

**Education, Climate Change and Climate Justice  
Irish Perspectives**

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## Introduction

Global climate change is now considered one of the most pressing issues to face humanity (IPCC, 2007; OECD, 2009). Despite initial commitments agreed at the United Nations Convention on Climate Change in 1992 and subsequent interventions to constrain increases in average global temperature to 2 degrees Celsius, recent evidence suggests that the earth can expect a destructive increase of four degrees Celsius under current carbon emission trends (EC, 2012). The magnitude and urgency of the issue of climate change, has resulted in the identification of a range of strategies across multiple sectors and scales. The potential need for and role of education with respect to climate change is suggested in the third report of the International Panel on Climate Change (IPCC): "Change in lifestyle and behaviour patterns can contribute to climate change mitigation across all sectors" and, further, "Education and training programmes can help overcome barriers to the market acceptance of energy efficiency, particularly in combination with other measures" (IPCC, 2007, p. 12; Darnton, 2008). This rather narrow interpretation of education's role in challenging climate change acts as a good starting point for this paper, which poses the question: what kind of education is needed to address climate change?

The paper uses the Irish context to exemplify current conceptualisations, attitudes and practices of experts, educators, teachers and teacher educators in relation to educational responses to climate change. Drawing on empirical research and current literature in education and environmental education, it goes on to suggest a framework for incorporating a justice perspective into climate change education for the primary education sector (ages four to twelve years) and for primary initial teacher education in the Irish context.

The bulk of research into climate change has to date developed our understanding of the physical processes that are driving climate change. The dynamics of the climate system, with often slow and complex rates of change, can make gradual increases in the earth's temperature imperceptible to direct human experience, making scientific interpretation of these processes important. Scientific analysis of climate change throws light on processes that might otherwise go unnoticed due to perceptions of risk and distributions of cause and affect across time and space (Dunlap et al., 2000). Scientific research has also resulted in technical advances in mitigating the causes and consequences of climate change and provided information for policy makers across varying levels and sectors of governance (IPCC, 2007). Scientific knowledge however, presents a partial understanding of climate change; in terms of causation, attention must also be focused on the social, political and

economic processes that need to be transformed, if climate change is to be addressed (Gonzalez-Gaudiano and Meira-Carrea, 2010).

The following section draws on relevant literature around climate change, global justice and environmental education to identify a range of key concepts which provide a theoretical framework for the research. It goes on to examine the context of the research and outlines the current place of climate change education in primary education in Ireland. The paper then describes the research approach and methodology used in the study, before presenting the main findings and the implications of those findings for climate change education. In conclusion, the paper outlines key recommendations for the sector.

### Conceptualising climate change

Any serious attempt to address global climate change must engage with the dominant global model of economic growth, which has been identified as a primary cause of the current climate crisis, along with associated social and cultural norms (Wainwright, 2010; Roberts and Parks, 2007; Huckle, 2010). Capitalism has several implications for climate change, over and above the long-standing association between carbon-based economies and global warming. Research in the social sciences indicates that the social structures and norms on which capitalist societies are premised can make it difficult to act on particular environmental messages and values, such as changing individual behaviour around energy-saving. Providing information on individual behavioural goals is unlikely to be effective in promoting a more carbon-neutral lifestyle, for example, if it runs counter to other powerful influences, such as wider social and cultural norms or economic costs (Owens & Driffill, 2008). Energy conscious behaviour is influenced in complex ways by factors such as economic cost, awareness, trust, commitment, and a sense of moral obligation (Devine-Wright & Devine-Wright, 2004; Owens & Driffill, 2008). Many barriers to behavioural change are built into the fabric of everyday life through government regulations, business practices, or the physical form of human settlements (Chawla, 2006; Palmer, 1998). Capitalism, therefore, creates the economic system which produces climate change, but simultaneously constrains individual action at societal level through social, cultural and economic norms, and through wider governance arrangements. Importantly however, the literature also suggests that these institutional barriers can be overcome through people's actions as citizens (Kollmuss and Agyeman, 2002).

The more obvious implication of the ideology and practice of capitalism in climate change is the institutionalising of open-ended economic expansion and accumulation as an

unquestioned good, requiring the on-going conversion of the planet into the means of production, with the consequent generation of inequalities of wealth and power (Roberts and Parks, 2007). The evidence for capitalism as a causal factor for climate change, allied with the unequal distribution of wealth and power characteristic of global capitalism, has generated a discourse of justice around climate change which emerges strongly in the social, economic and political literature (Vargas, 2000; Huckle, 2010). In terms of historical emissions, industrialised countries account for roughly 80% of the carbon dioxide build up in the atmosphere to date (Baumert et al., 2005). The IPCC (2007) states that in order to bridge inequity, industrialised nations need to reduce emissions by about 85%, while developing nations can more or less remain at the present levels. Complicating this is the growth in carbon emissions of highly populated countries, particularly Brazil, Russia, India and China (BRIC nations). There have been increased calls for the involvement of these countries in a global effort to address climate change (Richels et al., 2009). Most critical, perhaps, is the fact that those populations already vulnerable to poverty, food and water shortages will suffer the worst consequences of changing weather brought about by climate change (IPCC, 2007; OECD, 2009; Maplecroft, 2010). This has prompted commentators to highlight the justice dimensions of climate change to emphasise the impact of climate change on the world's poorest people (Trócaire, 2010; MRCJF, 2011). With such radical carbon emission targets required from developed countries, in particular, and with current carbon emission levels well in excess of these targets, climate change and climate justice pose challenges for educators.

#### Education for climate justice

Any effort to address economic growth, environmental degradation and social development, as problematised in the previous section, naturally falls within the paradigm of sustainable development (The World Commission on Environmental and Development, 1987). A highly contested term, sustainable development acts as a "vehicle for a huge range of aspirations for a better world" (Szerszynski, 1998:150) and is therefore difficult to define. The aspirations alluded to above involve, and are underpinned by, different value orientations. For example, utilitarian instrumentalist or anthropocentric value orientation may consider the environment as a resource for the purpose of social and/or economic development; a technocentric value orientation may view of sustainable development as a matter of making adjustments to present human activities to sustain economic and social development; eco-centric view correspond to extending ethical considerations and rights of survival to species other than humans and may encompass intrinsic value orientations.

From the time sustainable development was first endorsed at the UN General Assembly in 1987, the parallel concept of education to support sustainable development has also been

explored (McKeown et al., 2002). Chapter 36 of Agenda 21, "Promoting Education, Public Awareness, and Training", identified the following aims for Education for Sustainable Development: to improve basic education; to reorient existing education to address sustainable development; to develop public understanding, awareness, and to implement training. While each of these aims clearly has direct relevance to climate change education, there is insufficient scope to address them all in the current paper. In order to progress discussion around climate change education it is to the second aim that we turn our attention. This aim recognises the importance of education in promoting sustainable development, and the necessity for a broad based educational response to environmental and social issues:

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues . . . it is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development.

(United Nations, 1992, Chapter 36)

Education, thus conceptualised in Agenda 21, is a critical component for achieving a sustainable future; ESD therefore calls for the creation and expansion of knowledge, skills and values to find new solutions for balanced development (McKeown et al., 2002).

It is suggested that people need basic knowledge from the natural sciences, social sciences, and humanities to understand the principles of sustainable development, how they can be implemented, the values involved, and ramifications of their implementation. However, the dominant educational response to climate change education has centred primarily on the physical and scientific dimensions (Kagawa and Selby, 2010). It is argued by these critics that this narrow educational response has led to an "overarching absorption with the technological fix" with learning experiences "confined to business as usual parameters" (Kagawa and Selby, 2010:5). A more rounded climate change education is called for which provides learners an opportunity to debate and discuss the roots, personal meanings and societal implications of climate change scenarios that are likely to play out during their lifetimes (Kagawa and Selby, 2010). Indeed, central to Chapter 36 of Agenda 21 is an emphasis on education where people could be "included in the intellectual task of critical appraisal of environmental and political situations" it calls for local, participatory engagement of citizens decision making. As such, ESD is inherently political.

ESD focuses largely on the major social, economic, and environmental issues that threaten the sustainability of the planet, across dimensions of time and space. Within this context, the idea of global citizenship is of central importance. Bottery (2006) maintains that education professionals are at "an important crossroads... at which they must choose to either embrace a global awareness in order to promote the public good or else retreat into

insularity” (p. 111). Multiple dimensions have been identified which are characteristic of Education for Global Citizenship<sup>1</sup>. Global citizenship education focuses on content and processes intended to increase children’s knowledge, understanding and awareness of concepts such as social justice, human rights, power, sustainable development, world democracy and world citizenship (Ruane et al., 2010). It promotes the fostering of critical thinking skills, multiple perspectives, open mindedness and empathy. It develops skills and dispositions that enable children to participate actively in society and to challenge injustice, prejudice and discrimination (Fiedler et al., 2008; Moss, 2003; Calder, 2000; Larsen & Faden, 2008; Fitzgerald, 2005; Fountain, 1990; Irish Aid, 2006). In many respects, it foregrounds many of the skills which are central to ESD (McKeown et al., 2002).

The following section looks that a number of key discourses within the academic literature that can be used to examine climate change education as a political, justice and values oriented education.

#### Towards a theoretical framework

This section poses - and attempts an initial response - to the question: what might a more rounded climate change education look like? To answer this question a range of literature has been drawn upon, including ESD, citizenship education, global citizenship education and values orientated education.

A number of typologies have been developed to explore teaching, learning and participation in environmental issues (Hart, 1992; Sterling, 2001). Sterling’s (2001) typology of learning around environmental issues can assist in understanding educational interventions around climate change. First order learning, which he defines as adaptive learning, does not require knowledge of the underlying rationale beyond the personal benefit that might accrue. Second order or reformatory learning involves critical reflection on one’s views in the light of new information. It challenges assumptions and promotes “thinking about thinking”. Third order learning (transformative or “deep” learning) is where one becomes critically aware of different paradigms and world views, including one’s own (Sterling 2001, p 15). This enables learners to link different paradigms to current issues and to identify the problems where two views contrast. While such typologies may give some analytical support to understanding different forms of learning, and indeed, critical thinking around the subject of climate change, the literature on citizenship provides another dimension.

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<sup>1</sup> Education for Global Citizenship which is also known as “development education”, “the global dimension”, “human rights education” and “global justice education”; this proliferation of terms has given rise to claims that it lacks conceptual clarity (Fiedler et al., 2008).

Westheimer & Kahne (2004) have created a typology around citizenship which identifies with three conceptions of the “good citizen”: personally responsible, participatory and justice orientated. The personally responsible citizen acts responsibly, but as an individual, in his or her community e.g. picking up litter; the participatory citizen participates in civic affairs and social life of the community at multiple scales, engaging in collective and community based efforts; the justice orientated citizen operates as an effective democratic citizen, and requires opportunities to analyse and understand the interplay of social, economic and political forces. These typologies highlight the different kinds of learning around environmental matters, and citizenship engagement, and problematize the ideas of personal and collective action, critical and systems thinking.

A systems thinking approach to curriculum design, as outlined by Greig, Selby and Pike (1989), is potentially transformative and characteristically holistic. Systems thinking requires that, rather than taking an analytic approach which breaks an issue down into its constituent parts, one must look at how an issue is part of a broader system - such as how environmental problems interact with social, political and economic issues, and how economic needs are interrelated with environmental, political and social needs (Greig, Selby and Pike, 1989). Critical reflection is seen as characteristic of this approach, with a consequent emphasis on the 'how' rather than the 'what' of thinking in an educational context (Jinkling and Spork, 1998). This emphasis becomes particularly relevant when the emphasis on values, prevalent in the literature, is considered. Tilbury (1995), for example, argues that the development of sustainable lifestyles is predicated on the active consideration of personal and societal values.

This focus on values raises the question of whether holistic models such as a systems thinking approach can be effectively promoted in current education systems, which may be predicated on a different value system. While the idea of education as a contested space where dominant ideologies are resisted as well as reproduced has replaced the more deterministic critique of education most associated with Bowles & Gintis (1976), instrumentalist and functionalist views of the relationship between education and the economy continue to prevail (Sugrue, 2004; Skillbeck, 2004) while the role of education in legitimising environmental degradation has been noted (Huckle, 2010).

Introduction to the research context: Ireland and the environment

It has been suggested by Filho (1996) that progress in environmental education is directly linked to how the government of a country regards environmental topics. As argued earlier, it can also be constrained by dominant social and cultural norms. Climate change education in Ireland, therefore, must be positioned within the political, economic and cultural context of the country, and its long, complicated engagement with environmental and development matters.

Normatively it appears that Ireland, like other European countries, ranks climate change as the third most serious problem the world faces, after the global economic down turn and global poverty (Eurobarometer, July, 2009). Moreover, as recently as 2005, four out of five Irish respondents to a European survey agreed with the view that policy makers should consider the environment to be just as important as economic and social policies while 85 per cent of respondents agreed that policy makers should take into account environmental concerns when deciding policy in other areas such as employment (Eurobarometer, 2005). A more recent survey indicates however, that the current economic crisis has had an impact on Irish attitudes towards development and environmental matters. The most recent data suggests that there has been a sharp increase in the proportion of Irish people prioritising economic growth over environmental matters, with a corresponding decline in the proportion favouring environmental protection over the economy. This shift in priority has occurred at a faster pace in Ireland than for the EU as a whole (Eurobarometer, 2009). Nonetheless, like many other high income countries in the global north, Irish attitudes towards the environment and towards political action on environmental issues seem to be reasonably favourable. However, qualitative research into the values and attitudes of Irish people paint a somewhat different picture.

Issues of national identity and post-colonialism have historically resulted in low cultural acceptance of environmental science in Ireland (Howe, 2000; Outram, 1998). Leonard's (2006) research into environmental civil society in Ireland has identified a perception that those who are overt in their concern to protect the environment tend to be middle class and urban, and without a strong connection (practically and historically) with the land and rural issues. Environmentalism more broadly, is associated with external recreational interests, the concern of urban dwellers and alien to everyday rural, local life (Viney, 2003). While the basis of this view may be found in Ireland's colonial past, it also has more recent origins in the cultural changes which have taken place in Irish society through urbanisation since the 1980s. At this time the identity of rural Ireland, so long equated with the 'real Ireland' gave way to increasingly urban standpoints and concerns. Tovey (1994) suggests this change ran parallel to the identification of dominant farming practices as posing a major threat to the

Irish countryside by environmental groups. This complex variety of reasons, linked to land, history, nationalism and identity, coupled with a political culture characterised by clientelism, brokerage, consensualism and localism (Collin & O'Shea, 2003), has contributed to Ireland's categorisation as a 'reluctant state' by the EU commission, due to non-implementation of environmental regulations (Kavanagh, 2010).

Taylor (2005) states that the goal of environmental policy in Ireland is environmental management rather than protection; environmental goals are subservient to economic goals. Within this context Motherway et al. (2003) argue that while sustainable development is institutionalised through ecological modernisation in the Irish context, the central element of ecological modernisation, that environmental protection becomes integral to all aspects of the economy and society, has not taken hold (Motherway et al., 2003). Moreover, the drive for economic development has undermined and made culturally problematic any form of dissent in Irish politics based on environmental values (Kavanagh, 2010). Powerful constituencies, in the form of politicians, business interests and local individuals, contest environmental regulations, demonise their proponents in public discourse and, in some documented cases, create an 'in' group and an 'out' group in communities. (O'Rourke, 2005; Kavanagh, 2010).

#### *Climate change education in Ireland:*

Since the advent of the Primary Curriculum in 1971, Irish primary education has been premised on a child-centred approach which embraces a commitment to social constructivism as an epistemological stance and to active and participatory pedagogies. While the curriculum espoused child-centredness at an ideological level, however, research into its implementation in the 1980s and 1990s revealed many contradictions at the level of enactment, including the continuation of didactic, teacher-centred traditional approaches in many classrooms, along with conceptual inconsistencies, such as the endorsement of integration as a fundamental principle while continuing to present the curriculum as largely subject-based (Waldron, 2004). In 1999 a new curriculum was introduced into Irish primary schools which restated a commitment to child-centred education and active learning and prioritised key skills in communication problem-solving, critical thinking, inquiry, investigation and analysis, and social and personal awareness and interaction.

Since the introduction of the new curriculum the National Council for Curriculum Assessment (NCCA) has conducted a number of reviews on its implementation. In 2005 a review of

Mathematics, English and Visual Arts was undertaken, and in 2008, a second review which focused on Irish, Science and SPHE was conducted. The latter review (NCCA, 2008) indicates where Science and SPHE are having valuable impacts on children's learning. With respect to Science, the review indicates that the curriculum has increased scientific knowledge, understanding and skills. The review of the SPHE curriculum suggests that children are supported to become more self-expressive and communicative and also, that it allowed for the introduction of new, participatory, teaching techniques. Despite such positive outcomes, the report found that substantive challenges remain. As had been previously found in the 2005 review, teachers identified curriculum overload, insufficient time to meet the needs of all learners due to large classes, and lack of instructional materials as among the key challenges of curriculum implementation (NCCA, 2008:17). In the case of Science, "respondents noted a lack of resources, including teacher resource materials such as teacher manuals" (NCCA, 2008:17). The review also suggests that there should be a renewed focus on developing children's higher order thinking and problem solving skills, particularly in science and SPHE, with greater consideration given to self-directed learning and to project work (NCCA, 2008:20).

The last decade has seen a number of state initiatives to highlight awareness of climate change and encourage changes in behaviour, particularly in relation to personal energy use (CHRCE, 2010). Campaigns such as the 'Change' campaign (Department of Environment, Heritage and Local Government) primarily follow an information-deficit model, providing public information to promote behavioural change (following Owen, 2002). However, the Change initiative also included the creation of an enquiry-based, cross-curricular educational resource, *Eco-Detectives*, developed for the initiative by the Centre for Human Rights and Citizenship Education, St Patrick's College and distributed to all primary schools in Ireland (Pike, 2010). The second state campaign on climate change, 'The Power of One' is administered by the Sustainable Energy Authority of Ireland which has a strong presence in the education sector. The Sustainable Energy Authority of Ireland education programme outreaches to primary schools around the country. The workshops are primarily grounded in exploring with children the scientific nature of energy and action-orientated responses to energy conservation. While climate change is mentioned within this context, it is not the main focus of the SEAI education programme, the primary goal of which is to educate learners on energy conservation, efficiency and the benefits of renewable over non-renewable sources (CHRCE, 2011).

In a recent evaluation of the SEAI education programme, teachers who participated located climate change education primarily within the subjects of Geography and Science (CHRCE,

2011). In the primary curriculum, Geography and Science contain an overlapping strand on 'Environmental Awareness and Care' which explicitly includes a focus on global warming as well as other related issues such as energy and climate. The strand aims to "foster a sense of responsibility for the long term care of the environment and a commitment to promote the sustainable use of the Earth's resources through personal life – style choices and participation in collective environmental decision making", which implies participation in the political sphere (NCCA, 1999b, p. 5). Teachers also identified the subject of Social, Personal and Health Education (SPHE) as a location for climate change education. SPHE contains a strand unit on developing citizenship and identifies environmental awareness as a component of citizenship (CHRCE, 2011). In general, the Irish Primary Curriculum is seen by commentators as flexible, adaptable and open, with the capacity to be re-imagined in a variety of ways to address particular issues (Ruane, Horgan and Cremin, 1999). This suggests the potential for learning around climate change to be incorporated across a range of curricular areas in the current Irish curriculum, as demonstrated by the *Eco-Detective* resource.

While citizenship is now explicitly included in the curriculum, much of the initiative for the inclusion of citizenship education in Irish education has come from outside the formal education sector (Hammarberg, 2007). The Green Schools Programme (GSP), run by a non-governmental organisation, *An Taisce*, in association with local councils, is perhaps the most widespread context for children's learning about the environment and the practice of democracy in primary schools. The programme is run in 2862 primary schools throughout the country, and offers a framework for integrating the curriculum strand of environmental awareness and care in a holistic manner into school practice. The wide engagement of primary schools is in part due to the support it has received from local government Environmental Awareness Officers (EAO). Each local authority in Ireland has at least one EAO, whose mandate is to ensure public awareness of waste management legislation. The GSP provides a useful visual marker of the work of the EAO in the local community; on the completion of each theme the primary school receives a green flag which is posted outside the school. The GSP requires schools to set up and apply an environmental management scheme, focusing on one environmental issue at a time, such as waste, energy, transport and water (An Taisce, 2010). While the energy and transport themes have a climate change element, the overall trajectory of the programme is to focus on action-orientated responses to the theme, based on an initial environmental audit. However, a new pilot initiative is currently underway to incorporate a global citizenship focus to each of the environmental themes. This has the potential to incorporate a wider justice element into the programme. A second key facet of the Green Schools programme is the requirement to establish and

facilitate on-going democratic structures in which children, teachers and others in the school community work together to develop, implement and audit the environmental management activities in the school (An Taisce, 2010).

Finally, education initiatives which focus on social justice, global justice and global citizenship are primarily located in the development education and human rights education sectors. Development Non-Governmental Organisations (e.g. Oxfam, Trócaire and Christian Aid) and Irish Aid run competitions and produce resources which include a focus on the global impacts of climate change.

### *Summary of Literature Review*

The literature locates climate change within the context of its root causes, the current form of economic growth and capitalism, which re-enforces global inequalities, but also creates bounded solutions to the climate change problem. Movement towards a more sustainable future is also conceptualised as problematic and underpinned by different value orientations, which pose challenges for education. In an Irish context, these challenges include the contested and controversial nature of political and public discourse around environmental issues. Nonetheless, Irish primary education offers potential spaces where a critical, justice-focused and systems-oriented approach can be developed.

### **Methodology**

This paper is drawn from the initial findings of a qualitative study into the understandings of various stakeholders engaged in climate change education in Ireland. The research was funded by the Development and Intercultural Education (DICE) project, which coordinates the integration of development and intercultural education in initial teacher education at primary level in Ireland; the DICE project is funded by Irish Aid, the Irish state agency for development aid. The empirical data which follows in the analysis section draws on the findings of seven focus groups and eight interviews conducted in the initial phase of research.

The research focuses on the following themes:

-Exploring conceptualisations of climate change and climate justice amongst stakeholders involved in the primary education sector and climate change specialists

- Examining how climate change and climate justice are currently incorporated into the primary education sector
- Identifying approaches that will contribute to the teaching of climate justice in initial teacher education and the primary classroom.

The aim of qualitative research is to understand the processes which underpin phenomena rather than to obtain a representative overview of attitudes held or to compare the views of groups with statistical means. In essence, it is an approach which emphasises process and context, seeks to uncover complexities and attempts to understand the social structures and processes at play in people's lives (Macnaghten & Urry, 1998; Rubin & Rubin, 2005). From a practical perspective, the qualitative approach emphasises flexibility, allowing the researcher to develop questioning as new ideas and themes emerge (Rubin & Rubin, 2005). However, like any research strategy, has its limitations particularly in relation to questions of subjective generalisability, replicability, and positionality. Much of the criticism levelled at qualitative research centres on questions of the role of the researcher in the research process. The positional nature of the researcher does inevitably influence research findings; the key issue is to be cognisant of how this may affect research findings and endeavour to ensure transparency in final analysis and reporting. Equally, endeavouring to ensure clarity and incorporating reflexivity in the data collection and analysis process develops rigour and assists in minimising such limitations (Rubin & Rubin, 2005).

### *Research process*

In the initial phase of the research a review of literature relating to climate change, climate change policy and climate change education was undertaken which informed the development of research tools and the subsequent analysis of data.

### *Interviews*

Semi-structured interviews were conducted with eight climate change specialists. Table 1 outlines the range of sectors and organisations which participated in research. Interviews were conducted at a venue chosen by the interviewee and generally lasted between forty-five minutes to one and a half hours. The interview, which was digitally recorded and later transcribed, followed an interview schedule that had previously been piloted with five individuals involved in climate change policy and/or climate change education.

### *Focus groups*

Seven focus groups were conducted; three focus groups with classroom teachers, three with 1<sup>st</sup> year student teachers and one with teacher educators. Table 2 provides a description of the focus groups. Each of the focus groups were conducted at a venue of their choosing, and generally lasted between thirty minutes and one hour. It should be noted that it was decided to use natural groupings, where individuals within the group have some 'common ground' by belonging to particular 'communities of interest' (Holbrook & Jackson, 1996). Dynamics within the focus group is an important consideration, and can influence the type of data received from the group. Therefore it is useful to use groups that are already established, and individuals are familiar with each other; this can negate the necessity to develop a group dynamic, relieving time pressures (Krueger, 1994). The focus groups followed an interview schedule which had previously been piloted with two groups involved in climate change education. The focus group schedule is also provided in the Appendix.

## Analysis

Data were categorised into meaningful themes which best fitted the experiences and understandings of research participants. Each of the four members of the research team was given one set of data to analyse (practicing teachers, student teachers, teacher educators and climate change specialists). One member of the research team reviewed all transcripts to maintain an overall understanding of the different themes which could potentially arise. Each individual analysed the data drawing on the constant comparison method (Lincoln & Guba, 1985). Each interview/focus group question formed a category under which responses were filed. Descriptive analysis was then conducted which identified differences and similarities in participants' responses to each question within a given group (i.e. teachers, student teachers, teacher educators and climate change specialists). Following this initial process the research team met on three occasions to share responses to the data, compare descriptive categories and begin the process of identifying conceptual themes. During this time the descriptive analysis was viewed in the context of the research questions and literature review. Following a final meeting of the research team a number of conceptual themes were agreed upon which form the basis of the analysis which follows. In the analysis section which follows quotes from interviews and focus groups are presented to illustrate key themes and ideas. Individuals have been given pseudonyms to provide anonymity.

Table 1. Interviewees: Pseudonym, sector, description and organisation

Pseudonym	Sector	Description	Organisation
Anja	Academic	Climate justice, public participation and governance	University
Sean	Academic	Climate change policy, geography	University
Cormac	Academic	Former Green Party Minister	Institute of Technology
Claire	Development analyst	Development policy, climate justice policy	Development NGO
Beth	Development educator	Development education	Development NGO
Niamh	Environmental educator	Environmental education, education for sustainable development policy	Environmental Youth NGO
Bernie	Environmental educator	Green Schools and global citizenship	Green Schools Programme
Paula	Teacher educator	Geography education	Higher Education Institute

Table 2: Focus groups: Identifier, category and description

Identifier	Category	Description
FG ITE	ITE	Participants from a teacher education college; Participants were invited via e-mail.
FG PT 1	Teacher	School was well known to researchers; as an Educate Together school the ethos is based on the rights of the child; as such teachers have awareness of development and human rights education practices.

FG PT 2	Teacher	School was well known to researchers having won national awards in development education; in addition one teacher in this focus group is attending the CHRCE M.Ed. specialism in Citizenship and Human rights education.
FG PT 3	Teacher	Focus group of teachers from 8 different schools completing a two year pilot programme for the Green Schools Global Citizenship Award.
FG ST 1	Student Teacher	5 1 <sup>st</sup> year students of a teacher education college; no previous engagement with issues of global citizenship or environmental education in college.
FG ST 2	Student Teacher	8 1 <sup>st</sup> year students of a teacher education college; had participated in a 5 week introduction course on global citizenship and development education; also undertaking an elective in Bioscience.
FG ST 3	Student Teacher	5 1 <sup>st</sup> year students of a teacher education college; no previous engagement with issues of global citizenship or environmental education in college.

### **Conceptualising climate change**

This section explores conceptualisations of climate change held by climate change specialists, initial teacher educators, teachers and student teachers. Three key themes emerge which demonstrate a continuum of justice orientated conceptualisations of climate change. The first theme orientates participants around physical/scientific understandings of climate change and justice with emphasis on local consequences; the second theme orientates participants around physical understandings, anthropogenic causes of climate change and global justice; the third theme orientates participants around an understanding of climate change based on anthropogenic causes, adaptive capacity and human rights responses to climate change.

Each of the focus groups and interviewees were first asked ‘what does climate change mean?’ Broadly speaking, teachers and students focus groups spontaneous responses focused on physical representations of climate change such as increasing temperature on the earth, sea level rise, melting ice caps, and extreme weather events such as flooding. This theme can be further sub-divided into two sub-themes, categorised as local and global

understandings of climate change. The local interpretation was found in the three student focus groups (SFG 1, 2 and 3), and is exemplified in the extract from FG ST3 below:

FG ST 3

<u>Moderator</u>	<u>What do you think climate change means?</u>
<u>Sidney</u>	<u>A change of climate.</u>
<u>Susie</u>	<u>How weather, seasons and stuff changed recently.</u>
<u>Patricia</u>	<u>More extreme natural disasters.</u>
<u>David</u>	<u>The floods in Dublin.</u>
<u>Sidney</u>	<u>More frequent extreme weather.</u>

The notion of changing weather patterns discussed by this group draws on anecdotes of recent flooding in Dublin, extremely cold winters experienced in Ireland in 2010 and changes in the timing of seasons (e.g. autumn coming earlier or later than expected). Such discussions, without prompting from the moderator, took on a local nature, relating directly to perceptions of the physical impact of climate on Ireland currently.

All focus groups were asked 'what does climate justice mean to you?' in order to provide some opportunity to elicit justice-orientated responses. Teachers and student groups were all initially hesitant to respond to this question and unsure of the terms' meaning. FG ST 1 and 3 suggested that climate justice was related to a range of ideas including: human – environment interactions, animal rights, and a discourse around development that ranges from the need for autonomy in matters of economic development, to the need for the global north to assist countries and communities from the global south:

FG ST 3

<u>Sidney</u>	<u>Being penalised for bad treatment of the environment?</u>
<u>David</u>	<u>Justice towards the earth and animals?</u>
<u>Susie</u>	<u>That people should be allowed develop as they want to? That we should not tell others how to act, or educate them how to act in a particular way?</u>

FG ST 1

<u>Karen</u>	<u>You have to teach them to do justice, use the resources given to them. They were given aid, you give them money and what do they do with it? They don't know what to [do], you have to teach them how to get back [their environment].</u>
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The responses espoused in the extracts above speak to the multi-faceted and complicated engagement encountered in this research with the term climate justice. The participants in student focus groups 1 and 3 draw on previous knowledge to construct their understandings in terms of punishment, animal rights, and development. The two conceptualisations of development are particularly interesting as they depict particular interpretations of economic development and the relationship between countries of the global north and global south. Susie's views betray little understanding of the relationship between unfettered economic development and climate change (Huckle, 2010; Roberts and Parks, 2007; Vargas, 2000).

Karen's statement positions countries in receipt of aid as passive recipients of aid from the global north. Neither Karen or Susie address culpability or display any understanding of interdependence which would support more nuanced views of aid and justice, poverty, vulnerability and distribution of resources associated with development education (Calder, 2000; Fiedler et al., 2008; Fitzgerald, 2005; Moss, 2003; Ruane et al., 2010).

In contrast to the locally informed views of climate change espoused above, the three teachers' focus groups build on similar representations of the physical impacts of climate change to introduce a more global interpretation. These groups discussed the natural variation in the climate system, the anthropogenic causes of climate change, and presented a more nuanced understanding of the global relations of climate change. The following extract from FG PT 1 is indicative of such discussion:

FG PT 1

Susan

I suppose the main thing would be a rise in temperatures, a drastic change in temperatures. Certain areas being renowned for having a specific climate that [has been] altered and changed within the last ten or twenty years in a significant way. Water levels rising and different things like that. Climate change is happening world-wide and having a knock-on effect.

Anthony

Climate has always changed over the millennia, but the reason climate change is in the news now and is important to everybody is that climate change now is induced by humans, at least most people agree on that, and that means we might be able to do something about it which is why it's important that education happens in that context.

Central to conceptualisations of climate change for the three teachers' groups was the explicit recognition of its anthropogenic causes and a global perspective on its consequences. These interpretations reflect their engagement with development issues in the classroom, and relate more directly to understandings of global citizenship and development education (Calder, 2000; Fiedler et al., 2008; Fitzgerald, 2005; Moss, 2003; Ruane et al., 2010).

The teachers (FG PT 1, 2, &3) and students (FG ST 3) were initially hesitant to respond to the question 'what does climate justice mean to you?', but after prompting a range of understandings of climate justice emerged. These groups positioned climate justice in terms of responsibility, stewardship for the earth and for future generations, respect for the environment and for people, and a sense of moral obligation to help vulnerable people adapt to climate change. However, these conceptualisations of justice demonstrated a limited understanding of causation and of the responses required from the global north.

FG PT 3

Laura

What we do on this side of the world affects the people in the developing world, you know. From the time when you get up in the morning, by the time you've got to the

tenth thing you do, Daniel in Uganda hasn't water to wash himself, because of the fact that we left on the immersion too long and we used too much energy.

This linear view of the causal relations of climate change locates interdependence at the level of the individual, creating a duality which positions individuals as either perpetrator or victim. While most strongly expressed by Laura, this perspective permeated discussion within FG PT 1, 2 & 3 and FG ST 3. It is possible that such a linear chain of causality may appeal to teachers because it is certain, outcome-orientated and solution-focused. It may also, however, render the learner unable to critically engage with the root causes of climate change outside the space of personal action (Jickling and Spork, 1998). Indeed, such responses underline the need for systems thinking and for open-ended, critical interpretation of climate change as espoused in the literature around education for sustainable development (Greig, Selby and Pike, 1989; Kagawa and Selby, 2010 a/b; Tilbury, 1995).

It should also be noted that in each of the six focus groups with students and teachers at least one individual in each focus group discussed the term climate change in terms of physical/ scientific misconceptions, such as ozone depletion, CFCs, or natural disasters such as earthquakes and tsunamis. The extracts below are illustrative of these misunderstandings:

FG PT 1:

Gayle I think the fact that the Richter scale recorded an earthquake in Donegal two or three weeks ago was a sign of how things are changing.

FG PT 2:

Kate When I think of climate change I think of global warming, and basically pollution and the ozone layer, things like that”.

FG ST 1:

Karen It is about the environment where stuff like tsunamis happen because of the damage people have [sic] done to the environment”.

Confusion between issues of atmospheric pollution and climate change has been found in other research (Kempton, 1991), with some suggestion that such views are “likely to influence both willingness and ability to participate in solving the problem of climate change” (Stamm et al., 2000: 220). Certainly in the case of teachers and student teachers who espoused such views it may impinge on their ability to adequately teach these topics.

Climate change specialists and teacher educators were also asked to respond to the question ‘what does climate change mean to you?’ and on their views of climate justice. Unlike the students and teachers, there were no discernible differences between their views on climate change and climate justice. Rather than focusing primarily on the impacts,

specialists drew on the causes of climate change. For these participants, issues of justice were inextricable from the term climate change itself. For example, the following extract from a former Green Party minister builds on his geographical knowledge of the natural variation in the climate system to position his understanding of climate change in terms of the imbalance within the climate system due to human activity, and its consequences:

Interview: Cormac – Academic

I would usually see it as the anthropogenic climate change, in other words the man-made, human induced changes that are occurring in the climate around the world. Some areas will be differently affected than others. In Ireland we are fairly fortunate that we probably won't be as significantly affected as in other countries. There is a real concern that the bulk of the problems will accrue to the developing world rather than the developed world.

Interviewees' conceptualisations of climate change tended to build on the anthropogenic causes of climate change and its differential impact on vulnerable groups which was seen to have an inverse relationship with culpability. However, climate change specialists also mentioned the reliance on an oil based economy, powerful vested interests, and lack of opportunity for alternative lifestyles within their conceptualisations of the anthropogenic causes of climate change. Inherent in this perspective is a more balanced, systems-oriented interpretation of climate change and culpability (following Greig, Selby & Pike, 1989).

A more radical justice-orientated perspective towards climate changes was offered by two interviewee working in development and development education who discussed climate change within a direct justice:

Interview: Claire – Development NGO

I mean climate change is the science. Climate change is what's happening. Climate justice is the approach, a vision, a state of being, a way to tackle climate change, so that benefits are equitably shared and that responses to climate change don't further exacerbate vulnerability".

Here a clear distinction is made between the scientific or physical conceptualisation of climate change and a justice orientated understanding and approach. The two interviewees sharing this view strongly associate climate change with the human development agenda of their organisation. The conceptualisation is predicated very strongly upon a global perspective and on protecting the most vulnerable in low income countries. This view of climate change is based on a development/human rights agenda, rather than an environmental one, and has found wide acceptance amongst international development, environmental and state organisations in Ireland, gaining increasing legitimacy in policy discussions (Sharkey, 2011; Tutu and Robinson, 2011). However, neither interviewee extended the justice agenda to include vulnerable groups at local level nor was there any

appreciation of wider environmental issues such as bio-diversity. The environment was very much conceptualised in terms of instrumentalist, anthropocentric values.

#### *Action – responses to climate change*

Participants were asked for their views on appropriate societal responses to climate change. The discussions reveal an overall understanding of the complexity of the issues, focusing on the tensions between individual and collective societal responses, the requirement for political leadership, and the cultural, economic and political barriers for institutional change. The analysis traces a path through these tensions, highlighting different perspectives within the responses of students, teachers and climate change specialists.

The following extract is typical of discussion on the responses to climate change within student and teacher focus groups. The responses begin by recalling individual actions for climate change, such as waste management, saving energy and renewable energy, and changing transport patterns.

#### FG ST 3:

Susie	Recycling.
David	Take buses more instead of taking your car.
Patricia	Turning off lights and unplugging things so the red light turns off.
Susie	Turning down your heating.
Sidney	I think stuff like switching to renewable energies, like Airtricity, and things like that

Sterling's (2001) typology of learning around environmental issues positions such first order learning as adaptive, focusing on individual experiences and goals outlined in government energy awareness campaigns. Such action-orientated responses were considered by climate specialists as an important 'entry point' to understanding climate change, offering the potential to move learners' climate change education beyond adaptive, first order learning:

#### Interview: Bernie – Environmental education

The first entry point into a broader conversation is creating awareness and changing behaviour and lifestyle. We need to do more to make the link between that awareness, and that openness to do those small things, to actually making the connection with the bigger development issues and the politics of climate change.

The suggestion that climate change education should build on adaptive learning warrants a deeper analysis. While the three student focus groups appeared particularly familiar with action-oriented responses, they also recognised the tensions between individual and collective action, economic benefits or incentives for change, and the requirement for wider

leadership to facilitate societal structures which offer structured support to environmentally friendly behaviour.

### FG ST 2

- Lisa Most people aren't doing their bit. The lifestyle, the cars and electricity and all that, they don't want to give it up.
- Enda They won't stop until it's made easier
- Sarah It's hard for one person to change their ways because it is so, I mean our individual input is going to be minuscule, if no one else comes alongside you. So you'll always think, 'Oh, I'm alone in this'. If people come together it could make a difference.
- Enda But individual action won't have an impact or contribute to [halting] climate change. They should be focused on making sure those technologies are used, as opposed to 'that technology is great but I'm not going to use it' kind of thing. There are people working on new cars that don't need petrol and that.
- Lisa They need to have a plan for that, if they had a plan to give everyone a better car rather than a normal car that would help.

While not analogous to Stirling's second or third order thinking around sustainable development, this extract demonstrates their thinking around the wider cultural and political barriers to a more sustainable lifestyle (Devine-Wright & Devine-Wright, 2004; Owens & Driffill, 2008) and the need for collective action (Westheimer and Kahne, 2004). However, students premise their discussion on the assumption that technological advances will resolve climate change. Challenging this assumption, which would invoke Stirling's second and third order thinking for example, is also required, as the extract from the following climate change specialist suggests:

### Interview: Sean – Academic

The real fact is we do have to change lifestyle and ultimately we can't tackle it by purely technological means and we simply have to become a carbon free society. That is the only way that we will get to the nub of the problem and we have to do that very quickly. Ultimately, we are back to politics and the problem can only be solved if there is a collective will on the part of society to redress the iniquities and the injustices. That collective role has not been manifested through the political system and through the public system. It is not really there at all yet.

As this climate specialist indicates, society requires transformation in the political sphere in order to address climate change, and cannot rely solely on technological or individualised responses. From the students' perspectives, however, political change was the responsibility of an undifferentiated 'they'.

Further insight is provided by a consideration of students' discussion of dystopian conceptualisations of climate change presented in the film 'The Day after Tomorrow' which arose spontaneously in each of the student focus groups. This film depicts a scenario of devastation in the city of New York (predominantly) caused by sudden climate change. The

following extract from the focus group with students from FG ST 2 is typical of the discussion related to this film; it demonstrates the potential for disempowerment within this discourse and locates power to effect change within a messianic or heroic representation of leadership:

### FG ST 2

Grace When you think about climate change you think of 'The Day After Tomorrow', like the world ending, you hear people talk about it all the time and it's like so out of your hands, [it's] one of those problems that some big leader has to come along and change

This distancing of political responsibility and denial of agency is highly problematic in the case of climate change, and environmental justice more broadly. As Kollumuss & Argyeman (2002) indicate, active environmental citizenship can be required in addressing the institutional barriers which prevent, or limit, environmentally sustainable behaviour. In addition to the barriers embodied in understandings of politics and political responsibility, social structures and cultural norms can also help or hinder access to environmental empowerment. Discussion in teacher focus groups identified cultural tensions that exist in relation to environmental responses in Irish society.

### FG PT 1

Noreen When we were growing up you had no awareness whatsoever, now there's a growing consciousness that what we do has an impact [on the environment]. And even though not everybody buys into it, it's certainly much more in people's psyche than it was.

Mark I think that its maybe, I don't mean this to sound derogatory in any sense, but it's in the middle class society, it's cool to be environmentally conscious and aware, and that's not necessarily the case in other sectors of society...for a lot of people if the recycling bins weren't there at their house it wouldn't make any difference. It's there, and it's convenient to recycle, so they do it. It kept your bin tags [costs]down.

Linda That is true actually.

Mark But now that we are actually have to pay for all of the bins going out I wonder will people bother as much? Or will they be just like, oh you know, I have to pay anyway so it can go in any bin.

Both students and teachers groups responses indicate a belief that there are structural and cultural impediments to a more sustainable society, and that action on the part of 'they', the undifferentiated body of decision-makers and experts is required. In contrast, climate change specialists indicate that appropriate and effective responses to climate change will require thoughtful, deep, transformative engagement with the root causes of climate change. Interviewees positioned their responses to climate change in terms of the current capitalist economic development model, and responses to climate change in terms of socio-political action across a range of scales. Interviewees universally accepted that for climate change to

be tackled in an appropriate manner political and economic transformation would be required.

#### Interview: Beth – Development NGO

Climate change is being looked at in terms of environmental and economic impacts, there is no questioning of the fundamentals, the economic system. It's far too narrow a discussion... without discussing the broader development models we're struggling to even find progress on the more narrow technical issues.

#### Interview: Anja – Academic

There simply just isn't the political vision and leadership, it's being held hostage by vested interests, that's crippling progress... our governance structures, our ways of thinking are not set up to deal with these issues at the moment

Addressing climate change, then, involves unpacking dominant economic and political systems, laying bare the inequalities and injustices which they generate. The question then arises, what is the most appropriate response from an educational perspective?

#### *Educational Responses to Climate Change*

All of the interviewees recognised a need to address climate change in primary education. Reflecting the literature (Ruane, Cremin and Horgan, 2009; CHRCE, 2011), Geography, Science and SPHE were identified as natural sites in the Primary Curriculum for teaching and learning. The Green Schools programme was also identified as offering important opportunities for climate change education. Respondents drew on current practice in environmental and development education for examples of possible pedagogy. This practice predominantly focuses on scientific understanding of climate change, the human impact of climate change and encouragement of personal actions (e.g. recycling, water conservation, reducing energy use) which can be taken to reduce carbon emissions. Respondents, in general, welcomed these educational interventions and supported their further expansion. In general, four perspectives emerge regarding appropriate educational responses to climate change. These perspectives relate to knowledge of climate change, personal responsibility and action, lived experience and climate change education and, finally, critical approaches to climate change education. The analysis which follows attempts to examine the assumptions which underpin respondents' perspectives on climate change education in Ireland.

Views which emphasised the importance of knowledge about climate change were expressed by teacher educators and specialists.

Interview: Paula – Teacher Education

I found that while you can teach the issues, the students don't understand the [climate change] processes involved at a base level and therefore they are not well informed in terms of articulating the key solutions to the problems.....you do need to know what the fundamental process and causes are.

This form of knowledge is clearly important in enabling insight into a global environmental phenomenon such as climate change (Dunlap, 1998). However, as the previous sections have indicated, defining the processes involved in climate change requires a systems perspective (Greig, Selby and Pike, 1989) and a trans-disciplinary approach (Gonzalez-Gaudiano and Meira-Cardesa, 2010; Wainwright, 2010). Focusing on one element to the exclusion of others presents a partial picture of climate change, and can result in misconceptions relating to its causes and consequences, and an absence of transformative, critical reflection (Kagawa and Selby, 2010).

Perspectives encouraging personal responsibility and action were encountered across the contributions of students, teachers, teacher educators and climate change specialists. Two different manifestations of this position were encountered. The first relates to the perceived need for educational approaches which encourage personal responsibility in the child and action aimed at influencing the child's family.

Interview: Sean – Academic

The idea in Green schools is that kids go home and nag their parents. That is working. If you talk to parents they are getting nagged by their kids about turning switches off and things like that

However, this form of action does not engender critical thinking on the part of children and adults, and as previously mentioned; if institutional structures are not arranged in a manner which facilitates environmentally conscious behaviour, or economic benefits, it is unlikely to be sustained (Motherway et al., 2003).

The second manifestation of this perspective suggests that education teaches children environmental values and behaviour in preparation for their role as future 'adult' citizens.

While mentioned by all respondents, this view was most strongly held, and uncritically engaged with, by students and teachers as the extract below illustrates:

### FG PT 3

Isn't that the very point about education in the primary sector, in particular, that it is creating awareness among the small citizens so that when they get bigger and become big citizens then they have an impact on lobby groups and within society.

A number of key points can be raised from the extract above. First, research in environmental values would support the general assertion that an early appreciation of the environment can underpin future environmental engagement (Palmer, 1998). However, research also indicates that expression of environmental values as behaviour does not follow a linear path from value to action. This uncritical position underestimates the constructed nature of environmental learning, which draws on experience of the wider cultural, social, political and economic norms outside the school environment (Chawla, 2006; Devine-Wright & Devine-Wright, 2004; Owens & Driffill, 2008). Second, the suggestion that action orientated individualised environmental education will lead to political engagement in the form of lobbying is problematic. Previous research into public participation in environmental matters in Ireland indicates low levels of public support for environmental civil society organisations, and marginalisation of those with environmental interests within the political culture more broadly (Leonard, 2006). Therefore, while a person may hold strong environmental values, this does not necessarily equate to a sense of agency or political action. Third, the manner in which children's citizenship is conceptualised in the above extract warrants attention. The extract positions the purpose of primary education as awareness raising for children as future environmental citizens. This position is critiqued in citizenship education and education for sustainable development, which advocates for a conceptualisation of children as citizens imbued with political agency and voice in their own right (Osler and Starkey, 2005; Covell and Howe, 2005).

Teacher educators and climate change specialists held similar perspectives to those discussed above. However, these respondents also critiqued and problematized their own assumptions. The following analysis of theme three, lived experience and climate change education, illustrates the tensions identified by climate change specialists and teacher educators around the teaching of environmental issues in primary school:

### FG ITE

Gary It's one thing teaching the ideals, everybody wants to build towards the ideal, but then if the children or pupils are in a situation and the reality is completely disconnected from the ideal thing, they [will] say this is all humpty-dumpty stuff

Ruth "If you are saying reduce and reuse [your waste] and this is at variance with other policies [with] regards to industrial development and creativity, job creation and all that sort of thing, how do we deal with that?"

Climate change specialists and teacher educators discussed the tensions between a primary education system which is conceptualised as 'idealised' and the wider reality of the neo-liberal capitalist society and expressed concern that climate change education is undermined by the dominant culture of consumerism and economic growth embedded within broader structures of society. However, they also suggested pathways to improve learning around climate change, taking into account these wider tensions and contexts.

The fourth perspective addresses the notion of critical engagement in education. This arose in discussion of climate change education with teacher educators and climate change specialists who highlighted the importance of contextualising climate change education within a broader critique of societal engagement with environmental issues. Two different sub-themes were encountered; the first addresses critical thinking in primary education and the second, the idea of individual versus collective action.

The lack of opportunity for contextualised critical engagement with environmental issues in primary school is highlighted in the following extract from a teacher educator. This extract draws on a recent public debate over the introduction of water charges in Ireland:

FG ITE

I think children aren't taught those [critical literacy] skills, they are not taught to really question what message is being given to them. So okay the first thing they will be presented with when they hear water charges is the anti-water charge campaign. They'll see somebody with a flyer or there'll be a sign up locally, but the immediacy of that won't be discussed [in school] really. So it's your curriculum, how open to change is that? Can you down tools if that's what you planned to study in the month of March and spend time on it? [If you could] that would allow children to really question and get behind the thinking [in society] and some of the legislation as well.

The extract above is illustrative of a number of key points around the Irish primary school curriculum, and the manner in which public deliberations around the implementation of environmental initiatives play out in an Irish context. As addressed earlier, while the curriculum is considered to be flexible, there is a widespread perception of curriculum overload (NCCA, 2008). The second issue relates to teachers' comfort around challenging

social, cultural and political norms, expressed cogently by Kate, a Green School teacher, below:

### FG PT 3

Kate I feel like I'm a red 'commie' or something sometimes... I mention little things like, you know, the government starts this school and when you meet a politician next you should tell him about what you want. But I just feel sometimes is it really my place to teach them [this]? Will I get in trouble? Will the parents think that I am planting ideas in their [children's] heads? I do worry about it.

Such discomfort helps to explain why educators stay within the safe terrain of action orientated environmental education. However, ultimately it restricts children's ability to conceptualise themselves as political actors. Furthermore, as noted by one specialist, the failure to critique societal values such as individualism limits children's capacities to envision themselves as part of a political collective.

Interview: Sean – Academic

We never teach about the importance of community group versus individual gain and we should. It is not surprising therefore that they [children] are not too concerned with community later on.

## Conclusion

Overall, the findings of this research indicate a range of conceptualisations around climate change and climate change education among participants in the research study. Student teachers and the majority of practicing teachers couched their understandings of climate change within physical representations of its impacts, locally and globally, with simplistic understandings of causation. In contrast the responses of ITE and climate change specialists indicated a more complex understanding. Holistic views regarding the local, global, justice, economic and political dimensions of the causes and consequences of climate change were expressed by this group. While the findings suggest a lack of familiarity among teachers and student teachers with the terminology of climate justice, those specialists who advocated and used the term tended to use it in the context of the anthropocentric dimensions of climate change and its impact on the developing world. In this context, it is important to critique the use by some government agencies and NGOs of the terminology of Climate Justice in their public discourse, given its apparent lack of impact on

target audiences to date and the potential of the term to exclude important local and environmental dimensions of climate change.

Many student and teacher participants in this study also demonstrated a lack of awareness of the role played by dominant political and economic ideologies in the construction of public and political discourse around climate change and in the limits they place on imagined futures. While the findings suggest that a systems approach to teaching climate change would foster a more transformative, holistic, nuanced framing of the issue, and naturally incorporate justice perspectives which encourage critical interpretations of the current growth model locally and globally, the implementation of such an approach would require considerable professional development for teachers and student teachers.

Some attention must also be paid to context. The findings suggest that educators must be cognisant of broader societal norms and discourses within which teaching and learning is situated to ensure that education engages with the reality of context. In the Irish situation, this must take into account oppositional discourses to environmental values, locally, nationally and globally. It is suggested here that critical engagement with such discourses in an open ended manner, drawing on a systems perspective, may lay bare value contradictions. This would enable learners to understand and reflect on constructions of knowledge developed, and social and cultural norms encountered, within and outside the school system. Such engagement inevitably moves climate change education at primary level beyond the comfort zone of the personally responsible citizen, or the more collective zone of the participative citizen and into the critical zone of the justice-oriented citizen with a consequent requirement that teachers support and facilitate that transition (Westheimer & Kahne, 2004). The study suggests that this may also be problematic.

The research encountered various conceptualisations of political efficacy around environmental issues. Students presented possible solutions to climate change based on individual action, and technocratic solutions. Central to these perspectives was a strong sense of disempowerment arising from dystopian views of the impact of climate change and a reliance on a single dynamic, powerful and heroic figure who would solve the problem. Within this perspective, there was no sense of personal responsibility for political decision-making through engagement with the political process. In contrast, some teacher participants demonstrated a strong sense of personal political efficacy, but appeared reluctant to bring politics into the classroom. It is suggested here that the action-oriented and prescriptive model which underpins current teaching of climate change, and many environmental education programmes is problematic. Enabling teachers to engage with the

politics of climate change in the classroom in a more critical, open-ended manner may relieve the tensions and contradictions that some teachers experienced, and may address students' sense of dis-empowerment. This would suggest that all teachers require space to understand and reflect on their own political agency, value orientations and assumptions regarding climate change in a way that enables them to respond to the social, political and environmental circumstances which they encounter. This presents a challenge and opportunity for pre-service and in career teacher education providers to identify and provide such spaces.

In summary, climate change appears at times a daunting concept for educators. However, it is contended that the role of education is to problematise the big issues and to foster thinking and action around creative responses. While further research into climate change education needs to take place, it is suggested here that a critical, open-ended, holistic systems approach to climate change education, which provides multiple spaces for reflection and pays attention to context, offers some way forward in addressing this issue.

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