of this barrier, Pupil 1 (9 years old): *'I can always remember, I just don't wanna tell you [laughs]'*, and the teacher supported this view, Teacher 1: *'children are pretty bad at remembering and not talking and just saying yeah I had a good day leaving it at that'.* Discussing the lessons got lost among other

communication, as seen before when Mum 5 says: *'I think you know especially for [Pupil 5] as well the days so busy and then by the time I get home it's normally later than this so, it's if sort of there's so much to say so not all of it comes out it's like.* Sometimes there's a lack of communication entirely, Mum 8: *'he doesn't talk much about school'*, and Mum 6: *'she never does, I try and ask her and it's nothing, I haven't done anything, nothing [laughs]'.* Mum 1 explains: *'I don't think it's symptomatic of these lessons I think it's just generally across all lessons, it is a case more often that not of us having to dig to get the detail of actually what's gone on and her being forthcoming'*, in terms of Mum 1 having to actively ask her daughter about school. However, they do seem to remember and communicate their lunch: Dad 1: *'And generally she can only remember what she's had for lunch'.*

Having no homework to discuss, which could help directly carry the messages from school to the home was also a barrier, Dad 1: *'A little bit, I say, because it didn't come home, she didn't talk extensively about it'.*

Also, parents not paying attention, Pupil 4 (11 years old): *'my Mum didn't really listen to me'*, having a bad memory, Mum 1: *'Mummy has a terrible memory so she could have done'* or disliking the songs when shown Pupil 1 (9 years old): *'No. I put the Disposable song on but Mummy didn't like it'* were other barriers.

Attending afterschool clubs was another barrier, Pupil 4 (11 years old): *'I normally have lots of clubs on'* leading to a long school day, Dad 1: *'we both [laughs], my wife and I both work so [Pupil 1] has a lot of time at school, so she's at school from half seven to about half five every day'* and Mum 1: *'yeah I think we quite often, we're, we're asking questions at a time of day when she's tired and hungry, and sometimes we get more detail than others'* were other factors.

Pupils being collected from school by other family may have also have been a barrier to discussion of the lessons with parents, Mum 5: *'so that's a Nanny and Grandad day, 'cause yeah they pick up on a Monday night*'.

Parents reflecting on how the school does not involve parents also was identified as a barrier, Mum 3: *'I think it would have been nice for the school to give us a list of these topics and what have you so we could have seen what we could have done at home and get the kids engaged at home which has not quite happened has it'.*

Already actioning specific practices was also a barrier to change, Researcher: *'You didn't get them to turn off lights, that sort of thing?'* Pupil 1 (9 years old): *'No Daddy does that'.* Existing awareness was a similar barrier: Dad 3: *'the five that you just mentioned or at least the first three or four are ones that probably impact what we already do a lot more than what we currently do because we all, [Mum 3] and I have learnt about all this stuff before and you know yeah we've got recycling and we do all of that kind of stuff'.*

Justifying and making exceptions for existing practices were barrier, as seen here, Pupil 3 (10 years old): *'at the start of scouts, I used to go down this road, because we have to drive there,'* and Pupil 4 (11 years old): *'my Dad said he only did it, he needed it when erm, he was waiting for the tap to go cold so that he could put his, like have a drink, erm'.* Linked to meanings of social practices, was the justification of needing entertainment, Pilot Study Pupil 1a: *'Because we have to keep an eye on our farm'* (Power Challenge) when discussing gadget use, and Pilot Study Pupil 1b: *'Er, play your Kindle as long as you can … so you don't get bored'* (Power Challenge).

There was also a barrier of not wanting to give up existing practices, Mum 3: *'you don't want to jeopardise your south of France holiday do you?!'* (You Don't Have To Fly) and a reluctancy to change Pilot Study Pupil 1b: *'Because I play technology too much. I want to carry on that'* (Power Challenge) and Pupil 4 (11 years old): *'this one I found quite, like, I understand we need should reduce our meat, but I don't think we should reduce a lot'* (Meat Reducer). Change requiring effort was a barrier, as noted in the researcher's field notes when the teacher said during the Power Challenge lesson '*why don't people do it? I'm guilty too'* and '*have to find the plug at the back of the TV, not very quick' – more effort, takes longer, but saves energy.*

Other barriers included children perceiving themselves as not learning much at school, Pupil 1 (9 years old): *'It's funny because sometimes I don't learn much. In some lessons',* children having lack of control as noted in fieldnotes, *Teacher explained how you pay for electricity, using a meter, obviously 'you don't pay for your bills'*. Families not being aware of the child's intentions, and thus not supporting action was another barrier, as seen here where Pupil 4 had hoped to reuse waste for arts and crafts, Pupil 4 (11 years old): *'but then my mum came into my room and she took them'.* Linked to routines was also the issue of not wanting to disturb family, Pupil 4 (11 years old): *'He, yeah, 'cause normally he doesn't go downstairs 'til*

he's just about to go because our dog gets irritated when people go downstairs and stuff so he normally gets irritated and my dad normally goes to work early, so it's like, so quite early' (Water Story). Pupil 4 explains here how her Dad preferred not to go downstairs to use a certain tap that would have helped save water, and instead his routine of not wanting to disturb the family meant he wasted some water each morning before work.

Subthemes of forgetfulness in terms of the children forgetting about the lessons, Pupil 3 (10 years old): *'I only remember the first one'* and Pupil 3 (10 years old): *'The second one not a clue',* their school day, Mum 7: *'Yeah, usually it's I can't remember [laughs]'* and Mum 1: *''what did you do at school?' 'Don't know, can't remember'. 'And there was a lot of that''*, or to remind their family of actions, Mum 5: *'You did that for about 2 days and then you forgot poppet'* (Power Challenge), meant the content was forgotten and thus not actioned.

5.4.2. Facilitators

Facilitators to discussion and action of environmental lessons and outcome on practice domains also included factors relating to the elements unpinning social practices, including skills and competences, of practices carried out previously, Mum 5*: 'you did strawberries last year didn't you?'* Pupil 5 (9 years old): *'yeah'* (Compost and Grow), and this experience led Pupil 5 to want to practise growing her own food again, Pupil 5 (9 years old): *'can we try it again?*', especially given that it was seen as easy to perform, Mum 5: *'just get some strawberry plants, it's easy enough to do'.*

Facilitators relevant to meanings were health being a key motivator to reducing use of gadgets and thus saving energy, as evidenced in fieldnotes *Parents wanting their children to have a break from screens - for their health, but saving energy is an environmentally friendly bonus.*

Facilitators related to resources and infrastructure included having enough time, Mum 5: *'We could probably even do that this summer, there's probably still time to do it because I think they grow quite quickly'*, saving money, Pupil 4 (11 years old): *'yeah, saving money, 'cause we like to go on holidays and like, and for birthday money and stuff and pocket money, so I think it will be better for me and my sisters if maybe we save more money then we might get a rise on pocket money'.*

Other facilitators included discussing the school day as a routine and habit, Mum 9: *'Yeah she does, we tend to, we try and sit down don't we? And have our evening meal, we try and sit down and talk about what we've done today, what we've learnt, what's been interesting. Erm and she's quite good at reporting back if she's really interested in something, I tend to hear about it*', and enjoying conversing, Mum 5: *'yeah you normally tell me about school, don't you? Like [Pupil 5] likes to chat don't you sweetheart?*', and Mum 10*: 'yeah she's pretty forthcoming to be honest'.* Enjoyment of these conversations may have meant that they were more likely to happen. Linked to this was parents asking about their child's school day, Teacher 1: *'exactly so I think it depends the child and it massively depends on the parents and whether they're interested enough to ask'*, and Dad 1: *'I normally ask in the car journey after picking you up, what did you do today and you'll just recall maths, English, and you'll tell me a little bit in the car on the way home won't you?'*

Parents' enjoyment of listening to the songs at home was another facilitator, Mum 3: *'Oh yeah I learnt a lot of fun things like that, so the girls do a lot of these YouTube videos at school… and sometimes when they come home from school they are like all I want to show you this rock song because they are singing it because it's in their head and then I'm like old but you want to do it on YouTube and then I'm like why do you need to go on YouTube?'*

Also, the children being interested by their education, and thus enjoying it, Mum 5: *'I think, sometimes she's more chatty about it than others, if something's grabbed her attention, she wants to talk about it',* and the children perceiving parental interest, Mum 1: *'yeah she's more likely to talk about rainforests and stuff to [Dad 1] then to me',* and Mum 1: *'whether it's something she thinks we'll be interested in then she'll talk about it, won't you? Like if you've done something geography related and you want to talk to Daddy'*

Enjoyment of practical activities at school was another facilitator, Mum 5: *'you quite like practical stuff don't you sweetheart? So if you've done something that you have to use your hands for you find that more interesting than just reading and writing don't you? So, if something practical's happened she'll normally … chat away about that, definitely, yeah'*, as well as children being in the right frame of mind, Dad 1: *'the one today so we did find her in the right frame of mind'* (Meat Reducer), and having fair decision making in the family, Dad 1: *'Yeah we try and make it as fair as possible don't we?'*

5.4.3. Factors acting as both barriers and facilitators

Some factors acted as both barriers and facilitators to discussion and action of environmental education and outcome on practice domains. The factors that acted as both barriers and facilitators included resource and infrastructural elements of garden size when discussing and actioning getting a compost bin. Having a small or basic garden was a barrier, Pupil 3 (10 years old): *'I did want one but we still haven't got a space'*, and Mum 9: *'So, and [Pupil 9], in fairness did ask if we could have a compost outside, erm but we live in a rented property and it's a fairly small garden so unfortunately we haven't got compost',* and Dad 7: *'He enjoys, enjoys the garden but we don't have a flower garden we have just a basic lawn so we don't have a compost heap',* and Pupil 3 (10 years old): *'there's like no way in the world that we've got space'*. No garden was a similar barrier, Mum 10: *'um yeah I mean the main thing I guess is being in a flat, erm we haven't got a garden to kind of, we've y'know we would grow our own things, and I would do a herb garden and thing but we just haven't got anywhere to put'*. By contrast, having a big enough garden acted as a facilitator to considering a compost bin, Mum 8: *'We started, we haven't got a compost heap really [laughs], we are digging [laughs], so we are lifting, we have a fair, a good size garden I suppose'.*

Resources linked to routines and habits were also factors that acted as both barriers and facilitators, as seen with Pupil 4 (11 years old), about her Dad wasting water: *'we have three separate bathrooms, one downstairs, one that the children use and then one that the adults use, and the one that the adults use normally is, it's normally left on the hot tap',* and Pupil 4 (11 years old): *'cause we always leave our TV on standby, I can maybe say just turn it off, sometimes, especially on weekends, we don't really watch it, so, 'cause we have family time so we could just turn it off at the plug'*, and Pupil 4 (11 years old): *'we don't really normally have showers, like baths, we normally have showers, but if we do have baths, this is kind of to do with our plug, it doesn't really work.'*

The time of day of the lessons was also another factor acting as both a barrier and a facilitator, reflected on by Teacher 1: *'Well I think the other thing is compared to [School 2], [School 2]'s lessons that are in the afternoon and it's fresh in their minds … ours are obviously before lunch'.*

5.4.4. Factors underpinning discussion, action and engagement

Several underlying factors that influenced discussion and action of lessons as well as engagement were pre-existing factors and barriers. Pre-existing facilitators included pupils always having enjoyed performing certain practices, as seen when Pupil 5 decided that she has always enjoyed growing strawberries, not just since learning about growing food in the lessons, Pupil 5 (9 years old): *'Er I've always liked'.*

Enjoyment of camping holidays was another facilitator, Pupil 4 (11 years old): *'and then my younger sister, we really like erm, to have caravan holidays, where we all snuggle up in a caravan, and one year we took our dog, and we had one where you could take a dog.'*

Also, pre-existing knowledge of environmental issues as noted in the researcher's fieldnotes during a pre-session visit to School 1 was a factor, with one pupil sharing how *Kelp will help – produce oxygen, takes in CO2 to absorb*, and note of how *Children are VERY knowledgeable about environmental issues*. Also when the Researcher comments about a new pupil who had just joined the class: *'Did you hear your Romanian pupil looking at the disposable thing they were labelling it and he actually said oh that is polluting the soil?'* Teacher 1: *'Really? So he had some knowledge already'* (Disposable).

Pupil interest in the topics of the lessons was also a facilitator, when Dad 1 discussed how Pupil 1 has not extensively discussed her lessons, Dad 1: *'I would have thought some of the subject matter that you've been talking about actually would be the kind of stuff, if you were going to talk about stuff, you'd probably be even more interested in talking about this wouldn't you? I would've thought you'd be more likely to have a conversation, because you tend to find it quite interesting, don't you?'*

Some practices were considered more necessary than others, for example, Pilot Study Pupil 1a: *''Cause it's [wasting] our energy that we need to use and there's stuff that we need to use it for so if it got really cold we need the heating but we don't need our tellies on all day we can just go outside.'*

Barriers included not wanting to upset parents, as expressed by Pupil 5 (9 years old): *'That's why I didn't want to show you because you would get all upset'* (Disposable). Actions being considered controversial and the practice mentioned in lesson being seen as having a big

impact on the pupil's life was also another barrier, Teacher 1*: 'it's quite controversial and it also impacts on their day-to-day life more than some of the others do'* (Meat Reducer).

5.4.5. Overarching factors

An overarching factor influencing potential engagement, discussion and action was the changing of social practices over time, as seen here when Dad 1 discusses the use of technology to save time and effort when washing, '*it's a lot easier and quicker to shove it in the washing machine and more efficient to do it that way'.*

5.5. Chapter conclusion

Thematic analysis of the family-based data provided rich descriptions of the family-based findings (Braun & Clarke, 2006). Family-based findings discussed how the environmental education was discussed and actioned in the family at home, where there was uncertainty as to whether the lessons had been discussed, and presented evidence that the education had not been discussed nor actioned. The outcome of the lessons being discussed or actioned was discussed, in terms of impact to waste management practices, energy use practices and travel practices. Evidence for no outcome on practice domains was presented, as well as other outcomes, such as raised awareness. Underlying factors that influenced whether lessons were discussed or actioned by pupils and their family members were presented. Some factors acted as both barriers and facilitators. Factors underpinning engagement with the environmental education resource as well as discussion and action in the family were also presented, as well as the overarching factor of changes to social practices over time (Giddens, 1984). The family-based findings, along with the school-based findings presented in Chapter 4 will be integrated and discussed in Chapter 6: Discussion.

Chapter 6: Discussion

6.1. Chapter introduction

This chapter will consider the three research questions which were, 1. 'How (if at all) do pupils engage with multimedia environmental education at school?', 2. 'Who (if anyone) in the family is discussing and actioning the environmental education, how (if at all), and what is the outcome (if there is one) on different practice domains (i.e. energy, water, waste, food, travel) at home?' and, 3. 'Which underlying factors help or hinder environmental education having an impact pupil engagement and on home practices (i.e. energy, water, waste, food, travel)?'

This thesis also acknowledged the SDGs relevant to the environment and education (see section 1.2.), and of addressing sustainability and environmental issues through the avenues of education and family. Environmental education was used as a potential 'key that unlocks the door' (Uzzell, 1999, p.397) to understanding how children might influence their family's home practices, following how they engaged with such education at school, the discussion and action of it in the home, and the underlying factors that influenced whether it impacted upon families' practices. Whether this education was successful in impacting family practices is discussed in section 6.5. Working at the family level was necessary to investigate the impact of environmental education on pupils and their families. Other studies have measured psychological constructs within a process of 'environmental socialisation' to study a similar process of whether younger generations can influence older generations to become more pro-environmental in their behaviours, through changes to their skills, knowledge and attitudes (Gentina & Muratore, 2012; Gentina & Singh, 2015). For this thesis however, social practice theory was applied to household sustainability issues, known as 'home practice' theory (Lane & Gorman-Murray, 2011; Gibson, Farbotko, Gill & Waitt, 2013; Foden, Browne, Evans, Sharp & Watson, 2018). Home practices were used to explore whether an environmental education programme could impact families and their practices within the nexus of water, food and energy (Foden, Browne, Evans, Sharp & Watson, 2018) as well as relevant domains of waste management and travel (O'Neill, 2015) to investigate the aspects of household sustainability that families have to navigate and the dilemmas they face (Gibson, Farbotko, Gill & Waitt, 2013). Social practice theory was relevant as it is concerned with studying practices themselves, as they change over time (Giddens, 1984),

and the underlying elements of meanings, resources and competences that help drive their performance (Shove, Pantzar & Watson, 2012).

The school-based findings (see Chapter 4) of this thesis addressed research questions 1 and 3 and found that pupils engaged in the environmental education in different ways, either actively, passively or not at all, showing a lack of engagement. Most of the data collection for this project took place 'in the field' (Hammersley & Atkinson, 2007) with the researcher immersed in the school setting (Bryman, 2016; Emerson, Fretz & Shaw, 2011) employing observations of lessons, group and individual interviews with pupils and teachers. Working in the school setting was crucial to understanding the initial step of the process, of how, if at all, children engage with a multimedia environmental education programme in the school context. The different ways pupils engaged in the environmental education lessons led to different outcomes on pupils' memory of the education, the opinions and judgements they formed, the understanding they gained from the education, the intentions they had to discuss or action the education, and action taken immediately in the school setting. Certain factors were identified as underlying how pupils engaged with the environmental education.

The family-based findings (see Chapter 5) of this thesis addressed research questions 2 and 3. As well as in schools, data collection for this thesis took place in family homes via home visits that utilised group interviews with family members and tours of homes. Collecting data in the field (Hammersly & Atkinson, 2007) of the family home setting was important to understand whether family members discussed or actioned the environmental education at home, how they might have done so using different strategies, and whether or not there was a subsequent outcome on practice domains of food, travel, waste management and energy and water use. Studying families in their homes also provided further insight, along with the school-based data, into the underlying factors that might have helped or hindered the environmental education from impacting home practices. Some data were also collected via telephone interviews, due to impacts from COVID-19 (see section 7.7) that resulted in changes to the research methods. These telephone interviews were insightful and helped contribute to the family-based findings.

The family-based findings found that families did discuss or action the education in the home, or there was uncertainty as to whether the education was discussed, or the education was not discussed at all. Certain practice domains were impacted by engagement,

discussion and action of the environmental education resource compared to others. Waste management practices, energy use practices and travel practices were impacted, whereas food and water use domains were not impacted. Certain barriers and facilitators were identified as underlying who in a family discussed and actioned the environmental education, how (if at all), and the outcome on different practice domains, with two factors acting as both barriers and facilitators. Some factors were identified as underlying pupil engagement with the multimedia environmental education, as well as who in a family discussed and actioned the environmental education, how they discussed that education, and the outcome on different practice domains.

6.2. Updated theoretical framework

Findings that have led to an updated theoretical framework (see Figure 6.1.) will be discussed throughout this chapter. Notable changes from the originally proposed theoretical framework (see section 2.4) based on the findings in the research include existing home practices preceding the environmental education, as in some families and with some lessons, these existing practices impacted how pupils engaged with their education. Distinctions between active, passive and lack of engagement leading to either an unchanged practice or discussion or action of education in the family have also been included in this revised framework. For example, pupils actively and positively engaging (see section 4.2.1.) in the 'Power Challenge' lesson at school, then forming intentions (see section 4.3.4.) to discuss how they might save energy with their family, having those discussions (see section 5.2.1) with family members, and then actioning those intentions on the practice domain of energy, such as by turning off lights (see section 5.3.2.). Other notable changes from the original theoretical framework include resistant or supportive responses from family members leading to a disrupted or new practice being established. Underlying factors have also been expanded to underpin the entire process.

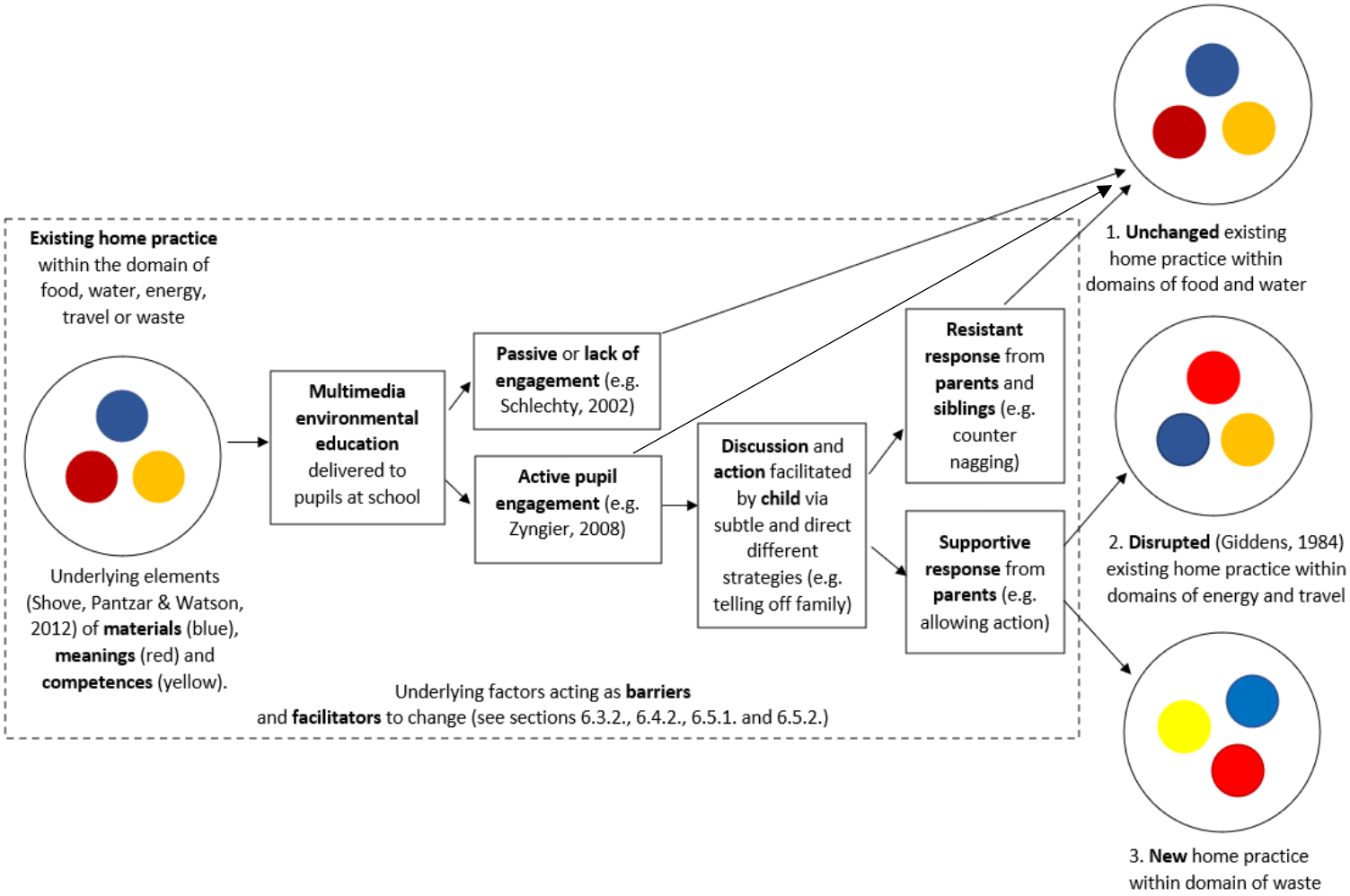


Figure 6.1. Updated theoretical framework from the findings of the research.

For the remainder of Chapter 6 the school-based and family-based findings are integrated and discussed under three topics, of harnessing the potential of multimedia in environmental education (section 6.3), studying communication in the family (section 6.4) and understanding (the lack of) impact on home practice domains (section 6.5). Within each of these topics, findings are discussed in relation to the updated theoretical framework (Figure 6.1.) and relevant literature from Chapter 2.

6.3. Harnessing the potential of multimedia in environmental education

Multimedia components were integral to the environmental education resource, with each lesson having its own song and animation on the topic (see Appendix 5 for details of each song and animation message). Within the theoretical framework presented in Figure 6.1, the delivery of multimedia environmental education at pupils' school was considered the first step, or the 'key that unlocks the door' (Uzzell, 1999, p.397) in the process of families

discussing and actioning environmental issues and impacting their practices in the home. Research has shown the potential power of multimedia (section 2.2.3.), to engage learners in education, like language learning (Ara, 2009; Engh, 2013; Krashen, 1982; Neisa, 2008) and environmental topics (Inwood & Taylor, 2012; Publicover, Wright, Baur & Duinker, 2018). Little research has been conducted on the role of multimedia and music (Kagan & Kirchberg, 2016) in environmental education until now. Environmental education aims for pupils to acquire learning, develop concern and find solutions (Uzzell, 1999) to equip learners with the skills, values, attitudes they need to secure a more sustainable future (Davies, 1998, 2010). To some extent Project Earth Rock, the multimedia environmental resource used in the research, addressed these aims. How pupils engaged with this education is discussed in section 6.3.1., followed by factors that impacted how pupils engaged with this education in section 6.3.2.

6.3.1. Pupil engagement

The notion of pupil engagement in this project was not used as it typically is in most educational literature (Zyngier, 2008), to study how engagement links to academic performance outcomes. Instead, pupil engagement was used specifically to explore whether or not pupils participated in the lessons, watched the animations, sang along to songs, understood the messages behind the lessons and showed an interest in the topic of the lessons during observations, as noted in field notes and in discussions in interviews. In this sense, engagement was considered an important precursor to pupils learning (Cumming, 1996) about environmental issues. Some researchers have acknowledged the difficulty in formally defining engagement (Newmann, 1986), with abstract definitions (e.g. Vibert & Shields, 2003) making the study of engagement operationally challenging when collecting data. Others have proposed that engagement as a concept can feel intuitive when observed and when absent (Newmann, 1986). The researcher understood the term engagement to mean how pupils behave, feel and think in school (Fredricks, Bluemnfeld, Friedel & Paris, 2005), in terms of behavioural, emotional and cognitive components (Finn, 1989; Zyngier, 2008), specifically in the pupils' Project Earth Rock lessons and immediately afterwards when interviewed (as discussed in Chapter 3). Given the potential of multimedia to engage learners (see section 2.2.3.), the remainder of section 6.3.1. discusses pupil engagement with the songs and animations from the environmental education lessons.

The songs from the multimedia environmental education were engaged with in different ways. Pupils positively and actively engaged with the songs, as defined and observed by the researcher as responding in a notably positive way to the lessons. Pupils also voluntarily chose to participate physically, by clapping, dancing, swaying, counting along and memorising guitar chords. These findings support Zyngier's (2008) understanding of behavioural engagement within the learning process (Murray, Mitchell, Gale, Edwards, & Zyngier, 2004; Smith, Butler-Kisber, LaRoque, 2001) as pupils chose to physically engage with the lessons, in a hands-on and tangible way (Hanley, 2004).

The pupils' teacher also discussed how the amount children were able to get involved in the content impacted upon their engagement, in terms of the more active the lesson, the more engaged pupils were, and the more passive the lesson, the less engaged pupils were. This finding supports the need for environmental education to be action-based (Uzzell, 1999) and tangible to learners (Hanley, 2004), by giving pupils 'an enhanced role for pupil discussion and participation in environmental action' (Bonnett & Williams, 1998, p. 159). Gaining insight from teachers by including them in the fieldwork strategy also helped highlight the crucial role they play in engaging learners with environmental education, given how teacher interest, input and competence can impact delivery of programmes (Ham & Sewing, 2010; Uzzell, 1999) and influence pupil engagement (Willms, 2003; Zyngier, 2008), like when Pupil 3 discussed with her parents how her teacher brought in a disposable nappy in the 'Disposable' lesson.

For the songs, there was evidence of enjoyment of lyrics, through laughter, enthusiastic singing along and excitement from pupils, further evidence of behavioural engagement, as well as emotional engagement (Zyngier, 2008), and how songs can provide enjoyment (Millington, 2011) and pleasure (Publicover, Wright, Baur & Duinker, 2018) for learners, thus reducing affective barriers (Coe, 1972; Claerr & Gargan, 1984; Krashen, 1982; Merriam, 1964; Wilcox, 1995) to engagement. This supports previous research that found that even audiovisual elements in an environmental education programme can help engage learners and provide enjoyment (Ballantyne, Fien & Packer, 2001). The theme of enjoyment is discussed below, linked to pupils' memory of the lessons. There was also evidence of good behaviour and calmness, with pupils listening quietly and being well behaved, as observed by the researcher. This finding supports the concept of engagement involving pupils

'following the rules' (Zyngier, 2008, p.1769) at school, when they showed good behaviour when behaviourally engaging with their lessons.

There was also evidence of negative active engagement, defined by the researcher as active involvement where pupils were challenged by the lessons and their content. Pupils experienced difficulties when engaging with certain songs, such as 'Power Challenge'. At times they did not get the pace of the song, such as if it was too fast, and would sing ahead. This finding is evidence of how the potential for pupils to behaviourally engage (Zyngier, 2008) by being encouraged to follow the rules and sing during their lessons was disrupted due to difficulties with the song itself. This may have reduced pupils' engagement with the messages of the song, instead placing cognitive effort (Zyngier, 2008) on how the songs should be properly sung. The song providing an opportunity for pupils to behaviourally engaged therefore impacted upon their cognitive engagement. Ensuring that the pace of an educational song is appropriate for child learners is crucial if children are to engage with the song's content and not experience difficulties performing the song. Most previous research, with the exception of Publicover, Wright, Baur & Duinker (2018), has only highlighted the benefits of using music to educate learners (Ara, 2009; Engh, 2013; Hallam, Price & Katsarou, 2002; Millington, 2011; Neisa, 2008; Ramsey, 2002), but has not discussed the nuances of its implementation, as found with the current research.

As well as evidence of positive and negative active pupil engagement with the songs, there was also evidence of passive engagement. The researcher defined this as basic involvement in the lessons. Passive engagement included evidence of boredom during some of the song teaching videos and physical participation sometimes being distracting, where pupils would clap but stop singing, or would misbehave by singing but also being silly or pulling faces at friends. Although the songs provided pupils with the opportunity to physically and behaviourally engage (Zyngier, 2008) in a hands-on, tangible way (Hanley, 2004) with their lessons through singing and other actions, this opportunity for physical and behavioural engagement meant that at times, pupils would also misbehave, and not follow the rules (Zyngier, 2008) which detracted from the learning process (Murray, Mitchell, Gale, Edwards, & Zyngier, 2004; Smith, Butler-Kisber, LaRoque, 2001). There was also evidence of pupils being passively compliant (Schlechty, 2002), where they would sing along because they felt they had to from fear of being told off by teachers. The fieldwork strategy where the

researcher would interview pupils after being observed in their lessons was instrumental to finding that pupils might seem genuinely engaged when observed, but instead feel under pressure to appear engaged by doing what is expected of them. This finding challenges the notion that engagement can be intuitively observed (Newman, 1986), and stresses the importance of methodical research strategies that discuss pupil engagement with pupils themselves, beyond classroom observations.

There was also some evidence of lack of engagement with the songs, defined by the researcher as no engagement at all. This was observed when only half the class would be observed as singing along to songs. Possible explanations as to why there was a lack of engagement with the songs are discussed in section 6.3.2.

There were less findings relating to how pupils engaged with the animations from the lessons, perhaps because they were a shorter component of the lessons compared to the songs. However, unlike with the songs, which pupils engaged with in different ways, there was only evidence of pupils positively and actively engaging with the animations. This included excitement from the animation noises, reactions of awe and shock and good behaviour and calmness where pupils were paying attention and being well-behaved. The animations having noises that elicited enjoyable excitement (Ballantyne, Fien & Packer, 2001) from pupils and helped them to emotionally engage (Zyngier, 2008) is a unique aspect (Inwood & Taylor, 2012) to multimedia education. The use of animated artwork helped to make lessons more experiential (Fragkoulis & Koutsoukos, 2018) for pupils. Pupils following the rules (Zyngier, 2008), being well-behaved, and displaying appropriate emotional (Zyngier, 2008) reactions during the animations may have been because there was less time for pupils to become bored or distracted as they could be with the longer songs. Indeed, the teachers reflected on the length of different components of the lessons and how the songs were too long for the children. This finding suggests that multimedia components of environmental education should be considerate of children's attention spans if they are to keep the children engaged throughout using simple messages (Strong, 1998).

There were several outcomes related to how pupils engaged with the multimedia from their lessons. Pupils had memories of the songs and could remember them, after hearing them in their lesson and then being interviewed immediately after, as well as several weeks later during family interviews when reflecting on their lessons. Pupils could also remember the

details and tune of the songs, sometimes voluntarily choosing to sing them in interviews, supporting previous conceptualisations of behavioural engagement (Zyngier, 2008) when pupils repeated the performance of songs from their lessons. Given the evidence that pupils engaged in different ways with the songs in their lessons, evidence that they could remember the songs suggests that regardless of whether they enjoyed the songs or not, they could still remember them. This supports previous research showing lasting effects on memory from music (Brown & Perry, 1991; Fonseca Mora, 2000; Hallam, Price & Katsarou, 2002; Wilcox, 1995). Pupils also had memories of additional multimedia like YouTube videos used by teachers in the lesson in an attempt to engage pupils, further indicating the role multimedia can play on memory.

Other outcomes of pupils engaging with the songs included them forming positive opinions and judgements, examples of emotional engagement (Zyngier, 2008). Pupils said it was fun to sing songs, they enjoyed the song, or liked the song but not the lesson. The enjoyment pupils got from the songs also helped pupils to remember the content of lessons. This finding supports previous research on how songs and audiovisual components can provide enjoyment (Ballantyne, Fien & Packer, 2001; Millington, 2011) and pleasure (Publicover, Wright, Baur & Duinker, 2018) for learners and implies a link between enjoyment of songs and memory. Pupils also said that certain songs were catchy, suggesting that the songs' ability to be remembered was appealing.

Pupils also liked certain songs compared to others and certain aspects of the songs, such as the same section of a song where other pupils had misbehaved (see section 4.2.), suggesting that pupils engaged with the songs in different ways and had different preferences (Publicover, Wright, Baur & Duinker, 2018), as pupils also enjoyed the variety of songs.

As well as pupils forming positive opinions and judgements about the songs, they also formed negative ones, where some songs were considered too long, again, confirmed by their teacher, or that certain songs were not considered catchy. This further indicates the idea of personal preference with music taste (Publicover, Wright, Baur & Duinker, 2018), as, what songs some pupils enjoyed, others did not. A link with memory and enjoyment is also further implied (Brown & Perry, 1991; Fonseca Mora, 2000; Hallam, Price & Katsarou, 2002; Millington, 2011; Publicover, Wright, Baur & Duinker, 2018; Wilcox, 1995), as some songs were not considered 'catchy'.

Another outcome of pupils engaging with the songs was the positive understanding that the songs were meaningful. However, there was also evidence of negative understandings where pupils had difficulty understanding songs and certain words used as well as the content and pace. Pupils also had intentions to discuss and action content learnt through the songs, and had intentions to share the songs with family. However, this was not always carried over in to actual discussion or action at home, similar to the intention-behaviour gap seen in other environmental research (Blake 1999, Carrington, Nevillle & Whitewell, 2010). This gap occurred for various reasons, including families being busy with their family routines (Waitt, Caputi, Gibson, Farbotko, Head, Gill & Stanes, 2012), children forgetting their intentions to discuss their lessons, and various communication issues discussed further in section 6.4.2., such as children and their parents only having basic conversations or a lack of communication generally, or discussions about the lessons getting lost among other communication when participants were 'doing family' (Morgan, 2011, p.6).

Although the focus of this thesis was mainly on potential spillover (Uzzell & Räthzel, 2018; Verfuerth, Gregory-Smith, Oates, Jones & Alevizou, 2021) of the education from the contexts of school and home, there was also some evidence of immediate action at school following the songs, such as turning off standby lights and after of the lessons had taken place, requests to the Headteacher to order litter pickers. Compared to some of the barriers that families faced in communicating the messages of the education (see section 6.4.2.) that resulted in a lack of impact on practice domains (see section 6.5.), such as the passing of time after a long school day, pupils taking action in the school context was up against less barriers relating to time such as having to remember the lessons and communicate content in amongst other discussions and routines of 'doing family' (Morgan, 2011, p.6; Waitt, Caputi, Gibson, Farbotko, Head, Gill & Stanes, 2012), as action and solution finding (Uzzell, 1999) was more immediate, often taking place in the environmental education lessons. Further research could be conducted into facilitators of immediate environmental action in school by pupils following engagement with multimedia environmental education.

With regards to outcomes that arose from pupils engaging with the animations, like with the songs (Hallm, Price & Katsarou, 2010) pupils had memories of the animations (Inwood & Taylor, 2012), sometimes prompted by seeing the animation stills in interviews. Pupils could remember details of the animations, confirmed by their teacher. These findings indicate a

link between animated artwork and memory that has not been found in previous research. However, there was also some confusion about the content of the animations suggesting that only certain animations were understandable and memorable for pupils. Previous research has indicated that children can be prone to misconceptions about certain environmental issues (Boyes & Stanisstreet, 1994), and are more likely to understand simpler messages (Strong, 1998). The short length of the animations may have meant that where the messages were obvious, they were understood, but if they were less clear, pupils did not have enough time to fully comprehend them. However, the songs were longer, but some were still misunderstood by pupils, indicating either issues with the clarity of particular songs and animations, or issues with children's understanding of some of the environmental issues (Boyes & Stanisstreet, 1994) in the songs or animations. The ages of the children in this research were younger at seven to 11 years old compared to the children in Boyes and Stanisstreet's (1994) study at 11 to 16 years old which may explain why some messages were misunderstood, given their younger development.

Like with the songs, pupils formed positive opinions and judgements from watching the animations. Pupils enjoyed the animations and considered them funny, suggesting that animations can provide pleasure and enjoyment for learners, like music (Millington, 2011; Publicover, Wright, Baur & Duinker, 2018) and audiovisual components (Ballantyne, Fien & Packer, 2001). There were also however, some negative opinions about the animations, where pupils disliked certain animations and considered them boring. Some pupils also considered the animations to be too simple, which was seen as negative, as they were considered childish. This, like with the songs, may have been a result of personal preference (Publicover, Wright, Baur & Duinker, 2018).

Other outcomes from pupil engagement were positive understandings from the animations, where pupils made links between the content of animations. There were also negative understandings, where there was some misunderstanding of the intended messages of the animations. KS2 pupils misunderstanding the messages of the animations is unsurprising, given previous research with 11- and 16-year-olds has indicated that these older children are prone to misconceptions and confusion about environmental issues like the greenhouse effect (Boyes & Stanisstreet, 1994). The animations were short and open to pupils' interpretation, which may have provided opportunities for misunderstanding and potential

confusion. Whereas with the songs, difficulties were with specific words or how the song was sung. The song was a much longer activity within the lesson, and more in-depth discussions took place around the songs, which might explain why there was less confusion with the content of the songs, as the teachers acted as facilitators (Uzzell, 1999) of these discussions and could clarify any confusion.

There was some evidence of multimedia components being discussed or actioned in the home. Pupils mentioned, sung or showed parents the songs on YouTube. The presence of multimedia allowed children to share their education in new ways with their family, beyond strategies like nagging and pester power, seen in previous research (e.g. Bridges & Briesch, 2006; Henry & Borzekowski, 2011). However, there was sometimes uncertainty as to whether the song was discussed, and there was evidence that the songs were sometimes not discussed at all. Pupils discussed the animations with their parents, and showed them the animations. There was also evidence of the animations not being discussed at home, sometimes purposefully in the case of Pupil 5 who chose not to discuss the emotionally charged (Ballantyne, Fien & Packer, 2001) Disposable animation as it featured a struggling giraffe, which was her parent's favourite animal. In this case, Pupil 5's concern for her parent's feelings acted as a barrier to discussion of the environmental education in the home (see section 6.3.2.).

In terms of whether the multimedia components from the lessons and how pupils engaged with them at school had any impact on practice domains in the home, there was only limited evidence that some of the content of the song, like turning off lights was translated in to action within the practice domain of energy. This real-world impact supports previous research that multimedia, including music, can help connect learners to real life situations (Ramsey, 2002) by encouraging them to take action on issues they connect with. Given that the lesson concerned with saving energy (i.e. 'Power Challenge') included a song and animation about turning lights offs, this may have made the issue of saving energy more tangible for pupils (De Bérigny, Gough, Faleh & Woolsey, 2014; Hanley, 2004), like how environmental education (Uzzell, 1999) such as Eco-Schools, underpinned by action-based frameworks focus on hands-on action for learners. The songs and animations helped pupils to discuss and action certain environmental practices (Bonnett & Williams, 1998).

Awareness of the underlying element of meaning (Shove, Pantzar & Watson, 2012) when energy saving and recycling as a waste practice was also gained within the family, linked to the content of the multimedia. Meanings are one underlying element of practices, along with materials and competences (Shove, Pantzar & Watson, 2012) that need to be disrupted (Giddens, 1984) or reconfigured in order to establish more environmentally friendly practices (Shove, 2017). Families establishing a new meaning underlying the practices of saving energy and recycling is an initial step in making these practices more environmentally friendly. However, if the materials and competences needed to carry out these practices are not reconfigured too, a new environmental practice is unlikely to be established within the family, as found in the research.

To conclude, pupils engaged with the multimedia components in their environmental education lessons in different ways. Pupils experienced some difficulties in understanding and remembering certain songs and animations. Songs provided pupils with opportunities to behaviourally engage with their education, with them enjoying these and the animations which helped them remember these components and subsequently discuss them at home. Given that music can be used as an effective educational tool (Ara, 2009; Paquette & Rieg, 2008; Jolly, 1975) to communicate complex topics and normalise pro-environmental behaviour (Publicover, Wright, Baur & Duinker, 2018), the multimedia, although useful, was not harnessed to its full potential. The power of music has been used to impact and inspire transformative environmental action, from advocacy (Publicover, Wright, Baur & Duinker, 2018) to social movements (Pepermans & Maeseele, 2017), and artwork used to understand ambiguity, encourage innovative thinking, develop supportive cultural norms (Eernstman & Wals, 2013) and provide aesthetic experiences that can help with transformative learning (Kokkos, 2010).

6.3.2. Factors impacting engagement with multimedia

Several underlying factors, including barriers and facilitators, were identified that impacted how pupils engaged with the multimedia from the environmental education and subsequently whether pupils then discussed or actioned the education at home with family.

With regard to the songs, a key barrier was pupils disliking singing generally. This is a major issue if environmental education is delivered via songs. The majority of research on music in

the learning process has only discussed the benefits of music on learners (e.g. Ara, 2009; Engh, 2013; Hallm, Price & Katsarou, 2010; Millington, 2011; Neisa, 2008; Ramsey, 2002). A musician in Publicover, Wright, Baur & Duinker (2018) discussed an issue with using music to engage learners with environmental issues. This was the issue of personal preference, and how 'if you're doing a class with a bunch of kids who are Miley Cyrus and Justin Bieber fans, it may be a little less effective to use a Neil Young song [from an earlier generation] to push the point' (Publicover, Wright, Baur & Duinker, 2018, pg. 8). Publicover, Wright, Baur & Duinker (2018) highlight a difficulty when using music in education, but do not discuss the issue of pupils disliking singing generally. Another barrier linked to a dislike of singing was pupils not wanting to sing in front of parents, which acted as a barrier to pupils discussing the multimedia in the home. Individual music taste was also identified as a barrier, which supports Publicover, Wright, Baur & Duinker's (2018) finding that for messages to be most effective, utilising learners' musical preferences is important.

Other barriers to pupil engagement with the multimedia were songs being too complicated (Strong, 1998) and taking time to explain, which impacted upon how they subsequently understood the messages (see section 6.3.2.). Facilitators to engagement included songs being considered catchy, supported by reflections from the teachers, and exposure to songs where they had been sung more than once, further implying a link between music and memory (Hallam, Price & Katsarou, 2002).

6.4. Studying communication in the family

Studying whether families discussed or actioned the environmental education pupils received in school and how (if at all), via different strategies of influence and communication styles addressed the research questions for this thesis (see section 2.4.). If environmental education is the key that unlocks the door to families becoming more environmentally friendly (Uzzell, 1999) then studying how such education is carried across the borders (Clark, 2000) of school and home was necessary. Research has looked at how children might bring school home (section 2.3.3.) following healthy eating interventions and campaigns at school (e.g. Ayadi, 2008; Pedersen, Grønhøj & Bech-Larsen, 2012) and how children might influence their parents via different strategies of influence when making purchase requests (section 2.3.2.). Studies have also shown the importance of communication (Uzzell, 1999) and family support (Ballantyne, Fien & Packer, 2001; Jay, Rose

& Simmons, 2018; Rose, Jay & Simmons, 2014; Uzzell, 1999), given that parental involvement in schooling can help children with their education (Bronfenbrenner, 1974, 1979; Comer and Haynes, 1991). According to social learning theory (Luszczynska & Schwarzer, 2005; Bandura & Walters, 1977), support from family and peers is crucial to securing a change of behaviour.

6.4.1. Strategies of influence

When family members did discuss or action certain lessons, several themes were identified. The children mentioned the lessons and certain components to their parents at specific times when performing relevant practices. Children tended to initiate conversations about the lessons, although there was also some uncertainty about who started the conversations. Gaining insight into social interactions is important in studies of social practices (Halkier, Katz-Gerro & Martens, 2011). Where lessons or certain components were mentioned by children, social interactions took place between family members (Epp and Price, 2008; Halkier, Katz-Gerro & Martens, 2011) in which their practices were often discussed, sometimes while performing a practice like eating lunch together. This performance of an existing practice acted as a prompt for discussion. For example, when routinely having lunch together, the topic of veganism and reducing meat consumption featured in the Meat Reducer lesson was sparked by their food consumption.

During these interactions, subtle strategies of suggestions and reminders were used by children as well as asking permission to action lessons. More direct strategies involved children 'telling off' family members, although this was short-lived. The content of the children's suggestions often involved restrictions and limitations to existing practices. In other studies where children have tried to influence their parent's behaviour, these interactions, based around the purchasing of food and other goods, are discussed as being more like a cooperative negotiation (Gram, 2015). The subtle versus direct strategy used by children to influence family members is similar to the distinction found in Pedersen, Grønhøj and Bech's (2012) study on a family healthy eating intervention. Children engaged in either more cooperative and helpful strategies or more direct demands. Children using direct demands might be considered similar to the narrative that children use 'pester power' to influence their parents, usually around the purchasing of goods (Lawlor & Prothero, 2010)

or ‘the nag factor’ encouraged by advertisers to prompt purchase requests from child to parent (Bridges & Briesch, 2015).

Nagging was found to be one strategy children used to action the environmental education with their family. Bridges and Briesch (2015) operationalised nagging on a scale, and defined nagging as occurring four or more times without any effect. Bridges and Briesch (2015) recognised that this type of persistent nagging may elicit frustration and cause stress for both child and their parents, resulting in it not being an effective strategy. In this thesis, nagging was not as persistent as Bridges and Briesch’s (2015) understanding related to product purchasing, with persistency being short-lived due to children forgetting to nag. Not wanting to personally acquire a product, and instead nagging family to turn lights off, may have been less intrinsically motivating for children and thus not directly impacting them (Foxman, Tansuhaj, & Ekstrom, 1989), hence why it was so short-lived.

Children may be more effective at influencing their families if they utilise more sophisticated ways of influencing their parents, that are more developed, more reciprocal and rely on more cooperative negotiation. Studies of older children who are effective at influencing their family members demonstrate the success of these more sophisticated strategies (e.g. Gentina & Muratore, 2012; Gentina & Singh, 2015). However, if these types of strategies are beyond the development range of KS2 children aged seven to 11 years, then questions are raised over the limitation of teaching children environmental education with the hope that they will influence their family’s practices. Instead, such intentions should perhaps be kept for older groups of students (Cullingford & Blewitt, 2013; Grønhoj & Olander, 2007; Jones, Delby & Sterling, 2010; Moore, 2005a; 2005b), and instead focus programmes on engaging younger pupils with environmental issues using multimedia (see section 6.3.1.) as an initial first step in changing household practices to become more sustainable. Researchers could then look at how persuasion develops to become more sophisticated, in the context of strategies of influence impacting environmental practices in the home.

The less sophisticated strategy of nagging that children used in this thesis, by reminding family members to turn lights off, was similar to Henry and Borzekowski’s (2011) concept of juvenile nagging, of constantly repeating or asking for something. However, as mentioned earlier, this constancy was short-lived by pupils. Henry and Borzekowski (2011) found that mothers viewed nagging interactions as interactions of conflict and talked of battles, losses

and victories, which may explain the reaction that some parents had in the research, of 'counter nagging' their children. This reaction of counter nagging by parents is a novel finding, as in Henry and Borzekowski's (2011) study, mothers dealt with nagging using strategies they described as good or bad and that they felt was more or less effective. Strategies included ignoring, giving in, yelling, distracting, calm consistency, avoidance, limiting commercial exposure, rules and negotiation, allowing alternative items and explanation. Strategies were grouped as either reactive or proactive depending on who was considered to be in control of the situation. The counter nagging reaction or parental response strategy (Palan and Wilkes, 1997) from parents in this thesis seemed to be reactive, as a direct response to children taking expert status (Uzzell, 1999), reversing traditional roles of socialisation (John, 1999; Maccoby, 2007; Snyder & Purdy, 1982; Whitbeck & Gecas, 1988) and nagging the parents.

In contrast to juvenile nagging, other studies have found that even by the age of five years old, children can make use of sophisticated negotiation strategies for their age in order to persuade their parents to fulfil their demands (Valkenburg & Cantor, 2001; Kuczynski & Kochanska, 1990; Kuczynski, Kochanska, Radke-Yarrow & Girnius-Brown, 1987; McNeal, 1992), particularly if negotiation plays an important role in family communication. However, negotiation was not a strategy used by the children in this thesis. Instead, the children used a range of strategies that were either subtle or more direct, and often involved mentioning the lessons or asking parents to do something.

Palan and Wilkes (1997) identified seven different strategies of influence of bargaining, expert, persuasion, legitimate, directive, emotional and request and parental response strategies in their study on adolescents influencing their parents. Palan and Wilkes found that adolescents were most successful when they emulated adult strategies. The only strategy that children used in this thesis that was similar to one identified in Palan and Wilkes's (1997) study was persuasion. As discussed previously, the children in this thesis used more juvenile, less sophisticated strategies of influence involving nagging and making requests, that were less successful and short-lived, reflective of their age and development.

Gentina and Singh (2015) in their study identified other bargaining strategies in adolescents, dependent on parental styles and culture. These strategies included striking deals involving money, which was not found in this thesis. Adolescents in Gentina and Singh's (2015) study

also used reasoning, which can be defined as 'use of logical arguments intended to reach an agreement with parents' (p. 7590; Palan & Wilkes, 1997), which again seems like a sophisticated strategy reflective of adolescents' level of development, as the children in this thesis did not use such reasoning and were much younger. Gentina and Singh (2015) also found that adolescents used persuasive strategies including nagging, which was a prevalent strategy used by children in this thesis. Perhaps where children are used to being told what to do by their parents according to traditional models of socialisation (see section 2.3.1.), they were copying strategies that they are used to receiving from parents as part of being the child learner (Snyder & Purdy, 1982) and being brought up and raised by parents (John, 1999; Maccoby, 2007; Whitbeck & Gecas, 1988).

There is evidence from Gentina and Singh (2015) that children who used nagging techniques had mothers who had more authoritarian parental styles. One explanation as to why the persuasive strategies of nagging used by children were not effective in having an impact on home practices was that the strategies did not offer mutual gain for both child and parent, such as through negotiation (Kuczynski & Kochanska, 1990, Kuczynski, Kochanska, Radke-Yarrow & Girnius-Brown, 1987; Lawlor & Prothero, 2011; McNeal, 1992; Valkenburg & Cantor, 2001), instead on the child focused on getting their own way (Gentina & Singh, 2015; Palan & Wilkes 1997). Gentina and Singh (2015) found that adolescents who used unilateral strategies of persuasion, involving persistence and nagging were the least effect at influencing their parents' environmentalism, which may help to explain why the nagging strategy of children in the current research did not have much impact on parents and the practices of the family.

Family members were involved in discussions and actions of the lessons through the ways they reacted to the child. These reactions were divided into supportive and resistant reactions. Supportive reactions involved parents allowing the child to action their education, supporting proposed changes to practices and helping with the child's homework relating to their lessons. To have reciprocity in the influence process, parents and children need to be willing to be influenced by each other (Uzzell, 1999). The social context, such as the family setting, can help facilitate participation and change (Ballantyne, Fien & Packer, 2001; Bandura & Walters, 1977; Uzzell, 1999) and so it is important for families to support children

in their engagement with environmental education and help support changes at home, as was the case with the supportive reactions by family members.

Resistant reactions included negative responses from family members, with siblings being particularly resistant. This finding is novel and has not been previously documented in the literature. These resistant reactions often followed a request or an action by the pupils to turn off gadgets or lights when they were in use, which may explain the frustration experiences by the siblings, and thus a negative, resistant reaction to the pupils, who did so in an attempt to save energy. The siblings were also in different classes to the pupils involved in the school-based fieldwork, either at the same school, or a different school, and did not receive the environmental education lessons. These siblings did not have the opportunity to engage with the content through the multimedia delivery and have a chance to understand its messages, like the pupils did.

Parents 'counter nagged' children when children suggested actioning their lessons and parents even used environmental friendliness as a reason to tell children off. In Lawlor and Prothero's (2011) study on purchase requests, parents reacted to interactions with their children in ways of agreement, refusal, procrastination or negotiation. Also, Lawlor and Prothero (2011) said how the children understood these reactions. The findings in this thesis did not necessarily point to the children understanding the reactions of their family members, only that they might anticipate their reactions. In this thesis, family members reacted in similar to ways to those in Lawlor and Prothero's (2011) study, with siblings resisting and refusing to support the action of the environmental education by the child. Parents 'counter nagging' children could be considered a method of negotiation by parents, as seen when one child suggested how the family could turn off their TV to save energy and her Mum suggested that instead the child spent less time on her iPad. Both family members were referring to saving energy in their practices and so are agreeing in some sense. However, their exchange was not like the 'good natured "game"' observed in Lawlor and Prothero's (2011, p.561) study. Instead, the parent reacted to a challenge by the child, linked to the willingness, or indeed reluctancy, to fulfil the role of pupil and of being told what to do by her child, identified previously by Uzzell (1999). The parent was telling off her child by countering her, as she did not seem happy being told what to do and being in the position of pupil.

There was evidence of family members being in agreement (Lawlor & Prothero, 2011) with the child by way of a supportive reaction. This agreement often took place once the child asked permission to action a certain practice, such as reusing a milk bottle during playtime, growing strawberries or taking more environmentally friendly transport on holiday. Although the parents showed support in their agreement, this asking of permission by children as an attempt to influence decisions (Ekström, 2007) about practices, and subsequent allowance by parents demonstrates that the parents had ultimate control (French & Raven, 1959; Recchia, Ross & Vickar, 2010) over the practices that the children asked to change, reflecting intergenerational power dynamics. If parents saw nagging as a conflict with their children, and children also had less control in the home, these factors work together to result in lessons, when they are mentioned, not having much impact on home practices.

Studies of spillover, defined as 'an effect of an intervention on subsequent behaviors not targeted by the intervention' (Truelove, Carrico, Weber, Toner, Raimi, & Vandenbergh, 2014, p.128), tend to focus on transfer across domains, such as waste behaviours and energy conservation (Poortinga, Whitmarsh, & Suffolk, 2013; Thøgersen & Ölander, 2003). This thesis did not find any evidence to suggest a transfer of pro-environmental action across practice domains of energy, water, waste, travel and food, however limited contextual spillover (Uzzell & Räthzel, 2018; Verfuerth, Gregory-Smith, Oates, Jones & Alevizou, 2021) between school and home was considered to take place given that the messages delivered at school translated to limited impacts to energy, waste and travel practices. A child learning education at school and coming home to potentially discuss or action it can also be seen as 'border crossing' (Clark, 2000) between the two contexts or institutional logics (Thornton, Ocasio, & Lounsbury, 2012) of school and home. Communication about school and homework from school are like Clark's (2000) permeations between borders, similar to 'insights from work' and 'work brought home', about elements from other domains entering each other (Beach, 1989, Hall & Richter, 1988; Piotrkowski, 1978). Clark (2000) said that when borders are flexible, and permeability occurs, then blending of borders occurs. Communication and homework may have helped the borders between school and homework become more flexible.

To conclude, children tended to initiate discussions about their environmental education, at times suggesting family members action the action, which occasionally was actioned (see sections 5.2.1. and 5.3.). By using less sophisticated strategies, compared to older children and adolescents (e.g. Gentina & Muratore, 2012; Gentina & Singh, 2015) of nagging, with limited evidence that such interactions were based on negotiations with family members, this often elicited resistance from family members, such as the novel finding of 'counter nags'. When children asked permission to action their education, more supportive reactions were evidenced by family members, but parents had ultimate control and power (French & Raven, 1959; Recchia, Ross & Vickar, 2010) over whether children were allowed to action the environmental education they had received and engaged with in school, and thus, acted as the gatekeepers for environmental education having an impact on practices within the home.

6.4.2. Factors impacting communication of environmental education

Facilitators regarding communication included discussions of the school day being habitual and routinised as part of 'doing family' (Morgan, 2011, p.6). Parents actively asking about their child's school day, children perceiving that their parents might have an interest in the topic and being in the right frame of mind were other facilitators. Enjoyment was also derived from these conversations, acting as further motivation for them taking place.

A facilitator identified by Uzzell (1999) was the environment being regarded as an appropriate topic for discussion within the home, and parents having pre-existing concern and knowledge for environmental problems (Uzzell, 1999). This thesis found that a facilitator to discussion was instead the children having pre-existing knowledge of environmental issues. Such knowledge then interested them to engage with their lessons, which is supported by another finding by Uzzell (1999), that a barrier to children influencing their parents' environmentalism was a lack of knowledge about environmental problems. Parents also enjoyed listening to certain songs that were shared with them by their children which acted as another facilitator, indicating that enjoyment (Millington, 2011) and pleasure (Publicover, Wright, Baur & Duinker, 2018) from musical songs used in education can extend beyond the immediate learner. Relating to school, children being interested by their education generally and enjoying practical, tangible (De Bérigny, Gough, Faleh & Woolsey,

2014; Hanley, 2004) and hands-on (Uzzell, 1999) activities were other facilitators to engagement with their environmental education.

In terms of barriers, communication issues linked to how families were busy 'doing family' (Morgan, 2011, p.6) and involved in their routine practices like 'driving to work, picking up the kids' (Waitt, Caputi, Gibson, Farbotko, Head, Gill & Stanes, 2012, p.52) involved conversations between children and parents often being basic, or discussions about the lessons getting lost among other communication, children forgetting about the lessons, parents not paying attention or not being aware of the children's intentions to action their lessons, or there being a lack of communication generally. This meant that often, children's intentions to discuss or action their environmental education (see section 4.3.4.) were not carried out, similar to an intention-behaviour gap identified in previous environmental research (Blake 1999, Carrington, Nevillle & Whitewell, 2010). Other barriers included the children not having any homework linked to some of their lessons, thus not facilitating the crossing of flexible borders of school and home (Clark, 2000), the school not including the parents in school activities (Jay, Rose & Simmons, 2018; Rose, Jay & Simmons, 2014), the children perceiving themselves as not learning much at school, having long school days after attending afterschool clubs and being collected from school by extended family members.

Environmental education programmes might benefit from having homework for all topics that can 'spillover' (Uzzell & Räthzel, 2018; Verfuerth, Gregory-Smith, Oates, Jones & Alevizou, 2021) and cross borders (Clark, 2000) and be actioned through relevant energy, water, waste, travel and food practices performed at home. For example, extending pupils' schoolwork of designing a meat-reducing menu by encouraging pupils to be hands-on (Hanley, 2004) and cook a meal from the menu with family members at home. This would further allow pupils to play an enhanced role in environmental action (Bonnett & Williams, 1998). Encouraging conversations with family members as part of this homework might also help with the education having more of an impact, particularly if children are encouraged to use more sophisticated strategies beyond nagging family members. Completing the existing homework tasks featured in the Project Earth Rock lessons as a family, yet not discussing them and how they are relevant to their practices may have explained why there was a lack of impact to the practices of families, despite parents being involved in such homework (Rose, Jay & Simmons, 2014), like the Water Story water tracking. Conversations could

involve families questioning the 'taken-for-granted' (Morgan, 2011) quality of resource intensive practices like showering, how they take hold in society and might be changed to become more sustainable (Shove, 2010; 2017). Questions might include ones like, 'why do so many people pour so many litres of water over themselves to clean a few specks of dirt on such a regular basis?' (Shove, 2017), as part of monitoring families' own water use. Schools perhaps sharing the topics that children are learning about could also help encourage 'border crossing' (Clark, 2000) between school and home and encourage communication about environmental education, particularly when parents are interested in a specific topic, or existing practices relevant to the children's education are already being practised in the family, showing their competence (Shove, Pantzar & Watson, 2012) and skill (Davies, 1998; 2010). Other times, after developing their own concern (Uzzell, 1999), pupils deliberately chose not to share messages from the lesson content with family members, despite them emotionally engaging with them (Finn, 1989; Fredricks, Bluemnfeld, Friedel & Paris, 2005; Zyngier, 2008), which is an issue if environmental messages, like plastic pollution in the case of Disposable, are emotionally charged for pupils and affect things they care about, like wildlife and animals (Ballantyne, Fien & Packer, 2001). How environmental educators might effectively navigate such issues needs further study in future research.

It was also evident that within the families, the parents, as well as the children had different roles related to their home practices and division of household chores. Mums, with the help from their children, often performed recycling practices, with one mother naming herself 'the Recycling Queen'. This supports Oates and McDonald's (2006) finding that women tend to initiate and sustain recycling practices, much like other domestic labour tasks. In contrast to Oates and McDonald's (2006) finding that households tend to perform recycling practices automatically and find it challenging to describe the details of their practices, participants, in particular the children in this thesis, ably explained the processes and systems they used to take their rubbish from the house to the garage and to the curb side for recycling, demonstrating the competence needed to perform recycling practices (Shove, Pantzar & Watson). This suggests that perhaps in contrast to their parents, that the children enjoyed their role of being involved in the system of sorting waste (Scott, Oates & Young, 2015) and were familiar with the process, with the practice of recycling becoming routinized (Giddens, 1984; Reckwitz, 2002). Fathers were often found to be the family member who controlled lighting and heating, practices related to bills and financial outputs for the family, which is

supported by research indicating that males are more likely to be involved with the management of energy-related bills (Brounen, Kok & Quigley, 2013).

6.5. Understanding (the lack of) impact on home practice domains

Studying families and how their practices might have been disrupted (Giddens, 1984) by pupil engagement with environmental education was carried out because families have significant carbon footprints (Druckman & Jackson, 2008), and 'the conduct of family life and personal relationships has profound consequences for environment and sustainability issues' (Jamieson, 2016, p.336). Section 6.5. discusses any impacts, or lack of impact to home practice domains following pupil engagement with environmental education at school and discussion and action in the home.

Regarding waste management practices, composting, reusing and recycling were all practices that were discussed or actioned following the pupil's Compost and Grow and Disposable lessons. One family had said they had since started doing more composting. This was helped by the size of their garden, an infrastructural related resource element (Shove, Pantzar & Watson, 2012) underlying the practice of composting that acted as both a facilitator and barrier for families. Shove, Pantzar and Watson (2012) wrote about how resources can help or hinder the performance of a practice. One family composted more since the lessons, acknowledging that they had a good size garden which helped. By contrast, four families stated how they were not able to perform compost practice due to issues with their garden size, or lack of garden entirely. This emphasises the need for adequate materials to perform practices (Shove, Pantzar & Watson, 2012). After pupils engaged with their Compost and Grow lesson at school, they came home and discussed the lesson with their family, and this underlying element of garden size then either restricted families' performance of the practice of composting, or fostered it. See sections 6.5.1. and 6.5.2. respectively for further discussion of barriers and facilitators to change.

Regarding waste management practices, one family talked about how they reused certain items (Grodzinska-Jurczak, Bartosiewicz, Twardowska & Ballantyne, 2010), and how when they recycled there seemed to be a change in understanding (Schill, Godefroit-Winkel, & Hogg, 2020), or meaning (Shove, Pantzar & Watson, 2012) underpinning the process (Scott, Oates & Young, 2015) and practice of recycling. This was likely aided by the pupils' teacher

bringing in objects for the lesson about waste with the intention to engage pupils and make the concept of waste and decomposition tangible (Hanley, 2004), given that Pupil 3 remembered her teacher bringing in supplementary objects and shared this with her parents. Seeing the tangible (Hanley, 2004) object of a disposable nappy in the context of an activity discussing how long certain materials took to decompose provided meaning (Shove, Pantzar & Watson, 2012) to Pupil 3 that contributed to her understanding (Schill, Godefroit-Winkel, & Hogg, 2020) of why waste items should be reused.

Energy use practices involved changes to lighting, in particular with pupils turning lights off. Children were often not involved with heating practices, not being responsible for bills (Brounen, Kok & Quigley, 2013), an issue acknowledged by a teacher in the energy-related lessons, and so turning off lights was perhaps a simple (Strong, 1998) and more accessible environmentally 'friendly' action (Boyes & Stanisstreet (1994) for them to perform and a way that they could have some control over energy practices. This finding provides implications for how environmental education programmes are designed, as they need to target practices that children actually have control over.

In terms of travel practices, changes to the types of holidays that families wanted to take, including more local camping trips rather than flying abroad were in part attributed to the environmental education, such as the You Don't Have To Fly lesson and its animation advocating local trips as opposed to flying. These types of holidays were seen as enjoyable and nostalgic which provided powerful underlying meanings that motivated taking these types of holidays (Shove, 2017).

There was no mention of any changes to food practices, beyond continuing to perform the practice of growing one's own food, which was an existing practice already for some families. In this sense, the education can be seen to have strengthened this existing practice, as Pupil 5 expressed an interest to perform it again, following engagement with the 'Compost and Grow' lesson. The lessons about food focused on locally sourced food, and in particular, reducing meat consumption. According to research, children are more involved in the purchasing habits of their household than in the past (Bandyopadhyay, Kindra & Sharp, 2015), which may act as leverage for them to influence family food shopping habits, including suggestions of buying less meat. As evidenced in this thesis, children did not

however action food practices relating to meat, instead children were more engaged with practices relating to other domains like energy and reducing energy use using simple (Strong, 1998) actions like turning lights off. Children showed an interest in growing their own food, particularly in a family where they had previously done so before, due to this experience providing underlying competence (Shove, Pantzar & Watson, 2012) to the practice of growing one's own food. Competences are crucial for the performance of social practices (Shove, Pantzar & Watson, 2012), as a person needs to have the necessary skills, know-how and techniques to perform them.

As well as this thesis identifying no changes to families' food practice domain, there were also no changes mentioned to water use practices despite involvement from parents (Bronfenbrenner, 1974, 1979; Comer and Haynes, 1991) in the water use tracking homework, and discussions in the family. This lack of change in the domain of water contrasts with previous research on environmental education having an impact on energy-saving practices in the family (Fu & Liu, 2017; O'Neill, 2015). Notably, some parents explained how they only discussed the water-related lesson and homework with their children; their children had not explicitly asked them to take any action. Uzzell (1999) found that when children did influence their parents' environmentalism, they did so only rarely which may explain why children in the present research had no impact on some of their family's practices. However, it is not clear why this lack of change was specific to the domains of food and water, and why there were changes, although minimal, to domains of waste management, energy use and travel. Previous research recognises that most families do not necessary focus on commodities like energy and water that they use when performing everyday practices (Foden, Browne, Evans, Sharp & Watson, 2018; Waitt, Caputi, Gibson, Farbotko, Head, Gill & Stanes, 2012) despite the 'Water Story' homework asking families to track their usage of water, and so why there was a specific lack of impact to the domains of food and water, compared to energy, waste and travel, needs exploring further (see section 7.8.). Gibson, Farbotko, Gill and Waitt (2013) noted that household sustainability issues were often rife with contradictions and uncertainty which might go some way to explain why some domains were impacted more than others. Other outcomes in the family following the environmental education included raised awareness and

meanings (Shove, Pantzar & Watson, 2012) underlying certain practices and less resistance from children when asked to perform practices by parents.

6.5.1. Barriers to change

Barriers related to elements underpinning social practices (Shove, Pantzar & Watson, 2012) were identified, of materials and resources relating to time, money and infrastructural issues of service provision provided by local councils and garden size. Meanings were another social practice element that acted as a barrier, including environmental friendliness not being an explicit motivator for some families (Hall, 2015). In Pedersen, Grønhøj and Bech-Larsen (2012)'s study, barriers for the intervention about healthy eating being actioned at home were similarly factors of time and cost, indicating that these are general barriers to actioning schoolwork in the home via the changing of practices, not specific to the Project Earth Rock resource.

Another barrier was children not being involved or having a lack of control in certain practices in the home, with adults essentially having more control over and specific roles in the performance of practices (e.g. Brounen, Kok & Quigley, 2013; Oates & McDonald, 2006), where parents would adopt the role of expert and the child as minority status (Uzzell, 1999). These findings reflect traditional models of socialisation processes (see section 2.4.2) where parents typically teach their child how to live in a society or culture (Brim, 1966; Grønhøj & Thøgersen, 2009; Maccoby, 2007). As Uzzell notes, 'it is adults who need to institute and engage in changed behaviours, adults who are parents but who are also consumers, industrialists, community leaders, educators and policy and decision makers in all walks of life' (Uzzell, 1999, pg. 397).

Existing practices, routines (Giddens, 1984; Reckwitz, 2002) and awareness were other barriers. Linked to this was justifications and exceptions for existing practices and a reluctancy to change them to become more sustainable, due to this requiring effort, much like the difficulties in translating intentions to effortful pro-environmental behaviour (Blake 1999, Carrington, Nevillle & Whitewell, 2010). Such factors might explain the lack of impact on home practices, including to water and food domains, despite the environmental education relating to these domains being discussed in the family.

6.5.2. Potential facilitators to change

Facilitators that potentially helped the environmental education impact practices included elements underpinning social practices (Shove, Pantzar & Watson, 2012), including skills, competences and experience, meanings and health being a key motivator, and resources and infrastructure of time and money. These findings are similar to factors identified as barriers to change, and highlight how the elements underpinning social practices can help drive their performance (Shove, Pantzar & Watson, 2012). For example, time and money as resources underpinning practices meant that families felt more able to perform more sustainable practices when they had more time and money or these practices were quicker or cheaper compared to less sustainable practices, and families were less able to perform these practices if they would cost more time or money. This is highlighted when one parent (see section 5.4.1.) discusses how a lack of regular school holiday time negatively impacts the holiday choices of the family.

Similar to some of the elements underlying social practices like resources of time and money (Shove, Pantzar & Watson, 2012), a couple of factors underlying who in a family discussed and actioned the environmental education, how it was discussed, and the outcome on different practice domains were identified as acting as both barriers and facilitators. These factors again related to elements underlying social practices, of resource and infrastructural elements of garden size. Garden size has been cited as a barrier in previous research on growing one's own food (Kortright and Wakefield, 2011), and so it being identified as an infrastructural (Shove, Pantzar & Watson, 2012) barrier as well as a facilitator to composting practices was a novel finding. Resources linked to routines (Giddens, 1984; Reckwitz, 2002) and habits as part of 'doing family' (Morgan, 2011, p. 6) were also factors acting as both facilitators and barriers, as well as practical delivery of the environmental education in terms of the time of day the lessons were delivered. This was discussed as being linked to pupil's attention spans, tiredness and whether they were likely to communicate their learning with family at the end of the day (see section 5.4.3.).

Other environmental educators in their educational programmes might benefit from focusing more heavily on the meanings that motivate the performance of pro-environmental practices (Shove, Pantzar & Watson, 2012) and be cautious in highlighting

practices that require stretching already constrained resources like time. For example, local family holidays could be advocated for by highlighting the meaning of spending time together and the enjoyment of certain types of holidays like camping, as found in the research, further bolstered by less time being spent travelling to holiday destinations. In terms of water-related practices, emphasising the meaning of getting clean, instead of focusing on the material of water might also help in the advocacy of shorter, less resource-intense showers. Programmes that aim to highlight these potential facilitators to change could be studied in future research, to assess whether such education, with social practice theory at its heart, impact upon practices when pupils engage with programmes and discuss them at home with their family.

6.6. Chapter conclusion

To summarise, an updated theoretical framework based on an integration of the school and family-based findings (see Chapters 4 and 5 respectively) was presented. The findings were integrated and discussed in depth to address the research questions for this thesis (see section 2.4.), in relation to previous literature (see Chapter 2). Themes relating to multimedia environmental education were discussed in section 6.3., in terms of pupil engagement with multimedia components (section 6.3.1.) and factors impacting engagement (section 6.3.2.). Overall, multimedia was engaged with positively, leading to enjoyment and memory of lessons. However, multimedia also created some unique issues that impacted pupil engagement. Communication in the family was discussed in section 6.4. with regard to the different strategies family members used to influence discussion and action of the environmental education (section 6.4.1.), and factors impacting this process (6.4.2.). Children tended to initiate communication, and children would often nag family members or ask permission to action the education on their practices. The impact of environmental education and discussion and action on practices was discussed in section 6.5., mostly with reference to energy, waste and travel domains, with underlying factors of barriers and facilitators explaining the impact, or lack of impact presented in sections 6.5.1. and 6.5.2 respectively. Following on from a discussion of the findings from the fieldwork of this thesis, the contributions to literature, theory, methodology and environmental education practice from this thesis are discussed in Chapter 7: Conclusion.

Chapter 7: Conclusion

7.1. Chapter introduction

Chapter 7: Conclusion includes a thesis summary in section 7.2, contributions to theory and literature in section 7.3., methodological contributions in section 7.4. and practical contributions to environmental education practitioners in section 7.5. Contributions to policy are discussed in section 7.6. and limitations of the research in section 7.7. Section 7.8. addresses these shortcomings by proposing avenues for future research. In section 7.9. the impact of COVID-19 on the research is discussed, followed by a chapter conclusion in section 7.10.

7.2. Thesis summary

Given the potential of music and artwork as educational tools to engage learners (Ara, 2009; Engh, 2013; Hansen, 2009; Inwood & Taylor, 2012; Krashen, 1982; Morales Neisa, 2008) and people in environmental issues (Pepermans & Maeseele, 2017; Publicover, Wright, Baur & Duinker, 2018) and the consequences and impacts of family life on the natural environment (Druckman & Jackson, 2009; Jamieson, 2016), this thesis investigated the impact multimedia environmental education had on pupils, their families and the practices they carried out within the home using home practice theory (Foden, Browne, Evans, Sharp & Watson, 2018; Gibson, Farbotko, Gill & Waitt, 2013; Lane & Gorman-Murray, 2011), derived from social practice theory (Shove, Pantzar & Watson, 2012). Observations in the school classroom setting and individual and group interviews with pupils, family members and teachers were conducted in four primary schools with 19 families across Essex, Gloucestershire and Dorset in the UK. Pupils were found to engage with multimedia in different ways, and although pupils experienced some difficulties with the content and messages, songs and animations were found to be engaged with positively, with pupils enjoying them and remembering their environmental lessons as a result. Different strategies were used by family members when discussing and actioning the environmental education, namely nagging or the use of ‘pester power’ and asking of permission by children, with family members both supporting and resisting requests, such as via ‘counter nags’ or by allowing children to make changes to practices. Minimal impacts were found on practices within the domains of travel, energy and waste management, including new meanings being established underlying certain

practices. No impact was found to water and food practice domains. In terms of pupil engagement and discussion and action of the environmental education at home, numerous underlying factors impacting any process of change were identified. Findings were supported by previous literature, as well as provided several novel findings, like the reactions of siblings and parents to the requests of pupils. This thesis offers contributions to environmental education practitioners as well as to theory and literature and methodology.

7.3. Contributions to theory and literature

This thesis drew upon literature from multiple fields, including educational engagement, environmental education, multimedia methods, socialisation, family communication and decision making, spillover research and border theory and social practice and home practice theory (see Chapter 2: Literature Review).

The application of an alternative model of social practice theory (Shove, Pantzar & Watson, 2012) to understanding household sustainability issues (Foden, Browne, Evans, Sharp & Watson, 2018; Gibson, Farbotko, Gill & Waitt, 2013; Lane & Gorman-Murray, 2011) and the findings of this thesis contribute to related literature on eco-socialisation (Gentina & Muratore, 2012; Gentina & Singh, 2015), as well as literature on family communication and decision making (see section 2.3.2.), in terms of understanding how children tend to initiate conversations, often employing pester power strategies like nagging (Bridges & Briesch, 2006; Henry & Borzekowski, 2011) about making environmental changes at home, following engagement with environmental education at school. For example, how the underlying elements (Shove, Pantzar & Watson, 2012) of practices, like the material of an adequately sized garden, are instrumental for the performance of the practices like composting, is a novel contribution, in the context of also studying how pupils positively engage with education about composting, and go home with an intention to practise this with family members. The supportive and resistant responses identified from family members also contributes to research on parental reactions to requests made by children (Lawlor & Prothero, 2011; Palan and Wilkes, 1997), with some findings, such as when parents allowed children to take action, and how children felt they did not have much control over practices, supporting research on traditional models of socialisation from parent to child (John, 1999; Maccoby, 2007; Snyder & Purdy, 1982; Whitbeck & Gecas, 1988). The findings relating to

the responses of siblings following action by pupils in the home was a novel contribution to the literature, as sibling involvement in environmental education impacts in the home has not been previously researched.

This thesis provides theoretical contributions through the application of social practice (Giddens, 1984; Hargreaves, 2011; Reckwitz, 2002; Schatzki 1996; 2002; Shove, Pantzar & Watson, 2012; Warde, 2005) and home practice theory (Foden, Browne, Evans, Sharp & Watson, 2018; Gibson, Farbotko, Gill & Waitt, 2013; Lane & Gorman-Murray, 2011) to exploring the impacts of environmental education. Social practice theory has not before been applied to explore impacts of environmental education, and intervention-based pro-environmental research has been criticised as lacking properly documented theoretical underpinnings when evaluating its effectiveness (Matthies, Klöckner & Preißner, 2006; Staats, Harland & Wilke, 2004; Steg, Van Den Berg & De Groot, 2013). Understanding has been gained in terms of how environmental education impacts practices in the home, including the meanings, materials and competences (Shove, Pantzar & Watson, 2012) such as time and money and experience that underlie practices and how these can act as factors that help or hinder any change. The updated theoretical framework based on the findings of this thesis (see Figure 6.1) illustrates the process of how, in certain instances, active pupil engagement with environmental education had an impact on practices, such as with the composting lesson, and how negative or a lack of pupil engagement, where pupils experienced challenges with certain lessons or had no intention to discuss or action content, resulted in no change to the practices of family. Subsequent publications of the findings of this thesis within the fields of environmental education will also provide further contributions to theory and literature.

How pupils engaged with a multimedia environmental education programme was reconceptualised beyond existing understandings of pupil engagement as how pupils think, feel and behave in school (Fredricks, Bluemnfeld, Friedel & Paris, 2005), encompassing cognitive, emotional and behavioural engagement (Finn, 1989; Zyngier, 2008). Through observations in the field (Hammersly & Atkinson, 2007) of the classroom setting and semi-structured interviews with pupils, using a novel card sorting exercise (Tinson, 2009) where they reflected on their engagement, conceptualisations of engagement as active, passive or lacking and either positive or negative were identified, and contribute to understandings of

how pupils might engage with environmental education programmes in the classroom setting. Previous understandings of passively compliant engagement (Schlechty, 2002) were supported. Contributions were made to literature on behavioural engagement (Zyngier, 2008) within the context of this thesis, as, despite the documented benefits of multimedia engaging learners through underlying mechanisms such as memory (see section 2.2.3.), multimedia components of songs and animations were found to be problematic at times when pupils became distracted by their use when they behaviourally engaged with them. Such contributions to theory and literature can be considered a contribution of originality (Corley & Gioia, 2011), whereby the understanding of how families navigate environmental issues, following education on such issues, has been advanced.

This thesis helped to respond to the demands of groups like Teach the Future (https://www.teachthefuture.uk/) and Fridays for Future (https://fridaysforfuture.org/) for education on environmental issues (Burns, 2020), given that this was a missing component of the compulsory National Curriculum in UK primary schools at the time of this thesis (UK Government, 2013). This thesis contributed by filling a gap in the literature, where the impacts of environmental education, including multimedia environmental education, have been less documented with primary school children (Grønhoj & Olander, 2007), compared to older learners, such as university students (Cullingford & Blewitt, 2013; Jones, Delby & Sterling, 2010; Moore, 2005a; 2005b). A key contribution of this thesis was through the exploration of multimedia methods (Rohwedder & Alm, 1994) and the combination of musical songs and animations within the Project Earth Rock programme and how it helped to positively engage pupils, through the mechanisms of memory (Brown & Perry, 1991; Fonseca Mora, 2000; Hallam, Price & Katsarou, 2002; Wilcox, 1995) and enjoyment (Millington, 2011; Publicover, Wright, Baur & Duinker, 2018). However, multimedia components also, at times, distracted and disengaged pupils from environmental messages (see section 6.3.). This contribution filled a gap in the research where studies of the impact of environmental education have not explored or utilised the educational potential of multimedia (Kagan & Kirchberg, 2016) to engage people in environmental issues, as seen in a previous body of literature (e.g. De Bérigny, Gough, Faleh & Woolsey, 2014; Eernstman & Wals, 2013; Fragkoulis & Koutsoukos, 2018; Hanley, 2004; Inwood & Taylor, 2012; Jonze, 2018; Kokkos, 2010; Publicover, Wright, Baur & Duinker, 2018; Ramsey, 2002). Previous research (Ara, 2009; Engh, 2013; Hallam, Price & Katsarou, 2002; Millington, 2011; Neisa,

2008; Ramsey, 2002) has focused primarily on the benefits of using multimedia like music in education. However, this research helped to highlight some of the nuances involved in its implementation.

The findings of this thesis relating to the impacts to energy, waste and travel practice domains following pupil engagement with environmental education at school, although minimal, contribute to literature on contextual spillover, within the contexts of school and home which is less studied than contextual spillover from work to home (Uzzell & Räthzel, 2018; Verfuerth, Gregory-Smith, Oates, Jones & Alevizou, 2021). This research builds on a body of existing literature where social practice theory has been used to understand spillover (Nash, Whitmarsh, Capstick, Hargreaves, Poortinga, Thomas, Sautkina, & Xenias, 2017; Uzzell & Räthzel, 2018) and the elements that make up a social practice (Shove, Pantzar & Watson, 2012). Similarly, crossovers of institutional logics (Thorton, Ocasio & Lounsbury, 2012) in terms of border theory (Clark, 2000) can also be considered, as messages about environmental practices delivered in pupils' school setting were carried across the borders and logics of school, to the family home, having a limited impact on family practices.

7.4. Methodological contributions

This thesis used a qualitative approach, underpinned by an interpretivistic epistemology (Tuli, 2010), to explore how the realities of multiple families (Hammond & Wellington, 2012; Inglis & Thorpe, 2012; Easterby-Smith, Thorpe & Jackson, 2015) might become more environmentally friendly through changes to their practices following environmental education. Fieldwork took place in the field of schools and homes (Hammersly & Atkinson, 2007) where the researcher was immersed in the culture and group (Tuli, 2010) of 19 families and four schools across three counties of the UK. Children were involved in discourses about how they engaged with their education (Zyngier, 2008), through pupil interviews after the environmental education lessons. The use of tours around family homes to provide insight in to the practices of families was novel in this context, considering previous research utilising this method (Mateas, Salvador, Scholtz & Sorensen, 1996; Saxbe & Repetti, 2010), and helped provide insights in to the underlying resource elements (Shove, Pantzar & Watson, 2012) used in the performance of practices in the home, such as objects like vegetable patches. By using qualitative methods, the researcher was able to conduct an

in-depth study of actual, accurate and recent behaviours in the field (Hammersly & Atkinson, 2007) and explore real-world changes, as opposed to posing hypothetical considerations of scenarios to participants (McDonald, Oates & Alevizou, 2016). The creation of a card sorting exercise (Tinson, 2009) to engage further reflection from pupils and teachers and on pupil engagement with lessons was also novel and helped contribute numerous findings to the research (see figures 4.3-4.8), in terms of outcomes of pupil engagement, like memory and enjoyment of certain lessons.

Following up the families from the main study on three occasions, including nearly a year after the environmental education programme had finished also provided longitudinal insight in to their practices and how these might have changed over time (Giddens, 1984). This allowed the researcher to explore any potential longer-term impact from the education, beyond immediate changes following pupil engagement with their lessons. Working with families for a long duration of time and in their family homes also helped to build a trusting and honest relationship, whereby any issues of social desirability bias and 'the tendency of research subjects to give socially desirable responses instead of choosing responses that are reflective of their true feelings' (Grimm, 2010, p. 2) were mitigated. Intervention-based pro-environmental research has been criticised as being short-term (Abrahamse, Steg, Vlek & Rothengatter, 2005; Dwyer, Leeming, Cobern, Porter & Jackson, 1993) and lacking properly documented theoretical underpinnings when evaluating its effectiveness (Matthies, Klöckner & Preißner, 2006; Staats, Harland & Wilke, 2004; Steg, Van Den Berg & De Groot, 2013). Such methodological contributions can be considered practically and scientifically useful (Corley & Gioia, 2011), in terms of providing tools for studying families and how their navigate environmental issues.

7.5. Contributions to environmental education practitioners

Based on the findings for this thesis, several recommendations that are practically useful (Corley & Gioia, 2011) for environmental education practitioners are suggested, and will be shared with Project Earth Rock, in terms of how to best to equip learners with the necessary skills, knowledge and attitudes required to achieve a more sustainable future (Davis, 1998; 2010) and to produce well informed and environmentally active adults (Neal & Palmer, 2003).

Utilising multimedia in programmes can harness the potential educational power of music and songs, as seen in educational settings (Ara, 2009; Engh, 2013; Morales Neisa, 2008) and social movements and advocacy (Pepermans & Maeseele, 2017; Publicover, Wright, Baur & Duinker, 2018). However, ensuring songs are age appropriate in terms of length, content and pace is key, along with an awareness of how learners might engage with programmes to avoid boredom, distraction and misbehaviour. Making musical components personable as well as optional to learners would account for individual tastes (Publicover, Wright, Baur & Duinker, 2018) that impact engagement and could prevent learners from being passively compliant (Schlechty, 2002) or feeling pressured to sing along.

Emphasising the meanings, materials and competences that drive the performance of practices (Shove, Pantzar & Watson, 2012) in lessons would be useful, as well as utilising activities that help to cross the borders (Clark, 2000) of school and home, such as homework and discussions with the family and making learning as tangible (Hanley, 2004) as possible, with more parental involvement, to help engage learners as much as possible and have the biggest impact on home practice (Foden, Browne, Evans, Sharp & Watson, 2018; Gibson, Farbotko, Gill & Waitt, 2013; Lane & Gorman-Murray, 2011) domains of energy, water, waste, food and travel.

7.6. Contributions to policy

During the time of this research, the UK Government announced that they would be including climate change and other environmental issues like biodiversity and conservation on a new science curriculum by 2023 (UK Government, 2021c). As part of actioning this plan, the UK Government planned to consult and collaboration with experts in environmental education (UK Government, 2022). The findings and contributions of this thesis could be used by the UK Government when considering the practical implementation (Croley & Gioia, 2011) of environmental education, such as through the use of creative methods like multimedia or in certain lessons like music and art. The findings relating to how pupils engage with environmental education and any factors that impact their engagement could also be considered to help advance understanding (Corley & Gioia, 2011) of how best to engage pupils with these issues, given that pupils can be prone to misconcepions and confusion (Boyes & Stanisstreet, 1994) depending on their age (Strong,

1998) when engaging with certain environmental topics. In terms of the UK Government hoping that their new environmental education might extend 'beyond the classroom', (UK Government, 2021c p.1), the findings of this thesis and how pupils might bring conversations home and action them with family members could be considered, to maximise the impact of environmental education taught in schools.

7.7. Limitations

Some limitations were identified with the research. Demographic information was not explicitly collected for all family participants, including ages of the pupils and their siblings, and the age and professions of the parents. Given that some parents were teachers and showed an interest in helping with an educational research project, how this demographic factor might have impacted the findings could be further explored.

In terms of the fieldwork, the family visits involved the research spending time with families for a limited amount of time which may have impacted the findings, in terms of not being able to fully observe the practices and routines of families as they performed their day-to-day activities of 'doing family' (Morgan, 2011, p. 6). Often, participants relied on accounts from their memory (see section 5.2.2.) when discussing conversations that they had about the environmental education lessons. The researcher also only interviewed the families once after all of the environmental education lessons had been delivered, so could only establish impact from the education for that time period.

As discussed in section 3.6., for the main study, the initial visit to School 1 acted as a pre-intervention observation opportunity before the environmental education was delivered. Due to lack of time and resource constraints, the researcher was unable to study the pupils for a longer amount of time to establish how they engaged with non-environmental lessons, or environmental lessons that were not delivered through multimedia. Much of the observation data was understood to relate to how pupils engaged with multimedia environmental education, however having a more rigorous pre and post intervention design would allow more certainty as to whether pupils engaged in the ways they did because of the intervention of multimedia environmental education. Working with families before the environmental education resource was delivered to pupils in school would also provide a baseline for the types of practices families carry out before the intervention.

Due to the explorative nature of the research, numerous types of pupil engagement and strategies of discussion and action in the family were identified across a sample of 20 different families. A broad range of factors that impacted any process of change to the families' practices following the children's environmental education at school was also identified. These findings helped to explain general trends with the families that were studied. The research however did not necessarily explore a clear causal link with every lesson and practice within the domains of food, energy, water, waste and travel with each pupil and each family member. Future research could instead study a smaller sample of families and explore the explicit causal links between engagement type, discussion and action strategies in the family, and how different underlying factors directly impact this process. This research offers an overview of what this process looks like with multiple families, in terms of the theoretical framework presented in section 6.2.

7.8. Avenues for future research

As discussed in section 6.5., discussing the lack of impact on practice domains like water and food, future research could explore whether environmental education that emphasises the underlying meanings (Shove, Pantzar & Watson, 2012) that motivate the performance of certain practices, such as why families might go on holiday or shower, or existing competences, might have more of an impact of families' practices, rather than emphasising materials like lack of time and money, infrastructure like having a garden, and resources and commodities like water and energy, as the Project Earth Rock resource did, given that most 'people do not generally think of consuming energy, but about driving to work, picking up the kids, and warming or cooling their house' (Waitt, Caputi, Gibson, Farbotko, Head, Gill & Stanes, 2012, p.52), and thus think less about the use of commodities like energy and water (Foden, Browne, Evans, Sharp & Watson, 2018). Given that meanings and competences drive performance of practices too (Shove, Pantzar & Watson, 2012), how powerful these might be in reconfiguring the practices of families, when emphasised in environmental education, could be explored.

In order to address some of the methodological limitations of the research, potential avenues for future research could involve conducting an ethnographic study with families for an extended period of time (Bryman, 2016) to accurately document the interactions

about environmental education as they take place, instead of relying on recollections of such interactions. An ethnographic study would also allow for observation of the practices that families carry out together and how. Using a mixed methods approach would allow for the collection of quantitative data regarding families' practices as well, such as energy and water use to build a fuller, more accurate (McDonald, Oates & Alevizou, 2016) account of families' carbon footprint (Druckman & Jackson, 2009) and whether this is impacted at all by pupil engagement with environmental engagement.

Future researchers could incorporate an even longer longitudinal component in to fieldwork so that the impact of lessons are followed up several years after the lessons have been delivered to see how they might impact the lives of families less immediately, such as during 'moments of change', like when pupils start secondary school, or when families experience other life changes like moving house, that might act to disrupt practices (Phipps & Ozanne, 2017).

To explore the different strategies of influence used by families (see section 6.4.1) in a wider sample of families, future researchers could combine in-depth ethnography with a small sample of families with a wider sample of pupils and families by using less invasive methods, such as telephone interviews or playground interviews, as these also provided insight in to home practices and the impact of the lessons when the planned fieldwork strategy for the current research had to be updated following the outbreak of COVID-19 (see section 7.7). Future studies could also look at different age groups to see where different strategies of influence start to develop. Future researchers could also study impacts that occur from environmental education in the school setting, given that immediate action was observed in the fieldwork (see section 4.3.5), and whether a supportive school climate (Bodsworth & Goodyear, 2017; Willms, 2003) might allow for sustainable transformation (Publicover, Wright, Baur & Duinker, 2018) to social movements (Pepermans & Maeseele, 2017) of schools.

To address the issue of pre and post intervention design and to provide further certainty over pupil engagement with multimedia environmental education, with more time and resources, a future study could explore how pupils engage with the intervention with a pre and post design. Researchers could observe classrooms of pupils receiving (1) non-environmental, non-multimedia lessons, (2) non-environmental, multimedia lessons (3)

environmental, non-multimedia lessons, and finally, (4) environmental, non-multimedia lessons such as the Project Earth Rock resource. Researchers could then compare whether and how pupils engage with these different conditions in order to assess and distinguish whether the multimedia delivery and/or environmental content play a role in this engagement.

7.9. Impact of COVID-19

The outbreak of coronavirus in the UK in the winter of 2019 and spring of 2020 meant that schools had to temporarily close, a 'lockdown' was put in place and social distancing became the norm for several months. This had a major impact on this thesis as the researcher was carrying out fieldwork in the follow-up school in Dorset at the time of the school closures. One of the scheduled Project Earth Rock lessons had to be cancelled. The researcher also planned to interview parents face-to-face in family homes (see section 3.7.1.), but had to conduct telephone interviews instead to conform with UK Government social distancing measures. Parents may have also have been under additional stress due to the pandemic, with many parents having to juggle childcare, home schooling and working from home. The researcher was aware that families had other immediate concerns, of health, employment, food, exercise, mental health, and these concerns may have had an effect on families' ability to undertake environmental initiatives, and had an effect on parents' time to take part in the current research. This researcher was also personally impacted by COVID-19 in numerous ways, including being unwell for several weeks with COVID-19 during the time of the thesis.

7.10. Chapter conclusion

This thesis provides contributions to practitioners of environmental education, as well as offers contributions to theory, literature and methodology. Future studies might extend the findings of this thesis to gain further insight into how pupils can apply the education they engage with at school to have a meaningful impact on practice domains in the home with their family, thus addressing wider environmental issues.

References

Abrahamse, W., Steg, L., Vlek, C., & Rothengatter, T. (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology*, *25*(3), 273-291.

Agee, J. (2009). Developing qualitative research questions: a reflective process. *International Journal of Qualitative Studies in Education, 22*(4), 431-447.

Ajzen, I. (1991). The theory of planned behavior*. Organizational Behavior and Human Decision Processes, 50*(2)*,* 179–211.

All Party Parliamentary Group on Social Mobility. (2014). The class ceiling: Increasing access to the leading profession. https://www.suttontrust.com/wp-content/uploads/2019/12/APPG-on-Social-Mobility_Report_FINAL.pdf

Antaki, C., Billig, M., Edwards, D., & Potter, J. (2003). Discourse analysis means doing analysis: A critique of six analytic shortcomings. *Athenea Digital: Revista de Pensamiento e Investigacion Social*, *1*(3), 1-39.

Ara, S. (2009). Use of songs, rhymes and games in teaching English to young learners in Bangladesh. *Dhaka University Journal of Linguistics*, *2*(3), 161-172.

Armstrong, J. B., & Impara, J. C. (1991). The impact of an environmental education program on knowledge and attitude. *The Journal of Environmental Education*, *22*(4), 36-40.

Aronson, E., & O'Leary, M. (1982). The relative effectiveness of models and prompts on energy conservation: A field experiment in a shower room. *Journal of Environmental Systems*, *12*(3), 219-224.

Asgedom, A. (2004). debates in research paradigms: Reflections in qualitative research in higher education. *The Ethiopian Journal of Higher Education, 1*(1), *41-61.*

Ayadi, K. (2008). The role of school in reducing the prevalence of child obesity. *Young Consumers*, *9*(3), 170-178.

Balke, T., Roberts, T., Xenitidou, M., & Gilbert, N. (2014). Modelling energy-consuming social practices as agents. In *Social Simulation Conference*. Barcelona.

Ballantyne, R., Fien, J. & Packer, J. (2001). School environmental education programme impacts upon student and family learning: A case study analysis. *Environmental Education Research*, *7*(1), 23-37.

Bandura, A., & Walters, R. H. (1977). *Social learning theory*. Prentice Hall.

Bandyopadhyay, S., Kindra, G., & Sharp, L. (2001). Is television advertising good for children? Areas of concern and policy implications. *International Journal of Advertising*, *20*(1), 89-116.

Barnes, B. (2005). Practice as collective action. In T.R. Schatzki & K. K. Cetaina (Eds.) *The practice turn in contemporary theory*, pp. 25-36. Routledge.

Baroni, L., Cenci, L., Tettamanti, M., & Berati, M. (2007). Evaluating the environmental impact of various dietary patterns combined with different food production systems. *European Journal of Clinical Nutrition, 61*(2), 279-286.

Bassey, M. (1995). *Creating education through research: a global perspective of educational research in the 21st Century*. Moor Press.

Belz, F.M. & Peattie K. (2012). *Sustainability marketing: A global perspective* (2nd ed.). Wiley.

Berns, R. M. (2015). *Child, family, school, community: Socialization and support*. Cengage Learning.

Biesta, G. (2009). Good education in an age of measurement: On the need to reconnect with the question of purpose in education. *Educational Assessment, Evaluation and Accountability, 21*(1), 33-46.

Bingen, J., Sage, J., & Sirieix, L. (2011). Consumer coping strategies: a study of consumers committed to eating local. *International Journal of Consumer Studies*, *35*(4), 410-419.

Birch, L. L. (1999). Development of food preferences. *Annual Review of Nutrition*, *19*(1), 41-62.

Bodsworth, H. & Goodyear, V.A. (2017): Barriers and facilitators to using digital technologies in the cooperative learning model in physical education. *Physical Education and Sport Pedagogy, 22.* 563-579.

Blake, J. (1999). Overcoming the 'value-action gap' in environmental policy: Tensions between national policy and local experience. *Local Environment*, *4*(3), 257-278.

Bogdan, R. & Biklen, S.K. (1992) *Qualitative research for education: An introduction to theory and methods.* Allwyn and Bacon.

Bonnett, M., & Williams, J. (1998). Environmental education and primary children's attitudes towards nature and the environment. *Cambridge Journal of Education*, *28*(2), 159-174.

Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge University Press.

Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. SAGE.

Boyes, E., & Stanisstreet, M. (1994). The ideas of secondary school children concerning ozone layer damage. *Global Environmental Change*, *4*(4), 311-324.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101.

Bridges, E., & Briesch, R.A., (2006). The 'nag factor' and children's product categories. *International Journal of Advertising, 25*(2), 157–187.

Brewer, J. D. (2000). *Ethnography*. McGraw-Hill Education.

Brim, O. G. (1966). Socialization through the life cycle. In O. G. Brim, & S. Wheeler (Eds.) *Socialization after childhood: Two essays,* (pp. 1-49). Wiley.

British Educational Research Association (2004). *Revised guidelines.* http://www.bera.ac.uk/guidelines.html

Brounen, D., Kok, N., & Quigley, J. M. (2013). Energy literacy, awareness, and conservation behavior of residential households. *Energy Economics*, *38*, 42-50.

Brown, P. (2017). Narrative: an ontology, epistemology and methodology for pro-environmental psychology research. *Energy Research & Social Science*, *31*, 215-222.

Brown, T., & Perry, F. Jr. (1991). A Comparison of Three Learning Strategies for ESL Vocabulary Acquisition. *TESOL Quarterly, 25*(4), 655-670.

Brundtland Commission. (1987). *Report of the World Commission on environment and development: Our common future.*

https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

Bryman, A. (1984). The debate about qualitative and quantitative research. a question of methods or epistemology. *The British Journal of Sociology, 35(1),* 75-92.

Bryman, A. (2016). *Social research methods*. (5th ed.). Oxford University Press.

Burns, J. (2020, February 24). Climate change: Schools failing us, say pupils. *BBC News.* https://www.bbc.co.uk/news/education-51492942

Carrington, M. J., Neville, B. A., & Whitwell, G. J. (2010). Why ethical consumers don't walk their talk: Towards a framework for understanding the gap between the ethical purchase intentions and actual buying behaviour of ethically minded consumers. *Journal of Business Ethics*, *97*(1), 139-158.

Carter, S. M. & Little, M. (2007). Justifying knowledge, justifying method, taking action: Epistemologies, methodologies, and methods in qualitative research. *Qualitative Health Research*, *17*(10), 1316-1328.

Chalkley, A. E., Routen, A. C., Harris, J.P., Cale, L.A., Gorely, T. & Sherar, L.B. (2018). A retrospective qualitative evaluation of barriers and facilitators to the implementation of a school-based running programme. *BMC Public Health, 18,* 1189.

Charles, N., & Kerr, M. (1988). *Women, food, and families*. Manchester University Press.

Chatterton, T. (2011). *An introduction to thinking about 'energy behaviour': A multi model approach.* Department of Energy & Climate Change. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48256/3887-intro-thinking-energy-behaviours.pdf

Cheal, D. (2002). *Sociology of family life.* Red Globe Press.

Cialdini, R. B. (2003). Crafting normative messages to protect the environment. *Current Directions in Psychological Science*, *12*(4), 105-109.

Cialdini, R. B., Kallgren, C. A., & Reno, R. R. (1991). A focus theory of normative conduct: A theoretical refinement and reevaluation of the role of norms in human behavior. *Advances in Experimental Social Psychology, 24,* 201-234.

Claerr, T., & Gargan, R. (1984). The Role of Songs in the Foreign Language Classroom. *OMLTA Journal, FL014904,* 28-32.

Clark, S. C. (2000). Work/family border theory: A new theory of work/family balance. *Human relations*, *53*(6), 747-770.

Coe, N. (1972). What use are songs in FL teaching? *International Review of Applied Linguistics in Language Teaching, 10*(4), 357-360.

Cohen, L., Manion, L. & Morrison, (2000). *Research methods in education* (5th ed.). Routledge Falmer.

Comer, J. P., & Haynes, N. M. (1991). Parent involvement in schools: An ecological approach. *The Elementary School Journal*, *91*(3), 271-277.

Connelly, L. M. (2008). Pilot Studies. *MEDSURG Nursing, 17*(6), 411–412.

Connolly, J., & Prothero, A. (2003). Sustainable consumption: consumption, consumers and the commodity discourse. *Consumption, Markets and Culture*, *6*(4), 275-291.

Cook, D. T. (2004). *The commodification of childhood*. Duke University Press.

Corley, K. G., & Gioia, D. A. (2011). Building theory about theory building: what constitutes a theoretical contribution? *Academy of Management Review, 36*(1), 12-32.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process.* Allen and Unwin.

Cullingford, C. & Blewitt, J. (2013). *The sustainability curriculum: The challenge for higher education*. Routledge.

Cumming, J. (1996). *From alienation to engagement: Opportunities for reform in the middle years of schooling: Key findings and recommendations*. Australian Curriculum Studies Association.

Cummings, E. M., Faircloth, W. B., Mitchell, P. M., Cummings, J. S., & Schermerhorn, A. C. (2008). Evaluating a brief prevention program for improving marital conflict in community families. *Journal of Family Psychology*, 22, 193–202.

Currie, J. & Deschênes, O. (2016). Children and climate change: Introducing the issue. *The Future of Children, 26*(1), 3-9.

Davidson, C. (2009). Transcription: Imperatives for qualitative research. *International Journal of Qualitative Methods*, *8*(2), 35-52.

Davis, J. (1998). Young children, environmental education and the future. *Early Childhood Education Journal*, *26*(2), 141-155.

Davis, J. (2010). Early childhood education for sustainability: Why it matters, what it is, and how whole centre action research and systems thinking can help. *Journal of Action Research Today in Early Childhood*, *1*, 35-44.

De Bérigny, C., Gough, P., Faleh, M. & Woolsey, E. (2014). Tangible user interface design for climate change education in interactive installation art, *Leonardo, 47*(5), 451-456.

DEFRA. (2005). *The validity of food miles as an indicator of sustainable development*. http://statistics.defra.gov.uk/esg/reports/foodmiles/default.asp

Denzin, N. K., & Lincoln, Y. S. (2011). *The Sage handbook of qualitative research*. Sage.

Deutsch, M. (1973). *The resolution of conflict: Constructive and destructive processes.* New Haven, CT: Yale University Press.

Dewey, J. (1900). Psychology and social practice*, Science, 11*(270), 321-333.

Dewey, J. (1986). Experience and education. *The Educational Forum*, *50* (3), 241-252).

Dornbusch, S. M. & Steinberg, L. (1990). Measures of school engagement. Unpublished manuscript, Temple University, Philadelphia.

Druckman, A., & Jackson, T. (2009). The carbon footprint of UK households 1990–2004: a socio-economically disaggregated, quasi-multi-regional input–output model. *Ecological Economics*, *68*(7), 2066-2077.

Dunlap, R. E. (2008). The new environmental paradigm scale: from marginality to worldwide use. *Journal of Environmental Education, 40*(1), 3-18.

Dwyer, W. O., Leeming, F. C., Cobern, M. K., Porter, B. E., & Jackson, J. M. (1993). Critical review of behavioral interventions to preserve the environment: Research since 1980. *Environment and Behavior*, *25*(5), 275-321.

Epley, N. (2008). Solving the (real) other minds problem. *Social and Personality Psychology Compass*, *2*(3), 1455-1474.

Easterby-Smith, M., Thorpe, R. & Jackson, P. R. (2015). *Management and business research*. (5th ed.). Sage.

Easton, M. (2014; February 11). What's the point of school? BBC News. https://www.bbc.co.uk/news/uk-26127515

Edmondson, A. C. & McManus, S. E. (2007). Methodological fit in management field research. *Academy of Management Review, 32*(4), 1246-1264.

Eernstman, N. & Wals, A. (2013). Locative meaning-making: An arts-based approach to learning for sustainable development. *Sustainability, 5*(4), 1645–1660.

Ekström, K. M. (1995). *Children's influence in family decision making: a study of yielding, consumer learning and consumer socialization*. [Unpublished doctoral dissertation]. University of Gothenburg.

Ekström, K. M. (2007). Parental consumer learning or 'keeping up with the children'. *Journal of Consumer Behaviour: An International Research Review*, *6*(4), 203-217.

Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st-century business. *Environmental Quality Management*, *8*(1), 37-51.

Elkington, J. (2004). Enter the Triple Bottom Line. In A. Henriques, & J. Richardson (Eds.), *The Triple Bottom Line, does it all add up? Assessing the sustainability of business and CSR* (pp. 1- 16). London: Earthscan.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing ethnographic fieldnotes*. University of Chicago Press.

Engh, D. (2013). Why use music in English language learning? A survey of the literature. *English Language Teaching*, *6*(2), 113-127.

Epp, A. M., & Price, L. L. (2008). Family identity: A framework of identity interplay in consumption practices. *Journal of Consumer Research*, *35*(1), 50-70.

Epp, A. M., Schau, H. J., & Price, L. L. (2014). The role of brands and mediating technologies in assembling long-distance family practices. *Journal of Marketing*, *78*(3), 81-101.

European Union. (2021a, August). *Causes of climate change. European Union.* https://ec.europa.eu/clima/change/causes_en

European Union. (2021b, August). *Consequences of climate change. European Union.* https://ec.europa.eu/clima/change/consequences_en

Evans, D., McMeekin, A., & Southerton, D. (2012). Sustainable consumption, behaviour change policies and theories of practice. In A. Warde, & D. Southerton E.), The habits of consumption (pp. 113-129). Helsinki Collegium for Advanced Studies.

Farzanfar, R. (2005). *Using Qualitative research methods to evaluate automated health promotion/disease prevention technologies: a procedures' manual*. Robert Wood Johnson Foundation.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research*, *59*(2), 117-142.

Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology*, *82*(2), 221.

Fischer, D., Böhme, T., & Geiger, S. M. (2017). Measuring young consumers' sustainable consumption behavior: Development and validation of the YCSCB scale. *Young Consumers, 18*(3), 312–326.

Foden, M., Browne, A. L., Evans, D. M., Sharp, L. & Watson, M. (2018). The water–energy–food nexus at home: New opportunities for policy interventions in household sustainability. *The Geographical Journal, 185*(4), 406-418.

Fonseca Mora, C. (2000). Foreign language acquisition and melody singing. *ELT Journal, 54*(2), 146-152.

Food and Agriculture Organisation of the United Nations. (2006). *Livestock's long shadow – environmental issues and options.* http://www.fao.org/3/a0701e/a0701e.pdf

Forgatch, M. S. (1989). Patterns and outcome in family problemsolving: The disrupting effect of negative emotion. *Journal of Marriage and the Family, 51,* 115–124.

Foxman, E. R., Tansuhaj, P. S., & Ekstrom, K. M. (1989). Family members' perceptions of adolescents' influence in family decision making. *Journal of Consumer Research*, *15*(4), 482-491.

Fragkoulis, I. & Koutsoukos, M. (2018). Environmental education through art: A creative teaching approach. *Education Quarterly Reviews, 1*(2), 83-88.

Fredricks, J. A., Blumenfeld, P., Friedel, J., & Paris, A. (2005). *School engagement.* Springer.

French, J. R. P., & Raven, B. H. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in social power* (pp. 150 –167). Ann Arbor: University of Michigan.

Fu, H. & Liu, X. (2017). A study on the impact of environmental education on individuals' behaviors concerning recycled water reuse. *Eurasia Journal of Mathematics, Science and Technology Education, 13*(10), 6715-6724.

Garnett, T. (2006). Fruit and vegetables & UK greenhouse gas emissions: Exploring the relationship. https://tabledebates.org/sites/default/files/2020-10/fruitveg_paper_final_0.pdf

Gauthier, A. H., Smeeding, T. M., & Furstenberg Jr. F., F. (2004). Are parents investing less time in children? Trends in selected industrialized countries. *Population and Development Review, 30*(4), 647-672.

Gentina, E. & Muratore, I. (2012). Environmentalism at home: The process of ecological resocialization by teenagers. *Journal of Consumer Behaviour, 11*(2), 162-169.

Gentina, E., & Singh, P. (2015). How national culture and parental style affect the process of adolescents' ecological resocialization. *Sustainability*, *7*(6), 7581-7603.

Gibb, N. (2015, July 9). *The purpose of education.* https://www.gov.uk/government/speeches/the-purpose-of-education

Gibson, C., Farbotko, C., Gill, N., Head, L. & Waitt, G. (2013). *Household sustainability: challenges and dilemmas in everyday life*. Edward Elgar Publishing.

Giddens, A. (1979). *Central problems in social theory: Action, structure, and contradiction in social analysis.* University of California Press.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. Polity Press.

Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research*, *35*(3), 472-482.

Gollety, M. (1999). Lorsque parents et enfants s'apprennent mutuellement à consommer. *Décisions Marketing*, *18*, 69-80.

Graham, A. (2000). Demand for leisure air travel and limits to growth. *Journal of Air Transport Management*, *6*(2), 109-118.

Gram, M. (2015). Buying food for the family: Negotiations in parent/child supermarket shopping: An observational study from Denmark and the United States. *Journal of contemporary ethnography*, *44*(2), 169-195.

Grieshaber, S. (1997). Mealtime rituals: Power and resistance in the construction of mealtime rules. *British Journal of Sociology, 48*(4), 649–66.

Grimm, P. (2010) *Social desirability bias.* Wiley International Encyclopaedia of Marketing. Chichester: Wiley.

Grodzinska-Jurczak, M., Bartosiewicz, A., Twardowska, A. & Ballantyne, R. (2003). Evaluating the impact of a school waste education programme upon students', parents' and teachers' environmental knowledge, attitudes and behaviour. *International Research in Geographical and Environmental Education*, *12*(2), 106-122.

Grønhøj, A., & Ölander, F. (2007). A gender perspective on environmentally related family consumption. *Journal of Consumer Behaviour: An International Research Review*, *6*(4), 218-235.

Grønhøj, A., & Thøgersen, J. (2009). Like father, like son? Intergenerational transmission of values, attitudes, and behaviours in the environmental domain. *Journal of Environmental Psychology*, *29*(4), 414-421.

Grønhøj, A., & Thøgersen, J. (2009). Like father, like son? Intergenerational transmission of values, attitudes, and behaviours in the environmental domain. *Journal of Environmental Psychology, 29*(4), 414-421.

Grossbart, S., Hughes, S. M., Pryor, S., & Yost, A. (2002). Socialization aspects of parents, children, and the internet. *Association for Consumer Research, 29*, 66-70.

Guba, E. & Lincoln, Y. (1994). Competing paradigms in qualitative research. In N. Denzin & Y. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 105- 117). Sage.

Gullestad, M. (1995). The morality of consumption. *Ethnologia Scandinavica, 25*, 97–107.

Halkier, B., Katz-Gerro, T., & Martens, L. (2011). Applying practice theory to the study of consumption: Theoretical and methodological considerations. *Journal of Consumer Culture, 11*(1), 3-13.

Hall, S. M. (2015). Everyday ethics: how families talk about consumption. In R. Robison, (Ed.). *Sustainability: New questions, new answers,* pp. 5-9. Global Sustainability Institute.

Hall, D. T., & Richter, J. (1988). Balancing work life and home life: What can organizations do to help? *Academy of Management Perspectives*, *2*(3), 213-223.

Hallam, D. & Molina, J. P. (1988). The United Kingdom market for fresh exotic fruit. *Overseas Development Natural Resources Institute Bulletin, 13*, 1-56.

Hallam, S., Price, J., & Katsarou, G. (2002). The effects of background music on primary school pupils' task performance. *Educational Studies*, *28*(2), 111-122.

Ham, S.H. & Sewing, D.R. (2010). Barriers to environmental education. *The Journal of Environmental Education, 19*(2), 17-24.

Hammersley, M. & Atkinson, P. (2007). Ethnography principles in practice. (3rd ed.) Routledge.

Hammond, M. & Wellington, J. (2012). *Research methods: The key concepts*. Routledge.

Hansen, E. (2009). Island Ecology: An exploration of place in the elementary art curriculum. *Art Education, 62*(6), 46-51.

Hargreaves, T. (2011). Practice-ing behaviour change: Applying social practice theory to pro-environmental behaviour change. *Journal of Consumer Culture*, *11*(1), 79-99.

Henley Centre (1994), *Young Eyes*, *a report commissioned by The Henley Centre*. Cambridge.

Henry, H. K., & Borzekowski, D. L. (2011). The Nag Factor: A mixed-methodology study in the US of young children's requests for advertised products. *Journal of Children and Media*, *5*(3), 298-317.

Holbrook, M. B. & O'shaughnessy, J. (1988). On the scientific status of consumer research and the need for an interpretive approach to studying consumption behavior. *Journal of Consumer Research*, *15*(3), 398-402.

Holland, D. & Lave, J. (2009). Social practice theory and the historical production of persons. *International Journal of Human Activity Theory, 2*, 1-15.

Höppner, G. (2017). Rethinking socialization research through the lens of new materialism. *Frontiers in Sociology, 2*, 1-9.

Huy Le, M. (1999). The Role of Music in Second Language Learning: A Vietnamese Perspective. *Paper presented at Combined 1999 Conference of the Australian Association for Research in Education and the New Zealand Association for Research in Education.*

Inglis, D. & Thorpe, C. (2012). *An invitation to social theory*. Cambridge: Polity.

Inwood, H. & Taylor, R. W. (2012). Creative approaches to environmental learning: Two perspectives on teaching environmental art education. *International Electronic Journal of Environmental Education*, *2*(1), 65-75.

IPCC. (2007). *AR4 Climate Change 2007: Synthesis Report.* https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf

IPCC. (2013). *Climate Change 2013: The Physical Science Basis.* Geneva: Intergovernmental Panel on Climate Change. https://www.ipcc.ch/site/assets/uploads/2018/03/WG1AR5_SummaryVolume_FINAL.pdf

Jairath, N., Hogerney, M., & Parsons, C. (2000). The role of the pilot study: A case illustration from cardiac nursing research. *Applied Nursing Research, 13*(2), 92–96.

James, A. (2013). *Socialising children*. Springer.

James, N., & Busher, H. (2009*). Online interviewing.* Sage Publications.

Jamieson, L. (2016). Families, relationships and environment': (Un)sustainability, climate change and biodiversity loss. *Families, Relationships and Societies*, *5*(3), 335-355.

Jay, T., Rose, J., & Simmons, B. (2018). Why is parental involvement in children's mathematics learning hard? Parental perspectives on their role supporting children's learning. *Sage Open*, *8*(2), 1-13.

John, D. R. (1999). Consumer socialization of children: A retrospective look at twenty-five years of research. *Journal of Consumer Research*, *26*(3), 183-213.

Jones, P., Selby, D. & Sterling, S. (2010). *Sustainability education: Perspectives and practice across higher education*. Earthscan.

Jonze, T. (2018, December 11). Icebergs ahead! Olafur Eliasson brings the frozen fjord to Britain. *The Guardian.* https://www.theguardian.com/artanddesign/2018/dec/11/icebergs-ahead-olafur-eliasson-brings-the-frozen-fjord-to-britain-ice-watch-london-climate-change#:~:text=Olafur%20Eliasson%20is%20putting%20the,on%20display%20in%20the%20City.

Jordan, R., Gray, S., Zellner, M., Glynn, P. D., Voinov, A., Hedelin, B., … & National Socio-Environmental Synthesis Center Participatory Modeling Pursuit Working Group. (2018). Twelve questions for the participatory modeling community. *Earth's Future*, *6*(8), 1046-1057.

Kagan, S. & Kirchberg, V. (2016). Music and sustainability: organizational cultures towards creative resilience–a review. *Journal of Cleaner Production*, *135*(1), 1487-1502.

Keep Britain Tidy. (2013). *Eco-Schools England. Exploring success to inform a new horizon.* https://www.keepbritaintidy.org/sites/default/files/resources/KBT_Eco-Schools_Informing_a_new_horizon_2013.pdf

Kelleher, C. (2009). Barriers to programming engagement. *Advances in Gender and Education, 1*, 5-10.

Kenny, M. E., Blustein, D. L., Chaves, A., Grossman, J. M., & Gallagher, L. A. (2003). The role of perceived barriers and relational support in the educational and vocational lives of urban high school students. *Journal of Counseling Psychology, 50*(2), 142–155.

Kerrane, B., Hogg, M. K., & Bettany, S. M. (2012). Children's influence strategies in practice: Exploring the co-constructed nature of the child influence process in family consumption. *Journal of Marketing Management*, *28*(7-8), 809-835.

Kilbourne, W. E., & Beckmann, S. C. (1998). Review and critical assessment of research on marketing and the environment. *Journal of Marketing Management*, *14*(6), 513-532.

Kilbourne, W., McDonagh, P., & Prothero, A. (1997). Sustainable consumption and the quality of life: A macromarketing challenge to the dominant social paradigm. *Journal of Macromarketing*, *17*(1), 4-24.

King Jr, M. L. (1947). The purpose of education. *The Maroon Tiger*, *10*, 123-124.

Kohlberg, L. (1976). Moral stages and moralization: The cognitive-development approach. *Moral development and Behavior: Theory Research and Social Issues*, 31-53.

Kokkos, A. (2010). Transformative learning through aesthetic experience: Towards a comprehensive method. *Journal of Transformative Education*, *8*(3), 155-177.

Kortright, R., & Wakefield, S. (2011). Edible backyards: a qualitative study of household food growing and its contributions to food security. *Agriculture and Human Values*, *28*(1), 39-53.

Krashen, S. (1982). Pri*nciples and practices in second language acquisition.* Oxford: Pergamon.

Krauss, S. E. (2005). Research paradigms and meaning making: A primer. *The Qualitative Report, 10*(4), 758-770.

Kuczynski, L., & Kochanska, G. (1990). Development of children's noncompliance strategies from toddlerhood to age 5. *Developmental Psychology*, *26*(3), 398-408.

Kuczynski, L., Kochanska, G., Radke-Yarrow, M., & Girnius-Brown, O. (1987). A developmental interpretation of young children's noncompliance. *Developmental Psychology*, *23*(6), 799-806.

Kuczynski, L., & Parkin, C. M. (2007). Agency and bidirectionality in socialization: Interactions, transactions, and relational dialectics. In J. E. Grusec & P. D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 259–283). Guilford Press.

Lake, R. (2003). Enhancing acquisition through music. *The Journal of Imagination in Language Learning and Teaching, 7*, 98-106.

Lane, R., and Gorman-Murray, A. (2011). *Material geographies of household sustainability*. Farnham: Ashgate Publishing.

Lapadat, J. C. (2000). Problematizing transcription: Purpose, paradigm and quality. *International Journal of Social Research Methodology*, *3*(3), 203-219.

Lapadat, J. C. & Lindsay, A. C. (1999) Transcription in research and practice: from standardization of technique to interpretive positionings. *Qualitative Inquiry, 5*, 64—86.

Larsson, B., Andersson, M. & Osbeck, C. (2010). Bringing environmentalism home: Children's influence on family consumption in the Nordic countries and beyond. *Childhood*, *17*(1), 129-147.

Lawlor, M. A., & Prothero, A. (2011). Pester power–A battle of wills between children and their parents. *Journal of Marketing Management*, *27*(5-6), 561-581.

Lee, K. (2014). Predictors of sustainable consumption among young educated consumers in Hong Kong. *Journal of International Consumer Marketing, (26*), 217-238.

Lems, K. (1996). For a Song: Music across the ESL Curriculum. *Paper presented at Annual Meeting of the Teachers of English to Speakers of Other Languages.*

Libman, K. (2007). Growing youth growing food: How vegetable gardening influences young people's food consciousness and eating habits. *Applied Environmental Education and Communication*, *6*(1), 87-95.

Lincoln, Y. S. & Guba, E. G. (2000). Paradigmatic controversies, contradictions, and emerging influences. In N. Denzin & Y. Lincoln (Eds.), *Handbook of Qualitative Research* (2nd ed.), pp. 163-188. Sage.

Luszczynska, A., & Schwarzer, R. (2005). Multidimensional health locus of control: comments on the construct and its measurement. *Journal of Health Psychology*, *10*(5), 633-642.

Lynch, B. K. (2001). Rethinking assessment from a critical perspective. *Language Testing*, *18*(4), 351-372.

Maccoby, E. E. (2007). Historical overview of socialization research and theory. In J. E. Grusec, & P.D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 13–41). Guilford.

Marczyk, G. , DeMatteo, D. & Festinger, D. (2005). *Essentials of research design and methodology*. John Wiley and Sons, Inc.

Marshall, C. & Rossman, G. B. (1999). *Designing qualitative research*. (3rd ed.). SAGE.

Martens, L. (2012). Practice 'in talk' and talk 'as practice': Dish washing and the reach of language. *Sociological Research Online*, *17*(3), 103-113.

Martens, L., & Scott, S. (2017). Understanding everyday kitchen life: Looking at performance, into performances and for practices. In M. Jonas, B. Littig & A. Wroblewski (Eds.) *Methodological reflections on practice oriented theories* (pp. 177-191). Springer.

Martensen, A. & Grønholdt, L. (2008). Children's influence on family decision making. *Innovative Marketing, 4*(1), 14-22.

Marx, K., (2000, [1852]) 'The Eighteenth Brumaire of Louis Bonaparte' in D. McLellen, (Ed.) *Karl Marx: Selected Works.* Oxford University Press.

Mason, J. (2002). *Qualitative Researching* (2nd ed.). Sage Publications.

Mateas, M., Salvador, T., Scholtz, J. & Sorensen, D. (1996, April). Engineering ethnography in the home. *Conference Companion on Human Factors in Computing Systems*, 283-284.

Matthies, E., Klöckner, C. A., & Preißner, C. L. (2006). Applying a modified moral decision making model to change habitual car use: how can commitment be effective? *Applied Psychology*, *55*(1), 91-106.

Matthies, E., & Wallis, H. (2015). Family socialization and sustainable consumption. In L. A. Reisch & J. Thøgersen, (Eds.) *Handbook of research on sustainable consumption,* pp. 268-282. Edward Elgar Publishing.

Maxwell, J. A. (2006). *Qualitative research design: An interactive approach* (2nd ed.). Sage.

Mays, N., & Pope, C. (1995). Qualitative research: rigour and qualitative research. *British Medical Journal*, *311*(6997), 109-112.

McCandless, B. R. (1969). Problems of child rearing in a changing society. *The Family Coordinator*, *18*(3), 291-293.

McDonagh, P., Dobscha, S., & Prothero, A. (2012). Sustainable consumption and production: Challenges for transformative consumer research. In D. G. Mick, S. Pettigrew, C. Pechmann & J. Ozanne (Eds.) *Transformative Consumer Research for Personal and Collective Well Being*, pp.267-282. Taylor & Francis Publishing.

McDonald, S. Oates C.J. & P.J. Alevizou (2016). in N.K. Malhotra (Ed.) *Marketing in and for a sustainable society*, pp. 139-168. Emerald.

McGee-Lennon, M. R., Wolters, M. K., & Brewster, S. (2011). Designing reminders for the Home: The role of Home tours. In *Proceedings of INCLUDE 2011*.

McNeal, J. U. (1992). *Kids as customers: A handbook of marketing to children*. Lexington Books.

Merriam, A. (1964). *The anthropology of music*. Evanston: Northwestern University Press.

Merriam, S. (1988). *Qualitative research and case study applications in education.* Jossey-Bass.

Miles, M. B. & Huberman, A. M. (1994). Qualitative data analysis: An expanded sourcebook, (2nd Edition.). Sage.

Millington, N. T. (2011). Using songs effectively to teach English to young learners. *Language Education in Asia*, *2*(1), 134-141.

Moisio, R., Arnould, E. J., & Price, L. L. (2004). Between mothers and markets: Constructing family identity through homemade food. *Journal of Consumer Culture*, *4*(3), 361-384.

Morgan, D. (2011). *Rethinking family practices*. Springer.

Morgan, M., Gibbs, S., Maxwell, K., & Britten, N. (2002). Hearing children's voices: methodological issues in conducting focus groups with children aged 7-11 years. *Qualitative Research*, *2*(1), 5-20.

Moore, J. (2005a). Is higher education ready for transformative learning? A question explored in the study of sustainability. *Journal of Transformative Education*, *3*(1), 76-91.

Moore, J. (2005b). Seven recommendations for creating sustainability education at the university level: A guide for change agents. *International Journal of Sustainability in Higher Education*, *6*(4), 326-339.

Moore, S., & Rosenthal, D. (2016). *Grandparenting: contemporary perspectives*. Routledge.

Morales Neisa, C. (2008). Using rock music as a teaching-learning tool. *Profile Issues in Teachers Professional Development*, (9), 163-180.

Morrow, V. (2008). Ethical dilemmas in research with children and young people about their social environments. *Children's Geographies*, *6*(1), 49-61.

Murdock, G. P. (1962). Structures and functions of the family. *Selected studies in marriage and the family.* Holt, Rinehart & Winston.

Murray, S., Mitchell, J., Gale, T., Edwards J. & Zyngier, D. (2004). Student disengagement from primary schooling: A review of research and practice. CASS Foundation.

Nash, C., & Basini, S. (2012). Pester power: it's all in "the game". *Young Consumers*, 13(3), 267-283.

National Association for Environmental Education (2006, August 22). *The environmental curriculum. Opportunities for Environmental Education across the National Curriculum for England.* https://naee.org.uk/wp-content/uploads/2015/06/NAEE_The_Environmental_Curriculum.pdf

Neal, P., & Palmer, J. (2003). *The handbook of environmental education*. Routledge.

Neuman, W., L. (2003). *Social research methods: Qualitative and quantitative Approaches* (5th Edition). Allyn and Bacon.

Newmann, F.M. (1986). Priorities for the future: Towards a common agenda. *Social Education, 50*, 240-250.

Nørgaard, M. K., Bruns, K., Christensen, P. H., & Mikkelsen, M. R. (2007). Children's influence on and participation in the family decision process during food buying. *Young Consumers, 8*(3), 197-216.

Oates, C. J., & McDonald, S. (2006). Recycling and the domestic division of labour: Is green pink or blue? *Sociology*, *40*(3), 417-433.

Oelschlaeger, M. (2005). "Holistic yet tangible": embracing the challenge of complexity for education for sustainable development. *Current Issues in Comparative Education*, *7*(2), 85-93.

Ofsted. (2018). *School inspection handbook. Handbook for inspecting schools in England under section 5 of the Education Act 2005.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730127/School_inspection_handbook_section_5_270718.pdf

O'Neill, C. (2015). *An exploration of the impact of the Green-Schools programme on the development of sustainable behaviours in the home* [Unpublished doctoral dissertation]. University College Cork.

Palan, K.M., & Wilkes, R.E. (1997). Adolescent–parent interaction in family decision making. *Journal of Consumer Research. 24* (2), 159–169.

Parsons, T. (1937). *The structure of social action.* Free Press.

Peattie, K. (1999). Trappings versus substance in the greening of marketing planning. *Journal of Strategic Marketing*, *7*(2), 131-148.

Pedersen, S., Grønhøj, A., & Bech-Larsen, T. (2012). Family members' roles in healthy-eating socialization based on a healthy-eating intervention. *Young Consumers*, *13*(3), 208-223.

Pepermans, Y. & Maeseele, P. (2017). Climate Change Communication in Belgium. *Oxford Research Encyclopedia of Climate Science*. Oxford University Press.

Pettigrew, C. Pechmann & J. L. Ozanne (Eds.) *Transformative consumer research for personal and collective well-being* (pp. 295-310). Routledge.

Phipps, M., & Ozanne, J. L. (2017). Routines disrupted: Reestablishing security through practice alignment. *Journal of Consumer Research*, *44*(2), 361-380.

Piaget, J. (1950). *The psychology of intelligence.* Brace.

Plowman, L. (2015). Researching young children's everyday uses of technology in the family home. *Interacting with Computers*, *27*(1), 36-46.

Popkewitz, T. S., Tabachnick, B. R. & Zeichner, K. (1979). Dulling the Senses: Research in Teacher Education. *Journal of Teacher Education, 30*(5), 52-60.

Poortinga, W., Whitmarsh, L., & Suffolk, C. (2013). The introduction of a single-use carrier bag charge in Wales: Attitude change and behavioural spillover effects. *Journal of Environmental Psychology*, *36*, 240-247.

Publicover, J. L., Wright, T. S., Baur, S. & Duinker, P. N. (2018). Music as a tool for environmental education and advocacy: Artistic perspectives from musicians of the Playlist for the Planet. *Environmental Education Research*, *24*(7), 925-936.

Raju, T. M. (2018). Influence of children in family purchase decision making: parents' perceptions. *International Journal of Enhanced Research in Management & Computer Applications, 7*(2), 21-25.

Ram, A., & Ross, H. S. (2001). Problem-solving, contention, and struggle: How siblings resolve a conflict of interests. *Child Development, 72*, 1710 –1722.

Ramsey, D. (2002). The role of music in environmental education: Lessons from the cod fishery crisis and the dust bowl days. *Canadian Journal of Environmental Education, 7*(1), 183-198.

Rapley, T. (2011). Some pragmatics of data analysis in D. Silverman, (Ed.) *Qualitative research: Theory method & practice* (3rd ed.), pp. 273-290.

Raworth, K. (2012). *A Safe and Just Space for Humanity: Can we live within the doughnut?* Oxfam. https://www-cdn.oxfam.org/s3fs-public/file_attachments/dp-a-safe-and-just-space-for-humanity-130212-en_5.pdf

Recchia, H. E., Ross, H. S., & Vickar, M. (2010). Power and conflict resolution in sibling, parent–child, and spousal negotiations. *Journal of Family Psychology*, *24*(5), 605.

Reckwitz, A. (2002). Toward a theory of social practices: A development in culturalist theorizing. *European Journal of Social Theory*, *5*(2), 243-263.

Reid, L., Sutton, P. and Hunter, C. (2010). Theorizing the meso level: the household as a crucible of pro-environmental behaviour. *Progress in Human Geography, 34*(3), 309-327.

Ritch, E. (2018). *Striding bravely into the future of sustainability: interpretations of the Eco-School message from Scottish children*.

Ritzer, G., Kammeyer, K. C., & Yetman, N. R. (1979). *Sociology: Experiencing a changing society*. Allyn and Bacon.

Rohwedder, W. J. & Alm, A. (1994). *Using computers in environmental education: Interactive multimedia and on-line learning. The environmental education toolbox--EE toolbox workshop resource manual*. ERIC.

Rokka, J. (2010). Netnographic inquiry and new translocal sites of the social. *International Journal of Consumer Studies*, *34*(4), 381-387.

Rose, J., Jay, T., & Simmons, B. (2014). It's helping your child experience the world. How parents can use everyday activities to engage their children in mathematical learning. In *Smith, C. (Ed.) Proceedings of the British Society for Research into Learning Mathematics, 33(2).*

Sarantakos, S. (2005). *Social research.* (3rd ed.). Macmillan Education.

Satchwell, C. (2013). Carbon literacy practices: textual footprints between school and home in children's construction of knowledge about climate change. *Local Environment, 18*(3), 289-304.

Saunders, M., Lewis, P. & Thornhill, A. (2016). *Research methods for business students*. (7th ed.). Pearson.

Saxbe, D. E., & Repetti, R. (2010). No place like home: Home tours correlate with daily patterns of mood and cortisol. *Personality and Social Psychology Bulletin*, *36*(1), 71-81.

Sayer, L.C., Bianchi, S. M. & Robinson, J.P. (2004). Are parents investing less in children? Trends in mothers' and fathers' time with children. *American Journal of Sociology, 110*(1), 1-43.

Schäfer, H. (2013). *Die instabilität der praxis. Reproduktion und transformation des sozialen in der praxistheorie* [Unpublished doctoral dissertation]. Weilerswist.

Schatzki, T. R. (1996). *Social practices: A Wittgensteinian approach to human activity and the social*. Cambridge University Press.

Schill, M., Godefroit-Winkel, D., & Hogg, M. K. (2020). Young children's consumer agency: The case of French children and recycling. *Journal of Business Research*, *110*, 292-305.

Schlechty, P. C. (2002). *Working on the work: An action plan for teachers, principals, and superintendents. The Jossey-Bass Education Series*. Jossey-Bass.

Schultz, P. W. (2002). Environmental attitudes and behaviors across cultures. *Online readings in psychology and culture*, *8*(1), 2307-0919.

Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck & W.P. Schultz (Eds.) *Psychology of sustainable development* (pp. 61-78). Springer.

Schulze, S. (2003). *Views on the Combination of quantitative and qualitative research approaches***.** Progressio, 25(2), 8-20.

Scott, J. (1990). *A matter of record.* Polity.

Scott, A., Oates, C., & Young, W. (2015). A conceptual framework of the adoption and practice of environmental actions in households. *Sustainability*, *7*(5), 5793-5818.

Shaw, C., Brady, L.M. & Davey, C. (2011). *Guidelines for Research with Children and Young People*. https://www.researchgate.net/profile/Louca-Mai-Brady/publication/260060346_NCB_Guidelines_for_Research_With_Children_and_Young_People/links/00b7d52f3fa9fba4f7000000/NCB-Guidelines-for-Research-With-Children-and-Young-People.pdf

Shove, E. (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and Planning A*, *42*(6), 1273-1285.

Shove, E. (2011). On the difference between chalk and cheese: a response to Whitmarsh et al's comments on ``Beyond the ABC: climate change policy and theories of social change. *Environment and Planning A, 43,* 262-264.

Shove, E. (2016). Matters of practice. In A. Hui, T. Schatzki & E. Shove (Eds.), *The nexus of practices connections, constellations, practitioners* (pp. 167-180). Routledge.

Shove, E. (2017, October 5). *Extraordinary lecture.* [Video]. Youtube. https://www.youtube.com/watch?v=ldEp3r1-8eo

Shove, E., Pantzar, M. & Watson, M. (2012). *The dynamics of social practice*. (1st ed.). SAGE.

Silverman, D. (1997). *Qualitative research: Theory, method and practice*. Sage.

Singh, P., Sahadev, S., Oates, C. J., & Alevizou, P. (2020). Pro-environmental behavior in families: A reverse socialization perspective. *Journal of Business Research*, *115*, 110-121.

Smith, W. J., Butler-Kisber, L., & LaRoque, L. (1998). *Student engagement in learning and school life: National project report. Case reports from project schools*. McGill University.

Snyder, E. E., & Purdy, D. A. (1982). Socialization into sport: Parent and child reverse and reciprocal effects. *Research Quarterly for Exercise and Sport*, *53*(3), 263-266.

Staats, H., Harland, P., & Wilke, H. A. (2004). Effecting durable change: A team approach to improve environmental behavior in the household. *Environment and Behavior*, *36*(3), 341-367.

Staats, H. J., Wit, A. P., & Midden, C. Y. H. (1996). Communicating the greenhouse effect to the public: Evaluation of a mass media campaign from a social dilemma perspective. *Journal of Environmental Management*, *46*(2), 189-203.

Stanley, S. M., Markman, H. J., & Whitton, S. W. (2002). Communication, conflict, and commitment: Insights on the foundations of relationship success from a national survey. *Family Process, 41,* 659 – 675.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*(3), 309-317.

Steg, L. E., Van Den Berg, A. E., & De Groot, J. I. (2013). *Environmental psychology: An introduction*. BPS Blackwell.

Stehfest, E., Bouwman, L., van Vuuren, D. P., den Elzen, M. G., Eickhout, B., & Kabat, P. (2009). *Climate benefits of changing diet. Climatic Change, 95*(1-2), 83-102.

Stein, N. L., & Albro, E. (2001). The origins and nature of arguments: Studies in conflict understanding, emotion, and negotiation. *Discourse Processes, 32,* 113–133.

Steinfeld, H., Gerber, P., Wassenaar, T., Castel, V., Rosales, M. & de Haan, C., (2006). Livestock's long shadow: environmental issues and options. http://www.fao.org/3/a0701e/a0701e.pdf

Strong, C. (1998). The impact of environmental education on children's knowledge and awareness of environmental concerns. *Marketing Intelligence & Planning*, *16*(6), 349-355.

The University of Sheffield. (2021). The University of Sheffield ethics policy governing research involving human participants personal data and human tissue: general principles and statements. https://www.sheffield.ac.uk/polopoly_fs/1.755691!/file/Ethics_Policy_Senate_Approved.pdf

The World Counts. (2021, August 22). *Tons of meat eaten.* https://www.theworldcounts.com/challenges/consumption/foods-and-beverages/world-consumption-of-meat/story

Thøgersen, J., & Ölander, F. (2003). Spillover of environment-friendly consumer behaviour. *Journal of Environmental Psychology*, *23*(3), 225-236.

Thornton, P. H., Ocasio, W., & Lounsbury, M. (2012). *The institutional logics perspective: A new approach to culture, structure, and process*. Oxford University Press.

Thunberg, G. (2019). *No one is too small to make a difference*. Penguin.

Tinson, J. (2009). *Conducting research with children and adolescents. Design, methods and empirical cases.* Goodfellow Publishing.

Truelove, H. B., Carrico, A. R., Weber, E. U., Raimi, K. T., & Vandenbergh, M. P. (2014). Positive and negative spillover of pro-environmental behavior: An integrative review and theoretical framework. *Global Environmental Change*, *29*, 127-138.

Tuli, F. (2010). The basis of distinction between qualitative and quantitative research in social science: Reflection on ontological, epistemological and methodological perspectives. *Ethiopian Journal of Education & Science, 6(*1), 97-108.

UK Government. (2013). *National curriculum: primary curriculum.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/425601/PRIMARY_national_curriculum.pdf

UK Government. (2019). *A Green Future: Our 25 Year Plan to Improve the Environment.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

UK Government. (2017a). *Education and training statistics for the United Kingdom: 2017 Country information and data sources.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/657822/SFR64_2017_Additional_Text.pdf

UK Government. (2017b). Find energy grants and ways to save energy in your home. https://www.gov.uk/improve-energy-efficiency

UK Government. (2021a, August 22). About us. https://www.gov.uk/government/organisations/department-for-education/about

UK Government. (2021b). *Cycling and walking investment strategy.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918442/cycling-walking-investment-strategy.pdf

UK Government. (2021c). *Education Secretary puts climate change at the heart of education.* https://www.gov.uk/government/news/education-secretary-puts-climate-change-at-the-heart-of-education--2

UK Government. (2022). *Sustainability and climate change strategy.* https://www.gov.uk/government/publications/sustainability-and-climate-change-strategy

Ulin, P. R., Robinson, E. T. & Tolley E. E. (2004). *Qualitative methods in public health: a field guide for applied research*. Jossey-Bass.

UN Environment Programme (2021, August). *Explore UN environment topics.* https://www.unep.org/explore-topics

United Nations. (2021, August). *The 17 Goals.* Department of Economic and Social Affairs. https://sdgs.un.org/goals

Uzzell, D. (1999). Education for environmental action in the community: New roles and relationships. *Cambridge Journal of Education*, *29*(3), 397-413.

Uzzell, D., & Räthzel, N. (2018). Border crossing and the logics of space: a case study in pro-environmental practices. *Frontiers in Psychology*, *9*, 2096.

Valentine, G. (1999). Eating in: Home, consumption, and identity. *Sociological Review, 47*(3), 491–524.

Valkenburg, P. M., & Cantor, J. (2001). The development of a child into a consumer. *Journal of Applied Developmental Psychology*, *22*(1), 61-72.

Verfuerth, C., Gregory-Smith, D., Oates, C. J., Jones, C. R., & Alevizou, P. (2021). Reducing meat consumption at work and at home: facilitators and barriers that influence contextual spillover. *Journal of Marketing Management*, *37*(7-8), 671-702.

Vibert, A., & Sheilds, C. M. (2003). Approaches to student engagement: Does ideology matter?. *McGill Journal of Education*, *38*(2), 221-240.

Vuchinich, S. (1999). Problem solving in families: Research and practice. Thousand Oaks, CA: Sage.

Waddington, P. (2008) Shades of green: A (mostly) practical A-Z for the reluctant environmentalist. Eden Project Books.

Waitt, G., Caputi, P., Gibson, C., Farbotko, C., Head, L., Gill, N., & Stanes, E. (2012). Sustainable household capability: which households are doing the work of environmental sustainability? *Australian Geographer*, *43*(1), 51-74.

Ward, S. (1974). Consumer socialization. *Journal of Consumer Research*, *1*(2), 1-14.

Warde, A. (2005). Consumption and theories of practice. *Journal of Consumer Culture, 5*(2), 131–153.

Watne, T., & Brennan, L. (2011). Behavioral change starts in the family: the role of family communication and implications for social marketing. *Journal of Nonprofit & Public Sector Marketing*, *23*(4), 367-386.

Wellington, J. (2015). *Educational research: Contemporary issues and practical approaches*. Bloomsbury Publishing.

Whitbeck, L. B., & Gecas, V. (1988). Value attributions and value transmission between parents and children. *Journal of Marriage and the Family*, 829-840.

Whitmarsh, L., O'Neill, S. & Lorenzoni, I. (2010). Climate change or social change? Debate within, amongst, and beyond disciplines. *Environment and Planning A, 43*, 258-261.

Wilcox, W. (1995). *Music cues from classroom singing for second language acquisition: Prosodic memory for pronunciation of target vocabulary by adult non-native English speakers* [Unpublished doctoral dissertation]. University of Kansas.

Willms, J. D. (2003). Student engagement at school. *A sense of belonging and participation. Organisation for Economic Co-operation and Development*.

Wonderopolis. (2020, August 22). *What can children teach their parents?* https://www.wonderopolis.org/wonder/what-can-children-teach-their-parents

WWF. (2009). *Simple & painless? The limitations of spillover in environmental campaigning.* http://assets.wwf.org.uk/downloads/simple_painless_report.pdf

Yates, L., & Evans, D. (2016). Dirtying Linen: Re-evaluating the sustainability of domestic laundry. *Environmental Policy and Governance*, *26*(2), 101-115.

Zollitsch, W., Winckler, C., Waiblinger., S., &; Haslberger, A. (2007). *Sustainable food production and ethics*. Wageningen Academic Publishers.

Zyngier, D. (2008). (Re) conceptualising student engagement: Doing education not doing time. *Teaching and Teacher Education*, *24*(7), 1765-1776.

Appendices

Appendix 1. Ethical approval

The University Of Sheffield.

Downloaded: 08/11/2018
Approved: 12/12/2017

Victoria Circus
Registration number: 170244370
Management School
Programme: PhD Management FT

Dear Victoria

PROJECT TITLE: The Impact of Music-Based Environmental Education within the Family Home
APPLICATION: Reference Number 016955

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 12/12/2017 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 016955 (dated 16/11/2017).
- Participant information sheet 1037276 version 1 (16/11/2017).
- Participant information sheet 1037275 version 1 (16/11/2017).
- Participant information sheet 1037274 version 1 (16/11/2017).
- Participant information sheet 1037272 version 1 (16/11/2017).
- Participant consent form 1037279 version 1 (16/11/2017).
- Participant consent form 1037278 version 1 (16/11/2017).
- Participant consent form 1037277 version 1 (16/11/2017).

The following optional amendments were suggested:

please see comments above.

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Yours sincerely

Lucy Bartrick
Ethics Administrator
Management School

Appendix 2. Sample family information pack, including participant information sheet and consent forms

[School name]'s involvement in an educational research project with The University of Sheffield

Dear Parent or Guardian,

From January to April 2019 your child's class is receiving 12 environmental lessons, on topics such as saving energy and water, fossil fuels, growing food, meat consumption, transport, waste management, recycling and working together. This is linked to a planned topic being taught on rainforests.

These lessons are being delivered as part of an educational research project organised by Victoria Circus, a PhD researcher from The University of Sheffield. Victoria's PhD is exploring the impact of environmental education in the home.

As part of this project and with your permission, Victoria would like to observe and audio-record these environmental lessons being taught and conduct brief, informal interviews with your child after each lesson to ask them what they thought about it. She would like to audio-record these interviews to generate typed transcripts to use as data for her research project. Victoria would also like to take photos of some of the schoolwork produced from this project such as drawings and energy diaries.

All data generated in this project will be anonymised so that you, your child and the school will not be identifiable.

For those of you who are interested in helping Victoria with her PhD project, she would like to conduct audio-recorded interviews with parents and guardians (e.g. in the school playground). She would also like to spend some time with families in their homes (e.g. after school) casually observing and discussing the types of activities they like to do together, including any environmental behaviours, such as recycling, and take photos of any relevant objects like recycling bins and smart meters.

Please see the attached information sheet (for you to keep), detailing further information about this project and for Victoria's contact details if you have any questions. Victoria will be visiting [school name] the week before the Christmas holidays so you will also have the opportunity to speak to her in person.

If you and your child are interested in taking part in this project, then please sign **both** consent forms and hand **the one at the back** to your child's teacher.

Thank you.

The University Of Sheffield.

Family Information Sheet

The impact of environmental education in the home [date]

Your family is being invited to take part in a research project. Please read the following information carefully before deciding whether or not to take part, and ask if you would like more information or have any questions.

1. **What is the purpose of this research project?**
   To study whether an environmental education programme delivered in school has an impact on primary school children and their families through the activities they do together over a 12-week period. This project is being conducted as part of my PhD at The University of Sheffield.

2. **Why has my family been invited to take part?**
   Your child's class is taking part in a 12 week environmental education programme studying topics like saving energy and water, fossil fuels, growing food, rainforest protection, meat consumption, transport, waste management, recycling and working together. I would like to work with your family to study whether this programme has had any impact on you and the types of activities you do together.

3. **Does my family have to take part?**
   No, participation is entirely voluntary. You may choose not to take part at all, or to partake in only some activities, or all of them. If your family chooses to take part in any way then you may withdraw at any time without having to give a reason.

4. **What will happen to my family if we take part?**
   Your child will take part in 12 environmental education sessions with their class at school over 12 weeks. Each session will last approximately 85 minutes and will cover topics like saving energy and water, fossil fuels, growing food, rainforest protection, meat consumption, transport, waste management, recycling and working together. The sessions are taught through a mix of individual, group and class work, multi-media and musical methods and 'take-home' activities, such as energy diaries and food menus. I will observe and audio-record the sessions being taught and take notes. I would like to photograph some of the schoolwork that your child produces (e.g. drawings, energy diary or food menu) to generate visual data for my project. After each session is finished, your child will be asked if they would like to take part in a short semi-structured interview. This will last approximately 10 minutes and I will ask them what they thought about the session. These interviews will be audio-recorded in order to create typed transcripts that will be analysed. You will also be invited to take part in audio-recorded semi-structured interviews with me, such as in the school playground or in your family home to discuss whether the sessions have had any impact on family life and the types of activities you do together. If you choose to be interviewed at home, then I would also like to casually observe the types of activities you do together, including any environmentally-friendly activities, and take photographs of related objects (e.g. your recycling bin, smart meter). These interviews will take

place before and after the first session has been taught and after the sixth and last session, and six months after the programme has finished to explore any long-term impact (i.e. five times in total).

5. **What do we have to do?**
   If your family chooses to take part, you will be asked to sign two consent forms (a copy for you and a copy for me) detailing which activities you would like to be involved in. If you have expressed an interest in partaking in an interview and/or home visit, then I will send out further information to you about making arrangements.

6. **Will we be recorded, and how will the recorded media be used?**
   Pending your permission, your child's lessons and interviews will be audio-recorded and their schoolwork photographed. You will also be audio-recorded during interviews and relevant objects in your home photographed in order to create transcripts and visual data that can be analysed to generate findings for the research project.

7. **What are the possible risks or disadvantages of taking part?**
   There are not any significant risks or disadvantages associated with taking part in this research project, beyond those experienced every day. However, a brief time commitment will be required from your family on five occasions to conduct the semi-structured interviews and observations.

8. **What are the possible benefits of taking part?**
   There are no significant benefits associated with taking part, however it is hoped that your family will enjoy being a part of this research project. Your child will receive a weekly environmental education session over 12 weeks and you will receive a personal copy of the research findings upon completion of the project.

9. **What happens if the research study stops earlier than expected?**
   You will be kept informed as to why the research project has had to stop and the next steps will be discussed with you.

10. **What if something goes wrong?**
    If at any point during the research project, you feel as if something has gone wrong and you would like to raise a complaint, please contact either myself or my supervisor, Dr Caroline Oates. Our contact details can be found below. If you feel that your complaint has not been handled to your satisfaction, please contact the Research Administrator of Sheffield University Management School, Mandy Robertson (**Telephone:** XXXX XXX XXXX **Email:** XXXXXXXXXXXXXXX), who will then escalate the complaint through the appropriate channels.

11. **Will our taking part in this project be kept confidential?**
    Yes, any information or details about your family and the school will be kept strictly confidential and all data will be anonymised. Your family and the school will not be identified or identifiable in any reports, publications or presentations.

12. **What type of information will be sought from us and why is the collection of this information relevant for achieving the research project's objectives?**

If you decide that your family would like to take part in this research project, then you will be required to sign two consent forms (a copy for you and a copy for me) detailing which activities you would like to be involved in. Observing your child's lessons and schoolwork, conducting semi-structured interviews with you and your child and observing the activities you like to do together as a family will allow me to address the objective of this research project, to study whether an environmental education programme has an impact on primary school children and their families.

In line with new Data Protection legislation, The University of Sheffield will act as the Data Controller for this research project. This means that the University is responsible for looking after your information and using it properly. In order to collect and use your personal information as part of this research project, we must have a basis in law to do so. The basis that we are using is that the research is 'a task in the public interest'. Further information, including details about how and why The University of Sheffield processes your personal information, how we keep your information secure, and your legal rights (including how to complain if you feel that your personal information has not been handled correctly), can be found in The University of Sheffield's Privacy Notice at www.sheffield.ac.uk/govern/data-protection/privacy/general.

13. What will happen to the results of the research project?

If you agree to take part in this research project then your family will receive a copy of the project findings when it is completed. Results will be written up in my doctoral thesis and also feature in several publications in academic journals towards the end of 2020. If you are interested, then you will be notified when and where to access these. I will present my results at several national and international academic conferences over the next three years. The anonymised data will also be submitted to the UK Data Service for use by other researchers in the future.

14. Who is organising and funding the research?

This research project is organised by me and my supervisors, Dr Caroline Oates, Dr Mark Blades and Dr Panayiota Alevizou from The University of Sheffield in collaboration with Project Earth Rock, who are providing the environmental education programme material. This research project is funded by the Economic and Social Research Council (ESRC).

15. Who has ethically reviewed the project?

This research project has been granted ethical approval by Sheffield University Management School's Research Ethics Committee.

Contacts for further information

Victoria Circus (PhD Researcher)
Sheffield University Management School
Conduit Road
Sheffield
S10 1FL
Telephone: XXXX XXX XXXX
Email: XXXXXXXXXXXXXXXX

Dr Caroline Oates (Supervisor)
Sheffield University Management School
Conduit Road
Sheffield
S10 1FL
Telephone: XXXX XXX XXXX
Email: XXXXXXXXXXXXXXXXXX

The University Of Sheffield.

Family Consent Form

The impact of environmental education in the home [date]

*Please read the following statements carefully before signing and **retain this copy**, along with your Family Information Sheet.*

		Yes/No
1.	I confirm that my family has read and understood the information sheet dated Autumn 2018 explaining the above research project and that we have had the opportunity to ask questions about the project.	☐
2.	I understand that my family's participation is voluntary and that we are free to withdraw at any time without needing to give a reason and without there being any negative consequences. To be removed from this research project, we should contact Victoria Circus on XXXX XXX XXXX or at XXXXXXXXXXXXX.	☐
3.	I understand that my family's data will be anonymised and I give permission for members of the research team (i.e. supervisors and collaborative partner) to have access to these anonymised data.	☐
4.	I understand that my family's name will not be linked with the research materials, and that we will not be identified or identifiable in the reports, publications or presentations that result from the research.	☐
5.	I agree to the anonymised data collected to be used by other researchers in the future.	☐
6.	I give permission for my child to be **audio-recorded** in class when receiving 12 environmental lessons from January – April 2019.	☐
7.	I give permission for my child to partake in **audio-recorded interviews** after their environmental lessons.	☐
8.	I give permission for my child's **project schoolwork to be photographed**.	☐
9.	I agree to **my family partaking in audio-recorded interviews**.	☐
10.	I agree to Victoria **spending some time with my family and observing us at home**.	☐
11.	I give permission for **objects relating to this project within our family home to be photographed**.	☐

_____	_____	_____	_____
Signature	Name of Parent/Guardian	Name of Child	Date

_____	_____	_____
Signature	Name of Lead Researcher	Date

The University Of Sheffield.

Family Consent Form

The impact of environmental education in the home [date]

Please read the following statements carefully before signing and ***hand this copy back to your child's teacher.***

	Yes/No
1. I confirm that my family has read and understood the information sheet dated Autumn 2018 explaining the above research project and that we have had the opportunity to ask questions about the project.	☐
2. I understand that my family's participation is voluntary and that we are free to withdraw at any time without needing to give a reason and without there being any negative consequences. To be removed from this research project, we should contact Victoria Circus on XXXX XXX XXXX or at XXXXXXXXXXXX.	☐
3. I understand that my family's data will be anonymised and I give permission for members of the research team (i.e. supervisors and collaborative partner) to have access to these anonymised data.	☐
4. I understand that my family's name will not be linked with the research materials, and that we will not be identified or identifiable in the reports, publications or presentations that result from the research.	☐
5. I agree to the anonymised data collected to be used by other researchers in the future.	☐
6. I give permission for my child to be **audio-recorded** in class when receiving 12 environmental lessons from January – April 2019.	☐
7. I give permission for my child to partake in **audio-recorded interviews** after their environmental lessons.	☐
8. I give permission for my child's **project schoolwork to be photographed**.	☐
9. I agree to **my family partaking in audio-recorded interviews**.	☐
10. I agree to Victoria **spending some time with my family and observing us at home**.	☐
11. I give permission for **objects relating to this project within our family home to be photographed**.	☐

_____	_____	_____	_____
Signature	Name of Parent/Guardian	Name of Child	Date

_____	_____	_____
Signature	Name of Lead Researcher	Date

Appendix 3. Example of environmental education song – 'Transportation' lyrics

Lyrics: Transportation

Transportation

By Jess Gold

Chorus
Transportation, transporting the nation
To where we need to be each day
A pair of wheels and some well-worn heels
Helping us along our way

Verse 1
Walking upon my feet
Smile at the friends that I meet
Riding my bike, sun on my face
A hearty breakfast aids the pace
(because you can't get there on air without your..)

Chorus

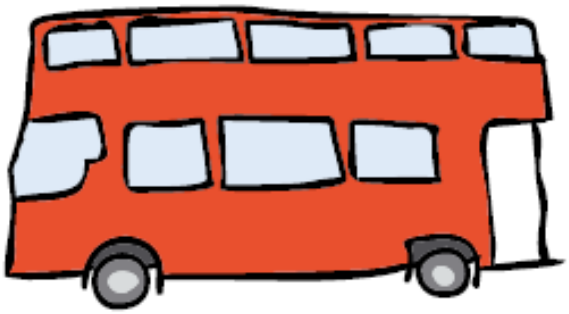
Verse 2
Our cars pollute our air
So if someone's driving, can you share?
The bus is sometimes late
But it will come if you wait, long enough for your

Chorus

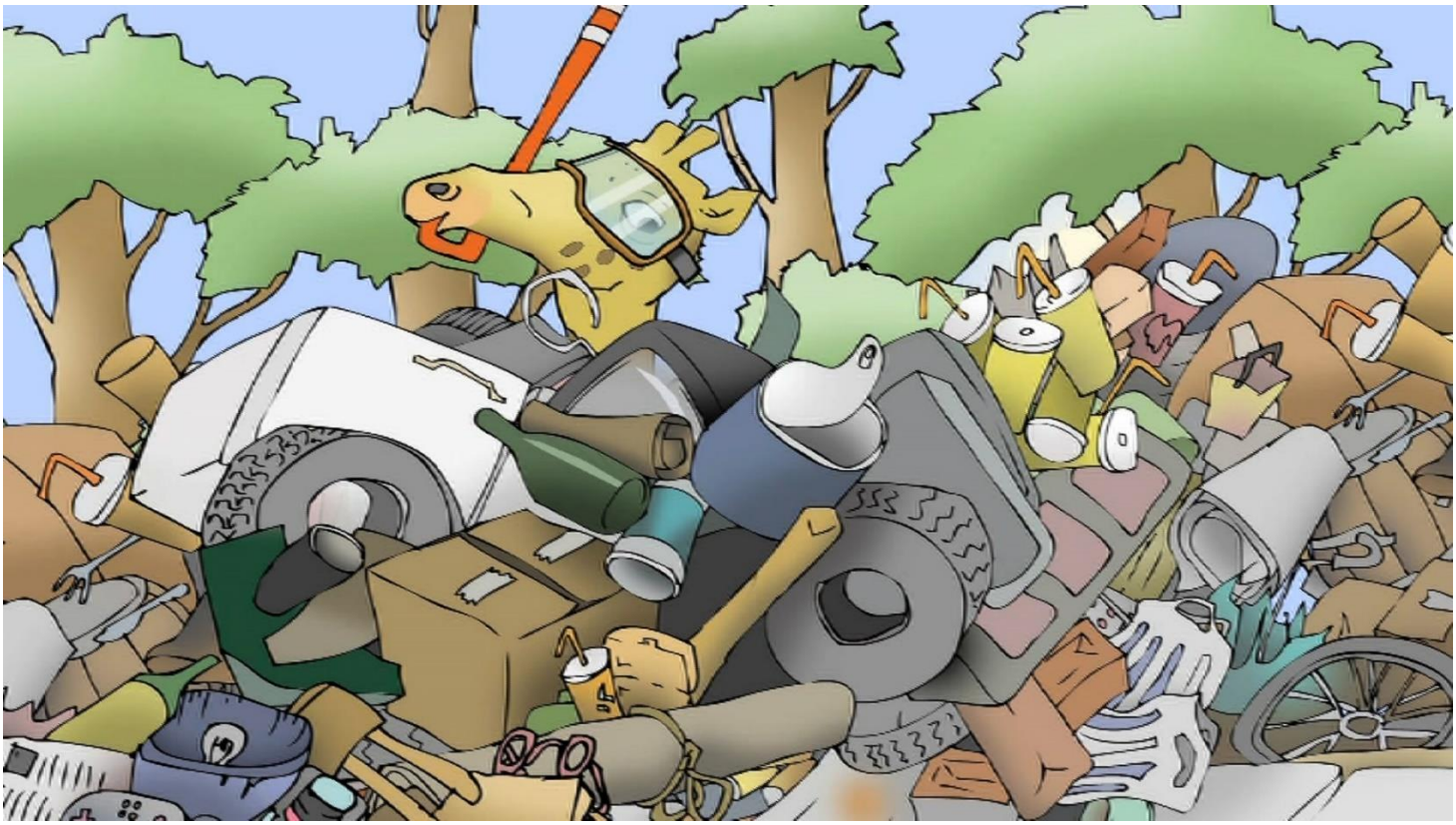
Bridge
(Look see community as you walk by the trees)
Have you seen the walking bus?
Just jump aboard as it comes your way
(The flowers and the buzzing bees go by)
It's quite fun and it's no fuss
(Life becomes alive and close to you)
Join your friends, you don't have to pay

Verse 3
If I eat a cereal bar
I'll burn it up if I cycle far
Carry my books as I walk along
I'll soon end up fit and strong
(because you can't get there on air without your..)

Chorus
Do-Do-Do-Do



Appendix 4. Example of environmental education animation - 'Disposable' animation still



Appendix 5. Information about the 12 Project Earth Rock lessons.

Topic name	Activities	Message of song	Message of animation	Suggested session duration	Practice domains mentioned in resource
(1) 'Power Challenge'	• Song and animation • Discussion about saving energy • Creation of energy saving diary	Using energy is expensive, use your head and make use of alternative ways to stay warm, cook, wash and have fun (e.g. exercise, travel, socialising, reading and growing food), take the challenge to avoid using gadgets. We waste lots of energy	A town with three power stations all pumping out smoke and houses and flats all lit up. Through the windows, people are watching TV, playing games, doing washing and hoovering etc. They get up and leave the room, leaving electronics on. The text ,"if you're not using it turn it off", as everyone turns off switches, the power stations go off and stop polluting, and birds fly over	65 minutes	Energy use Water use Transport Food
(2) 'School Council song'	• Song and animation • Discussion about School Council • Activity deciding fictional school council representatives based on different character traits	If you're not happy about something going on in school or you want something done then discuss this with your school council. Everyone plays a role in running the school	The sun rises over the school, school children cheer. There's an empty space on the playground field, and two students have ideas to turn it in to a tennis court or a football pitch. After they give public speeches and hold a vote, the space is turned in to football pitch. So if you have an idea for something at school, discuss and get it actioned	80 minutes	N/A

(3) 'Disposable'	• Song and animation • Discussion about the term 'disposable' • Quiz guessing decomposition duration of different items	Telling a story about packaging of a takeaway, the meaning of the word disposable meaning it's wasted. Reduce, reuse and recycle, and the extent of waste produced	A giraffe is walking along in a forest, walks past a butterfly and some birds, and then walks through a 'waste' rubbish heap that gets taller and taller, so much so that it has to use a snorkel to breath as it walks through. So, there's so much waste building up that even a really tall giraffe is swamped by it	95 minutes	Managing waste
(4) 'Water Story'	• Song and animation • Discussion about water use • Activity calculating personal water use	Telling a story about being on a trip in a different country and not having water available to wash whenever, only at a specific time, unlike this country where we can use water whenever we want and as much as we want	Birds chirping, a man on a boat in a lake/reservoir eating grapes with a blackbird on a pole standing behind him, feeding him some occasionally. Under the lake is a pipe feeding water to a nearby house where someone is hosing their car, having a shower and flushing their toilet. Slowly the water gets lower so the man can't reach the blackbird to feed him grapes. So, if everyone uses too much water then we won't be able to do the things we like	85 minutes	Water use
(5) 'Fossil Fools'	• Song and animation • Discussion about fossil fuels	How fossil fuels e.g. oil are formed, but we are exploiting the planet of these	'A story about oil'. A man is sat under a tree playing guitar but beneath the surface is lots of oil. A big lock is put on the Earth. A	85 minutes	Energy use

	• Demonstrations of how fossil fuels are a) made by squashing plasticine b) used by pouring sand away • Research on climate change	fossil fuels, but there's a positive future ahead using cleaner, renewable energy sources	man in the sky sees the Earth and has dollar signs in his eyes and then unlocks the lock and the world cracks and there's an oil explosion. So, some people exploit the value of the Earth through getting oil from it, which will have dangerous consequences		
(6) 'Counting the Carbon'	• Song and animation • Discussion about carbon footprints • Activity calculating carbon footprints	About our global, personal and national carbon footprints and how we are exceeding limits of how much carbon we're burning. Lots of different ways to stop using carbon e.g. turning off lights, eating less meat, growing food, putting on jumpers, walking, reusing, recycling etc.	Man playing computer games, a giant 'carbon' rock crashes through the lounge. He drags it out and attaches it to his car (which pollutes and makes the rock bigger) as he drives to a cafe. He drags the rock in and eats a chicken which makes it grow bigger. He has an idea to eat vegetables instead which makes it shrink. He goes to a bike shop and buys a bike which also makes it shrink until eventually it disappears and he's free from the rock. Other people on bikes without rocks join him to cycle alongside. So, our lifestyle choices all have an impact on our carbon footprint	85 minutes	Energy use Food Travel
(7) 'Meat Reducer'	• Song and animation • Discussion about eating less meat	Information/ story telling about intensive farming for meat, how many resources are needed, and	In a restaurant two monkeys are looking at a menu. The waiter asks what they want. One chooses meat	85 minutes	Food

	• Activity calculating carbon footprint of diet • Design a low carbon food menu	how you could help by reducing amount of meat you eat, helping with food distribution, different examples of vegetarian foods	and the other vegetables. The monkey who chose vegetables gets much more on his plate, whereas the monkey who chose meat only gets a small meat chop and seems confused. The waiter pulls down a presentation explaining that one farm can grow lots of vegetables that can feed lots of people, or 1 animal that feeds few people, which would leave lots of people hungry. So, it's more efficient and socially responsible just to eat vegetables instead of meat		
(8) 'Transportation'	• Song and animation • Discussion about travelling to school • Activity ordering different modes of travel based on their environmental impact • Activity discussing pros and cons of fictional town with only environmentally friendly travel	Purpose of transportation getting us where we need to be, problem of pollution, more sustainable transport (e.g. public transport, car share, walking bus), benefits of socialising and being healthy and doing exercise	Monkeys jumping through trees, walking along and then a man walking along, a man in an old-fashioned car, a slightly bigger, more futuristic car. All the while his stomach is getting bigger. Then it shows all of them side by side like the evolution of man. So, we have now evolved not to move and walk, but instead sit in a car which is bad for our health	95 minutes	Travel Food

(9) 'Compost and Grow'	• Song and animation • Discussion about compost • Activity designing a poster about compost	Things that can go in the compost heap, process of making compost using worms and then growing vegetables, a sing along quiz about where fruit and vegetables grow (i.e. above or below the ground), eating fresh and local and reducing food miles	A man walking down his garden to put lots of organic waste on his compost heap. The worms happily eat this. And down below the heap there's a 'Compost Cafe' where three carrots are sitting at a table. Three tubes come down and put compost on their plates and they happily get ready to eat it. So, if you turn natural waste in to compost, it can feed food that you can eat	80 minutes	Managing waste Food
(10) 'Small Grains'	• Song and animation • Discussion of inspirational quotes • Activity writing a persuasive letter about a topic of concern	The Earth isn't well, but my actions seem insignificant as I'm just small and only one person, but great things (e.g. like the desert) are made up lots of small parts, it's fun to work together and stand up for what you believe in as others will join you and together you can change the world	Group of people angrily protesting that they love dinosaurs and want to bring them back, with placards. A giant dinosaur then comes along stamping its feet. The crowd gasp and are amazed and move back and then cheer. So, if you protest and take action on something, it might end up happening, even if it seems extreme or impossible	75 minutes	Water use
(11) 'You don't have to fly'	• Song and animation • Discussion of holidays and flying	You don't have to fly even though people think you do, planes require	A man choosing between a holiday far away (having to take a flight from the airport) or close for	90 minutes	Travel

	• Activity guessing photo of local and foreign holiday destinations • Activity calculating time needed to travel to foreign destination in a more environmentally friendly way	fossil fuels and although they get you places quickly, they burn fossil fuels. Sustainable alternatives are available (car, train, ferry) or go on a local holiday or hike	his family. He looks at some brochures. They choose to fly which seems to take a while as he checks his watch whilst on the flight. Another family spontaneously decide to have a holiday and go camping in the same city, which is easy to get to. The two families are compared, both sitting around doing the same kind of thing. So, after taking a flight somewhere, you will probably end up being somewhere similar doing the same activities. It also takes longer to fly and requires more preparation. About spending time together as a family.		
(12) 'Rainforest song'	• Song and animation • Discussion about rainforests • Create a song about the rainforest	Far away in rainforests plants and animals are helping to control our climate/carbon cycle here, should stop cutting them down for beef, soy, palm etc. as it impacts other animals e.g. orangutans. Need to campaign to get it stopped	Two monkeys sitting in a tree together reading the newspaper to each other. A loud chainsaw noise makes their tree vibrate and stops what they're doing. Lots of trees have been cut down by the man with the chainsaw and two signs saying 'new farm' and 'for sale' have been put up. Loud mooing from cows can then be heard and the monkeys are alarmed as now lots of cows	90 minutes	Food

			are around them where the trees used to be. So, wild habitats are being chopped down to make way for farms for cows i.e. for beef/dairy.		

Appendix 6. Sample pupil interview schedule

Meat Reducer recap

- Did you talk about the Meat Reducer lesson at all with your families? E.g. the song or animation, your menu
- Did you eat anything from your menu? What/how come you didn't?

[date] Transportation Interview

- What did you think of the Transportation lesson? Why?
- What do you think the lesson was about? What was it trying to teach you? (ask what they mean by pollution if it comes up)
- What things stop you from using active transport like walking, cycling? Compared to say, driving in your car
- What things make it more enjoyable to walk and cycle?
- Did you know much about different types of transport and how they affect the environment before today's lesson?
- Did you think the lesson had links to any of the other lessons you've had? How so?

- What did you think of the song? Why? Have you heard it before?
- Did you think the song had a message? (show lyrics) What was the message?

- What did you think of the animation? Why?
- Did you think the animation had a message? (show still)
- Did you prefer the song or the animation? Why?

- What did you think of the different activities you did?
    - how you travel to see your friends
    - ranking 'cleanest and greenest' transport activity and facts (what do you think clean and green means in this lesson?)
    - advantages and disadvantages of no cars and vote (what advantages and disadvantages did they put?)
- What was your favourite and least favourite bit of the lesson? Why?

- How do you and your family normally travel around?
- Are you going to tell your family about the lesson? How come/what will you tell them?
- Are you going to try and get your family to do anything differently now that you've had this session? What? How come?
- What things might help you to do 'that' as a family?

- What things might get in the way from you doing ‘that’ as a family?

- (Any specific/additional questions relating to them/observation)
- Drawing: draw a picture of your family using clean and green active transport to go somewhere that you normally visit

Appendix 7. Sample family interview schedule from first home visit

[date] at home with [family number]

Introduction

- Thank you for having me, **introduce myself** and that I'm interested in studying whether or not what [pupil number] is learning at school, all about different environmental issues is having any impact *or not* on family life and the activities you do together. As part of my study, it's really important that I speak with families to explore this, and all the ways it might or might not be impacting family life, and why. Some of the lessons have more obvious implications for family life and others less so.
- **Suggest sitting somewhere comfortable** where we can have the interview where I'll just ask them some questions about school and family life, in particular the sorts of things you talk about and what you do, and then if you'd like and if we've got a little bit of time left, you can show me anything around the home that you think might be relevant or interesting to me. And if it's still okay, I'll take some photographs. I've got quite a lot I'd like to ask you, but we'll try and make sure the interview is no longer than an hour, it depends how much you want to tell me, and do let me know if you want a break at any point, or if you don't want to answer any questions (e.g. if they feel too personal).
- Stress that I want you to be entirely **honest**, there's no right or wrong answers, not judging you at all and whatever you tell me will be interesting, relevant and useful.
- Once seated and ready for the interview, ask if they have **any questions**, check they are okay to be recorded, **switch Dictaphone** on and then ask them to tell me a little bit **about their family**, and **what made them want to take part in my study**.

Family life: activities you do together, you as a family, your view on environmental friendliness

Family activities/practices

1) I read a quote once that said that "families are what families do". Can you tell me **the types of things you regularly get up to** as a family, might be **everyday routines** or **habits** (E.g. going food shopping)
2) Do you have any family **traditions** that you like to uphold?
3) Can you give me any examples where you have **changed the way you do something** as a family? It might be a lifestyle change or following some information you've received or a significant event (e.g. moving house) if not, maybe where you've *nearly* changed something, but it didn't work out. Talk me through why.
4) Just want to talk through some of your interests, as [pupil number]'s lessons are being taught quite creatively. What kind of **music** do you listen to as a family? Do you play any **instruments**?
5) Do you ever watch **cartoons/animations** as a family?
6) Do you ever do any **drawing/art and crafts** as a family? ([pupil number]'s water drawing)

Family dynamics

1) Can you tell me a little bit about how you normally **talk to each other** and **communicate** as a family (e.g. some people have WhatsApp groups)

2) **Who decides what you get up** to as a family (e.g. when you've got an afternoon free)? Does [pupil number] have much say in what you get up to as a family?
3) Would you say you **influence each other** much, in terms of your views/actions?

Environmental friendliness: will talk about this in more detail in a minute, so just speaking generally...

1) To each parent: What does **environmental friendliness** mean to you? [pupil number], what does it mean to you? Do you have different opinions on environmental friendliness?
2) Do you ever **talk about being 'environmentally friendly'** as a family? Or talk about environmental issues? Who starts these discussions? What do you tend to talk about?
3) Do you consider yourself an **environmentally friendly family**? Is there anyone in your family who you consider to be particularly environmentally friendly?
4) Going to talk about this more in a minute...but is there **anything you do** as a family that you think is particularly environmentally friendly? Anything that stands out?
5) What kind of things **get in the way** of you being environmentally friendly as a family or are issues or barriers? (e.g. turning things off taking more time) What things might **help you** to be environmentally friendly as a family or make it easier?
6) Do you **watch nature or environmental documentaries** as a family? (e.g. some of Drowning in Plastic, too upsetting)
7) Are you interested in **environmental news** stories? E.g. Recently there were groups of school **children striking** from school over climate change. What are your thoughts on that?

[Pupil number]'s school life

1) [pupil number]...how do you feel about going to school? Do you enjoy school?
2) Not including the lessons she's been having with me...Does [pupil number] ever **tell you** about what she's been learning at school? Try and teach you anything or get you to do anything because of what she's been learning about? Does she bring up school or do you ask her?
3) Can you think of a time where [pupil number] has done something at school and you've **carried it on at home**...it might be a piece of homework, a project etc.
4) **How involved** would you say are you as a family with her school work and homework? Who usually picks [pupil number] up from school?

Environmental lessons and different family activities

5 Environmental lessons

1) [pupil number], do you **remember what the lessons** we've been having were about? (5 of them: saving energy, about the School Council, disposing of things and reducing, reusing and recycling, saving water, fossil fuels and climate change) and then we had one on carbon footprints last week (missed this lesson).

Water use

1) Can you tell me about the different **ways you use water** as a family? Do you have any **routines or habits** with how you use water? (e.g. when brushing teeth, drinking a certain amount of water, brushing teeth in shower)
2) Do you ever **talk about how you use water** as a family?
3) Have you ever **changed the way you use water** as a family at all? How come? Do you ever try and **save water** as a family or use water in a more environmentally friendly way? What do you do? (e.g. Dad brushing teeth in shower) How come you do that?

4) What things might **get in the way** of you saving water as a family? E.g. habit of leaving the tap on when brushing teeth. What things might **help you** to save water as a family? (Not plugging dishwasher in)
5) [pupil number] have you **talked about the lesson** you had on water with your family? How come/what has she said? Mentioned the **songs** or the **animations**? (show lyrics and animation still – have you looked up the songs on the internet?) Activity where they **guessed how water is used in the home?** Flushing toilet used the most, 316.5L weighs the same as a manatee (like a seal), said you *couldn't* carry that much water home every day. Could say why you said that, and whether, if you had to carry your water, you might do anything differently? (mentioned reusing water) **Drawing?** (Dad brushing teeth in shower, Mum washing up, [sister] turning off teeth, [pupil number]having shower) Mentioned anything else about the lesson?
6) Has [pupil number] tried to get you to **DO anything differently** since having this lesson? Anything else? Have **you** tried to get her to do anything differently?
7) Have you got **anything to show me** that's relevant to how you use/save water as a family? E.g. water butt, water bottles - take photos afterwards

Energy use

1) Can you tell me about the different **ways you use energy** as a family. Do you have any **routines or habits** with how you use energy?
2) Do you ever **talk** about how you use energy as a family?
3) Have you ever **changed the way you use** energy as a family at all? Do you ever try and **save energy** as a family or use energy in a more environmentally friendly way? (e.g. Dad 'known' for turning lights off) How come you do that? E.g. to be env. friendly or to save on bills? What else do you do?
4) What things might **get in the way** of you saving energy as a family? (leaving lights on – a habit, time consuming) What things might **help you** to save energy as a family?
5) [pupil number], did you **talk about either of the two lessons** you had about energy with your family? (saving power and fossil fools) Said she told mum about unplugging the TV, said maybe and tell Dad, said it wouldn't work because of wires, would need to label them, time consuming). Mention the **songs or the animations**? (show lyrics and animation still) **Energy diary?** Did you show your family? (highlighted where she saved energy) **Drawing?** ([pupil number] unplugging TV, mum recycling, [sister] turning off taps, Dad turning off lights) Mentioned anything else about these lessons?
6) Has [pupil number] tried to get you to **do anything differently** since having any of these lessons? E.g. turning lights off. Anything else? Have you tried to get her to do anything differently?
7) Have you got **anything to show me** that's relevant to how you use/save energy as a family? E.g. smart meter, blankets for when you get cold - take photos afterwards

Waste management

1) Can you tell me about the **different ways you manage your waste** as a family. Do you have any **routines or habits** with how you manage your waste?
2) Do you ever **talk about** how you manage your waste as a family?
3) Have you ever **changed the way you manage your waste** as a family at all? E.g. a different system. Do you ever try and **reduce, reuse, recycle** as a family or manage your waste in a more environmentally friendly way? (Mum in drawing recycling, said [pupil number] and [sister] also help, said 'often reuse things', giving things to charity, sharing old phones) What do you do? How come you do that?

4) What things might **get in the way** of you reducing, reusing or recycling as a family, or managing your waste in a more environmentally friendly way? (small recycling bin that fills up quickly, keeping and reusing things taking up space) What things might **help you** to save energy as a family?
5) [pupil number] did you **talk about** the lesson on recycling, reducing/reusing with your family? Mentioned the **songs or the animations**? (show lyrics and animation still) The **activity where they guessed** how long things took to decompose? (enjoyed guessing, all took much longer than guessed, especially Styrofoam – never, couldn't believe it, or that plastic is made from oil) How come/what has she said? Anything else?
6) Has [pupil number] tried to **get you to do anything differently** since having this lesson? Anything else? Have **you** tried to get her to do anything differently?
7) Have you got **anything to show me** that's relevant to how you manage your waste as a family? Maybe walk me through what you do to recycle, e.g. different bins - take photos after

Other lessons

1) Not as relevant to what you're doing at home, but I'm still interested in whether [pupil number] **mentioned the School Council** lesson. Has she? Mentioned the songs or the animations? (show lyrics and animation still) The activity where they had to think of how suitable different personality traits were in a Council rep ([pupil number]'s top 2 were honest and reliable). Anything to say about this?
2) Had a lesson last week about carbon footprints and how we can reduce our carbon footprint which [pupil number] missed. Have you ever thought about **your family's carbon footprint** or tried to do anything to reduce it?
3) The next 6 lessons are going to be on:

- **reducing meat consumption**
- **environmentally friendly travel**
- **making compost from natural waste and growing your own food**
- **working together to make change happen**
- **reducing flying**

We'll talk about them more next time if that's okay, but did you have anything to say about them at this stage? Anything relevant you want to show me?

Show me anything relevant to water use/energy use/waste management/School Council/carbon footprints or other lessons/environmental issues (and take photos)

Any questions?

Appendix 8. Cards used in card sorting activity with teachers and pupils and their families.

Appendix 9. Sample of data analysis using NVivo.