

**Learning for Change in a Changing Climate: A Community-Based
Education Perspective**

Author

Gaillard, Estelle

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Learning for Change in a Changing Climate: A Community-based Education Perspective

Estelle Gaillard

Maîtrise, BA (Hons), MA (Hons)

Griffith School of Environment
Science, Environment, Engineering and Technology
Griffith University

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Abstract

Climate change is emerging as a dominant challenge to environmental and social sustainability in the 21st century. Decelerating the growth of greenhouse gas emissions and reducing other human impacts on the planet, as well as adapting to the changes already in motion, requires fundamental societal changes. While action is needed at all levels of society, individuals and communities have a critical role to play in changing their own behaviours as well as supporting collective action and policy change. The question about how to effectively ‘educate’ individuals and communities on climate change issues is the subject of a growing body of research.

Research to date suggests that the educational response to climate change has concentrated primarily on awareness raising and information dissemination, and that the majority of Australians are now aware of and are concerned about climate change. This calls for alternative educational approaches that can help facilitate climate change learning and action within communities.

This research used a multi-method, case study approach drawing from three major theoretical areas: environmental education, with an emphasis on learning and change in communities, social diffusion theory, and climate change communication theories. The selected case study was The Climate Project Australia (TCP), which uses community leaders to educate their respective communities on climate change and promote action and community dialogue on the issue. This research explored how community-based education can play a more transformative role in responding to climate change challenges. More specifically, the research examined whether TCP offers an effective educational model to enhance learning and support change at the individual and collective levels. Qualitative and quantitative data, collected through pre/post questionnaires, semi-structured interviews and participant observation, generated evidence of both learning outcomes and processes.

During the analysis, participants were categorised into three groups - labelled the ‘Already converted’, the ‘Early aware’ and the ‘Doubtful’ - which enabled a more in-depth and accurate understanding of the range of reported learning outcomes and experiences. The research shows that educating each group on climate change requires careful consideration of content-knowledge, educator and learning processes. Overall, findings indicate that effective climate change education must promote relevant dimensions of knowledge beyond climate change science. Importantly, the emphasis should be on action-oriented knowledge and strategies for change. Moreover, findings show that opportunities for social interactions and dialogue are effective in promoting learning. This suggests that interactive approaches, although potentially challenging for both learners and educators, are best suited for exploring complex issues such as climate change and facilitating learning for change.

Statement of originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Estelle Gaillard

Date September 24, 2011

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Acronyms

ABARE	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
AIT	An Inconvenient Truth
ARIES	The Australian Research Institute for Environment and Sustainability
BOM	Bureau of Meteorology
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EAE	Environmental Adult Education
EE	Environmental Education
EfS	Education for Sustainability
IPCC	Intergovernmental Panel on Climate Change
TCP	The Climate Project
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	The United Nations Framework Convention on Climate Change

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Chapter 1 - Learning for change in a changing climate

Learners of all ages can be invited to take up the challenge of understanding and rethinking the world ...of deliberating where to go at this critical fork in the road. The learning process needs to have personal and societal transformative potential, flowing directly and naturally into community engagement. (Kagawa & Selby 2010, p. 5)

1.1 Introduction

In *Education and Climate Change: Living and Learning in Interesting Times*, Kagawa and Selby (2010) state that climate change presents enormous challenges but also many opportunities for rethinking, changing and transforming ourselves and society in what they refer to as 'interesting times' (p. 3). In such times, they argue, education and learning have a crucial role to play.

Climate change¹ is emerging as a dominant challenge to environmental and social sustainability in the 21st century (Dryzek, Norgaard & Schlosberg 2011; IPCC 2007; Orr 2009; Stern 2007) and is a subject of considerable debate. There is a growing awareness that efforts to achieve a transition towards a more sustainable future are inextricably linked with responding to climate change challenges. Beyond natural climate variability, human activities are playing a considerable role in causing the present and predicted climatic changes (see Flannery 2005; Hansen 2008; IPCC 2007a; Orr 2009; Steffen 2009). Addressing climate change is therefore becoming prominent on environmental, political, social and economic agendas (Nicholson-Cole 2004). Reducing the increasing growth of greenhouse gas emissions and human impacts on Earth's life support systems, as well as adapting to the changes already in motion, requires fundamental societal transformations. While government actions at national and international levels are critical in setting priorities and policies to prevent further emissions and reduce climate impacts, the public² also needs to be mobilised to take action and drive as well as

¹ While the terms global warming and climate change are both used to describe global changes in the climate (often in different and conflicting ways; see for example Whitmarsh 2009), the term climate change is defined in this research as 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods' (UNFCCC 1992, p. 3).

² Although the term public is used here, this study recognises there is not one 'public' but a heterogeneity of 'publics' (Moser 2010; Whitmarsh 2005).

support policy changes (Moser & Dilling 2007; Ockwell et al. 2009; Whitmarsh, Lorenzoni & O'Neill 2010). The question about how to 'educate' the public on climate change issues and actively engage³ them in creating change is the focus of an increasing body of research (see Kagawa & Selby 2010; Moser & Dilling 2007; Sussman 2009; Whitmarsh, O'Neill & Lorenzoni 2010). However, limited research in the field of environmental education has explored the role and effectiveness of community-based education programs in actively engaging individuals and communities on climate change. This study contributes to this discussion and body of research and practice by exploring a particular community-based education program (The Climate Project Australia) and the implications of this program for broader concerns about the role that community-based education can play in actively engaging individuals and communities on climate change issues and facilitating societal responses to these challenges.

This chapter presents the background to climate change in the context of the transition towards sustainability, and the role of education in responding to climate change challenges to date. It describes the focus of existing research and highlights the need for individuals and communities to be educated about and actively engaged in addressing climate change issues. It presents the central research question driving this study, together with a description of the design and conduct of the research using a multi-methods case study approach. The Climate Project Australia (TCP) was selected as a single case study as it is a community-based education program based on a social learning model; it aims to educate communities on climate change as well as its potential solutions and to promote community dialogue and action on the issue. The chapter concludes with an outline of the thesis structure.

1.2 Climate change and the transition towards sustainability

The capacity and apparent willingness of humankind to destabilise the climate conditions that made civilization possible is the issue of our time. (Orr 2011, p. 1)

Climate change as a key threat to sustainability

There is widespread consensus among the international scientific community that climate change is happening and that it is, for the greater part, human-induced. In their most recent

³ Engagement in this study refers to a state of connection with an issue comprising three interrelated dimensions: cognitive, affective and behavioural (Lorenzoni, Nicholson-Cole & Whitmarsh 2007). This definition will be explored further in Chapter 2.

summary in 2007, the Intergovernmental Panel on Climate Change⁴ (IPCC) concludes that the warming of the climate is unequivocal as long-term increases in average global air and ocean temperatures, widespread melting of snow and ice and rising average global sea level have been observed. The IPCC (2007a, p. 53) asserts that ‘anthropogenic warming could lead to some impacts that are abrupt or irreversible, depending upon the rate and magnitude of the climate change’. Drawing from scientific research on climate change, the scenarios for the future include varied and numerous substantial impacts on both human and natural systems throughout the world, including Australia. Impacts on human societies are predicted to be widespread and potentially catastrophic, including significant increase in droughts, floods, water shortages, extreme weather events and decreased agricultural productivity (IPCC 2007a). As I write this thesis, new studies (e.g. Climate Commission 2011; CSIRO 2011; Keenan & Cleugh 2011; Steffen 2009) continue to emerge on the impacts of climate change, and scenarios are increasingly more severe than previously. For example, various studies have reported more rapid changes, including melting of sea ice and polar ice sheets, sea-level rises, increase in extreme events, and global surface temperatures (see Archer 2009; Church et al 2011; Hansen 2009; UNEP 2009).

Climate scenarios for Australia also forecast severe impacts including: increased frequency and severity of extreme weather events, such as floods and droughts; warming of the Australian climate; changed weather patterns that will undermine key agricultural regions; and rising sea levels that will affect coastal communities and cause irreparable damage to key biodiversity ecosystems such as the Great Barrier Reef (CSIRO & BoM 2007; Hennesy et al. 2008; IPCC 2007a; Keenan & Cleugh 2011; Steffen 2009). These impacts have potentially long-term implications for Australia’s environmental, social and economic sustainability and security (Garnaut 2008, 2011).

The IPCC (2007a) considers climate change as the biggest threat to sustainability⁵. While there are a number of issues to be addressed in the transition towards a more sustainable world (such as the depletion of resources, water supplies, health, loss of biodiversity and rising social and economic inequity), climate change is regarded by many as an issue of particular concern because it exacerbates existing environmental and social threats. Climate change also presents all societies with a series of challenges at many levels. These include the extent of its impacts

⁴ The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environmental Programme (UNEP) to assess and present current scientific knowledge about climate change, its predicted impacts, and possible policy responses. The IPCC’s main reports, published in 1990, 1995, 2001 and 2007 represent the views of the majority of the world’s climate scientists.

⁵ As conceptualised in this thesis, sustainability emphasises the links and interdependencies of the environmental, social, political and economic dimensions of sustainability (UNESCO 2002).

on people and ecosystems, the length of time over which it will continue, the actions that consequently need to be taken and the considerable societal debate it generates (Hicks 2010). Essentially, ‘all ecological and human systems are implicated and are being or will be affected by its consequences in the short, medium , or long term’ (Gonzalez-Guadiano & Meira-Cartea 2010, p. 18).

Beyond being solely a scientific issue, climate change is an environmental, social and political phenomenon which challenges the way we think about ourselves, our societies and humanity’s place on Earth (Hulme 2009). As Wals (2010) states, human-triggered climate change goes beyond the environmental to include the social, political, economic and cultural; it also comprises the local, regional and the global, in terms of both its impacts and potential solutions. Therefore, mitigating climate change and adapting⁶ to its unavoidable impacts are recognised by many as important components of the transition towards a more environmentally, economically and socially sustainable future (Moser & Dilling 2007).

Responding to climate change

An awakened and mobilized public can begin to implement change in its own communities and demand change. (Finley 2007, p. 36)

Researchers and policy makers increasingly recognise that effective responses to climate change, and its associated biophysical and socioeconomic impacts, require fundamental, contextual and multi-dimensional changes in the way our societies operate (see Bangay & Blum 2010; Gonzalez-Guadiano & Meira-Cartea 2010; IPCC 2001; Stern 2007). As Isham and Waage (2007, p. 12) assert, ‘to stop the accelerating growth of greenhouse gas emissions, to reduce those emissions to a small fraction of their current levels over a mere generation, will require unprecedented social and economic transformation’.

There are many key leverage points to tackle climate change from ‘bottom-up’ mobilisations to ‘top-down’ initiatives (Isham & Waage 2007) and, thus, actions from all levels of society - individuals, communities, institutions, businesses, industries, and local, national and international governments and agencies - are needed. As Ostrom (2010), states averting climate change threats requires collective actions at the local, regional, national and global levels. While many of the most significant climate change challenges require actions at the national and

⁶ The IPCC (2007b) defines mitigation in relation to climate change as ‘implementing policies to reduce greenhouse gas emissions and enhance sinks’ (p. 818) and adaptation as ‘initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects’ (p. 809).

global levels, there is also increasing recognition of the importance of addressing climate change at individual and community levels, as climate change impacts will be felt and responses will be made at these levels, as well as more globally (Nicholson-Cole 2004). Therefore, there is a need for action by groups, communities and organisations.

This thesis recognises that individuals and communities⁷ have a critical role in addressing climate change. Although they will not be able to ‘solve’ the climate problem through their actions alone (see Moser 2006a; Whitmarsh & Lorenzoni 2010) by acting collectively they have multiple crucial roles to play in the change process. For example, as a political force, they can mobilize, demand and support policy changes at local and higher levels of government (Moser 2008). They can contribute to decisions that are made about climate change at the community or national level. As consumers of energy, material goods and environmental resources, they can enact behavioural changes⁸ that are consistent with the mitigation and adaptation measures required (Moser 2006a; Whitmarsh & Lorenzoni 2010). They can also participate in public dialogue on climate change at various levels. They can engage in informed conversation with family, friends, communities, workplaces, environmental organisations, policy experts, scientists and politicians about climate change issues. In addition, individuals and communities can serve as examples and role models for other individuals and communities to promote broader change (Bandura 1977; Roger 2003; Maser & Kirk 1996). In short, individuals and communities have multiple key roles to play in both the private and public spheres⁹ as consumers, citizens and members of diverse communities (Whitmarsh et al. 2010).

Consequently it is important to educate, encourage and empower individuals and communities to take active roles in addressing the challenges of climate change and sustainability. This leads us to the question of how best to educate and actively engage individuals and communities in ways that facilitate change. One proposed solution to assist in addressing the challenges posed by climate change is community-based environmental education. Stapp et al. (1969, p. 31) defined environmental education as ‘aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work towards their solution’. Such education aims to empower

⁷ In this study, the term community refers to a community of *place* (geographic location), a community of *identity* (based on shared characteristics such as workplace or sporting club) or a community of *interest* (community of practice) (Andrews, Stevens & Wise 2002, p. 161). Examples of communities in this study were local environmental groups, Rotary clubs, religious groups, and workplaces.

⁸ As Whitmarsh and Lorenzoni (2010, p. 158) state mitigation and adaptation behaviours include the adoption of new technologies as well as ‘a range of energy conservation activities and risk responses’, and ‘community and political action to change broader societal structures’ to create sustainable societies.

⁹ Stern (2000) distinguishes between private sphere behaviours (e.g. green consumerism and household waste disposal) and public sphere behaviours (e.g. environmental activism and low commitment active citizenship).

and create conditions that enhance learning and support individuals and system change. As some researchers (see Clover 2002a; Kagawa & Selby 2010; Tilbury et al. 2005; Tilbury & Wortman 2008) recognise the importance of education aimed at the community level, a central question becomes how these environmental education programs can best enhance learning and support change at the individual and community levels.

1.3 The role of education and learning in addressing climate change

As Wals (2010, p. 10) states, education and learning, alongside innovation, legislation and policies, 'have always played a role in responding to the loss of nature, environmental degradation, natural resource depletion and, indeed, the current sustainability crisis'. It can therefore be argued that education and learning have a crucial role to play in addressing climate change issues and facilitating societal changes. The literature suggests, however, that educational responses to date have been mostly limited to raising awareness and individual behaviour change (see Clover & Hall 2010; Gonzalez-Guadiano & Meira-Cartea 2010; Moloney, Horne & Fien 2010).

Education, particularly environmental education, has long been recognised by researchers, scholars, practitioners, organisations, and agencies as a key element in the transition towards a more sustainable future (see ARIES 2009; Fien 1993; Scott & Gough 2004; Wals 2010). The field of education for sustainability emerged from environmental education over ten years ago¹⁰ to address the multiple dimensions of sustainability: ecological, social, economic and political (UNESCO 2002). We have witnessed a growing awareness that moving to a more sustainable future is inextricably linked to addressing climate change challenges. Concurrently, there is increasing recognition among researchers of the role of environmental education in addressing climate change. The fields of environmental education, education for sustainability, environmental adult education and community-based education are now beginning to respond to climate change (see Kagawa & Selby 2010). There is even mention of an emerging field of climate change education (see Kagawa & Selby 2010). However, much focus remains on formal education in schools and there is a debate around what climate change education implies and how it should be promoted.

¹⁰ This shift from environmental education to education for sustainability can be found in the Thessaloniki Declaration (UNESCO 1997). Such shift is the subject of on-going debates (e.g. Barraza, Duque-Aristizabal & Rebolledo 2003; Jickling & Wals 2008; Wals 2010).

The literature suggests that climate change education programs predominantly focus on the ‘facts’ of climate change, particularly the scientific basis of predictions, as well as calls for individuals to reduce their ecological footprints¹¹ through, for example, recycling or energy saving (see Clover & Hall 2010; Gonzalez-Guadiano & Meira-Carrea 2010; Padolsky 2006). While there are exceptions, the majority of community-based environmental education programs focus on raising awareness, by disseminating information on climate change and related topics, and on promoting individual behaviour change. This is despite recognition that to effectively mitigate and adapt to climate change, individuals, communities, institutions and societies need to change. This suggests that the focus of climate change community-based education should shift to encompass not only individuals and their behaviour change but also broader community and societal change.

As noted above, raising community awareness about climate change has been the main focus of many community-based education programs, often using large-scale education campaigns and community-based behaviour change programs which are based on information transfer and aimed at individual behaviour change (Clover & Hall 2010; Gonzalez-Guadiano & Meira-Carrea 2010; Moloney et al. 2010; Fritze, Williamson & Wiseman 2009). The focus on awareness is often based on the belief that if people know about and understand climate change (especially climate science), they are more likely to change their attitudes and behaviours. This is often referred to as a linear model of information dissemination or a ‘deficit model’ (see Kelsey & Dillon 2010; Kollmuss & Agyeman 2002). It is important to note that considerable academic research suggests, however, that more knowledge and information do not necessarily lead to environmental action (see Kollmuss & Agyeman 2002). Despite this, many programs still retain this focus. For this reason, some researchers and educators argue that community-based education programs should shift towards ‘learning for change’ (Sterling 2003) with calls for more process and action-oriented approaches rather than primarily content or information driven.

Public opinion polls and trends analysis (Collins 2009; Leviston et al. 2011; Reser et al. 2011; The Climate Institute 2010) show that the Australian public is overwhelming aware of and concerned about climate change. This suggests that information-driven communication and educational efforts have been successful at raising public awareness. Yet, despite heightened awareness and concern, climate change issues not only persist but grow. As the scientific

¹¹ The ecological footprint concept was developed by Wackernagel and Rees in the 90s (see Wackernagel & Rees 1995). Ecological footprint analysis compares human demand on nature with the biosphere's ability to regenerate resources and provide services. The carbon footprint is a subset of the ecological footprint that measures all greenhouse gases a specific unit (e.g. individual group or nation).

consensus on human-induced climate change has become stronger, and impacts are being documented, greenhouse gas emissions into the atmosphere continue to increase inexorably (see Climate Commission 2011; Garnaut 2011). Public opinion polls indicate that action to mitigate climate change is somewhat limited (Leviston et al. 2011; Reser et al. 2011), with energy demand for both domestic uses and transport rising (ABARE 2010; ABS 2009). This suggests that, while a high level of public awareness of climate change has been achieved, it has not yet translated into significant action. Therefore, there is an urgent need for alternative educational and learning approaches, beyond transmission of information (i.e. providing more information), to facilitate action (in both private and public spheres) and social change (see for example Kagawa & Selby 2010).

There is a call for education and learning approaches that embed climate change learning and action within community contexts (Kagawa & Selby 2010). This call begs the question about what kinds of learning models and practices can help individuals and communities to actively engage in climate change and move towards a more sustainable world. As Clover and Hall (2010, p. 162) argue, ‘learning in interesting times calls for interesting socio-environmental educational practices that include public engagement’. Some researchers are calling for a re-positioning of community-based education away from narrow ‘informational’ and science-based approaches - primarily concerned with transferring knowledge and ‘facts’ - towards more interactive and transformative approaches that focus on enabling individual and collective action for change in supportive learning settings (see Tilbury & Wortman 2008; Clover & Hall 2010).

We might ask how community-based education can play a more transformative role in responding to climate change and facilitate learning for change. Researchers in the field of environmental education and education for sustainability have recently debated this question, including discussions on appropriate content and learning approaches. Some believe that responding to the challenges posed by climate change and moving towards a sustainable future demand new approaches to educate and actively engage individuals and communities (Clover & Hall 2010; Hicks 2010; Kagawa & Selby 2010; Tilbury & Wortman 2008). This study provides a contribution to this discussion.

1.4 Overview of the study

This study was undertaken in light of the increasing interest in climate change in the field of environmental education. The literature suggests that the emphasis to date has been heavily on raising awareness and changing the behaviour of individuals, and that alternative learning approaches are now needed. Thus, this study was prompted by an interest in how learning, and community-based education in particular, can most effectively engage individuals and communities in climate change and sustainability. To explore this topic and provide a basis for investigating learning and change in community contexts, the central question of this research is: ‘How can community-based climate change education facilitate learning for change?’

This question was addressed using a multi-methods approach with a single case study: a community-based climate change education program called The Climate Project Australia (TCP) (see Chapter 3 for more details on the case study selection). The aim was to explore whether the TCP model of learning offers an effective model to enhance learning and support change in community contexts in order to draw broader lessons for community-based education. Data was collected, between September 2007 and November 2009, from TCP participants and educators at 17 TCP events throughout Queensland, Australia at four different stages: 1) before the educational program, 2) immediately after the program, 3) two to three weeks after the program and 4) six to eight months after the program. Three methods were used - pre/post questionnaires, semi-structured interviews and participant observation - to assemble a detailed and in-depth account of the learning and change that occurred through a single case study. Specifically, the study investigates learning outcomes and processes from the perspective of the learners. The quantitative data collected was tested for significance and comparison using Excel and SPSS; the qualitative data was analysed thematically using the research software Nvivo7.

To answer the research question, I also drew on three main theoretical areas: environmental education, with an emphasis on learning and change in community context, climate change communication, and social diffusion theories (for details see Chapter 2). Since climate change first emerged on the public agenda, there has been a sharp rise in research on climate change communication and, more recently, on how to use communication effectively to facilitate social change¹² in response to this global issue (Moser 2010a). The literature suggests that the field of

¹² Social change can be broadly defined as ‘the equally multifarious complex of processes involved in the transformation of values, thoughts and behaviours of individuals, communities and societies’ (Moser 2004, p. 18). Social change can be observed at the individual, organisational and societal levels (Moser & Dilling 2007). The type and scale of social change on which this research focuses is individual and community-level change.

climate change communication has been active while environmental education has been slower to respond, particularly outside formal education. Chapter 2 reviews literature on climate change communication to gain a better understanding of the nature and characteristics of climate change and how these make the issue a fundamentally complex topic from a communication viewpoint. It also looks at challenges and opportunities for communicating the topic to see how these insights can help inform effective community-based climate change education. The social diffusion theory (Rogers 2003) is a theory of social change driven by a process of social learning, thus offering a mechanism of change and learning at the individual and community levels. This is of particular interest in this study, which seeks to investigate learning and change in the community context. In this study, social learning¹³ may provide useful ways of thinking about learning in social groups and community contexts. This thesis explores the social diffusion model in the context of climate change and community-based education through the use of the TCP case study.

1.5 Structure of this thesis

This introduction explains the background, rationale and significance of the research in light of the growing interest in the field of environmental education in climate change and learning. It presents the objectives of the research, explains the research question and introduces the methodological approach. The six chapters of this thesis are arranged as follows:

- Chapter 2 reviews the literature relevant to this research, including environmental education, education for sustainability, community education, adult learning, social learning, social diffusion and risk and climate change communication. Each body of literature is discussed in terms of the ideas they can contribute to effective community-based climate change education.
- Chapter 3 outlines the design and conduct of this research. It presents the use of the multi-methods approach within a single case study. It describes the three data collection methods used - participant observations, questionnaires and semi-structured interviews - with details of how they were carried out and the data analysed. It also presents an overview of the case study selected, The Climate Project Australia (TCP).

¹³ While according to Parson and Clark (1995) the term social learning conceals great diversity, in this study the term is defined as learning by individuals that takes place in social settings as well as learning by social groups or communities. This definition is explored further in Chapter 2.

- Chapter 4 presents the results of the case study. It first explains the analytical process from which a typology of learners emerged. The quantitative and qualitative results are then summarised under each of the three learner groups, labelled ‘Already converted’, ‘Early aware’ and ‘Doubtful’. While the origin of the typology cannot be credited to a particular research question or objective when I first started this study, it became a useful tool to enable a more in-depth and accurate understanding of differences in learning experiences and outcomes reported by research participants. The chapter concludes with a brief synthesis of findings.

- The discussion of the findings in Chapter 5 is shaped around the key elements of learning that have emerged from this study: learners, content-knowledge, learning process, educator and learning settings. The relationships between these elements and how they can facilitate or hinder learning for change at both individual and community levels are discussed.

- Chapter 6 concludes by discussing the major findings in this thesis and highlighting implications for practice. It also describes the study’s limitations and calls for future research to build on themes illuminated by this study.

Chapter 2 - Literature review

In order to answer questions about learning, community environmental education, social change in the context of climate change, and the interactions between the three, this study was informed by three areas of literature. First, I provide an overview of environmental education and education for sustainability and identify the key principles of transformative education for sustainability in community context. Second, I review the literature on social diffusion, a theory of social change underpinned by social learning processes. Thirdly, I explore the climate change communication literature.

2.1 Learning for change: the role of community-based education

2.1.1 Education and learning

Communication, education and learning have always played a role in finding a response to the loss of nature, environmental degradation, natural resource depletion and, indeed, the current sustainability crisis. (Wals 2010, p. 10)

Today, in the context of climate change, there are calls for formal, non-formal and informal education to play a crucial role in addressing climate change (see Kagawa & Selby 2010). While there is a diverse range of contexts in which education and learning take place, contexts can be categorised in three main categories:

- Formal education occurs in educational institutions or structured systems, where educators use a prescribed curriculum to educate selected learners. The setting is normally a classroom.
- Non-formal education is also relatively structured but its venue is typically outside the formal education system and often occur through local and community-based initiatives such as programs offered by museums, libraries, civic organisations, community centres and clubs (Falk 2005; Heimlich 1993; Merriam, Caffarella & Baumgartner 2007).
- Informal education is non-organised learning which often grows out of spontaneous situations among and between individuals and groups, in family settings, among peers, and in a self-taught manner (Reeves Clark 2007; Falk & Dierking 2002; Fien 1993; Merriam et al. 2007).

This thesis focuses on non-formal education or learning opportunities outside of the formal educational system in community contexts. It is important, however, to define the term ‘community’ as it has been defined in the literature in several ways. I shall use in this study Andrews, Stevens and Wise (2002, p. 161) definition who declare that ‘community’ of a community-based environmental education model may be a community of *place* (tied to a geographic location), a community of *identity* (tied to each other through social characteristics that can transcend place such as an industry or a sporting club) or a community of *interest* (community of practice).

2.1.1.1 Environmental education

Environmental education (EE) has been defined, at the First Intergovernmental Conference on EE held in 1977 in Tbilisi, as:

A process aimed at developing a world population that is aware and concerned about the total environment and its associated problems, and has the attitudes, motivations, knowledge, commitment and skills to work individually and collectively towards solutions of current problems and the preventions of new ones. (UNESCO-UNEP 1978 ‘Tbilisi Declaration’)

The Tbilisi Declaration outlines the goals of EE as three-fold:

- To foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas;
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment
- To create new patterns of behaviour of individuals, groups, and society as a whole towards the environment (UNESCO-UNEP 1978).

The Tbilisi Declaration also describes the following five objectives of EE: ‘To help individuals and social groups to acquire awareness, knowledge, attitudes, skills and provide opportunities for participation’ (UNESCO-UNEP 1978, p. 3). As Chawla and Flanders Cushing (2007) point out, according to this definition, developing and enhancing environmental awareness, knowledge, attitudes and skills are used to support the ultimate objective of EE, that is people’s active involvement in working towards solving environmental problems. The Tbilisi framework has been used by environmental educators for designing a range of different programs (Monroe, Andrews & Biedenweg 2007).

Inextricably woven into these five objectives (awareness, knowledge and understanding, attitudes, skills and participation) are three broad ways of approaching EE: *in*, *about* and *for* the environment¹⁴ (Fien & Gough 1996; Palmer 1998):

- Education *in* the environment aims at developing environmental awareness and concern for the environment through direct experiences in the natural environment (Fien 2003).
- Education *about* the environment adopts an informative approach, which aims primarily to promote awareness, knowledge and understanding of natural systems and the interaction between humankind and the environment (Tilbury 1995) - knowledge about the environment. It is important to note, however, that the 'environment' that is the focus of education *about* the environment is more than just 'nature'. It encompasses biophysical, social, economic and political systems (Fien & Gough 1996).
- Education *for* the environment describes an action-based orientation of EE seeking to encourage individual and social transformation. Such an approach provides a socially critical or transformative orientation to EE (Fien 1993; Clover 1996). Fien and Gough (1996) claim that, in contrast with education *in* and *about* the environment, education *for* the environment focuses on learners gaining critical thinking and skills to work towards the resolution of environmental questions, issues and problems.

These three broad ways of approaching EE indicate the different purposes of environmental education: from opportunities to explore the natural environment, to learning about environmental issues, to gaining action skills to work towards solutions (Monroe et al. 2007). This suggests that there is a significant range of foci and expected outcomes from an educational point of view. For example, Scott and Gough (2003) present different foci¹⁵ (e.g. nature, conservation, social change and learning), learning outcomes (e.g. values and feelings, understanding, skills, behaviour, democratic citizenship skills and learning about learning) and thus educational aims associated with different environmental education programs. This is in line with Chawla and Flanders Cushing (2007) who state that some environmental educators focus on promoting pro-environmental behaviours, such as teaching how to reduce water use or recycle, while others aim to develop commitment, knowledge and skills to help individuals and groups participate competently in the public sphere. As a result, environmental education encompasses a broad range of programs, goals and outcomes (Heimlich 2010; Monroe 2010) reflecting diverse views on appropriate content and pedagogical approaches (see for example Mapping & Johnson 2005). Such approaches are informed by different views about learners, educators and knowledge and how learning happens.

¹⁴ Lucas (1972) suggested that environmental education is education *in*, *about* and *for* the environment.

¹⁵ Scott and Gough (2003, pp. 53-54) offer nine categories of interest which capture a range of different foci and objectives of those who are interested in promoting environmental learning.

Different perspectives - transmissive versus transformative

There is no consensus about the role of EE in society (Heimlich & Ardoin 2008; Wals 2010). Two perspectives are particularly relevant here: the transmissive (or instrumental) perspective and the transformative (or emancipatory) perspective. Both are informed by different views of knowledge, learning, how learning happens, how people learn, and the roles of learners and educators in learning. At one extreme, education and learning are mostly expert-driven and content-focused. At the other extreme, education and learning are mostly issue and process driven (i.e. where there is a strong sense of involving learners in the learning process) (Wals 2010).

The transmissive approach is familiar and widely used in environmental programs and activities (Kelsey & Dillon 2010; Russell 1997; Sterling 2003; Stevenson & Stirling 2010). The transmission of information, in verbal and visual format, can be effective in some instances. It can be useful for sharing or presenting relatively simple facts or a particular viewpoint to a group of people in a short amount of time. It can also be suitable to introduce a specific topic, background information or to clarify concepts at the start of a learning process. However, on its own such approach is quite limited as it is quite passive and does not actively involve learners in the learning process. As Monroe et al. (2007, p. 211) state, ‘although *conveying information* forms the core of what many programs include, the nature of one-way information flow often excludes participation’ (emphasis in the original). In the transmissive approach, learning is essentially defined as the passive acquisition of facts, concepts or skills. It involves acquiring a new piece of information or skill which, when internalised, can become a useful resource if the learner sees a purpose and use for it (Scott & Gough 2003). This transmissive model of learning tends to prioritise content over process (Russell 1997; Sterling 2001) with educators seen as experts and learners as passive recipients of a prescribed content.

In such a model, learning is predominantly seen as a cognitive process *about* issues. As Falk (2005) states, the transmissive perspective tends to reflect a traditional view of learning which essentially treats learning as a linear and predictable transfer and accumulation of knowledge; and knowledge is understood as facts (Kelsey 2003). In this view, learning is commonly associated with the acquisition of facts and concepts (Falk & Sheppard 2006); learning outcomes are defined by a body of knowledge that is closely related to the content of education programs (Storksdieck, Ellenbogen & Heimlich 2005). Often this approach has an underlying behaviourist orientation; that is, education serves to change the behaviours of the individual or collective. In this context ‘to educate’ is understood as ‘to provide information’ and ‘educational activities involve disseminating information about the topic or about a specific behaviour, with the goal to motivate people to act’ (Schultz 2002, pp. 67-68).

The assumption behind such an approach, termed ‘deficit model’, is that educating people about environmental issues, that is increasing their level of awareness and understanding, would automatically translate into concern and pro-environmental behaviours. As Sterling (2005) states, such approaches tend to reflect an instrumental belief in the role of education where raising awareness and understanding about the environment would change thinking and behaviours. They also reflect a linear and rationalist view of change: an idea that education about an issue is sufficient to encourage positive behaviour changes. Research shows, however, that increasing people’s level of awareness, understanding and concern does not necessarily translate into action, or translates into only limited action. This is also known as the ‘value-action’ or ‘attitude-behaviour’ gap (Blake 1999). The limitations of such a model of learning have been widely documented (see Heimlich & Ardoin 2008; Kollmuss & Agyeman 2002; Monroe 2003; Sterling 2001; Stevenson 2007).

Much EE around the world aims at changing learner behaviour, and this is often defined to include attitudes, beliefs and values. Within this perspective, the formation of awareness of and knowledge about nature and the environment is informed by behaviourist understanding (e.g. Ajzen 1991; Ajzen & Fishbein 1980) that assumes a more or less linear causality between environmental awareness, knowledge and behaviour change. In other words, an increase in environmental awareness will lead to pro-environmental behaviour. For example, Peyton and Miller (1980, p. 173) state that, ‘educational efforts to produce environmentally literate citizens have been largely based on the postulate that a linear relationship exists among cognitive (knowledge), affective (attitudes), and conative (behavioral) domains’. In a much cited article, Hungerford and Volk (1990, p. 9) explain this assumption: ‘If we make human beings more knowledgeable, they will, in turn, become more aware of the environment and its problems and, thus, be more motivated to act towards the environment in more responsible ways.’ Yet, as discussed previously, research indicates that contrary to this common belief, increased knowledge or pro-environmental attitudes alone do not motivate and lead to behavioural changes (Chawla & Flauders Cushing 2007; Hines, Hungerford & Tomera 1986; Heimlich & Ardoin 2008; Kollmuss & Agyeman 2002; Monroe 2003). For example, in a meta-analysis of more than 100 environmental behaviour studies, Hines, Hungerford and Tomera (1986) found weak links between pro-environmental attitudes and pro-environmental behaviours. The authors identified that perceptions of sense of efficacy (i.e. an individual’s perceived ability to bring about change), individual sense of responsibility, and commitment or intention to act were crucial antecedents of action included (Kollmuss & Agyeman 2002). Nevertheless, despite such evidence, according to Monroe (2010), such inherent belief remains strong in the EE field with initiatives continuing to rely on information and knowledge to generate action (Heimlich 2010).

There appears to be an underlying assumption that environmental problems are caused by people who lack knowledge and as such simply do not appreciate environmental problems for what they are. The solution to this problem is often based on the provision of information and knowledge transfer. As a result, much emphasis in EE approaches is put in knowledge and understanding of sustainable issues, commonly with a strong emphasis on science (Jensen 2002). As Jensen (2002) suggests, in EE, environmental problems are often approached from a scientific perspective with a strong focus on scientific content-knowledge about how serious the problem is and how quickly it is evolving. This translates into education about problems but less about solutions to address such problems. Instead, Jensen (2002, pp. 331) advocates an ‘action-oriented environmental education’ that includes ‘action-oriented knowledge’: (1) Knowledge about effects or about environmental problems (the ‘what?’), (2) Knowledge about the root causes of such problems (the ‘why?’), (3) Knowledge about strategies to effectively address them and change (the ‘how?’) and (4) Knowledge about alternatives and visions (the ‘where to?’).

Questions about the relationship between knowledge, awareness and understanding environmental issues and acting on them lead to some doubts about the transmissive or instrumental focus of EE. In addition, some educators and researchers (e.g. Chawla & Flanders Cushing 2007; Clover 2002b; Courtenay-Hall & Rogers 2002; Fien 1998; Jensen 2002; Robottom 1995) challenge the strong focus on individual behavioural change. They maintain that the idea of focusing on individual behaviour does not consider the social and cultural aspects of environmental and sustainability issues. While educational efforts should encourage individuals to make changes in their lifestyles, Maniates (2001) argues that there is an additional need to think critically about the power relations and influences that underlie the current socio-environmental crisis. This is in line with Huckle (1986) who states, if social change is to be achieved, personal change must be accompanied by ‘a political struggle to redistribute economic and political power and change the basis of decision-making’ (p. 13). According to many socially critical environmental educators such as Fien, Robottom, Gough, Huckle and Sterling, effective education should take into account the dynamics of socio-environmental issues originating in social, political and environmental attitudes, behaviours, actions, decision-making and policies (Hill 2003). Consequently, effective education should educate people about exactly how their society operates, thereby allowing them to become fully involved in its transformation towards sustainability (Fien 1998). Robottom (1995) claims that this aspect is neglected in individualist approaches that focus mainly on individuals and lifestyle change without strong consideration for the economic, social and political systems that might impede these individual changes. Along the same lines, Maniates (2001) and Courtenay-Hall and Rogers (2002) warn against individualising action and responsibility, claiming that this risks

reducing environmental activities to the private sphere. They also argue that ‘privatized picture of environmental action’ (Courtney-Hall & Rogers 2002, p. 290) fails to meet a central goal of EE; that is helping individuals and groups to gain the knowledge, commitment, critical thinking skills necessary for them to play vital roles as citizens in the public sphere. Some educators and researchers (Fien 2003; Clover 2002b; Maniates 2001) challenge such a focus in EE on individual behaviour change and instead call for a strong focus on helping learners to become responsible environmental citizens who understand what is going on in society, are capable of thinking critically, determine themselves what needs to be done and act competently (Courtney-Hall & Rogers 2002; Jickling & Wals 2008).

A transformative approach on the other hand assumes that ‘citizens need to become engaged in an active dialogue to establish co-owned objectives, shared meanings and a joint self-determined plan of action to make change themselves’ (Wals 2010, p. 19). Transformative education reflects a belief that learning is emergent where knowledge and understanding are seen as co-constructed. Such a perspective depicts a more social or constructive view of learning (Wals 2010) and an understanding of knowledge as co-creation (Dillon 2003). This is in line with social constructive theories of learning that emphasis the social or collaborative nature of learning (Stevenson & Stirling 2010); and ‘claim that we build (construct) knowledge through social interactions - so that through dialogue, we become more knowledgeable’ (Dillon 2003, p. 218).

2.1.1.2 Shift from environmental education to education for sustainability

There has been a shift from environmental education (EE) to education for sustainability¹⁶ (EfS) although many argue (see Wals 2010; Elliott & Davis 2009) that EE is essentially about sustainability when interpreted in the spirit of the definition from the Tbilisi Declaration. Proponents of EfS draw attention to the importance of moving away from traditional teaching and learning to more interactive and participatory approaches. However, it is important to recognise that, just like we have seen with interpretations of EE, there are narrow and broad interpretations of EfS (Wals 2010).

¹⁶ Debate about the shift from environmental education (EE) to education for sustainability (EfS) are on-going and have been documented (see Gough 1997; Jickling & Wals 2008; Palmer 1998; Wals 2007). The debate is outside the scope and focus of this study. Although I strongly agree with Wals (2010) that effective environmental education is essentially about sustainability, I have touched upon both (EE and EfS) in this literature review. Yet, in my discussion, when referring to environmental education and education for sustainability, I will use the term environmental education.

Different interpretations of education for sustainability

There are different interpretations of EfS both in terms of content and educational processes. These reflect different understandings of how people learn and how best to encourage their learning. They are informed by different learning theories, a discussion of which is beyond the scope of this literature review.

There are narrow and broad interpretations of EfS. A narrow interpretation tends to emphasise the environment dimensions of sustainability and focuses on expanding knowledge and understanding through methods of instruction or transmission. A broader, more transformative focus stresses the importance of interaction, dialogue, reflection and moving beyond the cognitive (Wals 2010). Elliott and Davis (2009) refer to a transmissive approach as ‘narrow’ EfS as it is primarily about the transmission and acquisition of knowledge about environmental issues and tends to portray learners as passive. Instead, they call for a ‘broader’ understanding of EfS as ‘education with a transformative agenda’ (p. 68) to create changes towards more sustainable ways of living. Indeed, EfS recognises that moving towards sustainability will require not only understanding the environmental and social challenges we face but also changing the way we think, live and work (UNESCO 2002). There are key features associated with EfS which encourage learning for change. Such features are explored further below.

Learning for change

One of EfS aims is to empower citizens to act for positive change (Tilbury et al. 2005). According to Tilbury and Calvo (2005), such aim requires participatory, process and action-oriented learning approaches; and this has implications for what people learn but particularly for how they learn. Sterling (2002, p. 8) characterises EfS as ‘second-order’ learning, that is, education that pays primary attention to the delivery of content with a strong emphasis on ‘learning for change’.

- EfS seeks to be transformative. The traditional (transmissive) approach to education relies on imparting knowledge (usually scientific) *about* the environment and the existence of environmental issues (Jensen 2002). The transformative approach aim to go beyond to address the root causes of environmental and social issues (in other words, why we have these problems) and how we can contribute to solving them.
- EfS is future-focused. It focuses on more than just solving current problems. It deals with the necessity to critically understand existing situations, examine probable and possible futures, and develop solutions, future goals and preferred futures. Developing visions and exploring possibilities are seen as important requisites for motivation and ability to act and change; and

‘crucially linked to the development of “hope”, “empowerment” and “action”’ (Tilbury 1995, p. 205).

- EFS focuses on helping individuals and groups develop critical thinking, skills and competencies to act as agents of change. It promotes both individual changes and systemic change. This is because people live and work within wider systems and social structures that can enable or constrain them to act in certain ways. Thus, EfS focuses on building the capacity of individuals to influence change within a system (that is within a group, community, workplace, organisation or wider society) (ARIES 2009). In this view, transformation is not primarily learner-centred but also context-oriented to promote transformation or changes at the individual level but also to social structures (e.g. such schools, workplaces, neighbourhoods or local communities) (e.g. Courtenay-Hall & Rogers 2002; Jensen 2002). Its primary goals are personal and social change (Russell 1997). This is echoed by Sterling (2001) who suggests that, for education to be a transformative force, it needs to move beyond conventional awareness-building approaches to more integrated strategic approaches with a focus on facilitating personal and collective change.
- EfS aims to develop commitment, skills and knowledge for active and informed citizenship¹⁷ so that people can participate in the public arena. Proponents of EfS tend to see education as a way to help people to act competently in the public sphere (Courtenay-Hall & Rogers 2002). This perspective is based on critical social theory that argues that environmental problems are rooted in social, economic and political systems and worldviews that support these systems (Fien 1993). In this view, it is not enough for EfS to promote action for the environment. It also needs to ‘connect the responsibilities of the individual as consumer with the individual as citizen ... the consumer is private sphere, linear and acquisitive; the citizen is public sphere, sharing and re-creative’ (O’Riordan 1994, p.10). This issue has also been raised by Stern (2000), who distinguishes between ‘private sphere’ and ‘public sphere’ environmentalism. While actions in the private sphere (e.g. green consumerism or household waste disposal) are helpful, they are limited in effectively addressing environmental problems (Clover 2002b; Maniates 2001; Princen, Maniate & Conca 2002). As a result, many researchers (see Clover 2003; Courtenay-Hall & Rogers 2002; O’Riordan 1994) agree with Gardner and Stern (2002) that, to bring about the broader social and economic transformations needed for transitioning to sustainability, the most effective actions are collective actions in the public sphere - when people mobilise to pressure governments and industries to ‘act for the common good’ (Chawla & Flaunders 2007, p. 438).

¹⁷ Stapp et al. (1969) defined environmental education as ‘aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work towards their solution’ (p. 31). This interpretation of environmental education matches commonly held meanings of education for sustainability today.

- EfS places less emphasis on awareness-raising approaches and more on interactive and participatory approaches. It moves away from transmissive models towards more active learning approaches. EfS is based on reflection and participation by promoting active learning and challenging educators as conveyors of information and by encouraging a collaborative learning process (ARIES 2009).

In EfS, there is increasing interest in social learning¹⁸. Many educators and researchers (see Krasny & Lee 2002; Glasser 2007; Monroe et al. 2009; Wals, Hoeven & Blanken 2009) maintain that EfS should focus more on participation and dialogue and less on knowledge transfer. These researchers place social learning at the centre of discussion about the environment and sustainability. Perhaps the clearest example of this is the anthology edited by Wals (2007a) *Social learning towards a sustainable world* that provides a rich body of chapters that address social learning in the context of schools, organisations and communities. This is of particular interest to my research that aims to explore learning processes at the community level.

Social learning

In this section, I present a brief discussion of how the term ‘social learning’ has been defined and explained in the literature in an EfS context. I then detail how I use the term in this thesis.

Social learning is not a new concept. It has a long history and different theoretical roots, and it appears in a range of contexts (Kilvington 2007). As Parson and Clark (1995, p. 429) state:

The term social learning conceals great diversity. Rather, the contributions employ the language, concepts, and research methods of a half-dozen major disciplines; they focus on individuals, groups, formal organizations, professional communities, or entire societies; they use different definitions of learning, of what it means for learning to be ‘social’ and of theory. The deepest difference is that for some, social learning means learning by individuals that takes place in social settings and/or is socially conditioned; for others it means learning by social aggregates.

Lundhom and Plummer (2010, p. 479) argue that ‘although it is possible to argue that all learning has some kind of social component, the term “social” often refers to learning that comes from communication and interaction (sharing information, different perspectives, etc.) between different stakeholders [...] and interested parties’. Social learning is essentially about bringing together people from various backgrounds with different values, perspectives, knowledge and experiences to scope and explore potential solutions to common problems (Wals

¹⁸ It is important to note here that there is an increasing interest in social learning in the educational field whether the ‘field’ is referred to as EE or EfS.

2007a). From this perspective, it is assumed that people learn more in heterogeneous groups than they do in homogeneous groups; or in other words, people learn more from each other if they do not think and act alike (Wals et al. 2009). For the purpose of this study, social learning is defined as learning by individuals that takes place in social settings as well as learning by communities or social groups.

Some researchers (see Scott & Gough 2003; Stevenson with Stirling 2010) suggest that these two-way processes of communication are particularly important when dealing with complex or contested issues where learners should be encouraged to discuss different perspectives, understanding, values and beliefs and create shared understanding and solutions. As sustainability is increasingly seen as a collective learning process (Wals et al. 2009), such processes are vital. As Wals (2010, p. 21) states:

The dynamics of our current world are such that citizens need to become engaged in active dialogue on the nature of the sustainability crisis. This is characterised among other things by high levels of complexity and uncertainty and suggests that people (individuals, groups and communities) will need to develop capacities and qualities that will allow them to contribute to alternative behaviours, lifestyles and systems both individually and collectively.

This can explain why EfS is increasingly drawing on social learning theories. Social learning is considered as more than merely knowledge-based and maintains that interaction with others in the context in which learning takes place is crucial. Educational methods based on interaction, dialogue and reflection are related to the view that development of knowledge and understanding has both personal and shared elements (Clayton 2010; Wals 2010). Social interaction allows the sharing of ideas and viewpoints and also encourages learners to reflect on their own perspectives (Wals 2010). In this context, learning is not viewed as transfer of knowledge from one individual to another but as a social process whereby knowledge is constructed (Lave & Wenger 1991). Wals (2007a, p. 19) suggests that social learning may help to better understand ‘not so much what people should know, do or be able to do [...] but rather: How do people learn? What do they want to know and learn?’ This is particularly relevant in my study as my specific interest is not only about ‘what’ adult learners learn but also about ‘how’ they learn (or want to learn) and ‘why’.

A social learning perspective may offer insights into how participants who engage in community-based education activities learn and what facilitates or hinders such learning. This is of special interest in my research exploring learning and change in community contexts. In this context, social learning provides useful ways of thinking about learning in social groups or in a community context. As Krasny and Lee (2002) state, the process of social learning occurs when

people with a common interest in some subject or problem come together over time to share ideas, knowledge and scope solutions. In this view, community contexts can serve as settings for information exchange and knowledge construction via discussion among individuals with different knowledge and experiences. As Wals (2010, p. 73) states, ‘in social learning, the interactions between people are viewed as possibilities or opportunities for meaningful learning’.

Social learning represents an ‘interactive approach to decision making and problem solving’ (Muro & Jeffrey 2008, p. 326). In a community context, social learning involves creating environments and opportunities for people to gather together, interact and engage in collaborative learning, through which they can make effective, collective decisions about topics that affect the wider community. It is a method of participatory planning that is already used in various fields such as natural resource management (see Keen, Brown & Dyball 2005; Muro & Jeffrey 2008; Pahl-Woslt 2002). By engaging in social learning, community members learn from and with others, potentially leading to the acquisition of new knowledge and skills¹⁹. The whole process is designed to enable members of the social learning group to develop a common understanding of a system and the problems associated with the system; based on that common understanding, they can then reach collective agreement about actions to be taken (Muro & Jeffrey 2008). Social learning is viewed as a particularly useful process in situations where a systemic issue (such as climate change for example) is characterised by uncertainty, complexity and significant environmental, economic and social dimensions, and where a variety of stakeholders with different knowledge bases, viewpoints and agendas are required to take collective action to effectively address an issue (Kilvington 2007; Pahl-Woslt 2002).

In order to solve environmental problems, it is essential to not only recognise the underlying complexities of the problems themselves but also the diverse views of the potential participants in the solution (Wals 2010). This requires that many viewpoints and sources of information be shared among the different participants concerned, and then integrated to find solutions that will guide the way forward. Monroe (2009) suggests that social learning may provide strategies for a small group of diverse individuals to work together on a complex issue by exploring options, collecting data and learning about potential solutions. Adopting such a view of learning requires putting emphasis on the process. As Collins and Ison²⁰ (2009, p. 366) state: ‘social learning [...] requires that particular attention is paid to the design of learning processes’.

¹⁹ According to Muro and Jeffrey (2008), the social learning process can also potentially lead to development of social capital by engendering trust and building relationships between social actors.

²⁰ Although in their article, Collins and Ison refer to social learning in the context of adaptation to climate change, I believe that their comment is highly relevant in the context of EE and EfS.

As Krasny and Lee (2002, p. 102) state, ‘social learning is collaborative and collective, i.e. “learning communities” ’ or groups share knowledge and experiences, discuss ideas and solutions to environmental problems and create ‘networks to promote continuous interaction and communication’. Social learning is therefore ‘situated’ in a group or community context (Heimlich & Ardoin 2008) such as family, schools, church, community centres and professional organisations. This suggests that social learning theory may be useful for EfS in community contexts, particularly when the focus is on the system level in addition to the individual level. As discussed earlier, EfS seeks to motivate, equip and involve both individuals and communities in reflecting on how they currently live and work. This assists individuals and communities in making informed decisions and creating ways to become more sustainable. Moreover, EfS aims to go beyond individual behaviour change and single actions to implement systemic change within the wider community (Tilbury et al. 2005). In this broad educational approach, targeted at both individual and systemic change (Tilbury et al. 2005), community is a vitally important context for sustainability initiatives and practices. The idea of linking local, regional and national issues to those faced globally is a well-established idea in the EfS literature because problems and their solutions are inextricably linked across all these levels (Clover 1996; Sterling 1996). As Maser and Kirk (1996) state, communities through their collective effects act as catalysts for change in the local, regional, state and national levels and finally at a global level. From this perspective, communities and grassroots or bottom-up approaches to sustainability have an important role to play in moving towards a more sustainable world.

2.1.2 Adult and community-based education

If...[we come to see] the importance of adult and community-based education strategies, and understand that the goal of greater sustainability will not be met without critically engaging voters, consumers, workers, employers, landowners, media representatives, community activists, nurses, lawyers, doctors, poets and musicians ... who play such key roles in society (Clover 2002c, p. 2)

Environmental adult education (EAE) combines environmental education (EE) and adult learning theory to provide meaningful educational experiences to learners with the purpose of bringing about change. As Clover (1996, p. 97) argues, ‘it is the adults of the world, as citizens, consumers, employers and parents, who make critical decisions on a daily-basis that affect others and the biosphere everyday’. It is adults who are ‘the force of social and political change in both domestic and global arenas’ (Lipschutz 1996, p. 2). This study supports Monroe (2007, p. 108) who states that ‘in the context of encouraging social change working with adults may be the most fertile ground’. If education is to be effective in facilitating social change, the need to

educate adults is significant particularly as the current social and environmental crisis demands immediate action. Clover, Shirley and Budd (1998) argue that, in addition to personal change, education must have a goal of collective social transformation. According to them, education is an engaged and participatory process of political and social learning and not solely a matter of awareness raising, information transmission, and individual behaviour change.

Some researchers (see Clover 1996; Guevara, Flowers & Whelan 2004) see a need for EE that is geared specifically to adults within their own communities in a non-formal setting. For instance, the environmental adult education (EAE) that Clover (1996) describes an EAE that is non-formal and draws on the existing knowledge and experiences of community members as they work together to address common problems and bring about the changes necessary towards more sustainable ways of living. Clover (2002b) believes that in order to bring about transformation concerning interwoven social and environmental issues, adults need the opportunity to come together, debate and develop collective solutions. This indicates that social learning might provide useful ways of thinking about learning and action in community contexts.

EAE is a process of teaching and learning which begins with the daily experiences of adults living in communities and is linked to confronting and challenging the root causes of socio-environmental damage (Clover et al. 1998). In particular, communities are called upon to play the important role of teacher and site of learning. EAE is seen as a process that involves learning for change (Clover et al. 1998), defined as a process that relates individual and social perspectives with goals of personal change as well as collective transformation. Clover (2002b) suggests that EAE attempts to promote the development of concrete personal and most importantly collective action. She also sees the value for collective learning processes as people can come together to share existing knowledge, analyse their own social, political, economic and environmental contexts and explore options for collective actions.

Adult learners/adult learning

Community-based education programs can be regarded as a form of adult education because they commonly include ‘activities intentionally designed for the purpose of bringing about learning among those whose age, social roles, or self-perception define them as adults’ (Merriam & Brockett 2007, p. 8). As a consequence, researchers (Brookfield 1986; Merriam, Caffarella & Baumgartner 2007) call for community-based programs to incorporate adult learning principles in their programs. These principles can serve as a basis for informing educators of adult learners about how to guide and foster adult education in community contexts. A number of researchers (Brookfield 1986; Illeris 2004; Knowles 1989; Vella 1994)

have identified different principles to guide practices in adult learning. These include active and participatory learning, drawing on learners' prior knowledge and addressing learners' motivations. These are discussed briefly below.

One of the key principles of effective adult learning is active learning, drawing from learners' prior knowledge and experiences as sources of learning and involving a high degree of participation. Research shows that adults learn more when their experiences are acknowledged and used in the learning process. Adults come to a learning situation with a range of knowledge, experiences and interests (Merriam & Brockett 2007) Therefore, since they carry a variety of real-life experiences, their learning must be practical, experience-based and accomplished quickly. Likewise, adults often bring a variety of learning styles to an educational activity. Jacobson, McDuff and Monroe (2006) believe that it is therefore important to use a variety of learning strategies to help respond to adults' different needs. In addition, adult learners' concerns and viewpoints can be divergent (Clover 2002a). A diversity of methods and processes can be used to exchange information, ideas and experiences and, explore topics together. Some adult learning theories suggest that adults need social interaction so that they can see things from different perspectives, and acquire and construct new knowledge (Merzirow 1980).

Knowles (1980) in his theory²¹ of andragogy for adult education argues that educators need to know why people are engaged in learning and make the reasons why they teach particular things, in particular ways, explicit. In this view, educators should support the development of self-direction in learners, be ready to draw on their own experiences where possible, and be aware of the tasks they are engaged in outside the learning environment and the social roles and stages these are associated with (Heimlich 2003). Educators should also relate learning to learners' real lives and issues rather than just focusing on de-contextualised topics and skills, and they should acknowledge people's own motivations for learning. Knowles (1980) used the term 'andragogy' instead of 'pedagogy' to clarify differences between the educational needs of adults and those of children. He identified the need for adults to be motivated to learn, to be active in the learning process, and to have their past experiences respected in the learning environment (Merriam & Caffarella 1991). He also identified that adults' experiences made them rich resources for one another.

Programs for adult learners are usually attended by choice (Jacobson et al. 2006; Merriam & Brockett 2007) and thus some researchers point to the need to understand motivation for participation (Merriam & Caffarella 1991). In this thesis, the focus is on adults as a 'non-formal

²¹ Merriam and Caffarella (1991) state that Knowles' conception of andragogy is an attempt to build a comprehensive theory (or model) of adult learning that is anchored in the characteristics of adult learners.

audience' (Jacobson et al. 2006, p. 37). Although Jacobson et al. (2006) distinguish adult from youth learning, they also talk about what they refer to as non-formal audiences who 'share some common characteristics for learning at any age, depending on the non-formal education opportunities' (p. 37). These include: (1) voluntary participation, (2) learner and leader oriented, (3) may or may not need it, (4) explore information, (5) build on past and current experiences and (6) intrinsic and extrinsic motives (p. 37).

Participation in non-formal education is commonly voluntary and therefore cannot be prescribed in the same traditions of formal education. Additionally, the content of such education has to be consistent with the interests and needs of the adult learners (Heimlich & Storksdieck 2007). Adults have their own agendas and desired outcomes; they have their own motivations²² for participating (Heimlich 1993; Heimlich & Storksdieck 2007). As noted by Houle (1961) several decades ago, people engage in activities for personal goals, for the sake of participation, or for social reasons. This indicates that understanding adults' entry motivations and expectations is critical to determine how to develop effective adult education programs (Jacobson et al. 2006; Merriam et al. 2007).

Clover (2002a, p. 176) calls for taking non-formal education programs 'beyond the simple notion of "public awareness" [...] into the realm of active, critical and creative engagement' to involve adults and their communities more actively than the conventional approaches and optimise on social learning and collective action (Clover & Hall 2000). This is in line with Tilbury, Hamu and Goldstein (2002, p. 12) who assert that, 'the quest for sustainability demands new approaches to involve people rather than convey just a body of knowledge' and that our current situation calls for additional and alternative processes from those traditionally used in education.

2.1.3 Climate change community-based education from an EE perspective

Over recent years, climate change education has emerged as a significant field of education. Along with this has come debate about what constitutes climate change education, how similar is it to EE and EfS and what it should be (see Kagawa & Selby 2010).

²² It is important to note that Heimlich and Storksdieck (2007) in their article *Changing Thinking about Learning for a Changing World* refer to free-choice or informal learning. However, I believe this also applies to non-formal education and learning as learners usually attend or participate in such activities voluntarily.

Outside of school curricula, however, there has not been a great deal of discussion about education and learning in relation to climate change or about the forms of education and learning needed or that might already be taking place. Yet, the situation is changing as researchers are discussing education related to climate change. Perhaps the clearest example of this is Kagawa and Selby's (2010) book *Education and climate change: Living and Learning in Interesting Times*.

Current research on climate change education shows that transmissive approaches are often taken (Clover & Hall 2010; Gonzalez-Guadiano & Meira-Cartea 2010). Non-formal or 'public education' on climate change is generally aimed at raising awareness and increasing knowledge about climate change and its effects. As a result, the focus is often on providing information about the science of climate change. Such focus is similar to traditional EE (Jensen 2002). Indeed the literature suggests that science education has been the dominant approach in educational programs on climate change (see Gonzalez-Guadiano & Meira-Cartea 2010). Within this view, climate change is heavily framed as a scientific issue and, as a result, educational programs aim to increase knowledge and understanding of climate change science through the transmission of scientific content; this reflects an instrumental approach with the underlying assumption that, once people acquire up-to-date and 'valid' scientific information, their attitudes and behaviours will change (Gonzalez-Gaudiano & Meira-Cartea 2010). Yet, as discussed previously, research indicates that increased knowledge about an issue does not alone motivate and lead to change (Kollmuss & Agyeman 2002). This highlights the need to turn to alternative forms of climate change education that are more in line with 'transformative' EE and EfS precepts and principles.

Additionally, while there are exceptions, climate change education efforts tend to have a strong focus on individual change and behaviour modification. They often focus on encouraging individuals to make personal and incremental changes by disseminating lists of actions people can take to reduce their impact (Clover & Hall 2010; Padolsky 2006). These suggestions tend to prioritise modest changes in behaviour such as taking shorter showers, cycling or walking instead of driving, and using specific technologies or services such as energy efficient light bulbs or green power. While such actions are commendable, they do not reflect the size and nature of the challenges posed by climate change. As Clover and Hall (2010) argue, a sole focus on individual behaviours ignores the cultural, social, economic and political structures that contribute to climate change. Furthermore, as Maniates (2001) warns, such focus may lead to the individualisation of action and responsibility for climate change issues.

There is also a call in the literature for education and learning approaches that embed climate change learning and action within community contexts (Kagawa & Selby 2010). This begs the question about what kinds of learning models and practices can help individuals and communities to actively engage in climate change and move towards a more sustainable world. My research in this thesis has been designed to address this gap by studying the effectiveness of a specific climate change education program in promoting learning and change at both individual and community levels.

2.2 Social diffusion theory

Social diffusion theory is compelling in this thesis as it provides a model of the mechanisms of learning and change at the community level. This theory has been used to study the spread of new ideas, practices and technologies for over 70 years in a wide variety of fields and disciplines²³. The doyen of the field is Everett Rogers, a social scientist who studied over 1500 innovations and their diffusion over the last five decades (Rabkin & Gershon 2007). According to Rogers (2003, p. 6), social diffusion theory explains social change or ‘the process by which alteration occurs in the structure and function of a social system’. Social change occurs when new ideas, practices or products are invented, diffused and adopted or rejected²⁴.

2.2.1 Definition of social diffusion

In his book *Diffusion of Innovations*, Rogers (2003, p. 5) defines social diffusion as ‘the process by which an innovation is communicated through certain channels over time among the members of a social system’. This definition can be broken down into four key elements: (1) innovation, (2) communication channels, (3) time and (4) social system. This section offers a detailed account of each of these four elements.

Innovation

While ‘the word *innovation* is often associated with the introduction of new technologies’ (Watts 2003, p. 232), an innovation can take various forms including products, ideas, policies,

²³ Research in social diffusion began in 1943 with a study on the diffusion of hybrid corn in Iowa. Since then the theory has been applied to a range of disciplines including public health, marketing, sociology, anthropology, marketing, geography, political science and communication (Dearing 2009; Rogers 2003).

²⁴ Rogers (2003) acknowledges, however, that change can also happen in other ways; for example, as result of a political revolution, a natural event or a government policy. The interest in this research is, however, in the role of education efforts in assisting ‘planned’ individual and social change.

behaviours, norms or social practices that are perceived to be new by an individual or other unit (e.g. a group of individuals, a community, an organisation or a government) who might adopt them.

Communication channels

An innovation must spread in order to be adopted. Therefore, the communication channels through which an innovation is diffused play a significant role in the diffusion process (Rogers 2003). Communication channels are ways through which communication occurs, such as face-to-face or interpersonal (e.g. conversation or formal talk), mediated (e.g. imprint such as newspapers, radio or TV) or interactive (e.g. the internet) (Moser 2010a; Rogers 2003). Different communication channels are most effective at different times in the social diffusion process. While mass media channels allow for more widespread dissemination of information, interpersonal channels are often found to be more influential on decision making (Rogers 2003). The literature suggests that some researchers (see Ehrhardt-Martinez 2008; Nisbet & Kotchet 2009) highlight the key role of interpersonal communication in today's society where most people are faced with an overabundance of information. The challenge is not only to find what is relevant in this sea of information but also to determine which sources are valid and reliable. In this context, people often turn to others, especially peers, whom they know and trust. For example, on the topic of climate change, which is considered a complex and controversial issue, Nisbet and Kotcher (2009) and Maibach (2008) argue that the effectiveness of interpersonal communication is even greater as the media tend to provide contradictory and confusing information.

Traditionally, communication was defined as 'a one-way linear act in which one individual seeks to transfer a message to another in order to achieve certain effects' (Rogers 2003, p. 6). However, Rogers himself, across the revisions of his book *Diffusion of Innovations*, shifted to an understanding of communication as 'a process in which participants create and share information with one another in order to reach a mutual understanding' (p. 5). Such a definition implies that communication is an interactive two-way process of convergence (Rogers 2003). It also shows that the diffusion model has evolved throughout the years from a linear model to more interactive models of communication (Moseley 2004). Such models emphasise the mutuality of influence in interpersonal communication, where people share information, give meaning by mutual feedback to the information they exchange and gain an understanding of each other's views (Rogers 2003).

Time

Time is a key dimension to the diffusion framework. The innovation–decision process is the process through which an individual (or other decision-making unit) passes from (1) knowledge of an innovation (knowledge), (2) to the formation of an attitude towards the innovation (persuasion), (3) to a decision to adopt or reject the innovation (decision), (4) to the implementation and use of the new idea (implementation), and (5) then to confirmation of this decision (confirmation). Rogers (2003) defines the innovation–decision process as an uncertainty-reduction process. As individuals and social groups pass through the innovation–decision process, they are motivated to seek more information and talk to others in order to decrease uncertainties about the relative advantages and the complexity of an innovation. A key insight in the innovation–decision process is that each of the communication channels at each stage of the innovation process requires different communication approaches: we need to consider who is communicating, how the communication is framed and the needs of targeted groups (Birney et al. 2006). Interpersonal communication is especially important during the last three stages of the process as people seek confirmation or interpretation of the information they have received from media and others. As we will see further in this section, the innovation–decision process is linked to the adopter categories in social diffusion and their different needs.

Social system

Social diffusion or the process of social change occurs within a social system. The notion of a system may be applied at various levels: macro, mezzo and micro levels (Sztompka 1993). At the macro level, the whole global society (i.e. humanity), international systems and nation-states may be conceived as systems; at the mezzo level, large associations, corporations, political parties and religious movement can be seen as systems; and, at the micro level, local communities, associations, firms, families and friendship circles may be treated as small systems. Furthermore, distinct parts of society like the economy, politics and culture may also be grasped in systemic terms. Consequently, social change is conceived as the change occurring within or including the social system (Rogers 2003; Sztompka 1993).

A social system is also based upon a social structure, defined as the patterns of causal interdependence and interconnection among the members of a system, their actions and their positions in the system (Lopez & Scott 2000). In addition, the communication flows between a system's members, by tracing who interacts with whom and under what circumstances, creates a communication structure (Rogers 2003). Social diffusion theorists' understandings of the nature of information flows from one individual to another is enhanced by the concepts of homophily and heterophily. Homophily is the degree to which two or more individuals who interact perceive themselves as similar in certain attributes such as beliefs, education, socioeconomic

status or interests (Rogers 2003). Homophily accelerates the diffusion process but it limits the spread of an innovation to those individuals who are already connected in a close network. In contrast, heterophily is the degree to which individuals who interact are different in certain attributes (Rogers 2003). Heterophily thus allows for a broader learning and diffusion of new ideas and innovations across diverse groups (Moser 2007a). Ultimately, the social diffusion process requires a certain degree of both heterophily and homophily.

Social networks are systems of social ties or relationships that link people together. They result when individuals connect within specific social contexts such as a community of place or a community of practice or at the personal level among friends, colleagues or acquaintances (Plastrik & Taylor 2006). Social networks can be defined by their structure (e.g. number of ties or proximity of relationship), by their functions (e.g. frequency of contact, duration or reciprocity) and according to the nature of the relationship (e.g. friends, relatives or family). Social networks perform a critical role in the diffusion process as potential adopters' decisions about whether to adopt an innovation are influenced by the opinions of others within their social networks (Dearing 2004; Rogers 2003; Valente 1996). Such networks are also instrumental not only in providing social support but in creating social identity²⁵ and what it means to be 'us'.

Social norms also set standards for socially acceptable behaviours within a social system (Cialdini 2001; Stern 2000). Social norms often discourage risk taking and the willingness to be the first to make a change (Johnston 2007). Social norms can be divided into subjective norms (e.g. beliefs about what others close to a subject think they should do) and descriptive norms (what other people are doing) (Bator & Cialdini 2000; Schultz et al. 2007). Research shows that individuals are highly influenced by their social contexts and as a result, social norms can be incredibly powerful in driving or hindering changes with a social system.

2.2.2 Adopter categories: the bell curve

The social diffusion theory results in a segmentation of a population. Rogers (2003) divides people into five 'adopter categories', based on their predisposition to adopt innovations. The categories are referred to as innovators, early adopters, early majority, late majority and laggards, based on a bell curve (Figure 1). Rogers (2003) argues that these categories extend to

²⁵ Social identity refers to an individual's knowledge or sense of belonging derived from the emotions and values associated with group membership (Tajfel 1972).

society as a whole, when entire social networks or social groups can assume these roles in relation to the spread of innovations.

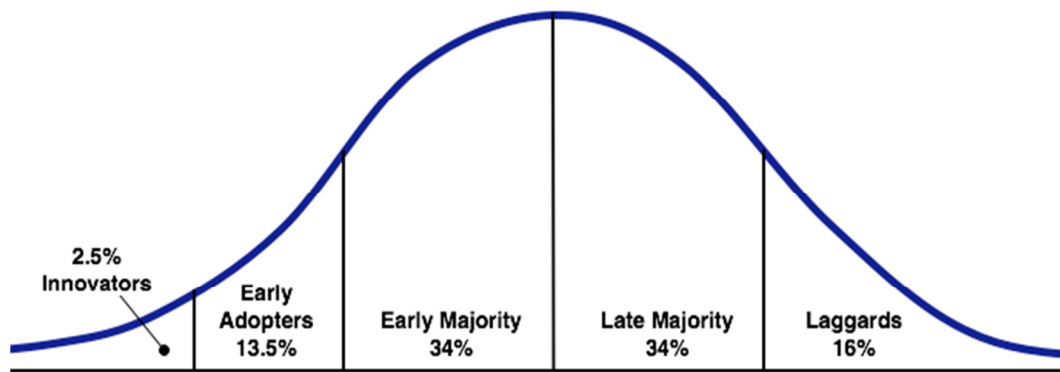


Figure 1 The bell curve (Rogers 2003, p. 281), showing the approximate percentage of people in a social system who fit into each adopter category.

This curve suggests that there is a typical pattern for innovators and early adopters to create the conditions so that a majority of people will eventually adopt new ideas, practices or technologies²⁶. In this context, early adopters²⁷ are seen as key individuals who are instrumental in driving the process of social change.

Adopter categories: Their characteristics and roles in social diffusion

- Innovators are venturesome, ‘due to a desire for the daring and the risky’ (Rogers 2003, p. 283) and cosmopolites. They play a key role in the diffusion process by introducing or advocating for new ideas, practices or devices into a system (Watts 2003, p. 232).
- Early adopters are key individuals who are attracted to an innovation and who have a high tolerance for experimentation (Rabkin & Gershon 2007). They decrease uncertainty about a new idea or practice by adopting it and then convey a subjective evaluation of the innovation to others through their interpersonal networks. Because early adopters are not too far ahead of the average individual in innovation, they serve as role models for many other members of a social system. They tend to be well connected and exert influence by their actions and interpersonal communication (Venkatraman 1989).
- The early majority tend to be deliberate and adopt innovations before the average member of a system or, as Rogers (2003, p. 284) states, ‘be not the first by which the new tried nor the

²⁶ AtKisson (1999) in his book *Believing Cassandra* uses the concept of an amoeba culture to describe how an innovation spreads and identify nine roles in the change process: innovator, change agent, transformer (early adopter), mainstreamer (noisy majority), reactionary, laggard, iconoclast, curmudgeon and spiritual recluse (pp. 18-182).

²⁷ The concept of ‘adopter categories’ suggests that innovativeness is a characteristic that individuals apply equally to every adoption decision that they make. However, as Pannell et al. (2006) argue, people who adopt one innovation early are not necessarily early adopters of all innovations.

last to lay the old aside'. This group relies heavily on social proof; that is, they look outside to others for evidence of what to think and how to act (Griskevicius, Cialdini & Goldstein 2008), especially under conditions of high uncertainty. They also need solid proof of the benefits of an innovation.

- The late majority tend to approach innovations with caution and they do not adopt until most others in their system have already done so.
- Late adopters, sometimes referred to as 'laggards', tend to be more traditional and isolated compared with earlier adopters. They are often suspicious of innovations and as a result, they are the last in a social system to adopt an innovation.

Such segmentation (highlighting key differences between adopter categories) calls for different strategies in which communication channels and messages are used to reach each adopter category (Rogers 2003). In addition to these five adopter categories, Rogers (2003) identifies two additional categories, 'opinion leaders' and 'change agents'²⁸ in the diffusion process. According to Rogers (2003), change agents are individuals who represent change agencies external to the system in which they seek to exert influence. They often use opinion leaders to lead their diffusion activities. Opinion leaders are members of a social system within which they are able to exert some influence whereas change agents are often outside a social system and use opinion leaders in their diffusion activities. In this study, educators are defined as informal opinion leaders who act as agents of change with their communities.

Opinion leaders

A central idea in social diffusion research is that 'opinion leaders', or 'influentials' (Keller & Berry 2003) as they are sometimes called, represent a minority of individuals who influence a relatively large number of their peers (Watts & Dodds 2007). As Watts and Dodds (2007, p. 442) state, 'opinion leaders are not "leaders" in the usual sense [...] Their influence is direct and derives from their informal status as individuals who are highly informed, respected or simply "connected"'. These individuals are important in shaping public opinion and preferences, informing others and altering behaviour (Niesbet & Kotcher 2009).

According to Katz (1957), being influential requires three attributes: (1) who one is (values and personal traits), (2) what one knows (competence and expertise), and (3) who one knows (in

²⁸ It is important to note that, while Rogers (2003) uses the terms 'opinion leaders' and 'change agents' to define individuals with different roles in social diffusion, these terms are sometimes used differently than Rogers or used synonymously in the literature. For example, opinion leaders are sometimes referred to as change agents (see Thompson, Estabrooks & Degner 2006). There is also considerable variation in research and studies in how opinion leaders are defined, selected, and trained (Valente & Pumpuang 2007).

other words, their social position, including who they know, who knows them and how accessible they are). In all cases, opinion leaders are seen as credible, trustworthy and having the ability to influence others. They do not necessarily have formal authority or hold positions of power (Nisbet & Kotcher 2009); their influence often stems from informal leadership roles that are attributed to them by peers (Rogers 2003). Their primary method of exerting their social influence is via interpersonal communication and strength of personality. As Dearing (2004, p. 27) state 'opinion leader approval is crucial for introducing new ideas into communication networks and lending those ideas credibility'. Regardless of the issue on which they are influential, opinion leaders tend to have certain personal and social attributes such as being: (1) found at every social level, (2) similar to those they influence, (3) avid consumers of information, (4) highly interested, informed and involved in the field in which they are influential, (5) socially accessible, (6) involved in social activities, (7) well connected (an active member of a wide social network), and (8) recognised as reliable sources of advice and guidance, (see Weimann et al. 2007).

Many diffusion-style efforts at the community level consciously attempt to identify well-connected individuals in the community or individuals who can be trained to become community advocates to promote community level changes (Gullota & Bloom 2002). These key individuals often function as the theoretical underpinning to peer education outreach programs (Valente & Davis 1999). Opinion leader strategies are used in various fields such as health promotion (e.g. Dearing 2004, 2008; Locock et al. 2001), HIV prevention (Kelly 2004), marketing (Gladwell 2002; Iyengar, Van de Bulte & Valente 2011) and political campaigning (Nisbet & Kotcher 2009). In the context of climate change, some researchers (see Maibach 2008; Moser & Dilling 2007; Nisbet & Kotcher 2009) call for the use of opinion leadership strategies, where key individuals help their peers understand what climate change means to them and how they can effectively respond in their particular contexts. They argue that this critical target group should become a priority for public engagement efforts as, if activated, opinion leaders can help accelerate societal changes.

2.2.3 The S-shaped innovation adoption curve and critical mass

Rogers (2003) argues that a diffusion process, in any given social system, follows an S-shaped curve (Figure 2). The S shape can apply to one innovation. It can also be used, however, to depict a trajectory of social change and stages of social transformation (Moser & Dilling 2007).

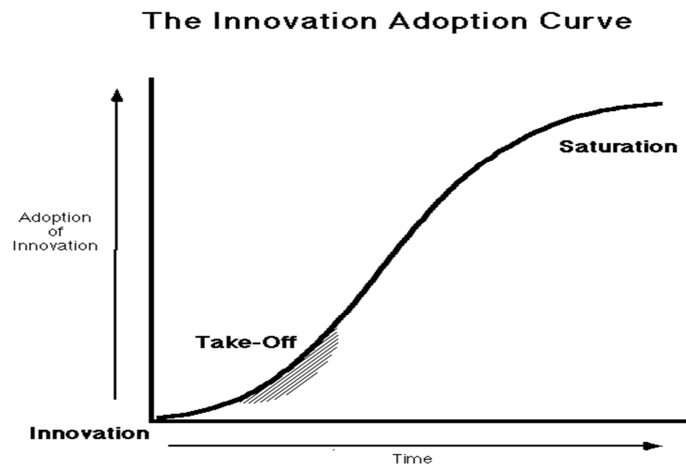


Figure 2 The S-shaped innovation adoption curve (Rogers 2003, p. 11)

According to Rogers (2003), after its conception, an innovation spreads slowly at first until it reaches the ‘take-off’ phase. At this stage, interpersonal networks become activated and start to spread an individual’s subjective evaluations of an innovation from peer to peer in a system. The central idea here is that interpersonal communication drives the diffusion process by creating a critical mass of adopters (Rogers 2003). Spreading the word is seen as a critical element in social change (Leiserowitz 2004). As Ball (2005, p. 372) states, the key ingredient here is the effect that one person has on the other or ‘the influence of interaction’. A critical mass (Rogers 2003) occurs when 10% to 20% of the population in a system has adopted an innovation. After reaching this point, sometimes referred to as the ‘tipping point’, the innovation’s rate of adoption becomes self-sustaining. Gladwell (2002) defines a ‘tipping point’ or ‘critical mass’ as the dramatic moment when an idea, trend or social behaviour crosses a threshold and spreads. Critical mass has a bearing on the relationship between individuals and the larger system of which they form a part. This stresses how an individual’s actions often depend on a perception of how many other individuals are thinking or behaving in a particular way (Cialdini 2001; Clayton & Brook 2005) and, most importantly, those individuals perceived as similar to others (Griskevicius et al. 2008). As Cialdini and Goldstein (2004) state, under conditions of uncertainty, people tend to look outside to others, especially similar others, for evidence of what to think and how to act. Observations and interpersonal communication among peers help people to cope with information uncertainty, reduce normative uncertainty and build consensus. After a critical mass is reached, the norms of the social system encourage

further adoption by the remaining individuals within a system (Rogers 2003). Critical mass also puts pressure on decision makers for additional policy and structural changes to facilitate further diffusion and adoption. After reaching critical mass, the S-shaped curve eventually reaches a saturation level, where virtually everyone who is going to adopt the innovation has done so (Rogers 2003).

People are situated within their immediate social networks. Beyond these, they are also linked to social networks of media, economic and political relations (Leiserowitz 2003). Such networks influence their attitudes and behaviours; the most fundamental tenet of social psychology is that people are affected by their context. Rogers (2003) indicates that information obtained from peers located in social and organisational networks have more weight than information obtained from the media or scientists. Individuals want to know whether their thinking is aligned with the ways of thinking and behaving of peers (Goldstein & Cialdini 2007; Goldstein, Cialdini & Griskevicius 2008; Rogers 2003). As Cialdini (2001) indicates, individuals often seek what he calls ‘social validation’ or ‘social proof’. A key aspect of social proof is that, under conditions of uncertainty, people look for cues in the social environments, and especially those perceived as similar, to guide their thoughts, opinions and behaviours (Cialdini 2001; Halpern & Bates 2004). The literature suggests that in the context of climate change, this is extremely important as studies on public views of climate change (e.g. Bulkeley 2000; Downing & Ballantyne 2007; Lorenzoni et al. 2007; Nicholson-Cole 2004) indicate that individuals often lack motivation for taking action or discount the effectiveness of their actions in tackling climate change because they see few other people engaging in climate change solutions.

2.2.4 Social diffusion as a process of social learning

The bell curve, the S-shaped curve and the concept of critical mass are crucial in understanding the social nature of the diffusion process. The diffusion of innovations is essentially a social process consisting of people talking to others about a new idea or practice as they gradually adopt the innovation (Rogers 2003). Social diffusion is driven by an underlying social learning process. Social learning occurs as people such as parents, relatives, friends, neighbours or colleagues interact with each other, pass information on to one another, discuss the innovation and share their experiences (Bandura 1977). Social learning theory (Bandura 1977) considers that people learn from one another through observational learning²⁹, imitation, modelling, social

²⁹ Bandura (1977) is the name most commonly associated with the development of the term ‘observational learning’. In his social learning theory (1977), he argues that people can learn new ideas,

interaction and interpersonal communication. Observational learning, where people learn by observing each other, can be done face-to-face or vicariously through the use of examples and stories (Jacobson et al. 2006).

According to Papa et al. (2000), while observational learning is important, group interaction is central to social learning processes as social change requires interaction, deliberation and action by members of a social system. Conversation may create a social learning environment when a group of people evaluate previously held ideas, consider a new idea or practice and serve as a catalyst for social change (Papa et al. 2000). In such a view, social learning provides useful ways of thinking about learning in networks or community contexts, as it highlights the social dimension of both learning and change. As Robinson (2001, p. 4) states:

Progressive social change has always been a collective, never an individual process. We need peers to inspire us, lead us, support us, motivate us to do our best, convince us, and give us reasons to stop acting like “utility maximizing individuals” and start acting like members of a community.

In this context, change is understood as a social challenge (Tribbia 2007).

While the social diffusion model presents a way to understand social change, it has been criticised for assuming a direct link between information exchange and change. Indeed, most past studies subscribed at least implicitly to a linear or at least a sequential model of effects. Earlier models of communication were linear, one-way processes from a source to a receiver. Communication assumed primarily a function of information dissemination and persuasion (Roger & Shoemaker 1971). The implicit belief here is that such communication can produce knowledge, which leads to attitudinal and behaviour change by an individual. This ignores, however, the complexity of social change processes that require interaction, deliberation and action by members of a social system (Papa et al. 2000).

Rogers (2003) responded to such criticism by defining communication as a two-way process of convergence rather than a one-way linear act in which an individual seeks to transfer a message to another to achieve certain outcomes. Communication, in this view, is perceived as a process in which participants share and create information with one another in order to reach a mutual understanding of new values, new concepts and new practices (Moseley 2004; Rogers 2003). As a result, there has been a shift towards more interactive and participatory models of communication where communication is seen as a two-way process of information sharing and

information and behaviours through direct experiences or by observing other people directly and/or vicariously through media, examples, or case studies (see Jacobson et al. 2006).

dialogue (Figuroa et al. 2003). As Singhal (2005) argues, ‘for social change to occur, both dissemination *and* dialogue need to co-exist dynamically, each shaping the other, and, in turn, being further shaped by the other’ (p. 1, emphasis in the original).

2.3 Communicating climate change

Communication plays a critical role in problem definition and agenda setting, creating an informed public and policy debate, social mobilization, helping to build political pressure necessary for policy and social change, and in identifying, promoting and spreading possible behavioural and policy solutions. (Moser & Luganda 2006, p. 17)

Climate change communication is an emerging field of research (Moser 2010a; Nerlich, Koteyko & Brown 2010) that draws from risk communication, environmental communication and science communication. Effective climate change communication is believed to be critical for developing an informed public - or publics - and fostering active engagement on the issue (Moser & Dilling 2007; Ockwell, Whitmarsh & O'Neill 2009). As Moser (2010a, p. 43) states, ‘climate change communication is now of keen interest to those interested in increasing public engagement with climate change and is emerging as a field of research in its own right’.

This section identifies a number of unique challenges to communicating about climate change, due to its nature and features, and to engaging people on the issue. It also offers insights from the literature on effective strategies for overcoming these challenges.

2.3.1 Responding to the climate change challenges

Responding to climate change requires actions from all levels of society: from the international to the local and from the top down to the bottom up. This highlights a need for widespread public engagement with climate change in order to promote social change. In this thesis, I focus on change at the individual and local community levels.

The Earth’s climate is changing and the threats posed by global climate change have been set out in a range of reports (Climate Commission 2011; CSIRO & BoM 2007; IPCC 2007). There is now a near global consensus among the scientific community that there is a causal relationship between human activities and climate change. Indeed, there is compelling evidence that present climatic changes result from the combination of natural variability and human

influences, in particular greenhouse gases emitted from the use of fossil fuels and land-use changes (Garnaut 2011; Hansen 2008; Houghton et al. 2001; Spratt & Sutton 2008). However, research indicates that beyond natural variability in the Earth's climate system, human activities are playing a significant part in cause present and projected climate changes. For instance, the 2007 IPCC report states that most of the observed increases in global average temperatures since the mid-twentieth century are very likely due to the observed increase in human-caused greenhouse emissions concentrations. It also indicates that warming of the climate is affecting human systems such as water resources, which will potentially force human migration and widespread acidification of the oceans. In the Australian context, Australia is deemed by many (see CSIRO & BoM 2007; Garnaut 2008; Steffen 2009) to be the inhabited continent most exposed to the predicted adverse effects of climate change. Consequently, the pressure to develop effective responses is increasing as it becomes clear that global greenhouse gas emissions are now higher than the concentration on which the last IPCC's worst scenarios were based; therefore, effects of climate change may occur faster than predicted and be more severe (Climate Commission 2011).

Climate change has emerged as the dominant threat to social and environmental sustainability. Addressing climate change is an environmental, social, economic, engineering, legal and political challenge (Newell & Pitman 2010) that requires actions from all levels of society (Ostrom 2010), including individuals, communities, institutions, business, industries, and local, national and international governments and agencies to move 'toward an environmentally, economically, and socially more sustainable future' (Moser & Dilling 2007, p. 491). There are many key leverage points to tackle climate change, from bottom-up mobilisations to top-down initiatives and all are needed. As Isham and Waage (2007, p. 12) state, 'to stop the accelerating growth of greenhouse gas emissions, to reduce those emissions to a small fraction of their current levels over a mere generation will require unprecedented individual, social, economic and political transformation'.

Dealing with climate change is becoming prominent across the environmental, social, economic and political spheres (Nicholson-Cole 2004). This is due to a realisation that our cultural, social, economic and political structures do not only play a part in causing climate change but are also subject to its potential effects (e.g. IPCC 2001, 2007); and that effective solutions to climate change need to confront the dysfunctional practices in these current structures (Harriss 2007). As the IPCC (2001, p. 8) points out changes in governance, lifestyles, economic activity, technological advances, policies, and pricing and regulation mechanisms are paramount if we want to effectively address the challenges of climate change. While stabilisation of the Earth's climate will require large-scale government policies and programs along with international

treaties, it will also require major shifts in individual and collective thinking and behaviours (Leiserowitz 2007). This is because climate change is influenced by both the collective expression of individual thinking and behaviour and by the broader social, economic and political processes that shape and constrain these ways of thinking and behaviours (Gardner & Stern 1996). Furthermore, responses to climate change extend from international to local levels (Lorenzoni et al. 2007) and involve interaction between local and global change processes.

Action against climate change requires individual, social, cultural and systemic changes and it demands a critical analysis of the current global and local cultural, social, economic and political structures. While taking an international and national perspective on climate change mitigation, it is also important to address climate change at local and individual levels because climate change impacts and mitigative responses will occur in this arena as well as more globally (Nicholson-Cole 2004). Clearly, individuals or even communities will not be able to 'solve' the problem through their own actions (e.g. Moser 2006a; Whitmarsh & Lorenzoni 2010; Whitmarsh & O'Neill 2010). Yet individuals and communities acting collectively do have two critical roles to play: as a political force, they can mobilise for policy changes at local and higher levels of government, and as consumers of energy, material goods and environmental resources, they can drive behavioural changes (at the household and local level) that are consistent with needed mitigation and adaptation measures (Ockwell et al. 2009; Moser 2008; Whitmarsh et al. 2010).

This thesis argues that informed and active engagement of individuals and communities is required to address climate change and move towards a sustainable future. As noted above, their support and engagement is needed for political leaders to be able to develop the required climate policies; they also play 'an important practical (behavioral) role in that they must adopt into their daily lives the changes, policies, technologies and shifting consumer choices which policies and markets set in motion' (Moser 2008, p. 121). The premise of this thesis is that individuals and communities play a critical role in bringing about the political and societal changes required to stabilise the climate. As a consequence, this leads to the question of how best to engage them in such change process. It is important here to define what is meant by 'engagement'. In this study, I adopt the definition of 'engagement' proposed by Lorenzoni et al. (2007), who identify three dimensions of people's connection to the issue: (1) a cognitive dimension (related to what people know or understand about the issue), (2) an affective dimension (people's emotional response to the issue such as interest, concern, despair or hope) and (3) a behavioural dimension (how people actively respond to climate change through some kind of action, including changes in behaviour and civic action) (see also Moser 2010b; Ockwell et al. 2009; O'Neill 2008; Whitmarsh et al. 2010; Wolf 2010).

In this context, engagement is a state of connection³⁰ comprising the three co-dependent dimensions of cognitive, affective and behaviour (O'Neill & Nicholson-Cole 2009). This implies that 'it is not enough for people to know about climate change in order to be engaged; they also need to care about it, be motivated and able to take action'³¹ (Lorenzoni et al. 2007, p. 446). This definition of engagement, however, does not suggest that there exists a linear relationship between the cognitive, affective and behavioural components, but that there are interrelated relationships between them (Whitmarsh et al. 2010). The three dimensions are discussed briefly below.

Cognitive engagement

The cognitive dimension of engagement relates to an individual's knowledge about climate change, its causes, impacts and possible solutions. Research shows that people understand new information through pre-existing cognitive structures (so-called mental models) (Moser & Dilling 2007). Such models shape people's perceptions, beliefs, understanding and misconceptions about the world around them as well as their decisions and behaviours regarding specific issues (Bostrom et al. 1994). The literature on climate change perceptions and beliefs suggests that people hold a variety of mental models about climate change, some of which wrongly capture the causes of the problem and as a result, incorrect responses to it (Bostrom & Lashof 2007). For example, Leiserowitz (2007) found that people often confuse ozone depletion with climate change leading them to support inappropriate solutions. According to Bostrom and Lashof (2007), having correct mental models is critical in promoting deeper understanding of climate change and appropriate responses. For instance, in their study, Bord, O'Connor and Fischer (2000) found that the most important predictor of behavioural intention to take action on climate change was an accurate understanding of the causes of climate change. Similarly, O'Neill and Hulme (2009) suggest that, if individuals have an adequate understanding of the issue, they will be more likely to support climate policies. However, while it can be argued that a certain level of knowledge about climate change is necessary, there is also evidence that more or better knowledge alone does not automatically increase concern or bring about effective changes (both individual and collective) (Chess & Johnson 2007; Moser & Dilling 2004).

Affective engagement

The affective or emotional dimension of engagement relates to an individual's affective responses (or lack of) to climate change. Such responses include interest, fear, hope, anxiety,

³⁰ Lorenzoni et al. (2007) define engagement as 'a personal state of connection with the issue of climate change', in contrast to engagement solely as a process of public participation in policy making.

³¹ Moser (2010) argues that an implicit normative assumption in Lorenzoni et al. (2007)'s definition is that engagement on climate change will lead to climate-friendly action, rather than action that defends the status quo based on extensive consumption of resources.

worry and concern. As Moser (2007b) states, affective engagement is influenced by the interpretation and appraisal of the information acquired through cognitive engagement. Research suggests that affect and emotion play an important role in influencing an individual's perceptions of and responses to climate change (see Swim et al. 2009). For instance, while Bord et al. (2000) found that negative appraisals of climate change impacts are likely to increase the likelihood that an individual will want to take action on the issue, other researchers (Moser 2007b; O'Neill & Nicholson-Cole 2009) found that negative reporting of climate change can result in counterproductive affective responses such as denial, paralysis or despair (Section 2.3.5 explores this further). This is term, affects behavioural intentions and engagement.

Behavioural engagement

Behavioural engagement is often defined as actions that individuals take to mitigate the impacts of climate change. In the climate change context, many researchers (see Hoppner & Whitmarsh 2010; Thøgersen & Thompson 2009; Wolf 2010) use Stern's behavioural categories. Stern (2000) identifies four categories of environmental significant behaviours: (1) environmental activism (e.g. participation in a demonstration), (2) non-activist behaviours in the public sphere (e.g. support and acceptance of policies, writing letters to political decision-makers, become member of an environmental group) (3) private sphere behaviours (e.g. consumer choices, energy use in the home) and (4) other behaviours (e.g. influencing organisations to which they belong). In relation to the behavioural dimension of engagement, Whitmarsh et al. (2011) emphasise the multiple roles and activities which individuals and communities can take in relation to climate change, both in the private and public spheres. Importantly, behavioural responses to climate change encompass a range of actions and are driven by diverse and often multiple expectations and motivations (Hoppner & Whitmarsh 2010).

2.3.2 Exploring public engagement on climate change in Australia

So to what extent is the public already engaged on climate change? Public opinion polls, investigating current public attitudes, understanding and action on climate change, abound on this issue internationally and to a lesser extent in Australia. In the Australian context, a number of studies (e.g. Collins 2009; Gallup 2010; Garnaut 2011; Leviston & Walker 2010; Leviston et al. 2011³²; Reser et al 2011; The Climate Institute 2010) have been conducted that examined public perceptions of climate change using primarily quantitative data drawn from large, often

³² Leviston et al. (2011) research reviews a total of 22 recent studies examining Australians' views of climate change, their beliefs about the role of human activities in producing climate change, and their support for various policy responses to climate change.

nationally representative samples. This combined research suggests the following generalised findings³³:

- Australians show a high level of awareness of climate change. For example, in the 2007 BBC World Service poll, 'Climate Change: Global Poll', 90% of Australians had heard or read 'a great deal' or 'some' about global warming and climate change. In the same poll, 81% of respondents viewed human activities as a significant cause of climate change. While they may have various perceptions of whether scientists agree about the reality, seriousness and causes of climate change, most Australians believe that the climate is changing³⁴. In terms of self-reported levels of knowledge and understanding, in the Gallup poll (2010), 97% of Australians stated they knew 'a great deal' (24%) or 'something' (73%) about the issue. Similarly, in Reser et al.'s study (2011), close to 75% of respondents felt they knew a reasonable amount about climate change.
- The level of affective connection to climate change is often measured by the level of concern and personal worry that, for example, it is already having effects and will be a serious threat in their own lifetimes (Moser 2010b). Research indicates that public concern about climate change has increased over the last decade. For example, the 2006 BBC World Service poll undertaken in 19 countries found that Australians were more concerned about climate change than people in other countries, with 69% being 'very concerned' that 'the way the world produces and uses energy is causing environmental problems including climate change' and another 25% being 'somewhat concerned' (BBC 2006, p. 2). A trend analysis study by the Australian National University (Collins 2009) shows that in 2008 80% of Australians reported being concerned about climate change, an increase from 50% in 2000. In terms of risk perceptions, the 2006 Lowy Institute poll shows that 68% of Australians rated global warming as a critical threat over the next decade, just behind international terrorism and nuclear weapons. However, a more recent survey (Gallup 2010) found that, even if Australians believe that the impacts have already begun to manifest, many still see climate change as a threat to others in the future and in other places, rather than as a threat to themselves or their communities. This is consistent with studies in the UK and US

³³ Researchers (see Collins 2009; Leviston et al. 2011; Reser et al. 2011) found that responses to questions in different polls about climate change vary systematically with the wording of questions and format of responses. While they claim that these differences do not negate the overall conclusions, they make measuring and tracking Australians' views more complex.

³⁴ Recent studies suggest that the belief in human-induced climate change has waned, matching trends in other Western countries (Leviston et al. 2011). The Gallup poll (2010) for Australia suggests the global financial crisis, the email hacking of the University of East Anglia's Climatic Research Unit (or Climategate) in November 2009, the failure to reach global agreements at Copenhagen in December 2009, and the Australian government's delayed action on climate policy may explain the decline in acceptance of human-induced climate change.

(Leiserowitz 2007; Lorenzoni & Pidgeon 2006) suggesting that while people might associate climate change with negative feelings and maintain they are concerned, the issue is not one of the public's main concern as it is generally perceived to be remote in space and time.

- The behavioural dimension of public engagement can be assessed by looking at different indicators of political support, behaviour changes and consumer choices (Moser 2010b). The poll BBC World Service conducted in 2007 shows that an overwhelming majority of Australians (95%) endorsed taking action, including 70 % who say major steps should be taken 'very soon'. Similarly, a recent review of opinion polls (Leviston et al. 2011) found that most Australians believe that Australia should take action on climate change without waiting for global consensus³⁵. However, there is no clear consensus of what policy actions Australians prefer (Levinston et al. 2011). The same study indicates that individual actions to reduce climate change are somewhat limited. While the most frequently reported actions are around energy efficiency and water conservation (e.g. turning off lights when not in use, or using less water), actions requiring greater commitment (time and money) were less likely to be adopted, for example, taking public transports, participating in an environmental group or contacting government officials about climate change (Leviston & Walker 2011).

The literature on public understanding of climate change suggest that, in some sense, communication on climate change has been very successful, as international and Australian opinion polls show widespread awareness of the issue and a general concern. However, informed understanding and behavioural responses are limited (Moser & Dilling 2011; Reser et al. 2011). As Moser and Dilling (2011) state, while the problem of climate change is increasingly accepted as a reality, perceptions of what it may mean remain misinformed, and sense of personal responsibility and efficacy remain low. In short, communication efforts to date have fallen short in deepening public engagement on the issue in ways that lead to effective changes in the political, social and personal spheres. Section 2.3.4 discusses possible barriers to engagement with climate change.

Before we move to Section 2.3.4, it is important to note that large-scale public opinion surveys have helped to identify main patterns of attitudes, perceptions, levels of understanding, concern and opinions, particularly in developed countries (Wolf & Moser 2011). They are, however, limited in terms of capturing the complexity of people's engagement on climate change;

³⁵ Although the survey found that Australians agreed with taking action before global consensus, this does not necessarily mean that they were willing to make significant lifestyle changes. For example, the Lowy Institute Poll (2010, p. 1) found that 72% of Australian agreed Australia should take action to reduce its carbon emissions, but they are not prepared to pay much for it. 33% were not prepared to pay anything and 25% were only prepared to pay \$10 or less extra per month on their electricity bill.

particularly how individuals and groups process information, understand and explain the causes and impacts of climate change, form their views and opinions, overcome barriers to change and change their behaviours (Wolf & Moser 2011). As a result, a number of researchers (see Moser & Wolf 2011; Whitmarsh 2009a) point to the need for more in-depth studies using other methodologies and methods, such as interviews, surveys of small samples, focus groups and case studies.

2.3.3 Challenges for engaging the public further on climate change

This section investigates a number of individual and social barriers to translating cognitive and emotional engagement into behavioural engagement or action on the complex, removed, uncertain and overwhelming issue of climate change (Lorenzoni et al. 2007; Whitmarsh et al. 2010; Wolf 2011).

The literature indicates that individuals experience a range of barriers which prevent or limit cognitive, affective and behavioural engagement on climate change (Lorenzoni et al. 2007; Moser & Dilling 2007; Ocklwell et al. 2009). Moser and Dilling (2007) argue that social groups, communities, organisations and institutions also experience these barriers to change. Barriers to engagement can be internal or external (Ajzen 1991; Gardner & Stern 1996). While many of these barriers have been identified with respect to other environmental issues (e.g. Blake 1999; Kollmuss & Agyeman 2002; Stern 2000), some are, however, specific to climate change due to its sheer complexity, uncertainty, temporal and spatial distance, urgency for action and risks of dangerous consequences (Garnaut 2008; Moser & Dilling 2007; Moser 2010b; Pearman & Hartel 2009). Furthermore, climate is an issue that poses major challenges to communicators and educators as people commonly associate climate with natural weather patterns, temperature changes or the ozone depletion (see Bord et al. 2000; Bostrom et al. 1994; Bostrom & Lashof 2007; Leiserowitz 2007; Moser & Dilling 2004; Ungar 2000); making it difficult to understand how climate works and how to most effectively tackle present climatic changes and those predicted in the future (Stern & Sweeney 2007). Additionally, climate change goes beyond solely being a scientific issue; it is environmental, cultural, social and political issue which challenges the way we think about ourselves, our societies and humanity's place on Earth (Hulme 2009).

Lorenzoni et al. (2007) categorise the barriers to climate change at both the individual and social levels. Social barriers include a lack of leadership and significant political action, or action by

business, structural and institutional impediments, prevailing social norms and free riders³⁶. Individual barriers include a lack of knowledge of the issue and/or the most effective ways to act, competing values and concerns, lack of interest and a lack of locally and personally relevant or accessible information. Moser (2006b) also categorised barriers in internal (psychological and cognitive) processes that may prevent individuals from engaging on this issue as well social, political and other external barriers. Some of these also make it challenging to communicate climate change as indicated in the following sections.

- Long-term nature of climate change - One of the barriers to engaging the public in climate change arises from the global and long term nature of the problem. As Whitmarsh (2005, p. 279) states, 'it is scientifically complex and uncertain, not amenable to direct observations or personal experience and distant from everyday concerns and activities in both space and time'. Yet, communicators often portray climate change as a future rather than a present risk (CRED 2009). The problem with this approach is that people typically perceive immediate threats as more relevant and of greater urgency than future problems (Slovic 2000; Weber 2006). Additionally, individuals have difficulty visualising 15 to 20 years in the future (O'Neill & Nicholson-Cole 2009), reinforcing the notion that climate change is not an immediate and relevant threat (Moser & Dilling 2007). Some researchers believe that this is one of the main reasons why motivating people to take action to address climate change is so challenging.
- Uncertainty - Despite the scientific consensus over the existence of human-induced climate change (IPCC 2007), there remains considerable uncertainty over the precise extent, time scale, impacts and consequences of climate change. Whitmarsh et al. (2011, p. 60) warn that the majority of people are 'poorly equipped to deal with such scientific uncertainty and tend to be confused by expert disagreement'. Managing such uncertainties is a key issue for those who are engaged in the process of climate change communication (Morton et al. 2011).
- A complex issue - Practically all ecological and human systems are implicated and are being or will be affected by its consequences in the short, medium and long term. In addition, Garnaut (2008) describes climate change as a 'diabolical' issue because the problem is uncertain in its format and extent; insidious rather than (as yet) confrontational; long-term rather than immediate; international as well as national and in the absence of effective mitigation there is a risk of dangerous consequences. Other dimensions to the dialogical nature of the issue include its sheer complexity, the urgent need for action and the inequities of its causes and effects (Pearman & Hartel 2009). A complex problem such as climate

³⁶ Free riders include those who benefit from the actions of others without taking action themselves (Downing & Ballantyne 2007). This is documented best in Hardin's (1968) *Tragedy of Commons* and the prisoners' dilemma literature.

change requires complex solutions and effectively addressing climate change requires fundamental and multi-dimensional changes in the way our societies operate (Bangay & Blum 2010). In addition to its complex nature, climate change is a controversial issue, with divergent opinions and beliefs about its causes, consequences and appropriate responses (Newell & Pitnam 2010), making it challenging for communicating and open dialogue.

- Low sense of efficacy - One of the most common and potent barriers is a person's belief that they lack the knowledge, skills or capacity to act (low sense of efficacy). Self-efficacy is a belief in one's ability to take action that will make a difference (Bandura 1997). The literature suggests that people feel disempowered and ineffective in the face of global climate change (Macnaghten 2003). This is in line with research indicating that often low self-efficacy is increased in the context of vast global issues requiring collective action; leading individuals to ask: 'How can my small choices make any difference to solving the world's problems?'. The literature on pro-environmental behaviours has shown that a sense of efficacy is one of the most important factors in determining whether people engage in such behaviours (Kaplan 2000; Kollmuss & Agyeman 2002). Kaplan (2000) also suggests that feelings of helplessness or powerlessness influence how likely an individual is to act. This indicates that to actively engage in an issue, people need to believe that they can do something about it and that it is worth doing something (see Aronson, Wilson & Akert 2004; Kaplan 2000; Tribbia 2007).
- Low collective efficacy - Another barrier is a perception that engagement by other actors is lacking. For example, in a study of public views of climate change in Newcastle, Australia (Bulkeley 2000), the majority of people said that they were deterred from taking action because of the perception that others were not doing the same. This perception was connected to the view that their individual actions 'wouldn't be much good unless a majority followed suit' (p. 365). Bulkeley (2000, p. 368) also commented that, 'the problem appears to be not one of knowledge, but of belief in the efficacy of action and of trust of the willingness of others, in particular government and industry, to take their share of the responsibility'. This suggests that people are more likely to act when they perceive that their efforts are part of a broader effort in society. Bandura (1995) defines collective efficacy as the degree to which individuals in a system believe that they can organise and execute courses of action required to achieve collective goals and to withstand opposition and setbacks. As Bandura (1995, p. 38) considers, 'people who have a sense of collective efficacy will mobilise their efforts and resources to cope with external obstacles to the changes they seek'. Another associated barrier is the perception that political action and

leadership on climate change are lacking and that individual action cannot have an impact on the political decision making process (i.e. low political efficacy³⁷).

- Social contexts and social norms - As Clayton and Brook (2005, p. 90) argue, ‘most people drastically overestimate the impact of individual motivations and dispositions on behaviour, discounting the effect of the situational context ... people’s behaviour is heavily influenced by the behaviour and expectations of other people, especially important others’. People routinely compare their actions with those of others (Festinger 1957) and derive subjective and descriptive norms from their observations about what the proper course of action is (e.g. Ajzen 1991; Cialdini 2001). For example, Bulkeley (2000) found in her study that knowledge is less important than social norms and social arrangements as a determinant of environmentally relevant behaviour. This indicates that the perception of a lack of interest or action taken by others can greatly influence an individuals’ behavioural engagement on climate change (Nicholson-Cole 2004). The literature (see Cialdini 2001; De Young 2002; Rogers 2003) suggests that social networks can enhance or hinder engagement if people see that others in their networks are or not doing the same. As Moser (2006b) states, individuals belong to social networks, have social identities, engage in social interactions, follow certain social norms and as a result, they tend to be heavily influenced by their social contexts and expectations. While individuals may be less likely to engage on climate change if it reflects social norms in conflict with accepted norms (Moser 2006b), interpersonal influences can also play a crucial role in either building or reinforcing pro- environmental norms (Stern 2000) or climate social norms.

As seen in this section, there are numerous cognitive, affective and behavioural barriers in responding to climate change. Furthermore, climate change itself has several traits that make it challenging to understand and communicate (Moser & Dilling 2007; Moser 2010a). These include a lack of immediacy, invisible causes, remoteness of effects, complexity and uncertainty (Leiserowitz 2007; Tribbia 2007). In this thesis, a key barrier to engagement is the nature and characteristics of climate change itself. The next sections look at common approaches to climate change and opportunities for more effective communication as suggested in the literature.

³⁷ According to Bandura (2004), political efficacy contains two separate components: (1) internal efficacy, referring to beliefs about one’s own competence to understand and to participate effectively in politics and (2) external efficacy, referring to beliefs about the responsiveness of governmental authorities and institutions to citizens’ demands.

2.3.4 Common approaches to climate change communication

Information deficit model

Communication approaches often rely on the out-dated psychological linear knowledge or ‘information deficit model’. At the heart of this approach is the notion that appropriate knowledge will have some tangible effect on behaviour (Sturgis & Allum 2004). This model assumes that the public are ‘empty vessels’ waiting to be filled with useful information on which they will then act rationally (see Irwin & Wynne 1996; Moser & Dilling 2004; Ockwell et al. 2009; Whitmarsh 2005; Wynne 1996). Yet the literature suggests that decision making is often more complex than traditional, linear models assume (Ockwell et al. 2009).

The disparity between public awareness and concern about climate change on the one hand and the limited behavioural response on the other is consistent with the widely reported ‘value-action’ or ‘attitude-behaviour’ gap (e.g. Blake 1999; Kollmuss & Agyeman 2002; Norgaard 2009). Blake (1999, p. 20) argues that the gap ‘cannot be overcome simply by invoking an “information deficit” model of participation, informed by a social psychological attitude behaviour model’. Blake (1999) produced a helpful schema³⁸ to show that the gap is filled with a range of barriers, of which lack of information is only one. Other important mediating factors are the framing of problems, social and political context, and personal and institutional constraints (Owens 2000). There is a call in the literature for more qualitative research to explore the disparity between information and action and to provide insights on how it can be addressed (Wolf & Moser 2011).

The literature suggests that information deficit model is problematic in a number of ways. Firstly, information and understanding are not sufficient to move people to action. In the context of climate change, research shows that increasing the level of awareness and understanding of the science underlying climate change does not directly or necessarily translate into concern or action (Moser & Dilling 2007). More information and better understanding have an important role to play; however, as Chess and Johnson (2007, p. 223) argue, ‘while information is not entirely inconsequential, it is much overrated as a change agent’. Secondly, learning more about climate change may also feel overwhelming and disempowering (Moser & Dilling 2011); for example, the problem may appear too large or frightening to solve. Thirdly, the information deficit model also underestimates the heterogeneity of audiences or ‘publics’ (Whitmarsh 2005, p. 25). For instance, people have diverse interests, experiences, beliefs and values and different

³⁸ Blake (1999, p.267) grouped barriers between environmental concern and action in three types: individual barriers / individual in social context and social/institutional barriers. He also identified three categories of obstacles: individuality, responsibility and practicality.

preferred ways of learning; thus ‘one-size-fits-all’ communication strategies are more likely to be less effective at engaging individuals.

Mobilisation by fear - Fear appeal³⁹

Lack of or limited engagement with an issue is often seen as a problem of attention. Therefore, communication programs may rely on fear to grab people’s attention, with the intention to evoke sufficient worry to motivate people to action. In fact, there is plenty of evidence of communication strategies that focus on negative impacts and future risks. As the Futerra report *Sizzle the New Climate Change* (2010, p. 11) states ‘for decades, climate communications have built mental pictures of climate chaos, even when created with the best intentions’. Indeed research indicates that climate change is typically framed in terms of risk, danger and catastrophe in the public domain (Hulme 2009). Some studies suggest, however, that using fearful representations may be counterproductive (e.g. Moser & Dilling 2004; O’Neill & Nicholson 2009). While these representations may be accurate, these messages on their own are rarely effective in generating appropriate responses to the danger. Indeed, they may have the opposite effect, causing apathy, resignation or scepticism (Moser & Dilling 2007; Swim et al. 2009). In addition, Hutchinson (2009) warns that messages of the future invoking fear impoverish people’s imagination. This is key as many (see Moser & Dilling 2007; Nicholson-Cole 2004; O’Neill & Nicholson-Cole 2009) argue that concerted action in response to climate change is likely to depend on the capacity of individuals and communities to imagine alternative futures and pathways that inspire hope and focus on action.

Many climate change communicators believe that a certain amount of fear can serve as an effective motivator to increase the issue’s urgency and lead people to act (Moser & Dilling 2011). However, the principal problem with fear as the main message of climate change communication is that what grabs attention (dire predictions, extreme consequences) does not automatically enable action. It is hypothesised that certain strong emotional responses such as fear, despair or a sense of being overwhelmed or powerless can inhibit cognitive engagement and action (Macy & Brown 1998; Moser 2007b; Nicholson-Cole 2004). Indeed, numerous studies (Lowe et al. 2006; Nicholson-Cole 2004; O’Neill & Nicholson-Cole 2009) have documented that fear appeals of overwhelmingly large problems can result in denial, numbing and apathy. As Moser and Dilling (2004) illustrate, well-meaning attempts to create urgency about climate change by appealing to fear of disasters or health risks frequently lead to the exact

³⁹ In this study, I use the term ‘fear appeal’ as defined in O’Neill and Nicholson-Cole (2009, p. 360): ‘the threat stimulus and whole cognitive and affective risk processing response; the communication attempt is designed to arouse fear in order to promote precautionary motivation and self-protective action’.

opposite of the desired response: denial, paralysis, apathy or actions that can create greater risks than the one being mitigated.

Clearly these findings pose difficult challenges for communicators and, raise the question of ‘how to communicate urgency without overwhelming and paralysing audiences?’ (Moser 2010a, p. 43). The literature calls for careful use of vivid and emotionally driven messages and imagery. Similarly, Moser (2007b) warns about the need to pay attention to climate-related emotions and to find ways to create urgency, but without dwelling on fear.

Communicating climate change through the media

Climate change communication can be undertaken using a wide variety of channels and sources. The literature indicates that many actors are involved in communicating the issue including governments, non-governmental organisations, communities, businesses, international agencies and celebrities (Nerlich et al. 2010; Nicholson-Cole 2005; O’Neill 2008). However, research has shown that the main channel through which the general public receives information about climate change is the mass media. Consequently the media has the greatest influence on people’s perceptions of the issue (Carvalho & Burgess 2005; Carvalho 2010; Trumbo & Shanahan 2000). Most of what people learn about climate change in the news media, from scientists and environmental advocates, involves projections of frightening futures, documentation of rapid changes, threats to species and humans and mental images of disaster and havoc (Hulme 2009). These are very difficult scenarios to face and consequently many people prefer to avoid or deny them (Moser 2007b).

Climate change is commonly represented through fear-inducing imagery (the next section explores this further) and alarmist narratives (Boykoff & Boykoff 2004; Ereaut & Segnit 2006; Hulme 2009; Nisbet & Mooney 2007; Segnit & Ereaut 2007; Storkdiesck & Stylinski 2011). Mass media commonly resort to extreme imagery to depict urgency and presumably to spur people into action. Research shows that fear is strongly apparent in both the kinds of imagery and words used in association with climate change more broadly (Ereaut & Segnit 2006; O’Neill & Nicholson-Cole 2009). For example, Ereaut and Segnit (2006) state that the alarmist climate repertoire is mostly used to communicate and talk about climate change. This repertoire is characterised by extreme language with an urgent tone, often focused on doom and gloom and apocalypse beyond human control. Storkdiesck and Stylinski (2011) offer some explanations for this by stating that newsworthiness increases with the level of alarm and presumably can grab the public’s attention. Accordingly, climate change is most commonly reported in the media in the context of dramatic-related events (see Carvalho & Burguess 2005). However, this can

overwhelm and distance many people from the issue (Dilling 2008; O'Neill & Nicholson-Cole 2009).

Growing literature in imagery

Researchers (Moser 2007b; O'Neill & Nicholson 2009) have touched upon this issue of whether the use of fear- and shock-provoking messages is likely to engage people with climate change. Some literature (see O'Neill & Nicholson-Cole 2009) suggests that using fearful representations of climate change may be counterproductive. There have been several attempts to use visual communications to raise awareness and concern about climate change through films for example such as *The Day After Tomorrow* (2004), a film depicting sudden and catastrophic climate change through fictional elements, and the documentary *An Inconvenient Truth* (2006) former U.S. Vice President Al Gore aimed at raise awareness on climate change and motivate action (Hulme 2009). Several studies investigated the impacts of *The Day After Tomorrow* on viewers in the US, UK and Japan (Leiserowitz 2004; Lowe 2006; Lowe et al. 2006) using pre- and post-questionnaires, follow-up interviews and focus groups. In the UK and US studies, while viewers reported increased levels of concern about environmental risks and climate change, they found it difficult to distinguish science facts from dramatized science fiction (Lowe 2006). Additionally, the UK study (Lowe et al. 2006) found that although respondents expressed increased motivation and behavioural intention after watching the film, the sense of urgency to act had diminished in the focus groups conducted in the four weeks following.

2.3.5 Opportunities for effective climate change communication

This section aims to offer some insights from the multi-disciplinary research literature on how communication can become more effective in assisting in the task of engaging individuals and groups on climate change (Moser & Dilling 2011). The literature on risk communication and climate change communication offer valuable insights on effective strategies to communicate information on climate change and motivate positive change. As Dilling (2008, p. 3) argues, 'we need to develop new strategies, new messengers and new ways of stimulating discussion and action that will be effective to respond to the changes in climate that are upon us'.

To increase the level of public engagement with climate change, a wide range of strategies to help overcome barriers to active engagement and build momentum for social change have been proposed (see Futerra 2005; Moser 2010a; Moser & Dilling 2004; O'Neill & Nicholson-Cole 2009). These include: a more sophisticated use of communicators, opinion leaders and the social influence they exert; framing climate change so that it links the issue with more persistent

concerns and values (Bostrom & Lashof 2007; FrameWorks Institute 2001); the complementary use of mass media and face-to-face communication (Dunwoody 2007); careful attention to the emotional impact of climate change communication and sending messages that convey empowerment, positive vision and practical help rather than fear (Moser 2007b; O'Neill & Nicholson-Cole 2009). The sections below highlight some opportunities for effective communication of climate change around several questions: (1) Who is the audience? (2) What messages, information or content are conveyed? (3) How is climate change framed? (4) Who are the messengers or communicators? and (5) Through which channel(s) does the communication occur? (see Moser 2010a).

‘Who is the audience?’

Audience choice is the first and most important strategic step in the communication process (Maibach et al. 2009; Moser 2010a). Many previous communication approaches have used mass communication methods, but have failed to communicate to specific audiences (Moser 2006a). Mass communication approaches attempt a ‘blanket’ approach, which is unlikely to engage meaningfully with individuals and communities. The literature calls for targeting communication efforts to particular audiences. Audience segmentation studies in the UK, Canada and the US (e.g. Angus Reid Strategies 2007; Hulme & Lorenzoni 2009; Leiserowitz et al. 2008; Maibach et al. 2009; Moser 2008; Rose 2007) show that there is not one public but many publics with different levels of engagement on climate change. This indicates that different strategies are required for different audiences, including framing climate change differently for different audiences, and selecting the appropriate content, communication channel and communication source for each audience.

The literature suggests that audience segmentation studies can provide important insights and communication strategies. For example, in their 2009 study, Maibach, Roser-Renouf and Leiserowitz identified six unique groups or audiences within the American public (*Global Warming’s Six Americas*), which that each responded to climate change in its own distinct way and thus required different and tailored communication strategies. The six audiences are referred to as the ‘Alarmed’, the ‘Concerned’, the ‘Cautious’, the ‘Disengaged’, the ‘Doubtful’ and the ‘Dismissive’.

‘What messages, information and content are conveyed?’

Commonly, as people begin to understand and emotionally relate to the risks of climate change, they want to do something about it. This reflects their desire to be not a part of the problem but rather a part of the solution (see Kaplan 2000). People want to know what they can do, that they can do it and that others are doing their share as well. Insights from the book *Creating a Climate*

for Change: Communicating Climate Change and Facilitating Social Change (Moser & Dilling 2007, p. 505) suggest that ‘providing information on solutions is at least as important in sustaining an audience’s active engagement as providing information on the problem’. Thus, what is needed now is more information on practical solutions, guidance, support from others, positive encouragement, skills and empowerment (e.g. De Young 2000; Kaplan 2000; Kaplan & Kaplan 2009; Kollmuss & Agyeman 2002). To help individuals stay engaged on an easily overwhelming issue, sort through complex issues, understand difficult trade-offs and change habitual thoughts and behaviours, communicators must identify and engage sources of social support. It is easy for an individual to feel isolated and powerless when faced with this immense problem. This may be overcome by creating a sense of the collective and tap into this community support (Kaplan 2000; Moser 2007a). As Fritze et al. (2008, pp. 6-7) state, ‘notwithstanding the enormity of the climate change challenge, we know that there are many actions that citizens can take individually and collectively to make a difference at the household, local, national and global levels. When people have something concrete to do to solve a problem, they are better able to move from despair and hopelessness to a sense of empowerment’.

‘How is the issue framed?’

The term ‘framing’ is used to describe how information is presented to convey a particular message or to produce a desired response. Nisbet (2009) defines frames as interpretive storylines that help people identify why an issue might be a problem, who or what might be responsible for it, and what should be done about it. The climate change communication literature (e.g. Moser & Dilling 2007; Frameworks Institute 2001) identifies the importance of framing as the way evidence is presented and how a problem is defined has been shown to affect people’s perception of and reaction to that information (Lakoff 2004). Hulme (2009) state that in the past two decades, climate change has moved from being solely framed as an environmental issue to being framed as a political, social, economic, educational, technical, security, health, social justice, moral and sustainability issue.

A frame can include visual imagery or words. For example, in their two studies, Warm Words and Warm Word II, Ereaut and Segnit (2006; 2007) identify several different ‘linguistic repertoires’⁴⁰ used to communicate and talk about climate change. Each repertoire carries implications how the causes of climate change were portrayed and what the responses should be. Research also indicates that the terms used to describe the physical transformation of global

⁴⁰ In Warm Words (2006), Ereaut and Segnit identify the following twelve distinct repertoires: Alarmism, Settlerdom, British comic nihilism, Rhetorical scepticism, Free market protection, ‘Expert’ denial, Warming is good, Techno-optimism, David and Goliath and Small Actions.

climate - 'global warming' or 'climate change' - also influence the ways people think about the problem, its causes, effects and its solutions and how they respond to it (Hulme 2009), suggesting important implications for researchers, communicators and educators. For example, a study in the UK (Whitmarsh 2009) shows that the choice of terminology significantly affects how people understand and evaluate the issue, 'climate change' evoking a lower level of concern than 'global warming'.

'Who are the messengers or communicators?'

Given that climate change does not represent a salient, tangible issue on which most people act, Moser & Dilling (2004) advocate the use of more relevant or 'trusted' communicators in order to improve credibility and legitimacy in climate change communication and to tailor communication strategies towards specific groups or audiences.

As part of the different ways framing of climate change suggested in the previous section, people other than scientists and environmentalists are beginning to engage in the climate change debate. Business and religious leaders, politicians, health practitioners, lawyers, engineers, architects, educators and community leaders are speaking out on climate change (Gaillard 2008). These 'new' communicators are seen as key individuals who act as entry points to specific groups. They can tailor their communication strategies to their audiences' specific needs, knowledge, concerns, motivation and spheres of influence. Sharing similar situational contexts, interests, values or concerns, communicators can help their 'peers' understand what climate change means to them and how they can effectively respond in their particular contexts (Moser & Dilling 2007).

Framing the information should be matched to the communicator. For example, Abbasi (2006) argues that if the issue is a scientific one, people generally regards scientists as the most credible sources of information. Furthermore, the communicator should be matched to the audience, to improve both the credibility of the information and their own credibility. Audiences may be more likely to believe a messenger if they belong to the same social or cultural group: that is, 'People Like Us' (or 'PLUs') (Agyeman cited in Chess & Johnson 2007, p. 230; Cialdini 2001). Such a messenger is important for an audience's personal comfort, identity, and group-internal norms and cohesion. Often, 'PLUs' (especially if people know and trust them personally) have greater credibility and legitimacy than someone who does not know an audience's circumstances as well (Moser & Dilling 2004). In other instances, however, trust in a message can be enhanced if they come from a different social or cultural group (Moser & Dilling 2011). Credibility and trust should be a key component in risk communication (Peters et al. 1997). When confronted by something complex or difficult to understand, people often use heuristics

or mental short cuts to help make a decision (Kahneman 2003; Krosnick 1991; Moser 2010b; Tversky & Kahneman 1974). For example, people may be more likely to believe information if it is from a source that they approve of or someone with credentials or expertise (Cialdini 2003).

As discussed above, communicators are an integral part of the framing (Moser & Dilling 2011; Framework Institute 2002). It is therefore important that the communicator matches the way the message is framed or the importance and credibility of the message could be undermined (FrameWorks Institute 2002). In the past, climate change has been predominantly framed as a scientific issue (Hulme 2009) and consequently, communicated by expert scientists and scientific organisations (Nisbet 2009). While scientists working in relevant fields are generally credible and trusted as sources of information about climate (Levinson et al. 2011; Leiserowitz et al 2010; NSF 2009), they are not the most trusted or most appropriate source with every audience or with any message (Moser & Dilling 2007). The clear message from the literature is that communicators must be trusted and match the message with the audience (Moser & Dilling 2011).

Research shows that people place their trust in different sources of information on climate change. Consequently, there is a call in the literature for broadening the range of communicators beyond the realm of scientists and environmentalists to reach different audience groups. As climate change moves beyond being a purely 'scientific' or 'environmental' issue, industry leaders, political champions, religious leaders and 'PLUs' in other communities are joining the public discourse as equally legitimate communicators. Because communicators are part of the framing, the right speaker also suggests to the audience how to interpret climate change (Moser & Dilling 2007). Identification of key individuals to spread a message to particular communities promises to be more effective and efficient than undifferentiated mass public education. However, the importance of credible communicators has not yet been empirically studied in the context of climate change (Chess & Johnson 2007). My study looks at how learners define a 'credible' educator and how this affects their learning experiences and outcomes.

Training credible communicators and giving them the necessary information, tools and skills to translate climate change into terms relevant to their specific audiences has been outlined in the literature as a potentially effective approach to actively engage individuals, communities, social and professional networks on the issue (Moser & Dilling 2007; Moser 2007a). Researchers (see Maibach et al. 2008; Nisbet & Kotcher 2009) increasingly recommend communication strategies that target opinion leaders (e.g. local community leaders, business leaders, religious leaders), who are considered particularly trustworthy by specific segments of the population.

According to Wolf and Moser (2011), such strategies could help to develop much wider public support for climate action. This is in line with Nisbet and Kotcher (2009, pp. 328-329) who argue that ‘until only very recently, public communication initiatives have ignored these special individuals across communities and social groups who can serve as vital go-betweens and information brokers, passing on messages about climate change [...] that speak directly to their otherwise inattentive peers, co-workers, and friends’. Indeed, Nisbet and Kotcher (2009) believe that opinion leaders have a crucial role to play in facilitating collective action on climate change.

Channels of communication

Communication channels are ways through which communication occurs, such as face-to-face or interpersonal (e.g. conversation or formal talk), mediated (e.g. imprint such as newspapers, radio or TV) or interactive (e.g. the internet) (Moser 2010a; Rogers 2003). Research indicates that popular understanding of climate change is primarily mediated through mass media (i.e. television, computer, radio, newspapers and magazines) which shape people’s awareness, concern, views and responses to the issue (Cavalho 2010). Individuals try to make sense of the information they receive about climate change by discussing it with others, sharing their views and reflecting upon their own perspective and understanding. As Fritze et al (2008, p. 6) state, ‘in the end, an individual’s understanding of climate change and their emotional reactions to this knowledge is a combination of individual processes such as their own concerns, defences, thoughts and feelings and social processes’.

There is a call in the literature for a shift from one-way message delivery (i.e. information deficit model) to a two-way dialogue that encourages participants to discuss climate change and share diverse perspectives, knowledge, skills and experiences. More dialogical and interactive processes may also offer benefits in communicating and understanding risk. As discussed earlier, substantial research shows that providing information and filling knowledge gaps is at best necessary but rarely sufficient to create active behavioural engagement and change (Moser 2010a). Consequently, some communication strategies are now beginning to recognise that the deficit model is out-dated (Moser 2006b) and that two-way dialogue is deemed more appropriate to effectively engage people on climate change. As Moser (2007, p. 344) advocates, ‘wholesale mass communication efforts must be complemented with audience-specific, small-group, dialogic, “retail” approaches to talking about climate change’.

2.4 Summary

This literature review discussed the concepts, themes, and elements that are essential in forming the basis of the dissertation study with relation to theories of environmental education, social diffusion and climate change communication. This review considered the links between these as related to learning for change. The overall study is grounded in the context of community-based climate change education.

This research has been designed to study the effectiveness of a specific climate change education program in promoting change at both individual and community levels by examining learning outcomes and learning processes. Learning outcomes are defined, based on the literature, in terms of changes in cognitive engagement (e.g. understanding), affective engagement (e.g. motivation, interest, despair, fear and powerlessness) and behavioural engagement (e.g. individual, social and political) or, in other words, learning outcomes were defined in terms of changes in how participants, as individuals and as groups, think, feel and act on climate change. This research also considers some challenges associated with the nature and characteristics of climate change, limitations of the deficit model and the social dimension of learning.

Chapter 3 - Design and conduct of the study

3.1 Introduction

This chapter outlines the research design and conduct of the study. First, the chapter presents the methodological approach that guides this research and the use of multi-methods with a single case-study design. Next, the rationale is provided for selecting the single case-study (The Climate Project Australia or TCP) including a brief description of the case. Finally, the methods used in this study to collect and analyse the qualitative and quantitative data - namely two questionnaires (before and after TCP events), semi-structured interviews and participant observation - are explained. Important issues of reliability, validity⁴¹ and ethics and how these were addressed in the design and conduct of the study are also discussed in relevant sections throughout this chapter.

3.2 Research design

3.2.1 The methodological approach for this study

This section introduces the approach taken to investigate the central research question in this thesis: ‘How can community-based climate change education facilitate learning for change?’ This question has both descriptive and exploratory intent. I sought to explore and describe factors that facilitate learning for change, at both individual and community level, in the context of climate change.

I chose to investigate this particular question within primarily an interpretive paradigm of enquiry. Guba and Lincoln (1994, p. 105) define a paradigm as ‘the basic belief system or worldviews that guides the investigator, not only in choices of method but ontologically and epistemologically fundamental ways’. A paradigm influences how the researcher interprets the world and thus informs the objectives and nature of the research inquiry, its methodological design and the data collection and analysis methods used (Creswell 2003; Denzin & Lincoln

⁴¹ Validity concerns the integrity of the conclusions generated from a piece of research; reliability is concerned with the question of whether the results are repeatable (Bryman 2001).

1994; Merriam 2009; Robottom & Hart 1993). In environmental educational research, Robottom and Hart (1993) identified three dominant research paradigms⁴²: positivism, interpretive (or constructivist) and critical.

The positivist paradigm of enquiry proceeds on the assumption that reality can and should be measured (realist ontology) and verified objectively by using a set of standardised quantitative methods to test hypothetical understanding (Guba & Lincoln 1998). In this paradigm, knowledge gained through scientific and experimental research is considered objective and quantifiable. By contrast, in the interpretive paradigm of enquiry, the world, or reality, is not a fixed, single or measurable phenomenon but it is constructed by individuals within their world (Merriam 2009). Thus research undertaken within such a paradigm seeks to comprehend what contributes to different people's understanding and perceptions of reality or realities (Rubin & Rubin 1995). Furthermore, as Merriam (2009, p. 11), states the purpose of interpretive enquiry is to 'describe, understand and interpret'. Thus, such research is designed to explore people's motivations, perceptions and 'lived' experiences and discover how they interpret the world around them and the experiences they have in it (Merriam 2009; Robottom & Hart 1993). Likewise, researchers who conduct research from an interpretive paradigm often speak of illuminating the sense that participants make of their experiences, including the meanings they attribute to their interactions and actions (Stevenson 2004) and 'giving participants a voice' (Barraza & Robottom 2008). Proponents of critical paradigm argue that people's views and actions are heavily influenced by social and political forces (Palmer & Birch 2005). Thus, researchers should involve participants in collaborative investigations to uncover and make explicit such influences and promote critique and transformation (Robottom & Hart 1993).

In order to rely as much as possible on the participants' views of the situation being studied, an interpretive paradigm of enquiry is often associated with qualitative methods including observations and interviews (Creswell 2003; Merriam 2009). Meanings and interpretations are perceived as difficult to measure in a precise and scientific way, and they differ from one person to another. So the researcher must use mostly qualitative methods and personal involvement to gain an understanding of how people interpret the world around them and how this informs their action (Henn et al. 2006). This study's research questions were designed to provide insights and understanding of learning and change from the perspective of the participants. According to Merriam (2009) such purpose calls for a more qualitative design in order to collect rich data that

⁴² Ruiz-Mallen et al. (2010, pp. 1757-1758) state that the differences between these three paradigms can be identified by the questions each of them ask. For example, positive enquiry may ask 'how much' environmental knowledge do learners gain; interpretive enquiry how' learners acquire environmental knowledge; and critical enquiry 'why' do learners acquire environmental knowledge.

allows for in-depth description, exploration and explanation. The aim of this study was to carry out an in-depth investigation of learning outcomes and processes from a learner's perspective. With this objective in mind, while two questionnaires (before and after TCP events) were used at the start of the research process to produce useful quantitative baseline data and basic insights on potential cause and effect, this study was predominantly qualitative in nature using observations and semi-structured interviews.

3.2.2 Case-study approach

This study employed a single case-study approach. A case study is defined here as 'an in-depth multi-faceted investigation, using qualitative and quantitative research methods, of a single social phenomenon' (Feagin, Orum & Sjoberg 1991, p. 2), within its real-life or natural setting (Yin 2003). A case-study approach was deemed the most appropriate approach as it provided the opportunity to explore the phenomenon of climate change community-based education through an in-depth investigation of a particular example of the phenomenon. Such an approach was particularly useful for studying a single community-based program in a holistic in-depth way that allowed for deep understanding of factors that can hinder or facilitate learning for change.

Case studies are commonly used as a research strategy in social science disciplines, including education, as they can serve to illuminate educational practices (Merriam 1998; Yin 2009) and allow researcher to 'go deep' and learn 'what works and what does not' (Corcoran, Walker & Wals 2004, p. 4). The case study approach enables researchers to conduct an in-depth and complete description and analysis of a bounded system such as a program, an institution, a person, a process or a social unit (Jacobson et al. 2006; Merriam 2009). According to Merriam (1988), a case study is appropriate when the researcher is interested in insight, discovery and interpretation because it uncovers the interaction of significant factors that characterise the phenomenon. This strategy allows for collection of data in a comprehensive and systematic format. It presents an approach for understanding a complex instance through description and contextual analysis (Corcoran et al. 2004). According to Stake (1995), researchers who use cases study both what is common and what is particular about the case.

Yin (2008) offers a typology of case study - exploratory, descriptive and explanatory -, although the boundaries between these are not absolutely clear. The kind of case study to be used is considered in view of three different aspects: the type of research question (typically to answer questions such as 'how' and 'why'), the extent of control over actual behavioural events (i.e.

when research has little or no possibility of controlling the events) and the general circumstances of the phenomenon to be studied (e.g. contemporary phenomenon in a real-life context) (Yin 2008). Using Yin's typology, the case study in this study can be labelled both explanatory and exploratory as it tried to gain a better understanding of 'what' happened within the case as well as 'how it happened' and 'why'. Stake (1995) gives another account of case studies that can be used for different purposes, namely intrinsic, and instrumental case studies. In an intrinsic case study, the desire is to gain knowledge about a particular case, the case being the primary interest; an instrumental case study is used to provide insights and enhance understanding of an issue. As Stevenson (2004) states, the instrumental case is examined in depth, with its context scrutinised and its activities detailed, but all in pursuit of such understanding. In a single instrumental case study (Stake 1995), the research focuses on an issue or concern and then selects one bounded case to illustrate the issue (Creswell 2006). However, Stake adds that there is no clear demarcation between an intrinsic and an instrumental case as research can be driven by both intrinsic and external interests.

In this research, my interest was to gain a better understanding of the role of community-based climate change education in facilitating learning for change. In order to pursue such understanding, I selected a single case to explore. The case selected is a climate change community-based education model, TCP, which seeks to educate and actively engage individuals and communities on climate change (see Section 3.3 for details of the case study). The purposes of this case study research were to investigate the model of learning used by the TCP program from the participants' perspectives, and to use what Lincoln and Guba (1985, p. 362) refer to as the 'lessons learned' from the case to explore how community-based climate change education can effectively facilitate learning for individual and community changes and inform future climate change community-based educational programs.

3.2.3 Use of multi-methods

This study employed a multi-methods⁴³ approach, which refers to 'research in which the investigator collects and analyses data, integrates the findings and draws inferences using both quantitative and qualitative methods in a single study' (Tashakkori & Creswell 2007, p. 4). Three data collection methods - pre/post questionnaires, semi-structured interviews and participant observation - were used to assemble a detailed and in-depth account of the single case (i.e. the community program TCP). These data collection methods are described further in

⁴³ In this study, I used Harding's (1987, p.2) definition of a research method as 'a technique for (or way of proceeding in) gathering evidence'. Harding equates 'method' with 'technique' whereas other scholars distinguish between them.

Section 3.4. These methods were selected to complement each other and to enable the collection of both quantitative and qualitative data from research participants from different angles and at various times during the research process.

The adoption of multi-methods can add to research validity⁴⁴ (Richard 2009) and an element of triangulation to this research (Babbie 2001). Triangulation is defined as the combination of methods in a study of a single phenomenon, an approach whereby evidence can be corroborated and supplemented (Silverman 2001). The benefits of using a multi-methods approach also derives from the notion that research can explain more fully the richness and complexity of experiences, meanings and actions by studying them from more than one standpoint (Barraza 2006). Employing a variety of methods can, thus, help explore research questions in a more exhaustive manner. It can also offset weaknesses of individual methods with the strengths of others, and vice versa (Singleton, Straits & Miller Straits 1993). In this study, three data collection methods were used so that the findings from one method could be complemented with or clarified by the findings of the other methods. For example, I used the questionnaires' data as a baseline (to provide some insights into how TCP events affected participants' engagement with climate change). Semi-structured interviews built upon and elaborated on that data to provide richer and more in-depth accounts of learners' experiences at a TCP event. Participant observations also complemented insights from the semi-structured interviews. The multi-methods approach in this research consisted primarily of three research stages that spanned a two-year period (from September 2007 to November 2009), each informed by the results of the previous stage. In this section, I briefly describe the methods used at different stages of the process to collect and analyse data in this study. Sections 3.4 and 3.5 discuss the design and application of these methods in further detail.

The multi-methods used in this study to collect data were:

- *Two questionnaires.* Participants completed a questionnaire before and after a TCP event (see Appendix 4 and Appendix 5). This was deemed the most appropriate method for initial data collection and to provide some baseline data on participants. The pre-questionnaire elicited respondents' outlooks on climate change before a TCP event and provided a baseline on which to assess the effects of TCP on the way they thought, felt and acted on climate change. The pre-questionnaire also provided some basic socio-demographic information. The questionnaires were brief because of the short time available at TCP events (see Section 3.3.1 for details) and thus were not intended to provide full explanations.

⁴⁴ Fielding and Fielding (1986), for example, state that multi-methods work requires a greater empirical and conceptual accountability on the part of the researcher and is useful in 'quality control'.

- *Semi-structured interviews.* Questionnaire data provided the basis for the semi-structured interviews which allowed a more detailed and accurate understanding of participants' learning experiences and outcomes as a result of attending a TCP event. Three weeks after a TCP event, I conducted semi-structured interviews with a sample of participants ($n = 75$) (see Section 3.4.2.2 for details on how participants were selected). The semi-structured interviews were intended to be a reflective exercise to explore participants' learning experiences and whether and how attendance at a TCP event may have affected their level of engagement (knowledge, affect and behaviour) on climate change⁴⁵. Semi-structured interviews played both exploratory and explanatory roles. During the interviews, I was able to explore further the 'what' (What was learnt? What was not learnt?), but also the 'how' (How did learning happen?) and the 'why' (Why did learning happen or not happen?). Semi-structured interviews were conducted six to eight months after the first interviews with a smaller sample (9 of 75) in order to add a longitudinal dimension to the study (Section 3.4.2.2 explains this in more details). The purpose of these interviews was to elicit qualitative data to enhance understanding of the long-term impact of TCP events on participants' engagement on climate change.
- *Participant observation.* Observations were conducted throughout the research (between September 2007 and November 2009) starting with former U.S Vice President Al Gore's training for selected TCP educators (Section 3.3.1 explains this in more details) followed by attending 17 TCP community events and other TCP activities for TCP educators.

3.3 Case study selection

As Merriam (2009, p. 81) states, typically two levels of sampling are necessary in case-study research; 'first you must select the case to be studied and then do some sampling within the case'. Purposive sampling involves making choices about a particular case, setting or people according to some specific criteria. It 'allows us to choose a case because it illustrates some feature or process in which we are interested' (Silverman 2001, p. 250). This section first identifies the case that was selected in this study for an in-depth investigation of TCP. It then gives an overview of who was selected to participate in this study and how, and what events and activities were selected to be observed.

⁴⁵ Learning outcomes in this study were defined in terms of changes in cognitive engagement (e.g. understanding), affective engagement (e.g. motivation, interest, despair, fear and powerlessness) and behavioural engagement (e.g. individual, social and political) (see Chapter 2) or, in other words, learning outcomes were defined in terms of changes in how participants, as individuals and as groups, think, feel and act on climate change.

3.3.1 The Climate Project Australia (TCP) as a case study

In this study, I was interested in the role of community-based climate change education in facilitating learning for change. I therefore searched for and purposefully selected a particular community-based education program, TCP, to develop insights and understanding of climate change education through detailed exploration and analysis of the program's educational approach.

As Yin (1994) states, a selected case needs to reflect some of the key issues or characteristics in the underlying theoretical or conceptual framework of the research. In this study, TCP was selected for its model of learning described below. In this study, I sought to explore whether the TCP model of learning was effective in enhancing learning and supporting change at both the individual and collective levels. In addition, TCP is high-profile project; given its prominence, it is likely to serve as model for future educational initiatives and, therefore, I considered that the model of learning it is based on was worth exploring.

3.3.1.1 Background to TCP

In the spring of 2006, former U.S. Vice President Al Gore released the documentary on climate change *An Inconvenient Truth* (AIT). Shortly after, Gore launched the Climate Project⁴⁶ (TCP), a global climate change education initiative that aims to 'educate the public about the harmful effects of climate change and to work towards solutions at the grassroots level worldwide' (TCP 2010) through community-based education events. In late 2006, Al Gore established in Australia a climate change leadership program in association with the Australian Conservation Foundation (ACF). The goal is to train individuals to become climate change leaders who will present their version of the AIT slide show. Eighty-four Australians were recruited and trained to take a leadership role on climate change and to educate their social networks and communities about the urgency and solvability of the climate crisis. In September 2007, an additional 170 Australians were trained⁴⁷. The training consisted of a three-day course to help trainees to understand climate change' and the rationale and background behind the slide show; educate them on the content and slides; equip them with presentation skills; provide logistical information; and build a learning community through networking at the training sessions.

⁴⁶ On September 14th 2011, The Climate Project (TCP) was renamed The Climate Reality Project.

⁴⁷ Since 2007, TCP has continued to expand. With nine official branches and a reach in more than 50 countries, TCP supports over 3,000 volunteers. By 2011, 242 individuals across Australia and New Zealand have been trained (TCP 2011).

3.3.1.2 Aims and strategies of TCP

We as communities are the problem but also the solution. Education and change by the community is what the Climate Project is all about. (A TCP educator)

TCP is a community-based education program that seeks to change the level of public engagement on climate change worldwide⁴⁸. More importantly, the ultimate aim is to move audiences to action in their personal lives, in their organisations and communities, and at the national level. TCP aims to increase participants' understanding of climate change, encourage action and facilitate their contribution to the wider public debate on the topic. The program uses a slide show presentation at community events to educate individuals and communities about the reality of climate change and to work towards solutions at the grassroots level. As a TCP educator aptly summed up: 'We have to begin a community dialogue on climate change'. In this context, communities include communities of place (defined by geographic location or where people live), of identity (tied through social characteristics that transcend place) and of interest (community of practice) such as local environmental groups, Rotary clubs, religious groups, community centres, workplaces and educational institutions.

TCP uses selected community members to engage with their peers, networks and communities on climate change. The program seeks to use these key individuals as entry points to communities across Australia to build widespread change. TCP educators⁴⁹ were selected based on their geographic location, social background, professions and networks. Broad diversity among educators was a strategy to reach as many communities as possible across Australia. TCP relied on a self-selection model to identify and recruit community leaders. A call for volunteers was placed on TCP's website and interested individuals filled out an application form that asked them to rate their experience in public-speaking, and their existing expertise in environmental and climate change issues. Additionally, in order to ensure that the slideshow's message would cut across social groups, applicants were asked to name five venues in which they would likely organise a TCP event and to identify types of audiences they would target. The assumption was that TCP educators would know their audiences and thus advertise and tailor their events accordingly. Educators agreed to deliver at least 10 presentations over a 12 month period.

⁴⁸ The Climate Project is a global program. In this research, I investigated TCP Australia but for ease of reading, I refer to TCP Australia as TCP in the rest of this thesis.

⁴⁹ TCP refers to these individuals as 'ambassadors' or 'presenters'. In this study, I refer to them as 'educators'.

TCP educators were expected to organise their own events (which required them to either identify an audience they could access or to advertise the event to attract an audience) although at times, they responded to guest speaking opportunities requested from the TCP website (as TCP presentations can be requested by any size group or organisation). In these instances, TCP staff dealt with the requests for speaking venues and contacted TCP educators directly based on geographical location, background and availability. In all cases (wherever the event was part of an existing program, created by them or requested), educators were expected to do their own marketing or advertising of events. The majority of educators used the flyers (based on the poster of *An Inconvenient Truth*) made available to them by TCP. Yet, it is important to note that marketing or advertising was not part of the training session to help educators advertise and organise their events and find audiences.

The rationale behind the TCP approach is that:

- Different communities need different educators - While some audiences might appreciate messages coming from Al Gore, he is not the most appropriate communicator for every audience. Indeed, the climate change communication literature suggests (e.g. Moser & Dilling 2007; Nisbet 2009) that many audiences prefer to hear, and are more receptive to, messages from 'People Like Us' or 'PLUs' (Agyeman in Chess & Johnson 2007, p. 230). The literature also suggests that interpersonal communication, that is face-to-face approaches, are more effective to engage individuals and groups on climate change than media channels.
- Climate change needs to become a topic of wider community discussion in order to build a grassroots groundswell of opinion and action. It is expected that the trained TCP educators can play a significant role in initiating and facilitating such discussion in their respective communities and encourage individual and community-level change.

After TCP educators went through the training program, they returned to their communities, workplaces and social groups to engage as many others as possible on climate change and its solutions. This approach is based on a 'peer-to-peer model' or 'everyday people speak to their own sector' (TCP 2007). For example, farmers are expected to talk to farmers, business leaders to fellow colleagues, and teachers to other teachers and to students. Such an approach is based on a social perspective of learning and change and therefore was of particular interest for my research.

3.3.1.3 Procedure for using TCP as a case study

I contacted ACF with a written proposal to TCP, outlining my proposed research study. The manager of TCP was interested and, after a period of negotiation, I was given permission to use TCP as case study for my research. I signed a deed of confidentiality with ACF prior to starting my research to protect ACF's confidential information and work product. It was also agreed that I would conduct my research independently and collect and handle data in accordance with the ethical research policies of Griffith University. The research methodology and design were scrutinised and approved by Griffith University Human Research Ethics Committee before participants were recruited and data collected.

In relation to data access, I alone had access to the raw quantitative and qualitative data collected. All the information (including recordings and transcripts from interviews, field notes and questionnaire responses) was stripped of a direct link to participants' identities as each participant was given a code key stored separately from the data itself. Griffith University's policy is that all research data must be held for a minimum period of five years from the date of publication. Therefore, the data is stored in a locked drawer in my office at home. This thesis and any subsequent publications will respect the confidentiality of research participants.

3.3.2 Research participants within the case

In this study, I was interested in exploring learning outcomes and processes as a result of TCP from the participants' perspective. In order to do so, I recruited two specific groups: a sample of TCP educators and a sample of their targeted audiences.

3.3.2.1 Recruiting TCP educators

To conduct this research, I wanted to select a group of TCP educators so I could attend a number of their educational initiatives and engage with TCP attendees. I also hoped that such relationships would allow me to gain vital insights into their experiences as climate change educators and the challenges they faced.

In deciding on the methods and sample that I should employ to conduct this study and meet my objectives, I had to take into account a number of practical considerations. These included time, and financial and geographical considerations. I decided to limit my sampling to the state of Queensland, Australia, where I lived during the collection stage of the research. After gaining ethical clearance from Griffith University regarding the conduct of the study, I made initial contact with the ACF employee who worked closely with Queensland TCP educators. This

person acted as a gatekeeper for my research as she provided me with an introduction and means of gaining access to the individuals I wanted as participants in the study. She granted me access to the generic profiles of the TCP educators in the state of Queensland (none of these individuals were known to me prior to the study). Throughout the study, she also invited me to take part in several TCP events as an observer.

The profiles stated the geographical location, the employment sectors and the expected targeted audiences of each educator. Based on this generic list, I purposefully selected twelve potential participating educators from different occupational sectors (e.g. farming, education, health and business), different genders and different geographical locations (urban, rural and coastal Queensland) both to represent a diverse sample and to mirror the TCP approach based on a 'peer-to-peer model' (TCP 2007). I also hoped that such a varied group would give me access to different audiences as my goal was to survey and interview a range of participants to generate a diversity of climate change outlooks and educational experiences.

The educators selected were first contacted by the ACF on my behalf as their personal contact information was not released to me. These individuals were invited to contact me directly if they had any queries or were interested in participating in the study. They were sent an invitation to participate (see Appendix 1) as well as a consent package including an information sheet providing further details on the purpose and conduct of the research and participants' potential roles and a consent form (see Appendix 2). The educators' primary involvement included keeping me informed of their events calendar (i.e. date of events, location and audience) and helping me gain access to these and conduct research when appropriate.

All educators contacted agreed to participate in the research and sign the consent form. However, throughout the study, some were no longer able to participate or logistical issues made it too difficult for us to work together. Thus, of the original twelve educators recruited, ten participated in my research. When I first developed the study, I planned to attend two TCP events with each educator. However, for various reasons, this did not work out as planned; instead I attended one TCP event with three educators and two TCP events with the other seven educators.

3.3.2.2 Recruiting TCP attendees

As part of this study, I attended 17 TCP events between April and November 2008 in various parts of Queensland. Events were held in different settings, such as workplaces, association meetings (e.g. Rotary Clubs, Landcare groups), neighbourhood meetings, community centres,

universities and churches. In some instances, the TCP presentation was included as the regular monthly meeting and participants were those who attended regularly. In other instances, participants found out about the event through friends, colleagues or announcements (e.g. via email lists, newspapers, flyers, posters etc...) by the TCP educator and/or the person or organisation who requested and organised the event⁵⁰. From 4 to 85 people attended each of the 17 events, for a total of around 380 participants.

Random sampling was used to select TCP attendees. As I attended each TCP event, I distributed a pre-questionnaire and a post-questionnaire to all attendees. At each event, I negotiated with the TCP educator and the organiser to be granted two to three minutes before the event to briefly introduce myself and the nature of the study and invite all TCP attendees to participate by completing the two questionnaires (pre-TCP and post-TCP). In accordance with Griffith University's Ethical Committee, each questionnaire had a cover sheet for participants to keep. The cover sheet outlined the nature of the research, their role in it as volunteers, provisions for confidentiality, risks and benefits and their option of withdrawal from the study at any time (see Appendix 3). The return of the completed questionnaires was accepted as an expression of consent. Participation was entirely voluntary. I collected all questionnaires at the end of each TCP event (blank, incomplete and completed questionnaires). In total, 187 attendees returned completed pre- and post-questionnaires (see section 3.4.1 for further details).

Participants were asked to write their contact details on the post-questionnaire if they were willing to participate further. Contacts were re-established by email or mail with all participants who gave their details (149 of 187). Of these 149, arrangements were made with 75 individuals for semi-structured interviews two to three weeks after the TCP event. Of these 75, nine were interviewed a second time approximately six to eight months after the first interviews (see section 3.4.2.2 for further details).

3.4 Data collection methods

At various stages in this study, different data collection methods were used to provide empirical evidence of learning and change from the perspective of the learners. Data was collected using integrated methods at four different points: 1) before a TCP event, 2) immediately after the

⁵⁰ Observations showed no marked difference between events that were a part of an existing program (e.g. monthly meeting at a Rotary club) and those created by educators (e.g. scheduled presentation at a university) in terms of who attended.

event, 3) two to three weeks after the event and 4) six to eight months after the event for a limited number of participants. This section identifies the data collection methods used in this study: a pre-questionnaire and a post-questionnaire (referred to below as Q1 and Q2, respectively), semi-structured interviews and participant observations. Each method is presented in a separate sub-section.

3.4.1 Pre/post-questionnaires (Q1 and Q2)

3.4.1.1 Design of the questionnaires

To investigate how TCP events affected participants' learning and their engagement on climate change, this study used a pre/post-questionnaire approach, as in similar research in the field of climate change communication (e.g. Lowe et al. 2006; Leiserowitz 2004; O'Neill 2008). The pre/post-questionnaire method is also widely used in environmental education (see Jacobson et al. 2006; Monroe et al. 2009; Rickinson 2001) to investigate programs' outcomes. For example, Rickinson (2001) in his extensive review of learning in environmental education found that quasi-experimental pre-test/post-test design using questionnaires was commonly used to investigate learning outcomes or shifts in prescribed nodes of evidence (e.g. knowledge, attitudes or behaviour). For the design of the two questionnaires in this study, reference was made to the relevant literature including models from previous studies of the structure and wording of public opinion questionnaires on climate change (e.g. Leiserowitz 2007; Downing & Ballantyne 2007). Particular reference was made to a similar pre/post-test study by Lowe et al. (2006) investigating impacts of the film *The Day After Tomorrow* on viewers' climate change outlooks.

The pre-questionnaire (Q1) consisted of eight items to assess aspects of respondents' cognitive (self-rated understanding and perceptions), affective (level of interest and worry⁵¹) and behavioural engagement on climate change as well as their motivation for attending a TCP event. The questions employed several formats, including different Likert-scale items and multiple-choice questions (see Appendix 4).

- *Motives for attending a TCP event.* This was captured with a multiple-choice question and an open-ended question requested the respondents to write down additional motives.

⁵¹ In this research, I use the term 'worry'. As Leiserowitz (2004, p. 37) states, in his study of the impacts of the film *The Day After tomorrow*, 'while 'concern' and 'worry' are often used synonymously ... 'worry' is a more active emotional state [as one may have a general concern for an issue without actively worrying about it], and as such is arguably a stronger predictor of action and behavior'.

- *Certainty of belief about the reality of climate change.* This was captured in the Q1 with the question ‘How convinced are you that the global climate is changing?’ Responses were recorded on a five-point Likert scale where 1 = ‘completely convinced’, 3 = ‘unsure’ and 5 = ‘not convinced at all’.
- *Level of worry about climate change.* Participants stated their level of worry about climate change on a five-point Likert scale where 1 = ‘a great deal’ to 5 = ‘not at all’.
- *Agreement with general statements on climate change.* Participants were asked to rate their agreement with six statements on a scale of 1 = strongly disagree, 3 = unsure to 5 = strongly agree about how they thought about climate change, the scientific consensus and what some of its potential impacts might be.
- *Self-assessed knowledge.* Self-rated understanding of the causes and impacts of climate change was measured by asking ‘How would you rate your understanding of the following?’ on a four-point Likert scale where 1 = ‘poor’ and 4 = ‘excellent’.
- *Personal action.* A measure of perceived self-efficacy was captured with the question ‘Do you feel you can personally take actions to help limit climate change?’ Responses were measured on the multiple-choice format yes/no/unsure and a request for examples of actions participants were taking to tackle climate change.
- *Demographic questions.* These questions asked for responses on occupation, gender, age and contact details if respondents were willing to be contacted and participate further in this study.

The post-questionnaire (Q2) contained ten questions (two of which were the same as those in the pre-questionnaire) as follows (See Appendix 5):

- *Rating features of the TCP event.* Respondents were also asked in the Q2 to rate various features of the TCP event: visual aids, scientific content, solution-content, performance of the TCP educator and overall relevance of what was presented and/or discussed at the event. Responses were measured on a five-point Likert scale where 1 = ‘poor’, 2 = ‘fair’, 3 = ‘good’, 4 = ‘excellent’ and 5 = ‘no opinion’.
- *Certainty of belief about the reality of climate change.* Q2 included self-reports from participants on whether they felt that the TCP event affected their belief in the reality of climate change. This was measured on a five-point Likert scale where 1 = ‘less convinced’, 3 = ‘no change/unsure’ and 5 = ‘more convinced’.
- *Level of worry.* Self-reports of level of worry after a TCP event measured in a five-point Likert scale where 1 = ‘less worried’, 3 = ‘no change/unsure’ and 5 = ‘more worried’.
- *Understanding of climate change causes and impacts.* Q2 included self-reports from participants on whether they felt that the TCP event affected their understanding of the

causes and impacts of climate change. This was measured on a six-point Likert scale where 1 = 'yes, a great deal' and 6 = 'no, not at all' by asking the following questions⁵²: 'Do you feel that this event has helped you understand the causes of climate change better?' and 'Do you feel that this presentation has helped you understand the impacts of climate change better?'

- Agreement with general statements on climate change. Q2 also repeated the statements on climate change captured by asking 'How strongly do you agree with the following statements?' This was done to identify changes in responses between Q1 and Q2.
- Behavioural intentions. Additionally, Q2 contained questions relating to behavioural intention as result of attending a TCP event measured in a multiple-choice question.
- Perceived learning. Finally, Q2 contained two open-ended questions in which respondents were encouraged to write down what message they had taken away from the TCP event and any additional comments. Respondents were then asked to write their contact details if they were willing to take part in the next stage of this research.

3.4.1.2 Administering the questionnaires

I administered the questionnaires at 17 TCP events. At each event, all attendees were given both pre- and post- questionnaires with a pen. They were asked to complete and hand in the two questionnaires, one before the TCP event started and the other immediately after the event. Participation⁵³ in this research was entirely voluntary. Most respondents took about five minutes to fill in the pre-questionnaire (Q1) which was then collected (all questionnaires were collected whether filled or blank). The post-questionnaire (Q2) was retained by the respondent and was completed at the end of the event or mailed back to the researcher shortly after (a pre-paid envelope was provided in these instances). Due to time constraints at all TCP events, and because I wanted participants to complete all questions without being too rushed or omitting some, the questionnaires had to be short and easy to complete.

As stated in Section 3.3.2.2, a total of around 380 participants attended the 17 TCP events included in this study. All participants were invited to complete both Q1 and Q2. Out of the 380 questionnaires (Q1 and Q2 respectively) handed out, Q1 was returned by 187 TCP attendees and Q2 by 194 TCP attendees. The data provided by participants who did not fill in Q1 or return Q2 was omitted from the analysis, leaving a total of 187 completed pre- and post-questionnaires for analysis and a usable response rate of 96.4%.

⁵² Although it is widely assumed that self-reported statements can be somewhat less reliable measures of true changes (see Dierking et al. 2007), in this study, self-reports were considered as important indicators for assessing learners' own perceptions of learning and change. The same applies to understanding. This study did not aim to assess learners' actual understanding (or misconceptions) about climate change but to gain insights into their interest on the topic and their perceived understanding and information needs.

⁵³ TCP attendees were not offered incentives (financial or other) to complete the questionnaires.

3.4.2 Semi-structured interviews

Semi-structured interviews are of great value in the pursuit of understanding people's motives and interpretations and in gaining insight into their worldviews. (Flick 2002, p. 4)

At the root of semi-structured interviews is an interest in understanding the experience of other people and the meaning they make of that experience (Merriam 2009). That was precisely the intention of the semi-structured interviews employed in this study: to better understand learning experiences and outcomes from participants' perspective (see questions in the interview guide Appendix 4) Participants were asked whether and how they felt their ways of thinking, feeling and acting on climate change had changed as a result of attending a TCP event. This was supported by some elaborative and probing questions to identify why and how these changes were achieved, in the context of the TCP model of learning.

Semi-structured interviews helped to interpret and build on the findings from the questionnaires in order to expand the scope of the study and identify a range of learning experiences and outcomes within the sample. Because of their open-ended nature, semi-structured interviews provided a way of generating 'thick and rich data' (Merriam 2009, p. 241) about participant's thoughts, feelings and actions on climate change and learning. This method is linked to the expectation that the interviewee's viewpoints are more likely to be expressed in a relatively open interview than in a questionnaire or tightly structured interview (Flick 1998). Semi-structured interviews also offer an in-depth and contextualised account of people's beliefs as expressed in their own language (Whitmarsh 2005).

3.4.2.1 Design of interview guide

This qualitative approach provides more in-depth insights into respondents' views of climate change and their experiences at a TCP event. A semi-structured form of questioning was chosen because it provided flexibility in the design, structure and condition of each interview (Blair 2008). In semi-structured interviews, the questions act as a guide to support the narrative string developed by the interviewee and act as a basis for avoiding stagnating or unproductive conversation. An interview guide, including a list of guiding questions and prompts, was therefore designed for conducting the interviews and ensuring that all aspects and topics relevant to the research questions were covered during the interview. Each question was designed to be relatively open ended and to access, in multiple ways, the respondents' insights on climate change and their thoughts and feelings about the TCP event and their perceptions of what they might have learnt and how. The same interview guide was used in all the interviews to help ensure continuity between the participants and reliability of data across all interviews.

However, the guide was intended to be flexible and exploratory rather than rigid, allowing me to clarify interviewees' responses, probe for details, pursue interesting arguments and tailor each interview to the interviewee (Kumar 1996). The order of question depended upon the flow of the conversation.

For the first interviews, the initial questions were general and asked interviewees for their retrospective views of their prior interest on climate change, their motivations for attending a TCP event and expectations of the event. Questions were then introduced to more specifically elicit insights on their experiences at the event. These questions were aimed to investigate learning experiences and outcomes from the perspectives of the learners. These were followed by questions about whether and how they felt that their understanding, feelings and behaviours towards climate change might have changed as a result of attending a TCP event. Some elaborative and probing questions then asked how participants felt that their engagement on climate change might have changed (or why they felt it had not) and what might have facilitated or hindered such changes in the context of the TCP program. This is in line with the exploratory and explanatory nature of this case study research, which explores not only the 'what' but also the 'how' and 'why' of learning and change? The purpose of the follow-up interviews was to elicit data to enhance understandings of the long-term impact of a TCP event on participants. I reminded the participant of the event, and prompted recollections by using excerpts from the first interview summary. My interest was in find out whether there were changes, if any, to these earlier responses and why. A short review of the two interview guides is presented in Box 1 below.

Box 1 Summary of the interview questions

Summary of the first interview questions

- Why did you attend a TCP event? What motivated you?
- What did you expect?
- Do you feel that your thinking/understanding about climate change has changed at all as a result of attending a TCP event? In what way and can you explain how and why?
- Do you feel that the way you felt about climate change has changed at all as a result of attending a TCP event? In what way and can you explain how and why?
- Do you feel that the way you acted (or did not act) on climate change has changed at all as a result of attending a TCP event? In what way and can you explain how and why?

Summary of the second interview questions

- Has anything changed since our last interview in terms of the way you thought, felt and acted on climate change?
- What (information or experience) or who might have helped you changed?
- What would help you learn more about or help you decided what to do about climate change?
- Do you see more people around you talking and/or acting on climate change?
- Have you spoken to more people about the issue?
- How do you see change happening in the next couple of years?
- How do you see your role in the change process?
- What do you feel you need at this stage (from educational efforts) to play this role? What do you feel you need now in relation to climate change?
- What else would you like to see in the public debate on climate change?

The first semi-structured interviews revealed detailed information about if, what and how learning occurred at TCP events based on participants' perceptions of what and how they had learnt and what components of the program had most affected their levels of cognitive, affective and behavioural engagement with climate change. Participants' responses provided data on the strengths and limitations of the program as well as suggestions for improvement.

3.4.2.2 Piloting and carrying out the interviews

Creswell (1998) recommends that researchers conduct pilot interviews before the study begins in order to refine and test their research questions (e.g. style and wording) and to practice their interviewing skills. In this research, short pilot interviews were conducted with several colleagues to ensure that questions were clear in meaning and addressed the areas of interest of this study. These also helped refine the flow and length of the interview script. Several opportunities for clarification were identified and the interview guide was revised accordingly. This process also allowed me to become familiar with the questions and develop a more relaxed approach to interviewing. In this research, it was important to view the interview as a conversation (Denzin & Lincoln 2002) so interviewees could feel comfortable to talk freely and express their opinions, views and feelings on climate change and the presentation without feeling constrained or judged.

The first semi-structured interviews were conducted with a total of 75 individuals two to three weeks after they attended a TCP event. All participants who gave their contact details in the questionnaire ($n = 149$) were contacted by mail or email. Of these 149, 75 were still interested in participating further in this study and available for an interview. All interviews were recorded with the consent of participants. This enabled me to concentrate on conducting interviews without have to take notes and also to make full transcripts for analytical purposes. Overall, interviews ranged in length from 15 to 50 minutes. Face-to-face interviews were scheduled when possible. These interviews were conducted in a variety of places including participants' workplaces, homes and public places such as cafes and libraries. However, due to geographical distance and time limitations, the majority of interviews were conducted over the phone (54 interviews were conducted over the phone and 19 face-to-face).

The second interviews were conducted six to eight months after the first interviews to explore the long-term impacts of TCP. Twelve of the original 75 participants were selected⁵⁴ from the

⁵⁴ The twelve participants were selected based on the three learner groups that emerged from the analysis of the questionnaires and first interviews (see Chapter 4 for a description of the learner typology). 4

three learner groups that emerged from the analysis of the first interviews (Chapter 4 explores this further) and contacted by email. However, only nine were available at that time. The purpose of these follow-up interviews was two-fold: to find out if participants felt that their understanding, thoughts, feelings and actions about climate change had changed at all (including ascertaining whether the shifts in understanding, attitudes, behavioural intentions and actions that might have been indicated in the initial interviews continued over time); and to find out what they felt they needed at that stage to support or increase their engagement on climate change (primarily in terms of education initiatives).

Upon completion, all interviews were transcribed verbatim and supplemented with researcher memos, as recommended by Babbie (2001).

3.4.3 Participant observation

Observation requires the first-hand involvement of the researcher with the social action as it occurs (Merriam 2009). The researcher is present as activities and events occur and therefore he/she is involved in immediate and on-going analysis and interpretation of those events and activities (Pole & Lampard 2002). As Foster (1996, p. vii) states, ‘observation is a matter of collecting information about the nature of the physical and social world as it unfolds before us directly via the senses, rather than indirectly via the accounts of others’.

In this study, participant observation consisted of spending time in the settings being studied e.g. TCP community events and other TCP activities targeted to TCP educators. I attended the 2007 Al Gore training, as did the educators selected in my study to familiarise myself with the project, its objectives, the content, the process, its learning approach, and to gain valuable insights into the educators’ experiences. For example, the slide show provided to educators contained about 500 slides. TCP educators were encouraged to customise their slide show. Therefore, I wanted to familiarise myself with the whole set of slides to gauge how and to what level educators did customise their visual presentation at the TCP events I attended as observer. According to Merriam (2009), a researcher can assume several stances while collecting information as an observer, from being a full participant to being a spectator. Following Gold’s

participants were identified in each group based on geographical location, gender, background (range of characteristics to ensure diversity); and also on their responses from the first interviews. I was particularly interested to see if participants who intended to change specific behaviour change or take specific action as a result of attending a TCP event followed through; or the opposite, that is, if participants who reported no change as a result of a TCP event had stayed the same or changed. These were the key criteria for the selection of the twelve participants.

(1958, p. 85) typology⁵⁵, in this research, I acted as ‘observer as participant’ meaning that my participation was secondary to my role as an observer. As such, I observed and interacted ‘closely enough with members to establish an insider’s identity without participating in the activities constituting the core of group membership’⁵⁶ (Adler & Adler 1998, p. 85). Being present at two TCP trainings (2007 and 2008), other TCP events and various activities also allowed me to interact with TCP educators and, through informal conversations, to gain some understanding of their experiences. Participant observations and informal comments collected from educators are discussed in relevant sections of Chapter 5.

Wolcott (1995) sees the identification of a focus as a central aspect of the observation process. This focus or interest drives a study initially and identifies the general area for observation (Delamanont 1992). In my research, the central aspects of the observation process were: the setting of the educational event, the content of each event (e.g. both in terms of what was presented and discussed), what was said by educators and comments from participants, the social environment or learning setting, and what happened or did not happen. As suggested by Merriam (2009), throughout the study, I kept ‘field’ notes containing detailed records of what occurred. These included a descriptive component (date, physical and social environments), the activities that occurred (or not), the people who participated and their behaviours, the substance of what people said, and what I did as a researcher. The observation notes also included a reflective component including my feelings, reactions, hunches, reflections on the research, possibilities for data analysis and elements to watch out for, as well as an initial interpretation of what was observed and speculation of what it meant. Through this process, I started to engage in some preliminary data analysis as suggested by Merriam (2009).

3.5 Data analysis and interpretation

This section explains the process adopted to guide and implement the management, organisation and analysis of the data collected during this study. The data set consisted of transcribed semi-structured interviews, field notes and quantitative data from questionnaires.

⁵⁵ Gold (1958)’s typology of researcher roles suggests four possible roles: the complete participant, the participant-as-observer, the observer-as-participant and the complete observer.

⁵⁶ In the context of TCP, the activities constituting the core of group membership included: the AI Gore trainings (2007 and 2008), regional meetings of TCP educators led by TCP staff, and access to the TCP internet website for TCP educators as a guest.

3.5.1 Analysis of quantitative data

Quantitative data was analysed using both Microsoft Excel and the Wilcoxon matched-pairs signed rank test in SPSS. The results were analysed using means, standard deviations and percentages to describe the central tendencies and variance of the data.

- Microsoft Excel was used to generate descriptive statistics (mean scores, standard deviation and percentages) for measures that did not compare changes in the pre/post questionnaires. These included socio-demographic information, responses to multiple-choice questions (e.g. motivation for attending a TCP event and behavioural intentions as a result of attending) and self-reported effects of a TCP event on level of belief in the reality of climate change, level of worry and understanding of causes and impacts.
- For similar questions posed in both the pre- and the post-questionnaires, the impact of TCP was analysed using Wilcoxon matched-pairs signed-rank test⁵⁷. The Wilcoxon test is a nonparametric test that compares two paired groups (in this study the same participants 'before' and 'after' a TCP event). The test calculates for each individual the difference between their 'before' and 'after' measurements (Crichton 2000). All potential changes between pre- and post-test questionnaires were tested for statistical significance. The Wilcoxon test is the non-parametric equivalent of the paired t-test. It is used when the distribution of differences between pairs may not follow a normal distribution (Crichton 2000).

Open ended responses in the post-questionnaire were analysed using the qualitative software program Nvivo7 along with the qualitative data from interviews and observations.

3.5.2 Analysis of qualitative data

I personally transcribed all interviews verbatim from the digital recorder into Word documents. This helped me familiarise myself with the data and encouraged preliminary thinking around emergent themes. It also allowed me to re-engage with the data at different stages during the analysis process.

⁵⁷ Like the *t-test*, the Wilcoxon test is based on paired data sets (i.e. data 'before' and 'after' collected from the same individuals). The parametric *t-test* assumes data follow a normal distribution while this assumption is avoided in the nonparametric Wilcoxon test because the test is based on the rank order of the differences (Crichton 2000). In this study, the data generated from the pre- and post- questionnaires was measured on an assessment scale (e.g. Likert scale from 1 to 5) and so it was ordinal level data (see O'Neill 2008). Thus, a non-parametric matched-pair test, the Wilcoxon matched-pairs signed rank test, was used.

Semi-structured interviews generated a huge volume of data. A process of coding and categorising the transcripts, identifying emerging patterns and relationships while still remaining in touch with the details within each transcript, was developed overtime. NVivo7, a qualitative data analysis software package, was used to manage and explore interview transcripts (both first and second interviews), observational notes and open-ended responses in the post-questionnaire. As Gaskell (2000) asserts, the software does not offer any analytical aid in the sense that the researcher remains the primary interpreter of the data but it does help to organise and analyse large and complex data sets. It also allows for easy access to the data throughout the analysis. Codes were assigned to quotations made up of statements, sentences or sections of text as was deemed appropriate (e.g. while maintaining the context of the quotation). I used a parallel process of writing dated memos in Nvivo 7 to record my ideas, thoughts, reflections, questions, decisions and links with the literature while engaging with the analysis and interpretation of the data. Merriam (2009 p. 222) refers to such process as an ‘audit trail’⁵⁸ or a strategy used to ensure consistency and reliability throughout the conduct of the study.

Coding categories were identified and refined through an interaction between concepts and themes emerging from the qualitative data and from theoretical perspectives derived from the literature on climate change and risk communication, social diffusion and environmental education in community contexts (as outlined in Chapter 2). In this research, building understanding and meaning from the data included both inductive and deductive⁵⁹ coding processes. Inductive analysis involves ‘working up’ from the data, that is, building new understanding from the rich descriptions in the data, discovering patterns and shaping codes from the data itself. Deductive analysis involves ‘working down’ from the theory. In this case, the categories used for qualitative data analysis are derived from theory before starting to code, rather than from the data itself.

The coding process in this study was an extremely time-consuming and iterative exercise. It involved reading and re-reading interview transcripts, and adding and revising codes until a saturation point was reached and no new codes were generated. A list of categories and subcategories with key words was finally designed and these categories formed the basis of the results and analysis presented in Chapter 4.

⁵⁸ The audit trail offers a clear description of the research path including the research design and the steps taken to collect, manage, analyse and report data (Lincoln & Guba 1985).

⁵⁹ As Patton (2002, p. 453) notes, ‘inductive analysis involves discovering patterns, themes, and categories in one’s data, in contrast to deductive analysis where the data are analysed according to an existing framework’.

A reliability procedure was set up to maintain transparency in the coding and categorisation process. This is explained in more detail in Box 2. This process of peer review helped to verify my coding and categorisation, highlighting areas where assumptions had been incorporated unintentionally. This type of exercise is often advocated by researchers (see Creswell 2003; Richard 2009).

Box 2 Peer review as a measure of the reliability of data coding and categorisation

1. To establish greater reliability in the qualitative analysis and coding processes, two transcripts were selected arbitrarily from the initial set of 75 interviews and given to an independent researcher. The researcher was also presented with a briefing of the study including the main research objectives, research questions, key theoretical concepts and an outline of my methodological approach. It was important to set the scene for the reviewer so that she was able to independently code the two transcripts.
2. We independently input the transcripts in NVivo7 and coded them according to both theoretical concepts and themes emerging from the data.
3. We went through the transcripts together and compared the sets of codes we developed independently from our analyses of the two transcripts and how we coded each transcript section.
4. Where codes differed, we discussed the differences in our interpretation of the theoretical concepts and the themes emerging from the data and identified whether the problem arose because of miscoding or because the codes did not adequately capture the themes emerging from the data.
5. This discussion led me to re-assess and adjust some codes and think about my interpretation of the data more carefully.

Following this process, 13 more interviews (first interviews) were coded to generate a code structure until saturation was reached. The remaining 60 interview transcripts were then coded accordingly with some codes being revisited and revised. Such a process allowed for further exploration, questioning and refinement of codes and their relationships to make sure the final codes were relevant and consistent. These additional transcripts also provided additional empirical data (i.e. participants' quotes) to select from when presenting the results.

3.6 Conclusion

This chapter has provided an overview of the methodology that informed the study design, the multi-methods approach within the single case study on which the research was based as well as the conduct of the study. Chapter 4 presents a more detailed discussion of the data analysis followed by an integrated view of the results anchored in a typology of learners.

Chapter 4 - Results and analysis

4.1 Introduction

This chapter presents the research results of the case study. It begins by explaining the analytical approach taken and continues with combined quantitative and qualitative results⁶⁰ organised under three learner groups that emerged during this study, labelled the ‘Already converted’, the ‘Early aware’ and the ‘Doubtful’. The origin of this learner typology cannot be credited to a particular research question or objective when I first started this study. However, while analysing the data, it became apparent that grouping participants might be a useful way to enable a more in-depth and accurate understanding of differences in learning experiences and outcomes reported by participants. The three learner groups identified are described starting with the largest group, the ‘Already converted’. Three individual cases are also presented in detail, each exemplifying a learner group. The chapter concludes with a brief synthesis that compares the three groups and determines any differential learning experiences and outcomes among them.

4.2 Data analysis: the development of a typology of learners

4.2.1 Defining groups of learners

This section explains the development in this study of a typology of learners. I first analysed and coded the qualitative data as a whole set ($n = 75$). During this analysis, it became clear, however, that there were significant similarities and differences among participants, both before and after a TCP event. I wondered if it might be possible to group the participants to enable a more accurate understanding of reported learning experiences and changes (or lack of changes). To test this hypothesis, I took the existing analysed data set and engaged in a second process of analysis which resulted the development of a learner typology with three sub-groups: the ‘Already converted’, ‘Early aware’ and ‘Doubtful’.

I started thinking about the people who attend TCP events. Who were these individuals? What could be said about their characteristics? Was there any grouping among them that might

⁶⁰ The typology was based on the 75 individuals who were both surveyed and interviewed. Full results for the questionnaire data (including detailed statistics and quotes) for the whole participant sample ($n = 187$) can be found in Appendix 6 as it offers a useful background to the learner typology.

indicate what they understood and thought about climate change, what they felt about the issue, what they did to address it, what motivated them to engage on the issue and why they attended a TCP event? Apparent trends in the whole data set indicated a possible grouping of learners based on their pre-existing levels of engagement on climate change (understanding, affect and behaviour⁶¹) as well as their interest, motivation⁶² and learning goals they brought to the educational activity. Results also indicated that the program affected different participants in different ways. Thus, it became clear that grouping participants would be useful to show how learning outcomes were affected by the pre-existing characteristics of participating learners. It was also judged useful to explore the variability in learning outcomes and experiences among learners and thus to gain a better understanding, in relation to the TCP program, of ‘what’ was learnt, ‘what’ was not learnt, and ‘how’ and ‘why’.

As a result, I started grouping together individuals who seemed to share similar characteristics, that is, similar interests, and similar cognitive, affective and behavioural levels of engagement on climate change before a TCP event. The development of a typology of learners was both a deductive and inductive process emerging from my reflections on the data as well as on the literature. For example, I reflected on Rogers’ (2003) adopter categories and ‘segmentation’ studies (see Chapter 2) in the climate communication literature and I became curious to see if and how my participants could fit into some of those categories. The labels for the typology came from the qualitative data (first semi-structured interviews). For example, one participant stated *‘I am already converted’*, leading to the creation of a group labelled the ‘Already converted’. Similarly the ‘Doubtful’ group was created after a participant said *‘I still doubt that it is human-induced’* and the ‘Early Aware’ group was created after a participant felt *‘more aware’* as a result of attending a TCP event.

The predominant measure of positioning participants in three learner groups was my interpretation of a respondent’s levels of engagement (cognitive, affective and behavioural) on climate change and his/her interests, needs and motives for attending a TCP (for further details of each dimension and main sub-indicators see Table 1 below). I used these indicators based on the literature (Chapter 2) to distinguish one participant from another. I also added motivations for attending a TCP event. Engagement by participants was classified as ‘high’, ‘moderate’ or ‘low’ based on their responses within each key indicator. For example, a participant who was involved in multiple actions including public sphere action (e.g. talking to others and/or making

⁶¹ As noted in Chapter 2, the three dimensions of engagement (knowledge/understanding, affect and behaviour) were used as nodes of evidence to capture changes or, in other words, measures of cognitive, affective and behavioural learning outcomes.

⁶² Expected outcomes were interpreted as motivation for participation at a TCP event.

their voice heard to officials) was placed in a higher behavioural engagement than those who specifically stated that they only recycled and turned off lights.

Table 1 Three dimensions of engagement and motivation for participation

Cognitive engagement indicators	Affective engagement indicators	Behavioural engagement indicators	Motivation for attending a TCP event and expectations
<ul style="list-style-type: none"> • Awareness of climate change • Belief about the reality of climate change and causes (human activities/natural processes) • Understanding of climate change (causes, impacts and solutions) • Perception of whether scientists agree about the reality, seriousness and causes of climate change 	<ul style="list-style-type: none"> • Level of interest • Level of personal and general worry • Perception of risks or belief that the effects of climate change are already manifested (linked to perceived personal threat, threat for future generation) • Range of emotional responses to climate change, e.g. fear, optimism 	<ul style="list-style-type: none"> • Private sphere behaviours⁶³, e.g. domestic energy conservation, walking/cycling, using public transport, reducing and recycling waste, food choices, consumer behaviours (green consumerism) • Public sphere, e.g. voting, petitioning, committed activism, joining an NGO, participating in community groups or organisations, collective action • Motivational drivers for behavioural engagement 	<ul style="list-style-type: none"> • Reasons for participating in a TCP event: <ul style="list-style-type: none"> - Cognitive interests - Affective interests - Personal motives - Social motives • Expected outcomes and expectations in relation to TCP

Constant reference to the first interview transcript of each participant and taking notes on key commonalities and differences while transcribing made the process of positioning participants more reliable and accountable. The typology-generating process was guided by my thorough knowledge of the whole data set as well as the details of each interview. Thinking about the interviews in relation to each other aided comparison and identification of similarities and differences between participants. Later in the process, the distribution of the pre-questionnaire (Q1) and the qualitative groups of learners were linked and compared to develop an integrated typology including both qualitative and quantitative data.

After this first typology was developed, based on the data before a TCP event, (both from Q1 and first semi-structure interviews) I added interview responses related to the TCP event and post-questionnaire (Q2) data so the typology included evidence about the characteristics of learners in relation to their learning experiences and reported learning outcomes as a result of attending a TCP event. Reflective accounts in participants' interviews also added a more in-

⁶³ This list is based on Stern (2000) (as discussed in Chapter 2) who distinguishes four types of environmentally significant individual behaviours: 1) environmental activism, 2) non-activist behaviours in the public sphere, 3) private sphere behaviours and 4) others (e.g. influencing organisations to which they belong).

depth understanding about what facilitated or hindered their learning. In light of these new dimensions, the positioning was reviewed and altered until a suitable typology was reached⁶⁴.

I acknowledge that participants did not fit neatly into groups. Typologies are not perfect and lack hard boundaries. As Houle ⁶⁵(1961, p. 16) points out, referring to his typology of adult learners, ‘these are not pure types’. In this study, a typology approach was, however, judged important and appropriate to make sense of the large volume and complexity of the data. Firstly, it enabled a more accurate understanding of who participated in a TCP event and why they participated. Secondly, it made it possible to examine learning from the perspectives of the learners and to gain a more accurate understanding of the range of different reported learning outcomes and learning experiences. Thirdly, it generated some highly valuable insights on how learning for change can best be facilitated for these different learner groups based on ‘what’ was learnt, ‘what’ was not learnt, and ‘how’ and ‘why’.

4.2.2 Individual profiles

Three complete profiles were put together for three individuals who participated in the whole research process (Q1 and Q2, and first and second semi-structured interviews). One individual represents the ‘Already converted’ group, one the ‘Early aware’ and one the ‘Doubtful’. These profiles aim to exemplify the characteristics of each group in this study and to present a range of levels of engagement on climate change, learning experiences and learning outcomes. The profiles also give an overview of each individual’s input into the research by summarising their contribution at each stage of their participation in this research and how a TCP event might have affected their learning and engagement on climate change. As suggested by Seidman (2006), developing profiles of individual participants is an effective way of presenting and sharing data⁶⁶ in context. A one-page profile (Tables 2, 3 and 4), including a brief commentary, is presented to conclude each separate section dedicated to one learner group.

⁶⁴ Participants were placed into discrete categories as a way of understanding the levels of engagement on climate change among the three learner groups, gauging their learning experiences and outcomes associated with a TCP event and reflecting on what they wanted to learn, what they felt they had learnt at the TCP event and how they had learnt.

⁶⁵ As seen in Chapter 2, Houle (1961) conducted a classic study of adults’ motivation for participating in learning activities. He classified adult learners as being primarily goal-oriented, activity-oriented or learning-oriented learners.

⁶⁶ Seidman (2006) refers to qualitative data from interviews. In this study, the profile is primarily based on qualitative data from the first and second semi-structured interviews but it also contains a section on quantitative data from the pre- and post- questionnaires.

4.3 Integrated results: A typology of learners ($n = 75$)

This typology of learners forms the basis of this section 4.3. Each learner group, the ‘Already converted’, ‘Early aware’ and ‘Doubtful’ (referred below as AC, EA and D), is presented separately. For each group, the quantitative and qualitative data was combined to show learners’ cognitive, affective and behavioural engagement on climate change prior to TCP; their motives for attending a TCP event and expectations; and to what extent and how attending a TCP event facilitated positive cognitive, affective and behavioural learning outcomes. An individual profile is also presented for each learner group at the end of each section. The section concludes with a brief synthesis of the differences and similarities between the learner groups in relation to their learning experiences and outcomes.

In this section, the data has been presented in the context of each indicator (cognitive, affective and behavioural dimensions of engagement and motivation for attending a TCP event). The reader should bear in mind, however, that the data is full of overlaps and connections. Through the analytical process, it became clear that these indicators were in fact interrelated and influenced each other. In addition, while I indicate the frequencies of responses for the quantitative data, numerous quotes⁶⁷ from interviews are provided to better illustrate the findings and give voice to the research participants.

4.3.1 The ‘Already converted’ (60%)

4.3.1.1 Engagement with climate change prior to TCP - ‘Already converted’ group

The ‘Already converted’ (AC) was the largest group representing 60% of the interviewee sample (45 of 75); 53% were female and 47% male with a mean age of 44 years. Overall, this group was the most active and engaged (knowledge, affect and behaviour) on climate change. They were convinced that climate change was happening, was primarily human-caused and believed that it was a serious and urgent problem. They were taking a range of actions to address the issue.

Cognitive engagement - AC

The pre-questionnaire (Q1) results reveal that all AC were either completely (71%) or mostly convinced (29%) that global climate was changing as exemplified by these comments: *I am*

⁶⁷ Interview transcripts were made verbatim and included repetitions, pauses, hesitations and the like to be as true to the conversation as possible (Bazeley 2007). However, in order to present the material clearly, I edited the quotes by eliminated hesitations, repetitions and made grammatical corrections (Wolcott 2009).

sold on climate change and *There is so much evidence now that it is happening full stop*. Likewise, all AC either strongly (91%) or somewhat (9%) agreed that human activities were having significant impacts on the global climate (mean⁶⁸ = 4.91, SD = 0.29; see Figure 3, p. 96).

Most AC felt well informed about the causes and impacts of climate change, with over 90% rating their understanding⁶⁹ of both topics either 'good' or 'excellent' (combined scores of 91% and 93%, respectively). A typical response from this group was: *I think I have a fairly well-developed understanding of climate change and its impact*. The AC kept themselves informed on climate change news and issues⁷⁰ through various media sources including TV, newspapers, internet and magazines. This suggests that the AC who were interested in climate change actively sought information on the topic and therefore subjectively felt informed as shown in these comment: *I actually know quite a bit already because I have done some research on that* and *we've been through a fair bit of educational process already*.

Almost two-thirds (60%) of the AC believed there was a scientific consensus that climate change was occurring, while 38% thought there was still a lot of disagreement among scientists (mean = 2.49, SD = 1.42; see Figure 3, p. 96). Interviews reveal, however, that participant's views of scientific disagreement referred to the large uncertainties that still remained regarding the rate of change, scale and distribution, rather than the reality of climate change. As one AC stated: *There are still a lot of uncertainties with climate change and even the experts don't have all the answers in terms of what is going to happen, where or how fast*.

Overwhelmingly, the AC saw climate change as a serious problem, with 96% agreeing that it required urgent attention (mean = 4.96, SD = 0.2; see Figure 3, p. 96). Among the AC, climate change was accepted as a reality that needed to be addressed through concerted collective efforts both from the grassroots as well as leadership from government as exemplified by this comment: *it is important for us all to play a part and also to band together to provoke political involvement*. AC understood the collective nature of the climate change problem and its solutions. They believed that climate change could be solved through concerted efforts and social action. However, they were unsure about how to make this happen and whether we collectively would do what was required to address the issue.

⁶⁸ Mean refers to mean score and SD to standard deviation.

⁶⁹ I feel it is important to reiterate here (see footnote p. 73) that in this study, self-reports were used as indicators for assessing learners' own perceived understanding of the causes and impacts of climate change. This study did not aim to assess learners' actual knowledge and understanding (or misconceptions) about climate change.

⁷⁰ Although information seeking behaviours should be in the behavioural engagement section, such behaviours serve to explain why participants felt that they were well informed on climate change.

Affective engagement - AC

The AC had a high interest in climate change and believed that it was an important issue both on a social and personal level. Eighty-five per cent of AC said they either worried ‘a great deal’ (49%) or ‘a fair amount’ (36%). However, interviews revealed that, while the reported level of worry was high, most AC did not see climate change as a personal threat during their lifetime, or thought so but were unsure how, as exemplified by this comment: *‘I think it already affects me ... how exactly I am not entirely sure’*. Some worried about what they perceived as slow action and lack of urgency in response to climate change as the following comments illustrate: *‘That is basically my biggest worry about climate change, are we doing anything quickly enough?’* and *‘I am worried about the timeline we are dealing with’*. This suggests that uncertainty about the nature of climate change impacts, as well as our ability to effect change in a meaningful timeframe, induced worry.

Almost all AC either strongly (73%) or somewhat (24%) agreed that the impacts of climate change were already harming people around the world rather than in the distant future (mean = 4.71, SD = 0.51; see Figure 3). Although most believed that Australia was particularly vulnerable to climate change (mean = 4.44, SD = 0.81; see Figure 3, p. 96), they saw climate change as a bigger threat to people in distant locations and future generations. However, AC perceived a sense of urgency about acting on climate change even if they did not identify or feel personally affected yet by local climate impacts. Other AC worried about what they saw as indirect impacts of climate change as illustrated in this comment: *‘I think it will start affecting people more like increase in fuel prices, food prices and things like that. You can start seeing it coming through already, which is damned scary.’*

Behavioural engagement and motivation - AC

The AC demonstrated a strong sense of responsibility and efficacy (93% felt that they could personally take action to help limit climate change). AC reported a wide range of actions in their personal lives, at home, with others (e.g. educating others), as part of their work and/or informally and through some citizenship actions⁷¹ (e.g. petition or writing to politicians). A minority engaged in activism (e.g. demonstration or membership to climate action groups). They perceived climate change as a collective systemic problem and thus one that required broader social changes in addition to individual changes. Such an outlook yielded a sense of

⁷¹ As discussed in Chapter 2, Stern (2000) distinguishes between activism (e.g. active involvement in environmental organisations and demonstrations) and non-activist behaviours in the public sphere (or low commitment active citizenship). This includes writing letters to political officials, joining and contributing funds to organisations and support or acceptance to public policies.

individual leadership to act. AC exerted leadership through their own behaviours (often making them visible to others) and interpersonal communication as shown in these comments:

I try to lead by example ... if enough people take action then it becomes the cool thing or the trend. It becomes the norm rather than being the unusual or special behaviour.

I believe that the true element is leadership, leading by example ... I think it is about setting that example, not being afraid to talk about these things and encourage people.

The majority of AC discussed climate change with family, friends or colleagues. Most enjoyed talking about the topic and providing information to others, although some reported that such conversations could be challenging at times as climate change was still perceived as ‘a controversial topic’ and ‘doom and gloom’. They also did not want to be perceived as ‘preaching’ or ‘forcing it on other people’.

Action on climate change was perceived by AC as urgent and this provided motivation to take personal responsibility and start to act now as exemplified by this comment:

I see a lot of urgency on climate change. If we keep doing what we are doing, I see the impacts of climate change being pretty catastrophic potentially. I think we need to do something and presently we are not doing anything really significant ... so because of that I feel compelled to do what I can do and get involved in some ways.

The AC accepted that individuals played a role in causing climate change and thus they should be involved in action to mitigate it. As one AC stated: ‘Nobody is free of emissions in our society’. Most talked about a strong sense of personal responsibility. Perceptions of responsibility were linked to moral obligation, e.g. feeling that people had to change, that climate was important because it would affect future generations or that individuals needed to live according to their beliefs and held values. Such a sense of responsibility featured as a key factor in their initial and on-going motivation for taking action. As the statement below indicates, the opportunity to make a difference through their action was also an important intrinsic motivator for engagement on climate change: ‘It gives me the opportunity to be involved in trying to contribute to the solution’. A few AC also commented on the need for them to take action as they saw themselves as environmentalists. As one AC stated: ‘You know, if someone who is quite involved in the environment and sustainability isn’t taking action on climate change then who is?’, suggesting that perceived identity⁷² can also be a strong motivation for acting to address climate change.

⁷² Identity here refers to ‘people’s sense of themselves: who they think of themselves as being’ (Crompton & Krasser 2009, p. 7).

4.3.1.2 Motivation for attending a TCP event - AC

Results show that the AC attended a TCP event with two key motives: to seek in-depth information (primarily on solutions) and to engage in discussion with others who held a similar interest. Furthermore, 76% of the AC had seen AIT and expected updated content and opportunities for interaction and discussion at the TCP face-to-face event. This comment exemplifies common responses from the AC group:

I went to the event to learn more about climate change. I believe it is happening; it is something we have to deal with and it is something really important for human kind or life on this Earth so to learn about ways to support or take action to prevent climate change or mediate it in some way.

The AC were interested in ‘going deeper’ or exploring in-depth the climate crisis and how climate change could be addressed. While they perceived climate science as complex and fast evolving, they had already accepted the seriousness of climate science and had substantial interest in learning about solutions, both individual and collective. Interview responses indicated that the AC were active information seekers. They engaged in a self-education process on climate change for both a) personal (e.g. stay well informed and updated on the issue) and b) social motives as they believed that climate change might be a topic of conversation with others or someone might want their opinion as shown in this comment: ‘*I wanted to learn more about climate change to talk to friends and family*’.

The AC were interested in meeting like-minded individuals and engaging in discussions with TCP educators and fellow attendees on climate change. Some respondents believed that attending a TCP event would provide a good avenue to learn how others in their community felt about and acted on climate change. For example: ‘*I was interested in meeting other people who had a similar interest especially because it is not always easy to talk about this topic with everyone*’ and ‘*I wanted to meet others interested in doing something about climate change*’.

4.3.1.3 Reported learning outcomes associated with TCP - AC

Most AC reported limited changes in their cognitive, affective and behavioural engagement with climate change as a result of attending a TCP event. Most reported unmet needs and expectations. Much of this was attributed to the lack of in-depth content on solutions. For others, concerns centred on the lack or limited opportunities for discussion and interaction. This suggests that educators often underestimated the ACs’ level of knowledge, understanding, interests and needs.

Cognitive outcomes - AC

A typical response from the AC group was:

I probably did not learn a lot mainly because a) I have sort of kept myself informed on climate change to some extent prior to the presentation and b) there wasn't a lot new that I hadn't heard or seen before but it reinforced what I had seen previously I guess.

AC were more likely to describe learning outcomes of their TCP experiences as validating or reinforcing rather than changing their existing perspectives and understanding of climate change. 'Confirmed', 'reinforced' and 'reminded' were terms that often emerged from Q2 and interview responses as shown in this comment: *'It was just an affirmation of what I had already learnt'*.

Sixty per cent of AC reported in Q2 feeling more convinced about the reality of climate change after attending a TCP event, while 40% reported no change. Interviews revealed though that the AC's level of conviction was reinforced by TCP as shown in this comment: *'I think it shocked me back into "yes this is really happening"'*. The comparison between answers to Q1 and Q2 shows that AC tended to agree more about scientific consensus (mean decreased from 2.49 before TCP to 2.18 after TCP; significant, $P \leq 0.31$) and human-induced climate change (mean score increased from 4.91 to 4.96) after attending a TCP event (see Figure 3, p. 96). Some AC felt that TCP had helped them either 'a great deal' or 'a fair amount' to better understand the causes and impacts of climate change, with combined scores of 46% and 45%, respectively. Interview data, however, indicates that, instead of an actual increase in understanding, the content helped them to clarify, reconfirm or add *'bits and pieces'* to what they already knew.

The majority of AC reported being already familiar with content of most TCP events. Indeed, most gave precisely that reason for the minimal change in their cognitive engagement on climate change following a TCP event. For example, AC indicated limited changes in the way they thought about climate change because the event did not offer them much that they had not seen or heard before. Some AC also felt they had learnt little because the event was extremely similar to *An Inconvenient Truth*, which they had already seen. As one AC noted: *'It was a reiteration of the documentary rather than going beyond it which is what I was hoping for ... It was kind of affirming that climate change was around'*. Interview data shows that many AC commented on the TCP event being *'too general'* or *'a good entry level'* presentation but not for them. This indicates that the content of most TCP events was not sufficiently in-depth to meet AC's needs and interests.

Many AC commented on not being ‘*the right audience*’ for the TCP event because it was too general. Its main agenda was perceived as making people aware that climate change was an issue when AC felt they were past that point.

I thought the presentation was good but not necessarily for me. I was not quite the intended audience for his presentation. I thought if people had not heard too much about climate change or did not know many of the details or were not convinced that it was happening, it might have been a good presentation for them. But I was convinced and I had heard a lot about it before so I did not need a lot of those preliminary steps.

Some felt that the event and educator were ‘*preaching to the converted*’, trying to convince them about the reality of climate change when they had already accepted the reality and seriousness of the issue. What they wanted and saw missing at most events was a strong content and discussion on solutions as shown in this comment: ‘*He was talking a lot about generalities. It almost felt a little like he was preaching to the converted. The people who were there were interested in climate change and had heard a lot about the topic so we could have spent less time on the problem and more on the solutions*’.

The disappointment of some AC in the lack of emphasis on solutions and their recommendations were indicative that most TCP events fell short of meeting the AC’s cognitive interests and needs. Although the content might have confirmed what many knew already, it was limited in increasing the ACs’ cognitive engagement on the issue. A common remark was that the presentation spent too much time on the problem and not enough on solutions as exemplified in this comment: ‘*They just spent too much time on the evidence of climate change and not really on the ways we can tackle it and other solutions*’. This indicates that, in most cases, educators underestimated the AC’s knowledge and interests. As one AC stated: ‘*I guess I am sort of at that point where OK I have seen all that, I am aware of all that, I have seen the Al Gore’s movie, I am 100% on board with it, I am just absolutely OK so what I want to know is what we can do about it ... and the answers weren’t there*’.

Some reported widening their understanding of climate change through interaction and discussion rather than the content-knowledge presented as shown in this comment: ‘*At the end, with other attendees, we shared information and tried to answer each other’s questions and that was very useful*’. This suggests that opportunities to interact with their peers might facilitate their learning and understanding. Findings indicated that, for this group, the process was not sufficiently interactive and that they would have preferred more discussion and interactions rather than a passive ‘*sit and listen*’ experience around a prescribed content. Observational evidence confirms comments that while there were limited opportunities for social interaction,

when it occurred, the group dynamic was often animated. This suggests that the lack of or limited time for interactions and discussion after TCP events may have resulted in lost opportunities for learning.

Affective outcomes - AC

The highest level of change recorded for this group was on the affective dimension of engagement. For some, TCP re-energised and re-motivated them as shown in this comment:

I think it probably fired me up again. I mean it is one of those things I think you need a little bit of a reminder from time to time. You know it is happening but hey we get our everyday lives as well so you try to do things but I guess ... you know we are all humans.

Others, however, reported leaving events feeling less optimistic, somewhat more helpless and discouraged. These AC came away from the event overwhelmed by the magnitude of the problem and changes required to effectively address it. For these AC, the TCP event was counterproductive with participants reporting feeling overwhelmed and less empowered following a TCP event. This indicates that for most AC, climate change could be even more daunting when interpreted in the context of individual action. A perceived disconnect between the magnitude of the issue and individual solutions can lead to a greater sense of helplessness as shown in this comment:

I kind of walked away from the presentation thinking well I can change my eating habits, I can eat less meat, I can eat less dairy, I can turn off, I can use less electricity but really the biggest impact is going to be changing the production of electricity in Australia. Without any kind of concerted effort to do that, then ... I feel ... I am kind of, I left feeling a little bit helpless.

Interview data indicates that the increase in worry expressed in Q2 was mostly due to an increase in feelings of urgency as illustrated in this example:

It kind of shocked me again back into “wow I need to do more”. It is something that lingers at the back of your mind but when it is like right “see this, see this”, you tend to think “wow, yes, this is a bit direr than what I remembered”.

This suggests that risk perceptions and a sense of urgency can induce worry. Over half the AC (55%) reported feeling more worried about climate change after attending a TCP event, while 42% reported no change as ‘it did not make me more worried as I was already considerably worried beforehand’. The comparison between answers in Q1 and Q2 showed that attending a TCP event slightly increased the number of AC who agreed that climate change was already

having impacts (mean increased from 4.71 to 4.73) and Australia was vulnerable to climate change (mean increased from 4.44 to 4.62; significant, $P \leq 0.18$; see Figure 3, p. 96).

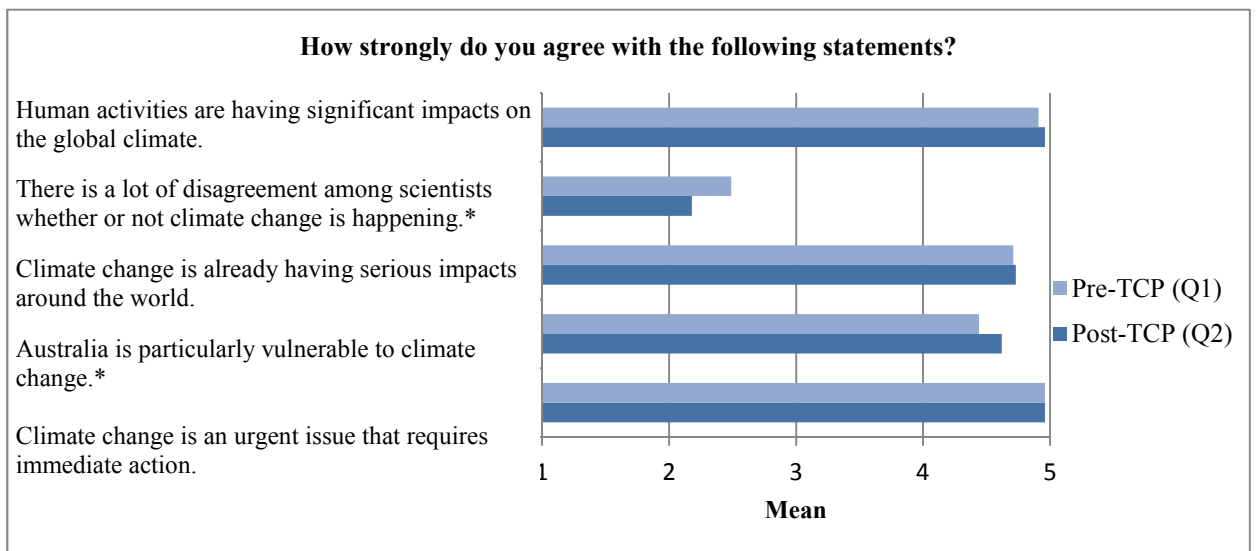
Some AC also expressed feelings of issue fatigue because of a persistent focus on negative and dramatic scenarios as shown in this comment:

I am just tired of hearing how bad it is ... I believe in the first place by the nature of the evidence so of course I am going to be receptive [to the presentation]. But again, I tune out pretty quickly when it is all about how bad it is, how bad it is getting. I know how bad it is.

This indicates that, even for the ACs who were actively engaged on climate change, it was challenging to be confronted once more by the magnitude of climate change and the challenges to address it and move towards a more sustainable world.

For a small minority of AC, attending the event or having time for social interaction had positive impacts as shown in these comments: ‘It just shows you that there are like-minded people out there which is really exciting’, and ‘I am not alone’. This suggests that like-minded people can play an important role in shaping positive affective engagement on climate change.

Figure 3 Mean changes (before and after a TCP event) - ‘Already converted’ group



The level of agreement was measured as 1 = strongly disagree, 3 = unsure, 5 = strongly agree in both Q1 and Q2. * The Wilcoxon matched-pairs signed rank test identified that differences between responses before and after a TCP event were significant ($p \leq 0.05$).

Behavioural outcomes - AC

TCP appears to have had some impacts on AC with 89% reporting an intention to do more as individuals. However, interviews revealed limited change in behavioural engagement as a result of attending a TCP event. Most stated in the interviews that they had not acted differently as a result of TCP. Principal changes reported were typically a reinforcement of current behaviours while the majority did not report making behavioural changes as a result of TCP. Much of that was attributed to the lack of or limited content and discussion on solutions beyond what the AC were already doing. Indeed, many AC reported having ended their experience at a TCP event wondering what they could possibly do to assist tackling climate change beyond what they were already doing and found few answers as exemplified in this comment: *'I was not told anything I could do beyond what I was already doing'*.

Many AC were concerned about the lack of or limited content on solutions. Some also commented on the fact that the limited solution-content strongly focused on individual actions and did not address broader solutions despite a strong interest from this group. The following statement reflects the view of most AC: *'I found that the section at the end on "What can you do?" was just too limited'*. Many AC were concerned about the no or limited content on and discussion on solutions beyond *'changing your light bulb'*.

The AC did not report social outcomes, often mentioning the lack of content on collective solutions and limited opportunities for interactions as exemplified in this comment: *'In terms of solutions, I did not feel there were any solutions we could take collectively that were presented. It seems more focused on individual actions'*. Furthermore, some were interested in civic and political engagement and felt that TCP could have provided them with some guidance but did not. Results suggest that most were still unsure after a TCP event how to be politically active and the effectiveness of such actions if taken as individuals, as shown by the following comments:

Nothing is really going to happen if you just tell people who are already converted and worried to change to efficient light bulbs for example. That's where I make my point that it is more important to learn how to lobby the government and corporations to enable broader changes to be made.

You can talk about lights and bikes and stuff like that but you also have to do political lobbying and how our political systems need to change, emission trading schemes and all of these things that we need to know about.

This suggests that, while the AC were motivated to do more, most felt constrained by a lack of direction on how to instigate significant actions which require collective efforts and collaboration.

Most AC reported only mentioning attending the TCP event to others, indicating that they felt they had not learnt anything new and therefore did not feel compelled to share their experiences with others. A few felt motivated to be more vocal when faced with the severity and urgency of the situation and responsibility as shown in this comment: *'I suppose because it jolted me to understanding the severity or the fact that we need to do something straight away ... that encourages me to be more vocal. It's time to start contacting people, sending emails'*. However, overall, TCP was limited at stimulating further interpersonal communication.

4.3.1.4 Second semi-structured interviews

The second semi-structured interviews, carried out six to eight months after TCP, revealed that the AC were less engaged on climate change. While their interest in the issue remained high and they still took action, they also reported fatigue as exemplified by this comment:

It is still something that is very important to me and I still do what I can but I am not going to quite the extent that perhaps I was before. It is just that I am not really pushing, arguing or fighting to get more done ... I think I am in one of those flaked spots at the moment ... you know let's see some real change.

Responses indicate that it is challenging for even the AC to sustain engagement on climate change when there is a perceived lack of commitment and action from others, further compounded by a lack of political leadership on climate change as illustrated in this comment:

I feel like not enough people are doing stuff so my own efforts were feeling a little futile ... And there was so much hope when the government promised⁷³ they were going to do a lot on climate change but then the financial crisis and other impacts in the world mean that it looks like there is not going to be that much done on climate change.

Responses also indicate an increase uncertainty in their ability to make a difference through their own actions as shown in this comment: *'I am less inspired to do more myself and I have*

⁷³ Second interviews were conducted in 2009. In November 2007, Australians went to the polls in what was referred to by some news media as the world's first climate change election (Glover 2007). Australians elected a new Labor government, under the leadership of Kevin Rudd, which identified during its election campaign water and climate change as two key issues. The Labor Party pledged to introduce a target of 60% cuts in Australia's carbon emissions by 2050 and to immediately ratify the Kyoto Protocol (see Gaillard 2008, p. 135).

been trying to figure out why ... I think it was all feeling more fatalistic perhaps. Feeling like it is going to happen anyway’.

This indicates that a perceived lack of engagement from others could lead to stagnation. This suggests that AC’s thoughts and actions were still heavily influenced by their social contexts and, no matter how motivated and driven they were, limited commitment or action from others could lead to doubt, feeling overwhelmed and discouraged, especially as the climate situation is reportedly worsening. As a result, when asked what they felt they needed to move forward, they reported not needing new information on climate change but social support from other like-minded individuals interested in acting on climate change as exemplified by this comment: *‘It looks like it’s just me on my own at the moment so you know you need a little bit of support to do that’.*

4.3.1.5 Summary - AC

A theme that emerged from interviews was that the AC were interested in a deeper exploration of the mechanisms of climate change and how climate change could be addressed. As one participant stated: *‘We are ready for the next step’.* Most felt that this was not addressed at the TCP event they attended. Reinforcement appeared to be the main learning outcome for this group. Findings show that most TCP events missed opportunities to help AC move forward to the next step in the engagement continuum on climate change.

In summary, the majority of AC felt only a marginally greater sense of engagement following a TCP event, mostly due to the generalised content and the lack of or limited opportunities for social interaction and discussion. This indicates that educators may have underestimated ACs’ level of understanding, knowledge and most importantly their interests and needs. This also indicates that engaging this group further on climate change requires more in-depth content on solutions and active learning processes that facilitate social interaction and discussion. Indeed, responses from second interviews indicate the need for social support to combat increasing helplessness, hopelessness (link to perception that there is a lack of action) and frustration.

4.3.1.6 Individual profile - Anna⁷⁴

Table 2 below summarises Anna’s contribution to the three stages of this research and highlights how TCP affected her level of engagement with climate change.

⁷⁴ Note that all participants’ names used in this study are pseudonyms to protect their identities.

Table 2 Individual profile summary for Anna, a member of the ‘Already converted’ group

<p>Questionnaire 1</p> <ul style="list-style-type: none"> • Anna wanted to find out more about the science behind climate change and to learn what she could do to tackle climate change. She also added that she wanted to meet like-minded people who were interested in climate change. • She hoped to gain more knowledge of scientific facts related to climate change and solutions for use in discussion with her friends and family • She was completely convinced that global climate is changing and she worried a great deal about the issue • She rated her understanding of both the causes and of the impacts of climate change as ‘good’ • She believed that there was a scientific consensus that climate change was happening and that human activities were having significant impacts in the climate. She strongly agreed that climate change was already having serious impacts around the world and somewhat agreed that Australia is particularly vulnerable to climate change. She strongly agreed that climate change was an urgent issue that required immediate action. • She took action to limit climate change listing ‘no car, turn off lights, short showers, less heating, compost, recycle, use local produce, vegetarianism, talk to others, do my own research’. <p>Questionnaire 2</p> <ul style="list-style-type: none"> • When asked what she might have learnt from the TCP event, her response was: ‘<i>It was mostly presenting information I already knew</i>’. • She reported not being more convinced or worried about climate change as a result of attending. • She did not really feel that the event had helped her understand the causes and impacts of climate change better • Results indicate no changes at all on the agreement scale • She did not report intention to take action reporting that ‘the presentation didn’t suggest anything I am not already doing’ • When asked what she took from the TCP event, she reported: ‘<i>Not too much really</i>’. • She recommended: ‘more quantitative science and more focused on action and potential solutions would be good’ 	<p>First semi-structured interview</p> <ul style="list-style-type: none"> • She was quite concerned about climate change and thought it was an important issue but not for herself or Australia but for people in other countries. • She defined climate change as a global problem; she was interested in finding out what Australia as a nation could do to tackle climate change (societal solutions) and what else she could do as an individual (individual solutions), knowing that at the time she was already taking actions such as biking, recycling and leading by example. • She discussed climate change with some of her friends and family. One reason for attending the TCP event was to find out more about solutions so that she was more informed when she engaged others on the topic. • As a scientist herself, she was interested in and looking for updated scientific information on climate change (she was already convinced of the reality of climate change and had heard a lot about climate change) and alternative solutions and their efficacy. • She believed that climate change was a problem, human-induced and required urgent action. She perceived a sense of urgency about acting on climate change even if she did not feel personally affected by local climate change. • Her expectations of the TCP event were not really met. She highly disappointed by: <ul style="list-style-type: none"> - The content (too general, not enough solutions, nothing new, no sound scientific background) - The educator (no science background, no answer to the questions she had, not perceived as too knowledgeable). • She felt she was not the appropriate audience for the event, the material lacked depth both in terms of up to-date science content and solutions. • She reported no changes as a result from the actual event. • She reported informal interaction at the end, processing the information together, discussing the content and asking questions. Regarding this as highly valuable and potential to keep in touch with like-minded individuals 	<p>Second semi-structured interview</p> <ul style="list-style-type: none"> • Anna was still very much concerned and considered the issue of climate change as important. However she had had ‘<i>a major change of heart over the last little while</i>’. She attributed this mostly to what she perceived as a widespread lack of action and absence of leadership at the political level. • She was not surrounded by people for whom climate change was a top priority in what they were doing in their lives. • She was disappointed and attributed her ‘<i>change of heart</i>’ in part to not managing (due to her work commitments) to stay in touch with people she met at TCP. • She claimed that, at this stage, what she needed was to find people who were also interested in acting on climate change to form a social group for discussions on the topic, sharing information, validation and support, to engage further, and to get motivated and energised again. • Although she planned to keep doing what she was doing (actions she took to reduce her ecological and carbon footprints), she was at this stage not doing more because she doubted the efficacy of these small individual actions and she did not feel that she was part of a collective. In terms of education strategies, she stated she needed informal education, social interaction, dialogue, conversation, a social network and social support.
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Summary - The questionnaire, the first and second interviews reveal that Anna did not feel that the TCP event addressed her needs in terms of content (in-depth science and solutions). However, she found the social aspect of meeting like-minded people to be extremely valuable in terms of learning and gaining social support.

4.3.2 The 'Early aware' (29%)

The 'Early aware' (EA) represented 29% of the interviewee sample (22 of 75); 55% were female and 45% male, with a combined mean age of 42.8 years. Overall, the EA were moderately engaged on climate change prior to TCP. All believed that it was happening and that human activities were playing a part, and they were somewhat worried. They took some individual actions to reduce their own environmental impact.

4.3.2.1 Engagement on climate change prior to a TCP event - EA

Cognitive engagement - EA

All the EA stated they were either completely (55%) or mostly (45%) convinced that global climate was changing. Furthermore, all strongly (82%) or somewhat (18%) agreed that human activities were having significant impacts on the global climate (mean = 4.82, SD = 0.39; see Figure 4, p. 106). Interview responses revealed that some believed climate change was largely human induced, while others said that it was caused by a combination of human activities and natural variability as shown in this comment: *'I believe that climate change is a natural thing but it is exacerbated by human intervention'*. The EA considered themselves somewhat informed on the causes and impacts of climate change with 86% rating their understanding⁷⁵ as either 'fair' (41%) or 'good' (45%) on both topics. Their understanding came primarily from mass media sources such as TV news, entertainment programs and the internet. A minority also reported having noticed seasonal changes in their own environment.

The majority of EA tended to pay average attention to information on climate change. Most did not seek out information on the issue but engaged with it when they came across it, as exemplified by this comment: *'I don't actively make an effort to keep up-to-date on climate change but, if there is something on TV or in the paper, I'd listen to it or read about it'*. A few reported being slightly more active, for example: *'I think I've been changing over the last couple of years. I saw An Inconvenient Truth, I've been reading a bit more about climate change, listening to the radio and so on'*.

The majority of EA stated there was so much conflicting information about climate change that it was difficult to know what or who to believe, citing media representations of the issue as often controversial and uncertain. This could explain why, while over half (59%) of the EA believed that there was a scientific consensus that climate change was happening (mean = 3.36, SD = 1.33; see Figure 4, p. 106), 28% still believed that there was a lot of disagreement among scientists, and 14% were unsure. Further, all EA either strongly (14%) or somewhat (86%)

⁷⁵ These results are based on learners' self-reported levels of knowledge and understanding.

agreed that climate change was an urgent issue that required immediate attention (mean = 4.86, SD = 0.35; see Figure 4, p. 106). This indicates that, even if the majority of EA reported moderate scientific knowledge and understanding about the causes and impacts of climate change, they still believed that the climate was changing, that human activities were playing a significant role and that something needed to be done urgently.

Affective engagement - EA

The EA were moderately interested in climate change. Almost all stated being worried about climate change either a great deal (68%) or a fair amount (14%). Interviews revealed, however, that most worried about climate change in a general sense as shown in this comment: *'I guess it is more an overall concern'*. The majority of EA strongly (59%) or somewhat (36%) believed that climate change was already having serious impacts around the world (mean score = 4.55, SD = 0.60; see Figure 4, p. 106). Yet, most did not see or were unsure that climate change would be a significant personal threat during their lifetime. While 73% somewhat (32%) or strongly (41%) agreed that Australia is vulnerable, most still perceived climate change as a geographically and temporally distant threat. They were more worried about the impacts on non-human nature, distant people and future generations. This indicates that most EA did yet not perceive climate change as having direct local relevance or a direct impact on themselves, their family or local community but *'it is sort of a more global concept I think'*.

The majority of EA reported an overall concern for the environment. As the statement below indicates, most EA conflated concern for the environment with climate change: *'It [climate change] has been a concern of mine for years and basically how we should have respect for Earth and life on Earth'*. A few EA also reported feeling concerned *'about the doom and gloom experts are predicting'*.

Behavioural engagement and motivation - EA

The majority of EA (82%) felt personally able to do something about climate change and talked about a variety of actions they were taking such as turning off lights, saving water and recycling. Most actions cited in both Q1 and first interviews were in the realm of domesticity and consumption.

Generally, EA felt that there were small things they could do to reduce climate change. Most, however, still felt limited in their ability to reduce climate change and were unsure that their actions could make a significant difference to global climate change. Indeed, interviews raised the problem of efficacy of individual actions as shown in this comment: *'On a personal level, there is little effect I can make. However, I endeavour to conserve energy and save water where possible'*. Individual actions for sustainability were seen as important and might encourage the

same in others. The EA did not engage in any civic or political activity related to climate change but were inclined to lead by example, hoping that others might see and take actions themselves; this is linked to their aggregate view of change: *'If enough people do it' or 'If I do my little part and others do too then I hope it will make a difference'*. While most expressed a responsibility to do their part no matter how small, they also felt that such actions were marginal unless others did the same.

The EA's motivation for action on climate change often overlapped with acting for wider environmental benefits or with a desire to save money. They expressed positive reasons for saving water and energy such as feeling that it is worth the effort for the greater environmental good, improving quality of life, saving money, feeling good about doing their bit and a desire to be more sustainable: *'I try to make a conscious effort if I can so it is not directly for climate change but to reduce my impact on the environment and also to save money'*. Some expressed a degree of righteousness stating that their behaviour was the *'right'* way to act on climate change or *'It is the right thing to do'*. Some suggested that they acted so as not to feel guilty about being part of the problem (not necessarily to reduce climate change) and to minimise their impacts on the environment by not wasting water and electricity. Some talked about their responsibility to act: *'It is my responsibility, it is our⁷⁶ responsibility not to leave such a mark on the planet'*, *'I don't want to leave a mess for my children⁷⁷'*.

The EA talked about climate change generally in a passing manner often associated with small talk about the weather and media coverage the night before, or if the opportunity comes up, as shown in the following comments: *'I talk about it sometimes when it's been in the news'*, *'I generally don't talk about it unless it comes up in conversation'*, *'I talk about it sometimes but it is hard to get through to people'*.

4.3.2.2 Motivation for attending TCP - EA

Most EA reported attending a TCP event because of a general interest in learning more about the topic. The EA indicated that they were looking for a better understanding of the causes and consequences of climate change as well as knowledge about potential solutions. Above all, they wanted information about practical actions they could take as individuals as illustrated in this comment: *'I am looking for practical knowledge that can be adapted into everyday processes to reduce the effects of climate change'*. This suggests that, as the EA had started realising the problem, they wanted to know that there were feasible solutions to address it and what specific

⁷⁶ Similarly to what Nicholson-Cole (2004) found her research on climate change imagery, participants in this study often referred to 'they', 'people', 'we' and 'our' when asked about importance of climate change or what they could do about it. This is common to all the result sections in this chapter.

⁷⁷ Based on these findings, 'being a parent' was often cited by participants as a reason for worry and motivation to act in terms of legacy left for future generations.

and appropriate actions they could take as individual. Some reported wanting to know more about climate change in Australia as this comment shows: *‘I was interested in what was happening in Australia and what we could do here’*. A minority of EA reported being interested in social and political actions, recognising the need to put pressure on local and national governments to act on climate change yet being unsure how to do this and the efficacy of such action if done individually.

Some EA also attended a TCP event for social motives. They were looking for opportunities to interact with others and find out what they were doing about climate change as shown below:

I was interested in interacting with others in the community who were interested and maybe had similar feelings but might go about things in different ways.

I actually wanted to see if there was anything new since AIT and I hoped to discuss what individuals can do. Maybe I could learn something I had not thought of before based on the opinion or advice from someone else, sharing with other people.

Interviews raised the problem of conflicting information making it hard to know ‘who’ and ‘what’ to believe. The EA were looking for reliable and credible information they could trust. Al Gore was seen as credible by most and TCP content and educators by association as illustrated by this comment: *‘I heard that the presentation would be given by someone trained by Al Gore so I thought it would be good’*.

4.4.2.3 Reported learning outcomes associated with TCP – EA

Most EA felt that their engagement on climate change had altered to various degrees as a result of participating in a TCP event. When asked what they felt they had learnt as a result of the TCP event, the principal learning outcome was a greater sense of awareness of the issue, but they also said that they had greater understanding and intentions to do more.

Cognitive outcomes - EA

The two principal cognitive learning outcomes associated with TCP were a greater awareness of climate change as well as the salience of the issue as shown by this comment: *‘I am more aware of how serious the issue is’*.

Some EA reported that the content and dramatic imagery led to a greater sense of awareness by making climate change ‘more real’, as exemplified by these comments: *‘it was very graphic, very startling to have those pictures in front of you and thinking “wow it is really happening”’, ‘maybe until the presentation, I did not realise how quickly things were deteriorating’* or *‘I think I am even more aware now ... the presentation really highlighted the urgency and the importance of climate change so it made it more real’*.

Most EA commented on the content being focused primarily on the evidence of impacts and risks associated with climate change. Such content led to greater understanding of the reality of climate change, as well as clarification and reinforcement as shown in these comments: *'I wasn't clear on a few issues, things I didn't fully understand. The presentation cleared a few things up for me ... it brought the whole thing together in a way and I realised the importance of the issue'* and *'It did not change my understanding but what it did is reinforce and clarify bits and pieces'*. This could explain why 77% of EA stated feeling more convinced that the global climate was changing after attending a TCP event, while 23% reported no change. This may also explain why there was a slight increase, after a TCP event, in the level of agreement to the statements 'climate change is an urgent issue that requires immediate action' (mean increase from 4.86 before TCP (Q1) to 4.91 after TCP (Q2)) and 'climate change is already having serious impacts' (from 4.55 to 4.59) (see Figure 4, p. 106).

Overall, TCP events appeared to have moderately increased EAs' self-rated understanding of climate change. The majority felt that TCP had helped them to understand the causes of climate change either a great deal (32%) or a fair amount (55%). Likewise, most felt it had helped them to understand climate change impacts either a great deal (27%) or a fair amount (59%).

When asked during interviews what facilitated such change, some EA attributed their increase in understanding to the content while others mentioned the educators. Some commented that the personal qualities and knowledge of educators had been beneficial in helping to clarify or confirm their understanding, as shown in the following comments: *'I was very glad she backed up the evidence of what I already felt'* and *'she was credible, passionate and her message was reinforcing'*.

Affective outcomes - EA

The majority of EA (72%) reported feeling more worried about climate change after attending a TCP event, while 27% reported no change. For some, the TCP content made the prospect of climate change all the more worrying and concerning, as illustrated by this comment: *'It made me realise how ignorant I was of climate change issues and gave me a fright as to the seriousness involved'* and *'I felt quite gloomy'*.

For some EA, the content presented was overwhelming, as shown in this comment: *'I think I was a bit depressed to hear all these facts ... especially without getting much input on what we can do'*. This suggests that the more EA were disturbed by the prospect of climate change, the more they wanted solutions so that they did not feel helpless, as this EA stated: *'You want to focus on something you can do; if not you become helpless'*.

For others, however, the content acted as a motivator: as shown in this comment: *‘I felt hopeful; I mean it is very worrying but hopeful too ... in the sense that it is not too late to do something but quite depressed about the current situation’.*

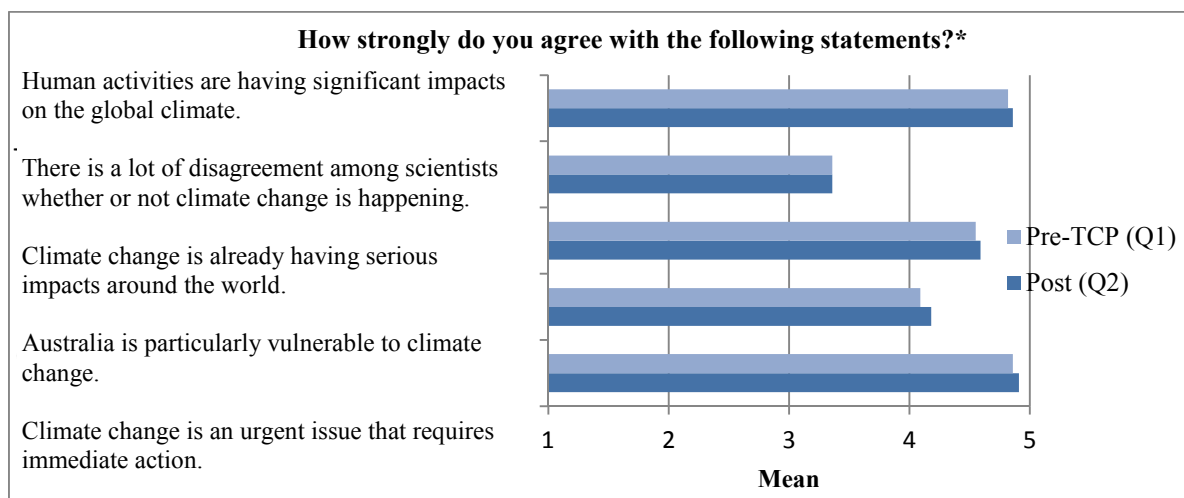
I did not feel as bad as after An Inconvenient Truth because the presenter sort of said that it was the small changes that we could make that added up to the bigger changes ... but, let’s face it, it is quite a depressing topic.

Some EA commented on the focus of TCP being *‘doom and gloom’*. A number of EA felt that *‘there was a fair degree of dark side’* and suggested a need for balance between the problem and potential solutions. As one EA stated: *‘We need to make sure that there is a balance between the seriousness of the issue and the fact that there are still things we can do’.*

The comparison between answers to Q1 and Q2 shows that EA were slightly more likely to agree that climate change was already having serious impacts around the world (mean increased from 4.55 to 4.59) and Australia was particularly vulnerable to climate change (from 4.09 to 4.18) after attending a TCP event (see Figure 4 below). Interviewees revealed that, although level of worry was momentarily aroused, this did not necessarily lead to action or major changes in the lifestyle of the EA, as shown in this statement:

Well I was not so much worried about my lifetime until the event. It seems to me that it is probably more urgent than what I thought it was ... but, having said that, it hasn’t really made a major change in what I do. Maybe trying a bit harder and being a little more vocal about trying to get other people to do something or at least think about it.

Figure 4 Mean changes (before and after a TCP event) - ‘Early aware’ group



*The level of agreement was measured as 1 = strongly disagree, 3 = unsure, 5 = strongly agree.

Behavioural outcomes - EA

When asked if they had done anything differently as a result of attending a TCP event, most EA said that their behaviour had not changed, but that it simply reinforced their previous (pro-environmental) behaviours. The principal outcome for the EA was a heightened awareness of their impacts and associated willingness to *'be more vigilant'*, *'to try harder'* and *'keep working on my own impacts'*.

I think it just reinforced some of the small things I do like turning off the lights when I am not in the room, turning the television off when I am not watching it, you know those sorts of things. It hasn't really spurred me into doing anything different but it has made me more fastidious about doing the things that I am already doing.

In both the post-questionnaire and interviews, most EA expressed an intention to do more or continue to do what they were doing believing that *'every little bit helps'* or feeling like they should do more *'I need to do a bit more like jump on my bike and buy more local food'*. Some EA stated that they had begun to make some efforts to *'do more'* or to be a bit *'more diligent'* in the actions they were taking prior to TCP and to be a bit more active. Participants talked about using their bicycles and walking more often instead of using their cars, and being more conscious in their everyday actions to save energy at home by, for example, turning of lights or switching the power off the wall. *'More'* is the key term here, indicating that the TCP event did not necessarily spur the EA into taking new actions but that it did reinforce the benefits of the actions they were already taking and foster a sense of personal responsibility. For some, TCP acted as a reminder and motivator, as shown in this comment: *'I guess the presentation reinforced that and re-motivated me to do something'*. However, the interviews reveal that there was still significant comment about whether personal action could contribute to the alleviation of a global problem. Some respondents felt that such individual action could have a significant effect on ameliorating the climate change problem while the majority questioned the efficacy of such individual action to tackle climate change: *'I am still not sure how much difference I can make'*.

Individual easy and feasible solutions suit some EA who were looking either to get involved or to take additional action in their daily lives. However, they wanted to know the efficacy of these individual actions and how they fitted within bigger collective response; they wanted to know what others were doing as most held aggregate views of change, as seen in Section 5.3.2.1. Some recommendations participants made were indicative of the EA's desire for practical examples and the need to know what others were doing: *'it is important because people need to know that others care and take action too'* or *'I think it would help to see what others are doing instead of focusing on the problem'*.

While some were satisfied with the solution-content, others mentioned felt that TCP did not offer solutions beyond what they were already doing as shown in these comments:

I would have liked to hear something other than the basic things like turning things at the power point, turning your lights off and minimising energy in the house. I am interested in other things I could do to make an impact.

I think the solutions presented like catching public transport or having the right light bulb are good for everyone. I think what was lacking was how those little solutions can have a real impact.

Furthermore, a handful of EA were interested in citizenship actions, such as petitioning and lobbying governments and big business, but felt they were still unsure how and were still in need of guidance after the TCP event. As one EA stated:

Maybe this is what I did not get out of the presentation, a way to actually empower myself and other individuals to get the message across the government that we are not happy driving fossil fuel cars and using fossil fuel energy.

Moreover, the EA reported no social outcomes. Much of this was attributed to the solution-content focusing primarily on individual solutions despite interest from some: *'I think the presentation could have taken advantage of having local people coming together to offer solutions at the collective level rather than just the individual'*.

Other than mentioning that they attended a TCP event, most EA did not report discussing the TCP event or the issue of climate change with others, citing that climate change was still a hard topic to talk about: *'don't want to be seen like preaching'*. There was also a perception of scepticism and that not everyone would be receptive; some reported that they did not feel they were knowledgeable enough but were happy to do their bit and talk to others if others initiated the conversation.

4.3.2.4 Second semi-structured interviews

Interview responses indicated that the heightened worry about climate change and motivation to act that was felt after TCP, did not persist. The EA were happy to continue to do *'their bit'* and remained interested in the topic but were not actively looking for information.

I think when it is sort of there and it is just easy to find, you're more likely to look into it and follow up, but when you try to find more time to physically go searching for things, that's sort of when you tend to put it off.

The EAs were content to take individual action and talk to others about what they did when the opportunity arose; they continued to see their role as doing things at home and in their own lives and telling people about it as illustrated in this comment:

I guess I am still sort of dropping hints in conversation and I guess when you sort of do things at home and stuff like that and tell other people about it ... and whether or not they try it that is up to them.

When asked what they felt they might need in terms of education on climate change, EA reported still needing practical information in terms of where to go and know what to do and how to follow up. This indicates that they wanted to be told what to do and how to do it.

4.3.2.5 Summary - EA

In summary, the majority of EA felt a greater sense of engagement following a TCP event, mostly due to the content and educator. Most EA found the experience of attending a TCP event both satisfying and beneficial, the event format was well suited to their needs, and the opportunity to interact with others was appreciated (when it did happen and was seen as lacking when it did not). However, some would have liked ‘*more opportunities for learning and more interactions*’. Some offered suggestions to improve TCP focusing primarily on solution-content and interaction with others; the EA wanted validation and a motivation to participate. They suggested that TCP events ought to focus more on practical action that individuals could take and the efficacy of such actions; most EA wanted to be told what to do:

Some sharing of ideas ... I guess that type of presentation could have possibly been improved by even a few, for example, a whiteboard to get the audience to put forward a couple of ideas on what they do or what they see as things that are achievable and might give at the individual level people a few thoughts and new ideas.

4.3.2.6 Individual profile - Sharon

Table 3 below summarises Sharon’s contribution to the three stages of this research and highlights how TCP affected her level of engagement with climate change.

Table 3 Individual profile summary for Sharon, a member of the ‘Early Aware’ group

<p>Questionnaire 1</p> <ul style="list-style-type: none"> • Sharon’s interest in attending the TCP event was to learn a bit more since AIT as well as practical actions she could do. • She was mostly convinced that global climate is changing and she worried a fair amount about the issue. • She rated her understanding of the causes of climate change as ‘good’ and the impacts of climate change as ‘fair’. <p>Questionnaire 2</p> <ul style="list-style-type: none"> • When asked what she might have learnt from the TCP event, Sharon’s response was: ‘<i>Gets me motivated again to do more to help the situation</i>’. • She reported being more convinced that climate change was happening and no change in her level of worry. • The TCP event helped Sharon to better understand the causes and impacts of climate change. • She reported no change in the way she thought about climate change as a result of the TCP event. • She reported that the TCP event reinforced her views and re-motivated her to do something. • She stated that the presentation helped a fair amount in understanding the causes and impacts of climate change things and reminded her of a few since AIT. 	<p>First semi-structured interview</p> <ul style="list-style-type: none"> • Sharon did not feel that climate change was any more important and did not feel much more able to do anything about climate change. • The event was a reminder that climate change was real, reporting that ‘<i>it opened my eyes</i>’. • Sharon attributed climate change to human activity and felt that everyone had a responsibility to look after the environment. • She stated that she was happy to continue doing ‘<i>little things</i>’, or ‘<i>her bit</i>’, and felt it was important to show and tell others. • She reported the need to be encouraged as well as instruction on what else she could do in order to become more engaged with climate change. • She felt that in general climate change was an important issue but at a personal level it was not. • She found the educator to be both engaging and knowledgeable. • She enjoyed the event yet would have liked more time for interaction with the TCP educator and fellow attendees. • Sharon reported that she had not expected interaction with others at the event but that, in retrospect, it would have been useful to share ideas and thoughts on climate change. 	<p>Second semi-structured interview</p> <ul style="list-style-type: none"> • Sharon stated that she did not feel any more able to do something about climate change. • She felt that she needed to be encouraged, that it needed to be made easier, mostly because people had limited time in their busy modern lives. • She stated that more information would have helped her to better understand climate change but also that she did not actively seek information due to time constraints. • Sharon would like to have been given a greater range of practical solutions that could easily be implemented at home or work. • She also reported that climate change was something she discussed with others, sharing tips on solutions. • Sharon reported that it was her belief that the government should act on act on climate change as she felt that as individual ‘<i>I can only do so much</i>’.
<p>Summary - The questionnaire, the first and second interviews reveal that beyond a greater awareness of the issue, Sharon’s opinions on climate change were not greatly influenced by the TCP event but that her understanding of the issue had improved. Six months later whilst still ‘doing her bit’ and discussing the issue Sharon did not report any marked change in her position or activities to tackle climate change. As a result of attending a TCP event, Sharon believed that people should be given guidance on how to affect environmental change in their own sphere as well as methods appropriate to influence the government.</p>		

4.3.3 The 'Doubtful' (11%)

The 'Doubtful' (D) was the smallest group representing 11% of the interview sample (8 of 75 participants). All D in this study were male with a mean age of 43.3 years. Overall, the D believed that climate change was happening but were sceptical about human causes. They were not too worried about the issue, thinking that it was not much of a threat yet. They took some action out of general environmental concern but not because of climate change.

4.3.3.1 Engagement on climate change prior to a TCP event - D

Cognitive engagement - D

The majority of D were either completely (50%) or mostly (38%) convinced that global climate was happening, while 12.5% were unsure. Interviews revealed that D did not refute that climate change was happening. Scepticism was apparent, however, in relation to the notion of human-induced climate change, as shown in this comment:

I think there is no doubt that the climate is changing but it always has ... I don't necessarily think that it is changing just because of anthropogenic causes.

Indeed a minority of D 'somewhat' (25%) or 'strongly' (12.5%) agreed that human activities were having significant impacts on the global climate, while 50% were unsure and 12.5% 'somewhat' disagreed, believing it was caused by either natural variability or a combination of the two. Most D referred to natural climate variability. They were unsure about the scientific evidence for human-induced climate change and unsure about its causes and potential impacts.

I think as humans I guess we have a slight impact but there are bigger things that influence what goes on the Earth ... it [climate change] is part of natural evolution.

Over two-thirds (75%) of D thought there was a lot of disagreement among scientists over whether climate change was occurring while 25% remained unsure. Interview data revealed that the D referred to scientific 'disagreement' in relation to the causes and impacts of climate change as opposed to whether climate change was happening (mean score = 3.88, SD = 0.64; see Figure 5, p. 118). Climate arguments between scientists were viewed as evidence that there was controversy and doubt about climate change. Interview data shows that news accounts of events in the media that cast doubt on climate science had an impact on D's thinking about climate change. as shown in this comment: *'They say it is going to get really hot and yet I just read in the Sunday Mail that 2008 is one of the coldest years in the last decade or something*

like that. I am not sure what to make of that'. Such accounts supported D's beliefs that climate change was not yet certain or proven and thus we needed to wait and see.

This correlates with interview data that indicates that the D were ambivalent about the causes and severity of climate change because they felt scientific evidence about its causes, scale and timeframe was incomplete and conflicting. The D reported encountering contradictory information on both sides of the argument, which fostered additional uncertainty and confusion. As one D stated: *'The jury is still out'*. Furthermore, the D did not necessarily attach a high level of urgency to climate change, reporting that were unsure about the scale and timeframe at which they felt action would be needed, if at all.

The majority of D felt that they were moderately to well informed on climate change; 88% rated both their understanding of the causes and the impacts of climate change either 'fair' or 'good'⁷⁸. A typical response from this group was: *'I think I have a fairly good understanding of what it is'*. As a group, 25% 'somewhat' disagreed that climate change was an urgent issue that required immediate attention, while 25% 'somehow' agreed and 50% were unsure (mean = 3.0, SD = 0.76; see Figure 5, p. 118). Interview data indicated that the D held views that did not support 'strong' actions on climate change as they alluded to uncertainties in science and thus limited knowledge to take action: *'we don't know enough'*. However, some felt that action should be taken as a matter of precaution.

Affective engagement - D

Despite their reported scepticism, the D reported a moderate to high level of interest in the topic, as shown in the following comments: *'I am not sold on climate change but I am very interested'*.

The D reported a low to moderate level of worry about climate change with 50% saying they worried some, while 37.5% worried only a little or not at all (12.5%). Results suggested a link between high level of uncertainty and a relatively low level of worry. The D tended to perceive climate change as a much lower risk than the two other groups. They did not view the threat as particularly severe; there was a sense that, because climate change was a natural phenomenon, or human activities had limited influences, it was not of great concern as shown in this comment: *'I am not worried overall in the sense that I don't think we as humans are the only thing that has influence on what goes on the planet.'*

Key concerns centred on uncertainty, bias, complexity and truth. The possibility that climate change might be catastrophic was accepted yet there was a belief that any devastating impacts

⁷⁸ These results are based on learners' self-reported levels of knowledge and understanding. This study did not assess learners' actual knowledge understanding (or misunderstanding) of the topic.

would not occur until beyond their lifetimes, and this minimised worry as illustrated by this comment: *'On one side, I am taking it very seriously and on the other side, well let's just wait and see'*. While 12.5% 'strongly' and 75% 'somewhat' agreed that climate change was already having serious impacts around the world (mean = 3.88, SD = 0.83; see Figure 5, p. 118), most viewed climate change as a bigger threat for people in distant locations and future generations. The D were unsure if and to what extent climate change would cause harm to them personally or to future generations. As this D participant stated: *'It could potentially be a dangerous thing in the future but things change, they always have and they always will so who knows'*.

Behavioural engagement - D

Regardless of their beliefs about climate change, the D reported taking action such as being efficient in their use of water and energy and they talked about the necessity for environmental actions such as recycling, saving water, using the car less often and planting trees to reduce their ecological footprint. As this D stated: *'I try to reduce your footprint ... I certainly believe that a greener world would be a healthier world to live in'*. Such actions were driven not by concern about climate change but by general environmental concern and a desire to save money as shown in these comments: *'I like to be able to minimise my energy use but that is more a personal out of pocket rather than the overall benefit I guess'* and *'I feel a general kind of respect and stewardship responsibility for the environment and the Earth'*. D believed that these actions should be carried out anyway even without climate change. For this group, changing practice in order to be more environmentally friendly was desirable.

Although this research explicitly asked which actions respondents were taking with the intention of mitigating climate change, and what motivated them to take such actions, the D stated that some actions were taken out of concern for the environment rather than for climate change; the desire to save money was also a motivator.

I take these actions for a peace of mind as it is good for the environment. Even if I am not 100% convinced about climate change, it doesn't mean that I am going to go around and pollute as much as I can.

The D tended to pay an average amount of attention to information on climate change. Most did not seek information on the issue but engaged with it when they came across it, while others were more active in seeking out information, showing an interest in the debate and talking to others.

4.3.3.2 Motivation for attending TCP

The D were primarily interested in building factual knowledge on the topic and gaining *'a clearer understanding of the science, both natural and man-made, that influence Earth climate'*.

They were primarily interested in learning more about the causes and potential harmful effects of climate change. Some were also interested in scientific arguments and how scientists knew that climate change was really happening.

In Q1, three of the eight D listed 'scepticism' and five listed 'science' as reasons for attending a TCP event. As seen in Section 4.3.3.1, the majority of D were unsure about the scientific evidence for human-induced climate change and had reservations about the scientific consensus on the topic. The D perceived climate change as a scientific issue, and they regarded scientists as the most credible educators: *'I am interested in the science behind climate change'*. They wanted to be presented both sides of what they saw as a debate and expected that the TCP educators would have both expertise in science and in-depth knowledge on the topic. They also wanted in-depth content on the science an exploration of both sides of the climate change story and debate about the science as illustrated in the quote below:

You hear so much about climate change. I was interested to see how it was going to be presented and if it was going to be updated with newer, more recent information and development.

4.3.3.3 Reported learning outcomes associated with TCP - D

Most D reported limited or no apparent cognitive, affective and behavioural outcomes as a result of attending a TCP event. Interviews revealed that all were still sceptical about human-induced climate change and uncertain about the science after attending TCP.

All the D stated they had not learnt anything⁷⁹ at all from the TCP event. Much of this was attributed to the content being perceived as too general, the lack of or limited discussion and the educator being perceived as biased or not knowledgeable enough about climate science. This contrasts with their initial expectations that the educators would be knowledgeable on the science.

Cognitive outcomes - D

Changes in factual knowledge and perceived understanding were small for this group. The most prevalent reasons for no or minimal cognitive learning outcomes were the content and educator. Most reported that TCP did not meet their needs and expectations. They were looking to solve personal uncertainties about science and gain a better understanding yet the content was too general, was not explained adequately and was perceived as being too one-sided and therefore biased.

⁷⁹ This may also have been partially because D tended to defined learning solely in terms of gaining factual knowledge about a topic.

A minority (37.5%) felt more convinced about the reality of climate change, while 62.5% reported no change. The comparison between answers to Q1 and Q2 show a slight increase in agreement that humans were having impacts on the climate (from 3.38 to 3.63; see Figure 5, p. 118) after attending a TCP event, as illustrated by these comments: *'I do accept that human interference has an effect on the climate but I think generally the natural effects is much greater'* and *'I think human influences speeds up the natural effect'*. Q2 show that D still believed that there was disagreement among scientists after attending TCP (mean = 3.88, SD = 0.6; see Figure 5, p. 118). Over half (62.5%) felt that the TCP event had helped them to understand the causes of climate change 'not too much' (37.5%) or 'only a little' (25%) and 37.5% 'not really' or 'not at all'. Half (50%) felt that the TCP event had helped them to understand the impacts of climate change 'not too much', 'only a little' (12.5%) and 'not really' and 'not at all' (37.5%).

During interviews, it was clear that the D were questioning the science behind climate change and asking questions such as *'How do we know if this is true?'* and *'Can we trust the science?'* Therefore, most expressed strong disappointment in not being presented with in-depth content on the science and an explanation of the scientific information presented.

I was looking for more science and the presenter she was essentially a presenter not a scientist so she was fine in her role. But it would have been nice to have a scientist presenting that data and show more in-depth knowledge behind the slides instead of here is the slide and that is it.

It sounded like a direct regurgitation of what the presenter had been taught. No development, no more recent information, no scientific background... It would have been nice to have the scientific explanation behind the information that was presented and not basically 'here is the data and that is it' which was the essence of a lot of the slides.

A recurring theme in interviewees' responses was a concern over bias, vested interest, confusion, reliability and uncertainty. Credibility of the information and transparency of knowledge were perceived as important.

I felt generally it was selective and one-sided approach. I do agree with the general thesis to start with ... through industrialisation we have dramatically changed our emissions and it is going to have some significant impacts but the certainty with which the evidence was presented, assumptions were been made but there was no evidence. It was selective ... because they were trying to create a dramatic scene.

Another common concern was that D felt that they were not the intended audience for the TCP event:

I mean the presentation was probably designed for a broader audience and for a range of people who might not be aware or want too much scientific information but this is something I was personally hoping for and it did not really get into it.

Some expressed concerns about vested interest as suggested by this comment: *'It had an agenda that was being pushed and that agenda was that man-made climate change was happening and it is going to result in catastrophic changes in our environment'*. Furthermore perceptions of bias were sufficient to cause suspicion, which in turn detracted from the credibility of the educator and content. Indeed the majority of D gave precisely those reasons for a lack of change in their cognitive engagement as a result of attending a TCP event: *'It was lacking scientific credibility and there is more and more evidence in available literature that there is not a 100% consensus yet'*.

Where the educator was not able to explain the scientific slides in adequate detail, the perception of limited knowledge and expertise in science damaged trust in the educator: *'This individual clearly did not have a level of understanding acquired to present the material she was presenting'*. This links the content and the educator; an educator who could not appropriately explain the scientific content lost some credibility and led some D to tune off during the TCP event. The D were looking for an expert on science and an experienced speaker who could present an in-depth view of the science of climate change without dramatising the climate change story. During interviews, some D reported not asking questions because they were unsure that the educator had enough background knowledge to answer them: *'It also gives people more confidence to ask questions if it looks like the presenter really knows his/her stuff and can lead a conversation and thrash out ideas'*. My own observations confirmed the limited or lack of interaction.

Some D also expressed concern about not having the space and time to debate the issue as they believed that *'there are still areas in this thesis that are debatable and those are the things people are wanting to talk about'* and yet *'there was not really a forum for people to disagree or express their opinions'*.

The comparison between Q1 and Q2 showed a slight increase in agreement with the statement: 'Climate change is an urgent issue that requires immediate attention' (mean increased from 3.00 to 3.13; see Figure 5, p. 118) after a TCP event. Some D felt that action should be taken as a matter of precaution while, for others, climate change science had to be more accurate before it could be used as a basis for making decisions; it had to be proven that climate change was caused by people: *'I am still not convinced'*. The comparison between Q1 and Q2 also showed a slight increase in agreement with the statement that 'Australia is vulnerable' (mean increased from 3.25 to 3.50) but a slight decrease in 'Climate change is already having impacts' (from

3.88 to 3.75, see Figure 5, p. 118). This could be explained by the strong reaction of most D to being presented with a lot of content on impacts and seeing such approach as too 'sensationalist', playing on emotions and thus suspicious: '*A lot of inferences were being made*', '*I did not find it very scientific*', '*It felt like there were linking every weather event to climate change which I think is disingenuous and bad science as well*', and '*What happened is that they were simply promoting the sort of climate change doomsday scenario and tagging everything to that*'.

Findings indicate that the D felt that the content was not impartial, and that focusing on imagery portraying the most dramatic climate impacts was counterproductive, for this group. Scepticism was triggered unintentionally as climate change was perceived to be exaggerated in order to support a particular agenda:

I think there was a lot of talk about the consequences of climate change and it was really about building fear ... I have a problem with that. Fear is OK as long as it is founded and grounded in good science.

Affective outcomes - D

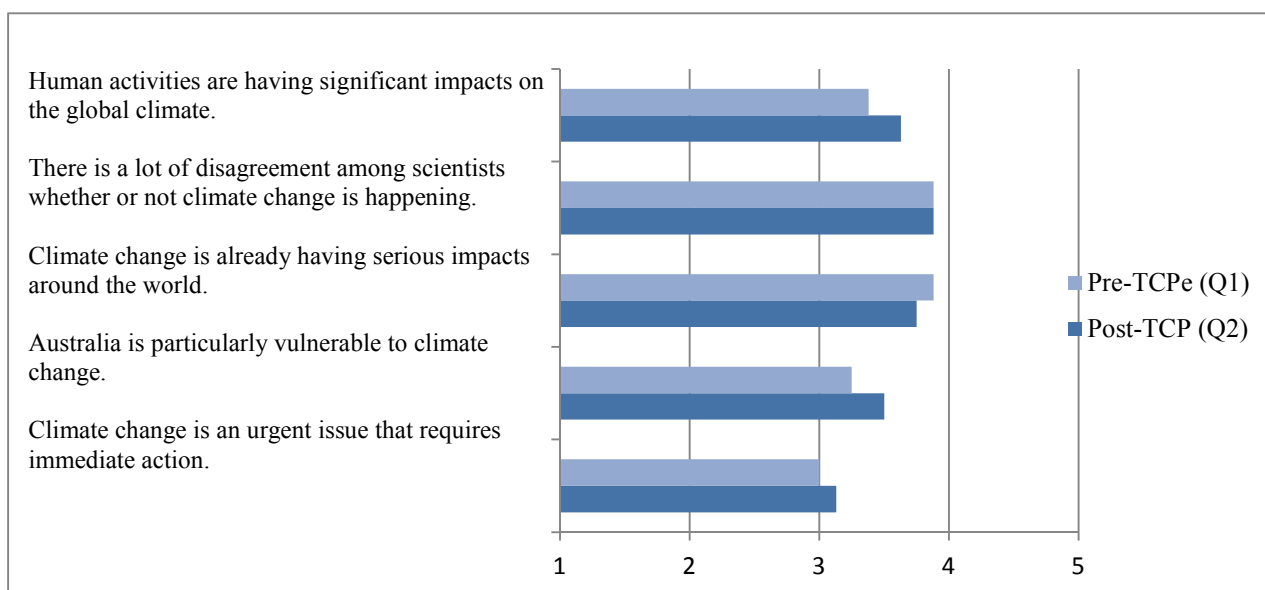
No D reported any change in their level of worry about climate change as a result of the TCP event. This was partially because they believed that the content presented and educator had vested interests and as a result likely to exaggerate the problem, as illustrated by this comment: '*I don't think it is as big as a problem as it was presented in that presentation by any stretch*'.

Although the possibility that climate change might be catastrophic was accepted, most D were still uncertain after attending a TCP event and were waiting for answers to be made sufficiently clear and legitimate by more scientific endeavour. Moreover, some D also commented on the content being too sensational, emotional or based on fear, rather than grounded in science, as shown by this comment: '*I think they sensationalised climate change, they overemphasised a lot of the effects*' and thus likely to exaggerate climate change; or:

It was very emotive. From a purely scientific perspective, much of the information was relayed to the audience in an emotive way. It was playing with emotions surrounding the whole issue of climate change potential impacts.

Implicit in these comments was a critique of emotional appeal being perceived as unscientific, biased and therefore suspicious. As a result such content was likely to be distrusted and rejected and thus was less susceptible to increase D's level of worry about climate change. This suggests that emotional content was counterproductive as it served to increase D's scepticism or uncertainty and at times reinforced their position of sitting on the fence.

Figure 5 Mean changes (before and after a TCP event) - 'Doubtful' group



The level of agreement was measured as 1 = strongly disagree, 3 = unsure, 5 = strongly agree.

Behavioural outcomes - D

When asked if they had acted differently as a result of attending a TCP event, all D stated that overall their behaviours had not changed. Most reported that, while they were still not convinced about the impacts of human activities on the climate after TCP, they were happy to continue taking action to reduce their ecological footprints and live more sustainability, such as saving energy and water saving.

Don't get me wrong, I am all for eating, improving our air quality, greening our Earth and things like that ... but the presentation did not change what I do.

I am still not convinced. I plan to be more sustainable; however, I am unsure of the impacts that will have.

One apparent behavioural outcome associated with TCP was an increase in information-seeking behaviour as shown in these comments: *'I am just unsure as to all the science and I am still gathering information to be better informed'* and *'I plan to keep myself more informed, do a little more research'*.

4.3.3.4 Second semi-structured interviews

The possibility that climate change might be catastrophic was accepted, yet the D were still sitting on the fence waiting for confirmation, for an answer that was made sufficiently clear and legitimated by scientific rigour as illustrated in this comment: *'At the end I am not a scientist so for all I know everything presented might turn out to be right but I will wait and see'*. They were still uncertain about the causes and impacts of climate change- natural versus human.

I don't think my thinking changed at all really. I am still a great believer that is part of the evolutionary effect ... I do accept that human interference has an effect on it but I generally think the natural effect is much greater.

The D also still expressed strong concern about uncertainty, complexity, and perceived bias and vested interest behind calls for action on climate change. This was seen as problematic because these were perceived as clouding the truth. Second interviews reveal decreased engagement with climate change as participants perceived that it had become even more contested and arguable.

The issue is for me that there is that debate I suppose so unless some really hard concrete stuff came out that had the collective agreement of pretty much everybody but I guess that will never really happen ... yeah, if there was something really concrete that came out, that would probably obviously made me change my mind a great deal.

I haven't done much to sort of change my opinion I guess ... I sort of really got tired of the debate after a while. It still seems like there was a lot of debate, sort of too much debate and a fair bit of uncertainty. It did not really stay at the forefront of my mind because I didn't really think that it was as big of an issue as what it was initially made out to be.

The D also thought that climate change had become too politicised, which made some suspicious of information on climate change provided by the government or politicians because the assumption was that it was politically motivated.

I see it becoming more a political issue. There are a lot of divided science and divided views. The political side seems to be quite set and they are sort of happy to do their bits and take a certain view from scientists and run with it because it suits them.

4.3.3.5 Summary – D

Most D stated in Q2 and SS1 that they had not learnt anything and that this was commonly attributed to the educator. Concerns centred around not being provided with an in-depth and balanced argument on the scientific content of the causes, impacts and solutions relating to climate change. They were also disappointed by the lack of opportunity to ask questions and debate the data. Interview responses suggest that the content of TCP and the way it was presented and investigated were matters of concern for the D. Second interviews indicate that D still focused on aspects of uncertainty, and remained on the fence.

4.3.3.6 Individual profile - Paul

The table below summarises Paul's contribution to the three stages of this research and highlights how TCP affected his level of engagement on climate change.

Table 4 Individual profile summary for Paul, a member of the ‘Doubtful’ group

<p>Questionnaire 1</p> <ul style="list-style-type: none"> • Paul was interested in climate change and wanted to find out more about the science behind the issue. • He hoped to get a broader understanding of the science of both natural and man-made effects that influence the Earth’s climate. • He was unsure that global climate was changing. • He worried only a little about climate change. • Paul rated both his understanding of the causes and of the impacts of climate change between fair and good. • He somewhat disagreed that human activities were having significant impacts on the global climate. • He somewhat agreed with the statement that there was a disagreement among scientists about whether climate change is happening. • Paul was unsure whether Australia was particularly vulnerable to climate change. • He was unsure whether climate change was an urgent issue that required immediate action. • He felt that he could personally take action to help limit climate change and listed ‘don’t drive to work’, ‘turn off appliances’ and ‘recycle’ as suitable actions. <p>Questionnaire 2</p> <ul style="list-style-type: none"> • When asked what, if anything, he felt he had learnt from the TCP event, Paul’s response was <i>‘I am still not convinced. There is still uncertainty in the data and the presentation did not address all the issues’</i>. • He was not more convinced that global climate is changing. Nor was he more or less worried about climate change. • He did not report that the TCP event had helped him to better understand the causes and impacts of climate change. • He disagreed that Australia was particularly vulnerable and that climate change was an urgent issue. • Paul recommended: <i>‘more scientific background and also needs to address what the sceptics are saying’</i>. 	<p>First semi-structured interview</p> <ul style="list-style-type: none"> • When asked why he attended a TCP event, Paul response was: <i>‘I am not completely sold but I am interested.’</i> • He believed that the climate was changing; however, he still had questions about the causes of the changes (whether human induced or the result of natural cycles). • Paul still encountered conflicting information and multiple reports on <i>‘both sides’</i> of the argument; therefore, he was still uncertain of the causes, the effects (negative or positive) and effective solutions. • Paul was doing his own research seeking more information from both sides of the argument to help clarify and make up his mind on climate change. He was looking for up-to-date scientific information, data grounded in solid science, more background knowledge on the slides and how the information was gathered. • He was not opposed to people taking action to reduce their ecological footprint and be more sustainable. However, he doubted the efficacy of these actions in the long run. • He reported no change after the TCP event: <ul style="list-style-type: none"> - In the way he thought about or understood climate change because it was too biased, not new, and did not give an explanation behind the information or a solid scientific background. - He planned to look for more information on a CSIRO study on climate change and the increase in infectious diseases. However, he reported that the motivation was not strong enough, that he had no time and felt lazy. • He was disappointed by the TCP event because: <ul style="list-style-type: none"> - He was looking for an expert educator with a strong scientific background who could give him a scientific explanation behind the information presented stating <i>‘the information was relevant but sometimes it is as good as the person who presents it’</i>. - He would have liked to see both sides of the debate and felt that TCP presentation was one sided. 	<p>Second semi-structured interview</p> <ul style="list-style-type: none"> • In the second interview, Paul stated that he did not feel that climate change had gained importance. • Paul’s attitude on climate change had not changed. He is still at the ‘trial’ phase and looking (not actively) for scientific information that would support or detract from the theory that climate change was human or naturally induced. • <i>‘There are a few things for me that need to be answered before I am fully sold on the whole thing. As I said, in the meantime, I am still happy to do my little bit more for general environmental health than climate change specifically’</i>. • Paul still took some small actions to reduce his ecological footprint and be more sustainable. He acknowledged that he should bike to work rather than drive but not so much for climate change as for health reasons. • He was willing to take small actions and to support legislations as long as this involved no direct cost, little change to his existing lifestyle and no inconvenience. • Paul claimed that there were a lot of people like him, not fully sold on climate change. • Paul still doubted his self-efficacy and the efficacy of his small individual actions. • Paul was still bogged down by describing climate change as ‘global warming’ when, in some parts of the world and at some times (e.g. 2008 as he mentioned), it was getting cooler. Therefore, there is a lot of confusion and uncertainty leading to scepticism and switching off. • Paul still took a look at the issue but from a distance. He wanted to stay informed and had conversations yet the issue is not at the forefront of his mind and he was not too concerned.
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Summary - The questionnaire, the first and second interviews reveal that Paul was sceptical of human-caused climate change due mainly to what he perceived as a lack of scientific consensus and uncertainties. Six months after attending a TCP event, Paul felt that his position was unchanged. This was due, in part, to a *‘wait and see’* attitude rather than pro-actively seeking additional information. He was not averse to make small incremental changes in his life to reduce his ecological footprint independently of his views on climate change. He was, however, not supportive of large-scale efforts or climate policies.

4.3.4 Brief synthesis of the typology

Differences and similarities between groups will be explored further in next chapter, Chapter 5 but this section presents a summary of the key findings for the typology (see Table 5). In addition, Appendix 7 and Appendix 8 present a synthesis of the quantitative data comparing the three groups.

This study has identified three learner groups that each responds to climate change in its own distinct way and thus has different interests and needs in the TCP program. The learner groups were identified based on their level of cognitive, affective and behavioural engagement in climate change and their reported outcomes and learning experiences at TCP. The three groups were distinguishable on all these dimensions and display different levels of engagement with the issue. The typology allowed me to investigate ‘Who learnt what, how?’ or ‘which group of learners or participants gained in what ways and how?’ (Storsdieck et al. 2005, p. 355)

- The ‘Already converted’ (AC), ‘Early aware’ (EA) and ‘Doubtful’ (D) differed in their levels of cognitive, affective and behavioural engagement on climate change as well as their motivations for attending a TCP educational event. Results indicate that this diversity strongly influenced what and how they learnt from their experiences at a TCP event.
- The three groups also differed in size: the largest group, the AC represented 60% (45 of 75 participants); the EA comprised 29% (22 of 75); and the D made up the smallest segment 11% (8 of 75). Results show that each group had different interests in and needs from the TCP program’s content and learning process.
- The three learner groups were not characterised by significant differences in age and gender. Results show that the mean age across the three groups was about 43. The gender ratio was almost evenly split in the AC and the EA groups. Although all the D were male, this sub-sample may be too small to draw conclusions based on gender.
- Learners differed in their pre-existing knowledge and understanding of climate change, their interests, their (information) needs, the information channels they used and what sources were credible to them.
- All groups accepted that climate change was happening but they were divided about the role of human activities in its cause.
- The groups had different learning needs. The AC and EA were particularly interested in learning more about what Australia as a nation and they personally could do to reduce climate change; they wanted knowledge about potential solutions and practical knowledge that enabled individual and collective action. The D, however, were primarily interested in learning about the science and scientific arguments behind the causes and impacts of climate change.
- Evidence shows that attendance at a TCP event affected learners’ cognitive, affective and behavioural engagement with climate change in different ways.

Table 5 Synthesis of the three learner groups: Differences and similarities

<p>The ‘Already converted’ (60%)</p>	<p>The ‘Early aware’ (29%)</p>	<p>The ‘Doubtful’ (11%)</p>
<p>Overall, this group was the most active and engaged (knowledge, affect and behaviour) on climate change. Prior to attending a TCP event, they were convinced that climate change was happening, was primarily human-caused and believed that it was a serious and urgent problem. They were taking a range of actions to address the issue as consumers and citizens.</p>	<p>Overall, the EA were moderately engaged on climate change prior to attending a TCP event. All believed that it was happening and that human activities were playing a part, and they were somewhat worried. They took some individual actions to reduce their own environmental impact, mostly in the private sphere.</p>	<p>Overall, the D believed that climate change was happening but were sceptical about human causes. They were not too worried about the issue, thinking that it was not much of a threat yet. They took some action out of general environmental concern but not because of climate change.</p>
<p>The AC were interested in exploring in-depth the climate crisis and how climate change could be addressed. While most had interest in updated science, they had substantial interest in learning about solutions (individual and collective). They were also interested in meeting like-minded individuals and engaging in discussions with TCP educators and fellow attendees on climate change.</p>	<p>Most EA reported attending a TCP event because of a general interest in learning more about the topic. The EA indicated that they were looking for a better understanding of the causes and consequences of climate change as well as knowledge about potential solutions. Above all, they wanted information about practical actions they could take as individuals. Some EA also attended a TCP event for social motives. They were looking for opportunities to interact with others and find out what they were doing about climate change</p>	<p>The D were primarily interested in building factual knowledge on the topic and in learning more about the causes and potential harmful effects of climate change. Some were also interested in scientific arguments and how scientists knew that climate change was really happening. They were also interested in discussing the topic with the educator primarily and fellow attendees</p>
<p>The majority of AC felt only a marginally greater sense of engagement following a TCP event, mostly due to the generalised content and the lack of or limited opportunities for social interaction and discussion. This indicates that educators may have underestimated ACs’ level of understanding, knowledge and most importantly their interests and needs. This also indicates that engaging this group further on climate change requires more in-depth content on solutions and active learning processes that facilitate social interactions and discussion. Reinforcement appeared to be the main learning outcome for this group. Findings show that most TCP events missed opportunities to help AC move forward to the next step in the engagement continuum on climate change.</p>	<p>The ‘Early aware’ experienced the most change in their knowledge and understanding. In summary, the majority of EA felt a greater sense of engagement following a TCP event, mostly due to the content and educator .Most EA found the experience of attending a TCP event both satisfying and beneficial, the presentation format was well suited to their needs, and the opportunity to interact with others was appreciated (when it did happen and was seen as lacking when it did not). Some offered suggestions to improve TCP focusing primarily on solution-content and interaction with others; the EA wanted social validation and motivation. They suggested that TCP events ought to focus more on practical action that individuals could take and the efficacy of such actions.</p>	<p>Most D reported limited or no apparent cognitive, affective and behavioural outcomes as a result of attending a TCP event. Interviews revealed that all were still sceptical about human-induced climate change and uncertain about the science after attending TCP. Much of this was attributed to the content being perceived as too general, the lack of or limited discussion and the educator being perceived as biased or not knowledgeable enough about climate science. This contrasts with their initial expectations that the educators would be knowledgeable on the science. Interview responses suggested that the content of TCP and the way it was presented and investigated were matters of concern for the D.</p>

- When comparing the changes to the level of engagement with climate change (cognitive, affective and behavioural), I found that three groups reported various kinds of learning outcomes. Results demonstrate a small overall change in cognitive, affective and behavioural outcomes across the three groups.
- Reinforcement, confirmation or validation of previously held understanding, feelings and beliefs was a key outcome for all groups.
- Of the three groups, the EA reported the most learning outcomes suggesting that the EA are likely to be the major beneficiaries of TCP efforts.
- Both AC and D reported not being the intended audience for TCP events.
- Particular dimensions of the content were identified as being important to different learner groups -in relation to their learning needs and interests/motivations.
- Most learners, across the three groups expressed a clear preference for a more interactive and dialogical program including more time for questions, reflection and discussions about climate change. Indeed opportunities for interaction were something that many participants in the three groups enjoyed when it happened and would have liked when it did not. Social interaction was not a part of most TCP events I observed despite intense interest from most participants in this study.

4.4 Conclusions

While these results cannot be generalised to the entire TCP attendee population, as I did not address the needs, nor hear the concerns from those who did not attend or respond to the questionnaire, I believe that the results are reasonably indicative of the types of individuals and groups who are likely to attend a TCP event. There is evidence that the respondents in this study are not that odd a bunch. For instance, in conversations with TCP staff and educators (both part of this research and others across Australia) there was indication that whilst sceptics remained, most participants were naturally self-selecting, motivated to attend through concern or their own interest. Furthermore, my observations at the TCP events I attended (based on informal discussion before and after the events, comments during the event or at question time), suggest that those who did not fill in a questionnaire were not so different from those who did. As such, I believe that the non-respondents were not that different from my sample.

The evidence in this research can be considered in relation to the characteristics of the learners. Indeed, it was clear from the results that learners in the three groups had different levels of engagement with climate change prior to TCP and, therefore, different interests, motivations and needs. Results also indicated that the program affected different learner groups in different ways. This suggests that learning outcomes were affected by the characteristics of participating learners.

Evidence can also be considered in relation to three aspects of the education program: content-knowledge, learning processes and educator. When asked what facilitated their learning, most learners pointed to content-knowledge, learning processes (especially opportunities to interact and talk with educators and other learners) and the educators themselves. These three elements also had different impacts on learning experiences and outcomes for each learner group. These three elements were considered crucial in facilitating or hindering learning experiences and outcomes.

In summary, four elements emerged from this study's findings as crucial to learning experiences and outcomes: content-knowledge, learning process, educator and learner. Therefore, these elements should be considered carefully when designing and conducting educational activities aimed at facilitating learning for change.

Figure 6 shows a model⁸⁰, or ‘learning system’, that maps these four elements. The blue background represents the fifth element; this indicates the relationship of the four elements with ‘where’ the learning takes place, both in terms of the context in which an educational activity is conducted (e.g. in a community setting), and broader social contexts.

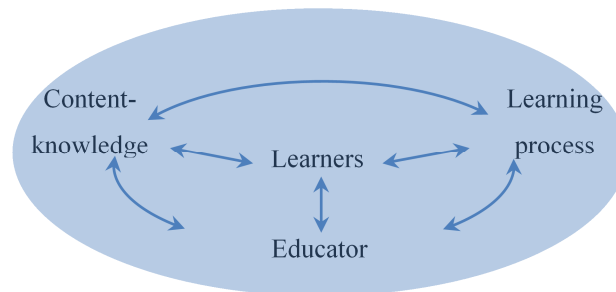


Figure 6 The ‘learning system’

The intent of this model is to guide the discussion in Chapter 5 that explores these elements further and the nature of their dynamic relationships in the context of facilitating learning for change.

This chapter clearly indicates that successfully educating and engaging each of the learner groups identified in this study on climate change requires different content and learning processes, including the roles of the learners and educators, each tailored to meet the interests and needs of each group. Such implications are discussed in the following chapter, Chapter 5, structured around the ‘learning system’ shown Figure 6.

⁸⁰ The idea of a heuristic model was inspired by the book *The Environmental Crisis: A System Approach* (Metcalf 1977).

Chapter 5 - Discussion

5.1 Introduction

The purpose of this chapter is to explore the theoretical and practical implications of the results presented in Chapter 4. The discussion is guided by the learning model presented in Figure 6 at the end of Chapter 4. This model encompasses five constituent and interactive elements: the learners' characteristics, the educator, the content-knowledge, the processes of learning including the roles of learners and educators, and the broader context in which learning takes place. The overall model is shown at the start of each section to indicate which element(s) are discussed and, most importantly, to highlight the relationships between elements in the context of facilitating learning for change. The chapter concludes with a summary of key findings.

5.2 The learners

This section focuses on the characteristics of the learners, at the core of the learning system (Figure 7), while their role in the learning process is explored in Section 5.4.

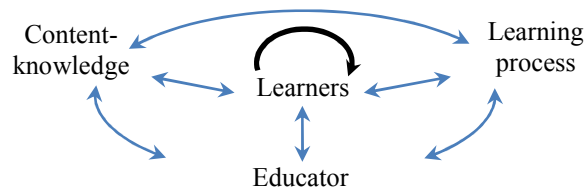


Figure 7 The learners

Perhaps one of the clearest findings emerging from this thesis is that, in order to facilitate learning for change, learners themselves must become the first concern. Evidence in this study stresses the importance of what learners bring to the learning situation. The typology in this study shows that the three learner groups, the 'Already converted', the 'Early aware' and the 'Doubtful', differed substantially in their pre-existing ways of thinking, feeling and acting on climate change. They also differed in what they wanted to learn and how they wanted to learn. These results clearly show that learners' characteristics, including the nature of their motivation and expectations, influenced significantly the nature and extent of learning outcomes and experiences at a TCP event.

I am of course not the first one to say that. Others have also found that different learners attend an educational program with different pre-existing knowledge, interests and needs and that these pre-existing characteristics can influence learning to various extents (e.g. Falk & Adelman 2003; Falk 2005; Jacobson et al. 2006). Yet, results in this study offer useful empirical data that supports suggestions in the literature that the most effective programs start with the learners in mind. Thus, knowing who will participate in an educational program, why they are participating and what and how they wish to learn is crucial knowledge for educators to design and conduct programs that meet the learners' interests and needs (Merriam & Brockett 2007; Merriam et al. 2007). This is particularly relevant when participation at an educational program is a voluntary activity, as in my case study.

The typology in this study, with three groups, loosely parallels the social theory nomenclature (Rogers 2003), as discussed in Chapter 2. The social diffusion model can be useful for educators seeking to enable learning for change as it offers a way of grouping learners based on where they are in the change process and also gives insights on how to move them along the change continuum. Because learner groups in this study, like categories of adopters, have certain characteristics, different learning approaches are needed to effectively 'educate' and 'engage' each of these groups on climate change.

- The 'Already converted' in this study possess some characteristics similar to what social diffusion theorists call early adopters (Rogers 2003). For example, the 'Already converted' were the most engaged group on climate change. They were convinced of the reality, seriousness and urgency of climate change. Most importantly, they believed that effectively addressing climate change required collective efforts. For most, such an outlook yielded a strong sense of responsibility and individual leadership which they exercised through their own actions (making them visible to others) and interpersonal communication. This is similar to early adopters, whose actions provide social proof for new ideas and practices and who also play a key role in talking to and sharing information with others (Rogers 2003). In this study, the 'Already converted' actively sought information to keep themselves informed on climate change but many also talked with others about climate change in their social networks. As a result, they reported looking for the latest content on climate change, primarily in-depth solutions, as well as opportunities to participate in discussions on climate change at a TCP event. As noted in Chapter 2, this group plays a key role in driving the social change process. Their beliefs and actions on climate change can activate diffusion process and trigger a critical mass (Rogers 2003).
- The 'Early aware' group in this study share some characteristics with the early majority defined in the social diffusion literature in Chapter 2. The 'Early aware' were also convinced

that climate change was happening and was a serious problem but they were less actively engaged than the 'Already converted'. They attended a TCP event looking for more information to clarify or increase their moderate understanding of the issue. They were also particularly interested in finding out what additional actions they could take as individuals. Moreover, they were also interested in what others (in their communities as well as in the broader context) were doing about climate change. This is consistent with the concept of social proof in the social diffusion literature. The early majority looks to others for evidence of how to think and act, especially under conditions of uncertainty (Bator & Cialdini 2000; Grieskevicius et al. 2008; Rogers 2003). As Rogers (2003) states, this group is deliberate in adopting new ideas and practices and they are neither the first to act nor the last. Social diffusion theory tells us that this category also plays a key role in change as they follow in the steps of the early adopters.

- Although the 'Already converted' and the 'Early aware' groups correspond closely with the early adopters and the early majority of social diffusion theory, the 'Doubtful' group in the study is different from the so-called laggards (Rogers 2003). While laggards are often described as suspicious of the new and lacking knowledge and motivation to adopt a specific innovation, the 'Doubtful' were not disengaged nor did they avoid thinking or learning about climate change. They were interested in the topic of climate change and willing to listen and consider. They felt that they were moderately or well informed about its causes and impacts. However, they alluded to uncertainties in the science and the complexity of the issue and, while they took some action to reduce their own ecological footprints, they adopted a 'wait-and-see' attitude to climate change. They reported looking primarily for more in-depth content and discussion about climate science to reduce their uncertainty and to help them make up their minds on the issue.

Each learner group in this study differed in what they wanted to learn and also in how they wanted to learn and which educators were perceived as most credible to them on the topic of climate change. This is consistent with social diffusion theory (Rogers 2003) that states that adopter categories require different types of information and communication channels to move forward in the change process. Comparing the typology of learners in this study with adopter categories provides one useful way to illustrate which stage each group has reached in the change process and, therefore, what their learning needs might be. The data in this study also reinforces the notion that the scope and purpose of an educational program should be linked to the participating learners or, in other words, to what can or should be achieved with specific learner groups.

This study exposes the value of grouping learners based on their characteristics and motivation to help ensure that educational experiences lead to meaningful learning experiences and outcomes. This study contributes to the growing literature on typologies of individuals (e.g. Dunlap 1998; Lorenzoni & Hulme 2009; Lorenzoni & Pidgeon 2006; Rose 2007) and segmentations in public views of climate change in the US, UK and Canada (see Angus Reid Strategies 2007; Downing & Ballantyne 2007; Leiserowitz 2007; Maibach, Leiserowitz & Roser-Renouf 2009, Leiserowitz, Maibach & Roser-Renouf 2010; Leiserowitz et al. 2010, 2011⁸¹). For example, in an opinion poll on climate change conducted in the US, Maibach et al. (2009) differentiate six distinct groups within the American public. These six groups - the Alarmed, Concerned, Cautious, Unconcerned, Doubtful and Dismissive - are distributed along an engagement spectrum from being strongly engaged on climate change to being completely dismissive of climate change as a threat.

If we compare the groups identified by Maibach et al. (2009) with the three groups identified in this study, some commonalities and differences can be highlighted. The 'Already converted' in this research share similarities with the 'Alarmed' group in that they were fully convinced of the reality and seriousness of climate change and were already taking action to address it. The 'Early aware' lean more towards the 'Concerned' group in that they were also convinced that climate change was happening and was a serious problem but they were less engaged on the issue than the 'Already Converted' and the 'Alarmed'. They differ from the 'Concerned' group, however, on a couple of points. There is little similarity between the 'Doubtful' group in this study and the 'Doubtful' group identified by Maibach et al. (2009), who defined 'Doubtful' as a group who did not know much about climate change and who were unlikely to seek out information on the topic. The 'Doubtful' in my study were informed on the topic and sought out more information to help make up their minds⁸². They believed that climate change was happening. They were, however, uncertain about human contributions to climate change and alluded to uncertainties in science. The 'Doubtful' in this study share some similarities with the 'Cautious' group in that sense; beyond this, however, there is little similarity between those two groups.

My study and that of Maibach et al. (2009) both show that successfully engaging different groups on climate change requires different educational strategies tailored to their needs and

⁸¹ The Six Americas is part of an on-going program of research. The six audiences were first identified in a first report released in May 2009 and were re-assessed in January 2010, June 2010 and May 2011. In this thesis, I used the May 2009 report for comparison as this data was collected in 2008/2009.

⁸² This could be because Maibach et al. 2009 used a sample of the general public while I looked at individuals who opted to attend a climate change educational event. In contrast to the data available from quantitative studies of large representative samples of the general public, findings in this research come from an in-depth study, predominantly quantitative, of a smaller sample. Despite these differences, the vast majority of segmentation, grouping or typology studies, including this study, highlight the need to identify different approaches to reach different groups.

interests. This is in line with an increasing interest in the climate communication literature in identifying and targeting of different ‘segments’ or groups of individuals who share similar characteristics such as beliefs, values, interests or behaviours (see Leiserowitz 2007; Lorenzoni & Hulme 2009; Maibach et al. 2009; Moser & Dilling 2007). While the majority of ‘segmentation’ studies are primarily quantitative, this study provides empirical data, mostly qualitative, on three distinct groups of adult learners within the Australian society who respond to climate change in different ways and thus require different educational approaches.

Evidence in this study clearly indicates that TCP cannot ‘educate’ the ‘Already converted’ in the same way that they can the ‘Early aware’ or the ‘Doubtful’. Other researchers in climate change communication (e.g. Moser 2006a, 2009; Whitmarsh 2005) also believe that communicators have to think clearly about who the audience is and not rely on a ‘one-size-fits-all’ approach. This is echoed in environmental education, as noted in Chapter 2, where proponents of transformative education and environmental adult education call for learner-centred approaches (e.g. Clover 2002c; Sterling 2001). This study highlights the importance of having a clear understanding of the characteristics, interests and needs of those who participate in community-based education programs.

The typology of learners that has emerged in this study carries important implications for determining the appropriate content-knowledge, learning processes and educator (all key elements of the learning system, see Figure 7) to effectively engage the ‘Already converted’, the ‘Early aware’ and the ‘Doubtful’ on climate change and facilitate learning for change. The following sections explore these implications.

5.3 Content-knowledge

This section explores the relationships between content-knowledge and learners (see Figure 8) to ascertain the links between content and learning outcomes for the different learner groups. This study exposed the need for content to be learner-centred as well as context-driven to meet learners’ interests and needs. This is consistent with the call for a more transformative approach to environmental education, as outlined in Chapter 2.

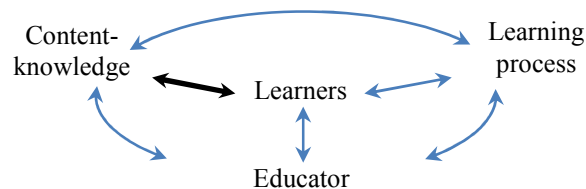


Figure 8 The content-knowledge

As seen in Chapter 4, learners in all three groups were not ‘clean slates’ when they attended a TCP event. They had been exposed to a wide spectrum of information sources on climate change, such as direct experience, media, educational activities, the documentary *An Inconvenient Truth*, informal social networks and their peers. The three groups reported different levels of cognitive engagement on climate change prior to a TCP event. They also reported different cognitive interests and needs. When considering the content-knowledge of an educational activity, a major imperative becomes then defining the parameters of such content to meet the interests and needs of specific learner groups within their contexts.

While the majority of learners were looking for novel and updated content on climate change science, they were primarily interested in climate change solutions. Many commented that TCP events focused primarily on climate change science rather than solutions. Furthermore, when solutions were provided, they were mainly solutions for individuals (Section 5.3.3 explores this point further). Such evidence indicates that there was a discrepancy between the content that the different learner groups expected, or were interested in, and what was presented to them. Thus, the results suggest that while providing more scientific content might marginally increase or reinforce some learners’ cognitive engagement on climate change, a greater focus on solutions would better fit most learners’ needs at this time.

5.3.1 Beyond extensive content-knowledge on climate science

Interviews and observational evidence reveal that the most commonly emphasised dimension of content-knowledge at TCP events was climate science. Such a focus was apparent in the extended content on evidence of climate change (e.g. information on the Earth’s climate and the natural and man-made causes of climate change, as well as observed and anticipated physical impacts of climate change) and the limited content on how we might respond. The latter commonly comprised only about one-quarter of the program.

Such scientifically oriented content implies that science was seen, by the TCP program and educators, as the central interest of most learners or at best that learners needed to understand climate science in order to further engage on climate change. Such an approach follows the

logic, discussed in Chapter 2, that people need to understand the science and its dire implications before they can be expected to act in response to climate change⁸³. This is consistent with the information deficit model in Chapter 2. As a result, the primary emphasis is on making science accessible and understandable. Most interestingly, findings in this study suggest that knowing that the problem exists and that human activities are playing a role in it may be sufficient to prompt a desire for action and, therefore, a desire to seek knowledge about solutions. These findings have practical implications for the content-knowledge component of TCP events.

Although TCP educators were encouraged to customise their presentations, they were requested not to change the sequence of Al Gore's slideshow, in which climate science was predominantly featured, defended and used to push a specific message: that climate change is real and it is a problem. This reflects a strong belief in the persuasive power of science, as exemplified in this comment from a TCP educator addressing attendees: *'Some of this is painful and hard to let in but the information is so convincing and compelling'*. This suggests that TCP was guided by a belief that the scientific framing of climate change was the most compelling story, regardless of differences among learners. Yet, findings in this study indicate that most learners were already persuaded that climate change was real and urgent and those who were not, the 'Doubtful', commented on the science content being too general and biased.

The three learner groups reported different levels of interest in climate science. Results show that the strong focus on climate science, and its impacts in particular, affected learners differently. Such content had the most impact on the 'Early aware'. For this group, the evidence content served to increase their awareness of climate change and their sense of urgency about the issue, to clarify some uncertainties they had and to add to or reinforce their understanding of causes and impacts. The same content, however, had limited impact on the 'Already converted' and the 'Doubtful'. For the 'Already converted', such evidence content mostly re-confirmed or reinforced rather than changed or increased their pre-existing knowledge and understanding of climate science. Most had some interest in science yet they had already accepted the scientific evidence and wanted up-to-date content or *'new developments'* on the issue. Most reported that the science content was too general. For example, several commented on the TCP event being a *'good introductory presentation'* aimed at a broader audience with limited understanding of climate change. Most commented that there was too much focus on understanding the consequences rather than the causes, and hence, related potential solutions. The 'Doubtful' group also indicated that the science content was too superficial and thus did not meet their expectations. They questioned the climate science and thus wanted in-depth content on science

⁸³ It is important to note that such a focus is not exclusive to climate change. As Jensen (2002) suggests, in environmental education, environmental problems are often approached from a scientific perspective with a strong focus on scientific content about how serious a problem is and how quickly it is evolving.

and an explanation behind the content (e.g. how the data was collected). Most also perceived the evidence content as biased and one-sided, pushing a specific agenda rather than exploring what they referred to as ‘*both sides*’ of the climate change story or directly addressing what sceptics were saying.

Learners in all three groups reported some level of interest in climate science. Therefore, it can be argued that there is a place for science content in such a program. One explanation for the interest in science content may be due to the nature of climate change, which is a rapidly evolving and complex issue, as noted in Chapter 2. Indeed, the science of climate change is subject to rapidly increasing amounts of scientific research, intense media coverage, controversy and political debate, making it challenging for most people to fully understand the multiple aspects of the issue and stay informed. Certainly, most learners in this study were interested in up-to-date content-knowledge. Findings show, however, that such science content needed to be different (both in terms of depth and extent) for each learner group, as their interests in and need for scientific knowledge varied greatly. Furthermore, most learners in the three groups felt that the evidence content was mostly used to convince them that climate change was a real and important issue. As this participant stated: *‘It [the presentation] had a main agenda... it was about making people aware that climate change was a serious and urgent issue’*. However, most felt that they were past that point, as they already believed that climate change was a real issue and had accepted the scientific evidence of climate change.

Findings also indicate that most learners were not unsure about the reality and seriousness of climate change (as most had identified it as a problem, although they might perceive and understand it differently) but about our ability as humans and societies to solve these challenges. For example, some learners talked about grappling with understanding how we could solve the climate change issue and the role they could play in the change process. Such interest in the ‘how’ (that is, potential solutions to the problem) was evident across the ‘Already converted’ and ‘Early aware’ groups. For example, while the ‘Already converted’ expressed a strong desire for change, comments suggest that this desire was constrained by a lack of understanding or direction on which actions to take beyond what they were already doing, and how to instigate broader social changes. Such findings clearly indicate that, if there was a knowledge deficit preventing most learners from acting further on climate change, it was not a lack of understanding of science but a lack of understanding on how to bring about change to effectively address climate change issues. These findings confirm suggestions in the literature that a lack of understanding of solutions can act as a critical barrier to behavioural engagement (see De Young 2002; Kaplan 2002; Lorenzoni et al. 2007; Moser 2010b; Whitmarsh et al. 2010).

Observational evidence concurs with participants' comments that content consisted primarily of proof that climate change was real, and warning of negative consequences. Solution-content was a minimal part of the educational activity and often at the end of the slideshow presentation, despite a stronger interest from the majority of participants. As one 'Already converted' participant stated: *'It was a classic case, eighty minutes of consequences and then what can you do addressed quickly at the end'*. This study exposes the need for solutions to be an integral part of the content in order to signal to learners that this is a problem that can be solved and to increase their understanding of possible solutions. This study reveals important knowledge gaps. Many learners lacked some of the knowledge needed to make informed decisions on the issue, and that this lack of understanding constituted a barrier to action. Therefore, facilitating learning for change and moving learners towards further action in their own lives and communities requires a strong solution-content.

Evidence indicates that what most learners needed was the 'how', or what Tribbia (2007) referred to as strategic knowledge, defined as a strong focus on the concrete means for tackling the problem and bringing about change. As one 'Already converted' respondent stated: *'Give us the scenario but then move to what we can do'*. Indeed, one of the key reasons for the limited behavioural outcomes, at both individual and collective levels, reported by most learners was the limited content on possible solutions, as well as what was already being done or what could be done. These findings clearly indicate a relationship between knowledge about specific actions and taking action. This study demonstrates that content-knowledge about actions/solutions is one aspect of moving towards action. Thus, the ability to further individual and collective behavioural engagement on climate change could be enhanced by content that enable people to know what meaningful actions they can take beyond what they are already doing, as well as how to facilitate broader changes. This argument is similar to that of Jensen (2002) who argues that, in the context of environmental education, although knowledge *per se* does not lead to action, knowledge should still be considered an important pre-condition for moving toward action. However, this requires a specific type of knowledge, or what Jensen (2002, p. 332) refers to as 'action-oriented knowledge'⁸⁴, including actions at all levels and pathways for change, rather than a prime focus on knowledge about the existence of the problem and its effects, extent and seriousness. Evidence in this study suggests that the dimensions of knowledge vital to facilitating learning for change (in other words, the types of knowledge conducive to action) involve understanding solutions for climate change at all levels and pathways for change towards a more sustainable future.

⁸⁴ According to Jensen (2002), action-oriented knowledge is one important pre-condition for the development of 'action competence'. Jensen and Schnack (1997) offered the concept of 'action competence' as an educational ideal in an action-oriented approach to EE. Action competence is operated through integration of cognitive and affective components such as knowledge, commitment, visions and action experiences (Jensen & Schnack 1997; Jensen 2002).

Indeed, most ‘Already converted’ and some ‘Early aware’ voiced disappointment in the strong focus on the problem (the ‘what’) and the lack of emphasis on solutions (the ‘how’). The recommendations some made also indicated the need for a more solution-oriented content including actions beyond what learners were already doing as well as broader solutions. This indicates a discrepancy between learners’ needs and strong desire for solutions and a largely problem-oriented content. Previous research in the field of climate change communication (e.g. FrameWorks Institute 2001; Futerra 2005, 2010; Moser & Dilling 2007) similarly identified that this tendency to focus primarily on depicting the climate change problem rather than offering solutions to tackle the problem - in other words maximising the problem and minimising the solution (Townsend cited in Black 2006) - was common practice. This is also common practice in climate change education, as discussed in Chapter 2.

This study shows that, while TCP educators may have been inclined or asked to present the underlying science of climate change, in the hope of motivating change, such content did not always match learners’ interests or needs. This supports the argument that starting from the learners is likely to be more effective to ensure that the content is relevant to them. Findings indicate that, while providing more scientific content might marginally increase or reinforce some learners’ cognitive engagement on climate change, a strong solution focus would be more relevant to most learners at this time.

5.3.2 Call for more content-knowledge on solutions

The previous section indicated that TCP events provided limited content on solutions but that there was a strong need for solution-content in order to facilitate learning for change. This section explores this point further, looking in more depth at the solution-content offered. This is particularly important as evidence in this study shows that the typology of learners has implications for the solution-content. Indeed, as learners’ levels of engagement with climate change and their social contexts varied, they were interested in and needed different solutions. Thus, the solution-content needs to be learner-centred and context-focused.

5.3.3.1. Strong focus on individual change

Evidence in this study indicates that solution-content was commonly approached from the individual-level perspective with a strong focus on change by individuals. Findings suggest that such an approach can be problematic in two main ways: such content did not meet the needs of all learners and it failed to capitalise on community settings to promote collective action. Both of these are explored below.

Observation and interview data indicate that TCP content often targeted an individual's sense of concern and responsibility. Presentations often concluded with a couple of slides providing suggestions on 'what you can do', including 'reduce your own carbon footprint', 'buy Greenpower', 'offset the rest of your carbon emissions' and 'spread the word'. It is important to keep in mind, however, that TCP educators were encouraged to customise their slideshows, and some educators in this study did by including more solutions; in those instances, the feedback from learners was positive.

Findings indicate that while the solution-content presented was appropriate for some learners, it was too limited for others. This highlights the importance of providing a range of opportunities for action that require different types of involvement, both individual and collective, to address the different learner groups' interests and their specific contexts. For example, the majority of the 'Early aware' were satisfied with the solution-content as they were looking primarily for practical actions they could take in their daily lives. However, the same content fell short for the 'Already converted' and some of the 'Early aware'. Findings show that the latter wondered what they could possibly do to counteract climate change beyond the individual actions (as consumers and as citizens) they were already taking, and most reported finding few answers.

The 'Early aware' were at the confirmation stage (Rogers 2003). For most, the content on solutions reinforced that they were already doing '*the right thing*' and encouraged them to do a bit more. However, they were still concerned that individual actions would not make a significant difference unless everyone else was taking action too. Although the 'Already converted' believed that their current individual actions taken together had potential to bring about change, they also wanted to find out more about the broader changes needed to address the social, political, economic and technological causes of climate change, and how these changes could be brought about. Results show that, at times, TCP presentations were disempowering and did not provide enough solutions for the 'Already converted' who were keen to take action beyond '*change your light bulbs*'. Many expressed some frustration at the lack of content on collective solutions as they held a strong belief in the need for concerted collective efforts to bring about the required changes needed to address climate change. On the other hand, after being presented with such a dramatic scenario, some 'Early aware' respondents welcomed hearing about 'small-scale actions' that they could take to reduce climate change (Section 5.3.4 explores this point further).

Focus on simple individual actions can be, however, problematic as results show that climate change can be even more daunting when interpreted in the context of individual actions. While individualising solutions commonly aims to empower individuals to take action, it can be disempowering to those who already take such actions and are looking for something else

(Section 5.3.3 revisits this point). Individual actions to help reduce greenhouse emissions, such as planting trees, recycling and using compact fluorescent light bulbs, can seem trivial and may be perceived as ineffective to address such a complex and global issue. Moreover, the argument to ‘do your bit’ relies on the belief that others, including governments and industries, will also take appropriate action (Bulkeley 2000). Results show that most learners felt that their efforts were useless unless others participated too, and this translated into a strong desire to know what others were doing. In this study, individualising calls for action raised the issue of efficacy from participants’ perspectives. For example, some learners perceived a discrepancy between the magnitude of the issue and individual solutions offered. Such findings highlight why a strong focus on individual action can at times be problematic and call for the need to offer a range of actions across different scales and establish a sense of collective response.

Individualising calls for action also fails to capitalise on the group or community setting in which the educational activity takes place. In the context of TCP, evidence indicates that the content’s focus on individual solutions limited social outcomes. Most learners reported no social outcomes as a result of TCP, partially due to the lack of collective solutions or actions in the content presented. This indicates that individualising calls for action was limited in its effectiveness because it did not take advantage of communities as places and spaces to motivate action at the community level. In order to facilitate community change, the solution-content should, therefore, be not only learner-centred but also context-oriented to encourage and promote changes directed at individuals but also at social settings (e.g. neighbourhoods, organisations and community groups). The argument put forward here is similar to that of Jensen (2002) who argues that knowledge about how we change include (1) knowledge about how to change individuals’ lives, (2) knowledge about how to contribute to change in systems and society at large, and (3) how people can work together to achieve these changes. Findings in this study indicate that such content-knowledge is crucial in facilitating learning for change in community contexts. This study supports suggestions in the literature in Chapter 2 that community-based education should aim for individual as well as collective change. Results show that most TCP events, however, fell short of building a sense of collective and explaining how individuals, groups and communities could be part of a broader response to climate change.

Moreover, findings indicate that while TCP framed climate change as a collective problem, most solutions presented to tackle the problem were individual solutions; this created a discrepancy between the way the problem was defined and solutions offered to solve it. Although most learners acknowledged the need for individual actions, they also believed that this was not enough to tackle the root causes of such a big issue. These learners felt that there was a big contrast between the small solutions presented (especially the ever-present ‘changing a light bulb’) and the magnitude of the crisis depicted. This is consistent with the discrepancy

outlined in the literature (see Ereaut & Segnit 2006) between stressing the large scale of the climate issue followed by telling people they can solve it through small individual actions. For some learners in this study, such discrepancy decreased their belief in our ability to solve the crisis. While it is important that people take ‘small’ individual actions, as this can have a substantive cumulative effect, evidence in this study warns against providing choices that are not proportionate with the magnitude of the problem. This study exposes the need to show how individual actions fit within the broader response to climate change and to build a sense of collective action. Moreover, findings suggest that when talking about climate change, it is important to be realistic about the major changes needed at all levels to effectively address climate change.

Focusing primarily on individuals can also be disempowering and increase a low sense of personal efficacy. For example, most learners reported disempowering beliefs regarding the efficacy of their individual actions especially when taken outside of a community or collective context. Most reported that people around them (in their closer circles and broader) were not engaged on climate change or taking action. These findings are consistent with other studies (see Bulkeley 2000; Moser 2006b) that show the importance of social contexts in change. Evidence in this study shows that a large number of learners attended a TCP event to either meet others interested in climate change or to find out how they can be part of the big-picture solution. Evidence indicates that TCP fell short of promoting a sense of the collective (particularly needed as participants often felt that their individual actions were not effective) and leading to collective action.

Some learners wanted to find out what was being done about climate change. After being reminded of or realising the challenges of tackling climate change, some learners expressed a desire for practical examples about changes already being made which they found motivational. Some suggested that they would have liked to see examples of individuals, groups, communities and organisations who were responding effectively to the challenges of climate change. This is in line with social learning theory (see Bandura 1995; Blewitt 2006; Jacobson et al. 2006), which suggests that learners can learn (through vicarious observational learning) from successful examples or case studies of others, especially those perceived as similar to them, that change is possible and increase motivation to act. Such examples can also help create a sense of collective, by providing social proof that others are doing it too, while exemplifying climate-related actions as new social norms.

Interview data indicates that some learners, mostly the ‘Already converted’, felt able to achieve more as a group than individually. This suggests that a sense of efficacy could be more efficiently fostered at the group or community level. According to Bandura (1995), increasing

the sense of collective efficacy, or the degree to which individuals in a system believe that they can organise and execute a course of action required to achieve collective goals, is seen as crucial to facilitating meaningful change in a social system. Findings in this study indicate that educating individuals and groups about the roles they could play not only as smart consumers, but also as community members and citizens, could help foster a sense of individual and collective efficacy both crucial in facilitating learning for change.

In this study, most learners perceived their sphere of influence or agency as limited because they did not know how to act to influence bigger changes, such as government responses. Findings also show that the 'Already converted' and some 'Early aware' wanted to better understand how social and political systems operated and how they could participate, influence decisions on climate change and effect broader change. Evidence in this study, however, shows that most TCP events fell short of helping these learners to find out how they could act in the sphere of civic and not just consumer action. These findings clearly indicate that, if individuals and social groups do not understand the processes by which they can exercise agency and become change agents, it is difficult for them to become socially and politically active. For example, some 'Already converted' and the 'Early aware' expressed an interest in taking environmental citizenship actions such as lobbying, petitioning and applying pressure to elected officials to take stronger action on climate change. However, after attending a TCP event, they were still unsure about how to get involved and also questioned the efficacy of such action, especially if taken individually. Such findings clearly indicate that a lack of understanding of individual and collective capacity to contribute to social change, and a lack of identification of meaningful ways to respond individually and collectively to climate change, can be strong barriers to engagement on climate change, as outlined in Chapter 2. Thus, this suggests that, if individuals and groups are to be engaged in active citizenship, they must learn how.

Evidence in this study exposes the need to expand beyond the private sphere for those learners interested in getting more involved in civic action. This requires more emphasis on educating them and providing them with practical ideas on how they can respond to the issue in the public arena. Emphasising the importance and value of individual and collective engagement in bringing about change on critical issues, such as climate change, might help foster a sense of political or civic efficacy. This is particularly important as successfully addressing climate change is not just based on the ability of individuals and communities to change, it requires policy changes (as seen in chapter 2). Consequently, individuals and communities must be educated on the political dimension of climate change if they are to make informed decisions and be mobilised to demand and support adequate climate change policies.

Furthermore, this study does not support the notion that simple private-sphere actions automatically spill over⁸⁵ (Thøgersen & Crompton 2009; Hoppner & Whitmarsh 2010) into more significant and difficult lifestyle changes and ultimately into public sphere actions; for example, that conserving energy at home would inevitably lead an individual to contact his/her elected politicians or participate in a demonstration to demand change. Evidence in this study indicates that, to facilitate such transition, content-knowledge must be included on how citizens can get involved and have a say in decisions about climate change at the community or national levels. This is consistent with transformative environmental education, as discussed in Chapter 2, which aims to help people gain the skills and knowledge required to act competently in the public sphere (e.g. Courtenay-Hall & Rogers 2002).

In this study, certain dimensions of knowledge, such as potential solutions and pathways for change at both individual and collective levels, have been identified as prerequisites for acting on the problem. However, merely identifying these is not sufficient. This study's findings show that it is equally important for the content-knowledge to be inspiring, motivating and enabling in order to trigger positive affective engagement and ultimately behavioural engagement. Indeed, findings in this study indicate that affective engagement plays a key role in determining action. This is explored further in the next section.

5.3.3 Emotional responses to content

This section examines participants' emotional responses to TCP content. As Moser (2010b) states, processing information on climate change is accompanied by and inseparable from emotions that are evoked by words and images. In this study, TCP content, including visual and verbal messages, prompted a range of emotional responses from feeling shocked, motivated and re-energised to feeling sad, overwhelmed and powerless. Such findings clearly demonstrate that learners' emotional responses must be considered carefully, as they can increase or hinder learners' affective engagement with climate change and ultimately their motivation for behavioural engagement.

5.3.4.1 Effect of threat-based or emotional appeals on affective engagement

The following comment by an 'Already converted' participant illustrates the subject of this section:

⁸⁵ Such a belief is illustrated for example by this comment from Al Gore (*Living on Earth* Program 2007) that 'when people take personal actions [on climate change], it leads inevitably to their desire to have changes in policies. They begin to communicate with the representatives at the local, and state, and national level'.

I feel like there was a lot of talk about the evidence and consequences of climate change and it was really about building up fear in the audience I think.

This indicates that the extended content on risks and climate impacts (as discussed in Section 5.3.1) was at times interpreted by learners as fear-building or emotive appeal.

Findings show that visual images were a powerful tool to grab most learners' attention and engage them on a more emotional level. For example, some learners reported in interviews that the use of dramatic images in TCP, citing for example melting glaciers, extreme floods and rising sea levels, made climate change '*more real*'. Such imagery played an important role in demonstrating or adding evidence of climate change impacts (current and projected), increasing awareness and sense of urgency, conveying the importance of climate change and acting as a shock effect. This clearly indicates that images can act as powerful and effective reminders of the reality of climate change. As one 'Already converted' participant said: '*The presentation shocks you back into reality and urgency of action*'. Moreover, emotional, vivid and dramatic imagery can also help prioritise the issue as it can slip behind more pressing matters dominating learners' lives. For example, some learners talked about the need and benefit of being reminded of the urgency and seriousness of climate change occasionally.

Evidence in this study supports suggestions in the literature that such imagery can capture people's attention (e.g. Moser 2007b; Nicholson 2004; O'Neill & Nicholson 2009) and convey the reality and urgency of the issue. However, the same imagery can also prompt feelings of powerlessness in relation to people's ability to make a significant difference to address such a big issue. For example, some learners reported increased concern, a sense of urgency, and motivation to action or further action. However, for others, the same images were associated with feelings of being overwhelmed, unable to do something, powerless and thus de-motivated. The 'Doubtful' were resistant to what they perceived as emotional appeal, which served mostly to increase their scepticism of human-caused climate change. This clearly indicates that fear appeal or dramatic images can be counterproductive and supported findings from other studies (e.g. Lowe 2006; Moser & Dilling 2007; O'Neill & Nicholson-Cole 2009). Indeed, the use of such images has implications for personal efficacy and response efficacy (defined by Moser (2007b) as the effectiveness of the proposed solutions to solve a given problem), as some learners were left feeling overwhelmed and helpless. For example, participants talked about feeling that their actions could make only a small difference to such a crisis. This indicates that, while fear appeal can help depict the scale of climate change through dramatic images, such an approach can exclude the possibility of action and agency for learners. This is in line with Ereaut and Segnit (2006) who stated that human beings as change agents are too often absent in dramatic scenarios. As an 'Already converted' stated: '*Climate change is so big and so bad that people don't think that they are empowered*'.

These findings are consistent with studies of the Hollywood movie *The Day after Tomorrow* (see Leiserowitz 2004; Lowe et al. 2006), which portrays catastrophic effects of climate change. These authors also found that dramatic images could heighten an audience's concern but also reduced their sense of efficacy in lessening climate change by taking action. The perception that the magnitude of climate change is so great that individual actions can make only a small difference⁸⁶, if any, presents a significant barrier to public engagement as outlined in Chapter 2 (see Segnit & Ereaut 2007; Lorenzoni et al. 2007). Furthermore, while pointing out the threats of climate change momentarily increased the level of worry for some 'Already converted' and 'Early aware' participants (indicated by their change attitudes and verbal expression of concern), as well as their motivation and intention to act, interviews revealed that this did not necessarily lead to further active engagement or actual long-term behavioural change. Thus, this study clearly confirms suggestions in the literature that fear is not an effective action motivator (see Moser & Dilling 2011) and adds empirical evidence for the need for the cautious use of fear appeals.

5.3.4.2. Importance of content structure

Findings in this study indicate that content on the overwhelming nature of climate impacts and its global scope (as seen in Chapter 2) are not likely to lead to action without realistic, empowering and enabling content on solutions commensurate with the magnitude of the problem.

Findings in this study demonstrate that content-knowledge on impacts and risk might be useful to convey the magnitude of the threat and urgency for action. However, to solve the climate crisis, it is critical for such content to be coupled with a strong solution-content, both visual and verbal, designed to increase understanding of existing and potential solutions and pathways for change. As an 'Already converted' suggested: *'You could spend ten minutes on "this is the problem", "this is what is going to happen" and then move to "what are we going to do about it [climate change]?"'*. This study also suggests that such content may help increase positive affective engagement on the issue and increase learners' sense of efficacy. This call is echoed by other researchers in both climate change communication and environmental education (e.g. Kaplan 2000; Elliott & Davis 2009; Jensen 2002; Moser & Dilling 2007; O'Neill & Nicholson 2009) who advocate that, to bolster people's sense of efficacy and to empower action, fear messages should be placed with messages that include concrete information about what to do.

While dramatic imagery can secure attention, it also can evoke negative emotional responses and increase the fear level in some learners. Thus, this study suggests that dramatic imagery can

⁸⁶ The global magnitude of climate change means that people may feel helpless, or what Lorenzoni et al. (2007, p. 450) refer to as a 'drop in the ocean' feeling.

play an important role in setting up the problem, but it needs to be coupled with strong solution imagery in order to alleviate the threat and convey a sense that the climate crisis can be solved. Evidence in this study indicates that there was limited imagery content on solutions, so presentation failed to convey a sense that the climate crisis could be solved. This study suggests that the more learners were disturbed by the prospect of climate change, the more they wanted to find out about solutions. These findings supports suggestions from the wider psychology literature (see Kaplan 2000; Kaplan & Kaplan 2009) that, to avoid being overwhelmed by the serious nature of the issue and therefore tune out or feel helpless, most learners wanted to know that they could take some action and that this action would be effective in addressing the issue.

Other researchers (see Lowe 2006; Moser 2010a; O'Neill & Nicholson 2009) have investigated whether the use of fear appeal is likely to actively engage people on climate change. This research certainly demonstrates that, while fear appeal has the power to grab attention, it needs to be used with caution as it can easily overwhelm learners and evoke counterproductive emotional responses and encumber behavioural engagement. Findings show that some negative emotional responses to climate change, such as fear, anxiety, powerlessness and hopelessness, if left unresolved, can strongly limit motivation for behavioural engagement and weaken commitment. This study indicates that realistic hope, a sense of efficacy and of possibility are required emotions when facilitating learning for change and motivating action.

This study also stresses the need for context-focused or localised content in order to increase climate change salience and facilitate emotional connections with the issue. For example, some learners mentioned that local imagery and content, as part of the TCP slideshow, created or could help emotional connection with the issue, while global imagery made the issue more distant. As one 'Early aware' respondent stated: *'I would have liked to see more local information because people don't relate to it if it is out there'*. While most learners in all three groups perceived climate change as a global issue, they appreciated (when it was included in the content) or would have liked to see (if it was not included) more localised content on both climate change impacts and solutions. Such findings are similar to other studies (Bulkeley 2000; Whitmarsh 2005) that indicated that more local images made an issue more personally relevant than did global images. Such localised content is also crucial for efficacy, as a sense of efficacy and possibilities for action are often best understood and perceived at the local level, especially for large-scale global issues (O'Neill 2008).

These findings suggest the need for a more localised approach in the backdrop of the global dimension, balancing the 'near and far'; it is crucial for the content to offer insights into how actions that individuals and communities can do locally can influence such a global issue, and how these actions are part of a big-picture solution). Findings in this study suggest that this

would help not only to build a better understanding of how local actions connect to this global issue but also to develop positive affective engagement.

This study suggests that, in order to facilitate learning for change, there must be serious consideration of the fact that, even with the best intention, an educational program can have unintended outcomes and be counterproductive. This is exemplified by this participant's comment: *'For me personally, I came away feeling less optimistic even though I think that is the opposite effect of what they [educators] wanted to have. I came away thinking this is insurmountable because of the way it was presented'*. This study's findings extend past research, as discussed in Chapter 2, showing that risk information and fear-evoking content can undermine the intended effects of a program. To facilitate learning for change, such content should be limited and always be combined with content that provides effective solutions at different levels.

5.3.4.3. Negative versus positive approach

Results in this study support suggestions in the climate change and environmental education literature (e.g. Jensen 2002; Monroe 2003; Moser 2007b) that 'negative' content (bleak outlook) may induce fatigue and anguish and in turn become debilitating or result in what Jensen (2002, p. 330) calls 'action paralysis', whereas a positive focus can inspire and lead to further engagement.

Evidence in this study indicates that excessive focus on risks and negative impacts of climate change without strong content on solutions (i.e. effective ways to counter these impacts) can result in turning learners off or into counterproductive emotional responses as illustrated by an 'Already converted' participant: *'I believed in the first place by the nature of the evidence so I was receptive. But I tuned out pretty quickly when it was all about how bad it was, how bad it was getting. I know how bad it is'*. Indeed, some learners commented that TCP events focused mostly on 'doom and gloom' scenarios of climate change. They reported already being familiar with images and doomsday projections about the future from the media and wider public domain. Indeed, as seen in Chapter 2, numerous studies (see Boykoff & Boykoff 2004; Ereaut & Segnit 2006; Hume 2009; Nisbet & Mooney 2007; Segnit & Ereaut 2007; Storksdieck & Stylinks 2010) showed that climate change is most commonly represented through fear-inducing imagery and 'alarmist' language. This phenomenon is not confined to climate change; modern environmental issues often involve an apocalyptic dimension. Other researchers (see Thomashow 2006) suggest that negative reporting of environmental destruction on a large scale can lead to a belief that change is impossible, causing people to feel powerless. Some learners in this study felt that such fear-inducing and dramatic representations were often mimicked by TCP content and thus expressed disappointment and concern. Such findings suggest that most

TCP events did not capitalise on their ability to frame climate change in ways that could have provided more positive representations away from the fear-induced representations commonly available in the traditional news coverage.

Some learners showed elements of fatigue in the face of ‘doom-and-gloom’ approaches and of being constantly reminded how dire the situation was. As one ‘Already converted’ respondent stated: *‘I am just tired of hearing how bad it is ... let’s start talking about things we can do. Let’s give people hope’*. This clearly shows the danger in repeating what the majority of learners already knew and believed (the environment was in bad shape, the climate was changing, human activities were playing a significant role and something needed to be done urgently) without offering hope and strategies for change. Providing more climate change information (e.g. science, causes and impacts) without the recognition of what learners already knew and without offering the basis for sufficient hope and action could lead to or accentuate responses of fatigue and weaken further engagement. These findings suggest that there is a strong need for educators to be aware of learners’ overexposure to ‘doom and gloom’ and overwhelming realities. The majority of learners wanted and needed a more positive and constructive way of dealing with the depressing information.

Other researchers (Moser 2010b; Nordhaus & Shellenberger 2009) have also expressed growing concern with issue fatigue. As Moser (2010b) states, issue fatigue is indicative of the cognitive and affective challenges individuals and communities face in trying to engage or engage further with climate change. This study clearly indicates that, when persistently faced with such scenarios, it can be hard for individuals, including the most engaged, the ‘Already converted’, to stay positive and optimistic about our ability as individuals and societies to change and overcome challenges posed by climate change. The challenges of sustaining positive engagement on climate change (and more broadly on the long-term transition towards sustainability) were even more evident in the second interviews conducted six to eight months after a TCP event. Learners from the three groups reported weaker engagement including being *‘less inspired’*, feeling *‘like not enough people are doing stuff so my efforts were feeling a little futile’* or *‘being tired of the debate and the constant doom and gloom’*. Some felt that climate change was worsening and actions at all levels were limited. Clearly, these findings pose a difficult challenge to climate change education: to balance a realistic account of the scope of the crisis and challenges that lie ahead with a sense of possibility, realistic hope and empowerment necessary for learning for change.

Interview data strongly indicate that most learners were or would be more responsive to a positive approach to exploring the climate change crisis and its solutions. A strong indication is that participants gave very positive comments when some educators offered hope and solutions.

For example, as one ‘Early aware’ participant stated: *‘The presenter did give hope that yes it is not all bad news, that there opportunities and that was very good’*. This suggests a need for positive and constructive scenarios and approaches to help learner groups actively engage on climate change and facilitate learning for change. Many researchers in the fields of climate change communication and environmental education (e.g. Elliott & Davis 2009; Hicks 2010; Lorenzoni et al. 2007; Moser 2007b; O’Neill 2008) also call for a shift to more positive and transformative approaches in dealing with climate change to avoid the danger of issue fatigue, hopelessness and powerlessness when facing ‘doom and gloom’ scenarios.

5.3.4 Conclusion

This section showed a strong relationship between learners and content (see Figure 8) and calls for content-knowledge to be learner-centred and context-oriented. This study suggests that the best way to further engage most learners on climate change may not lie in increasing the sense of the reality or urgency of climate change itself (through science content) but rather in finding ways to boost the learners’ sense of self and collective efficacy and offer content on possible solutions at both individual and collective levels.

While TCP was successful in increasing a sense of urgency, it was short in simultaneously empowering learners to take effective action. Content that seeks to inform learners about the problem but is limited in demonstrating how to change can be counterproductive and hinder learning for change. This is especially relevant when, as demonstrated in this study, the vast majority of learners already believed that climate change was a problem that required immediate attention.

Knowledge building about climate change science and impacts cannot be the sole focus of an effective strategy seeking to facilitate learning for change. Such knowledge needs to be accompanied by knowledge designed to increase understanding of strategies for change (how do we change things?) and alternative pathways (where do we want to go?) in order to move learners towards further positive engagement on climate change and, ultimately, action. The argument I put forward here is similar to that of some other researchers in environmental education (Athman & Monroe 2003; Jensen 2002) who advocate for action-oriented knowledge or what Wals (2006, p. 55) refers to as ‘learning for action’. In order to increase the likelihood that content will lead to action, it is critical to focus on action and change, at both individual and collective levels, and on developing a sense of empowerment among learners. This study strongly suggests that learning for change demands a strong focus on both.

While knowledge alone has limited effect on bringing about change, it is clear that ‘how to’ knowledge is a powerful and necessary element in facilitating learning for change. Evidence in this study exposes the need for the content to move beyond the ‘what’ (of the crisis) to the ‘how’ (to solve it). In addition, evidence in this study shows that knowledge of the effects of climate change, when taken in isolation, can create a sense of worry and reduce a learner’s sense of efficacy. Although, the use of threats or fear appeal (visual and verbal content), to increase understanding of the reality and urgency of climate change, acted as a motivator for some participants; for others it had the opposite effect, as these participants described leaving a TCP event feeling overwhelmed by the magnitude of the issue and with a sense of powerless. This study therefore warns, in line with Moser (2007b), about the risk of neglecting emotional responses on positive engagement and the need to use emotional appeals judiciously to avoid negative responses. Instead, positive engagement should be motivated towards action and facilitate learning for change.

Content and dimensions of knowledge are, however, only part of an educational activity. As we will discuss in the next section, learning for change is not solely about relevant content; it is also about effective learning processes.

5.4 Learning processes

In this section, I explore the relationships between learning processes and the roles played by both learners and educators in such processes (see Figure 9).

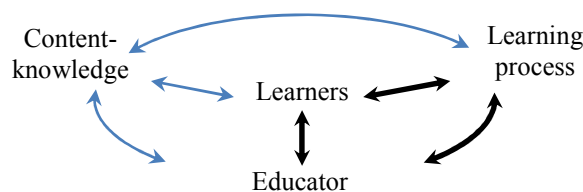


Figure 9 The learning processes

According to both interviews and observation evidence, a passive ‘*sit and listen*’ mode of learning was dominant at most TCP events. However, when social interaction happened, dialoguing with peers and educator was identified by most learners as effective in promoting learning. Findings show the importance of the social dimension of learning and change and how TCP efforts did not sufficiently make use of this important reality. This study suggests that engaging with a complex issue like climate change calls for more than just knowledge transfer. This study highlights the importance of learning approaches that challenges the belief that ‘the

facts speak for themselves' (Kelsey 2003, p. 423) and instead emphasises the active roles of learners and educators, and the social nature of learning and change.

5.4.1 Focus on content over process

Observational evidence shows that a model of learning based primarily on the transmission of a prescribed content (presentation of ideas and information) from educator to participants was evident to some extent in all TCP events. Although a few TCP events explicitly provided opportunities for attendees to interact with the educator and fellow attendees, most events followed the traditional slideshow and talk or lecture format. Such a traditional approach is more commonly associated with formal education, which involves the transmission of what is perceived as 'expert' knowledge and a one-way communication delivery.

Data from observations and interviews with participants show that most TCP events gave priority to the content over the process of learning. They provided information, seemingly underpinned by a strong belief that 'the facts speak for themselves' Kelsey (2003, p. 423). This demonstrates a belief that the content-knowledge is so persuasive (as discussed in Section 5.3) that it should automatically lead people to action. The objective is then simply a matter of making the 'right' information available. Indeed, comments from participants and observational evidence indicate that the TCP program was built on a learning/educational approach of motivating change via often overwhelming, factual evidence of climate change (often focused on science as discussed in Section 5.3.1). In this context, as noted in Chapter 2, information or knowledge is viewed as a fixed body of facts that can be transmitted from a resource person to a recipient; education is conceptualised as information transmission, with the expectation that learners will draw conclusions from the data in a direct and logical way (Kelsey 2003).

Despite seeking to facilitate discussion in TCP events, findings indicate that TCP relied primarily on a transmissive model of learning. As noted in Chapter 2, in such a model, learning is commonly defined as the passive acquisition of facts from a source to a recipient. Observations and interview data show that most TCP events offered limited opportunities for questions, discussion and social interaction. This is despite TCP's goal of facilitating community dialogue and despite learners' social motives. As it currently stands, the TCP program uses a limited format to involve learners in an informed and open discussion and activate interpersonal communication both at the TCP event and beyond (Section 5.6 explores this point further).

From a social diffusion perspective, I found that TCP used a traditional innovation diffusion model and that a more participative and active approach based on interpersonal communication

would have been more appropriate to facilitate dialogue and social learning. Findings suggest that TCP events structured mostly around information dissemination led to missed opportunities to capitalise on the learning setting to serve as a space for community discussion on climate change. This indicates the importance of designing appropriate time and space to move beyond the transfer of prescribed content to facilitating the next step; this is what Glasser (2007) calls active social learning.

Failure to create time and space for discussion and interactions demonstrates a traditional view of the social diffusion model, which is predominantly about message transfer, and limits the effectiveness of the social learning model on which TCP is based. As seen in Chapter 2, the social diffusion model was originally based on linear, one-way communication and transmission of knowledge (Morris 2003). However, the model has evolved to incorporate more interactive and participatory practices to facilitate two-way communication (Rogers 2003). This study concludes that TCP would benefit from broadening their model of learning beyond merely transfer of information. Results indicate that TCP disseminated information but did not move on to the next stage – creating opportunity for dialogue and social learning by capitalising more fully on face-to-face and community settings - to encourage the building of shared understanding, which then facilitates further dissemination and dialogue. As Singhal (2005) argues, the social diffusion process is a social process where both dissemination and dialogue need to co-exist dynamically, each shaping the other. This indicates an understanding of learning not just as diffusion of knowledge from one person to another; but as an active process of knowledge sharing and building.

Such one-way communication or delivery format also risks inscribing a deficit model approach in which a TCP educator is the expert and participating learners are the spectators who are assumed to be deficient in awareness and understanding (Trench 2008). Evidence in this study clearly indicates, however, that the majority of learners were not deficient in awareness or basic understanding of climate change. This suggests that different learning approaches are needed in order to facilitate learning for change and that more interactive and participatory processes might be more appropriate.

Moreover, a deficit model approach or vertical transmission process (from educator to learners) can be problematic for adult learners as it misses opportunities to tap into their prior knowledge and experiences (Merriam 2001) through discussion and interaction (Section 5.4.3 revisits this point). This is in line with adult education literature (see Brookfield 1986; Knowles et al. 2002; Merriam 2009) and reflects a social view of learning. For example, participants were motivated to find out what others were thinking about and doing on climate change. As noted in Chapter 2, adult learners do not come to a situation as blank slates. Rather, they come with a range of

knowledge, experiences and interests, ‘some of which can serve as possible learning resources’ (Merriam & Brockett 2007, p. 150). Such findings call for a more interactive and participatory process; and are consistent with the literature on environmental adult education (e.g. Guevara, Flower & Whelan 2004; Clover et al. 1998) that identify participatory learning approaches in which learners are actively involved in the learning process as essential elements of effective education.

The educational strategy of most TCP presentations was essentially instructive. Such a format led to increased awareness, understanding or reinforcement (as discussed in Section 5.3). However, if the aim is to engage individuals and communities in dialogue and action, the educational experience should not rely solely on one-way information dissemination. Such approach ignores the interactive nature of learning in which learners are active in the processing, interpretation, validation of information, and sharing and construction of new knowledge (see Wals & Noorduyn 2010). A talk or presentation on its own offers little room for dialogue and building a shared understanding of the problem and possible solutions, which is achieving one of TCP goals.

A lecture is most often a monologue while active learning is a dialogue or a multilogue (Moser & Hanson 1996). It casts learners as passive recipients of prescribed content rather than active participants in the learning process. A lecture is passive to the degree that a learner’s participation is minimal, where the primary activity is listening to one person talking (Hanson & Moser 2003). Presentations at the TCP events did not offer ways to directly or immediately participate in dialogue about climate change and its solutions. Findings in this study recognise the key importance of social interaction in both the sharing of knowledge and the creation of new knowledge. Most participants in this study would have preferred more interactive experiences so that they could play a more active role rather than listening to prescribed content with limited opportunities to ask questions or interact with others on the topic. Thus, enabling learners to participate actively in the learning process requires different approaches.

A number of participants felt that they had limited involvement in the learning process because they were not given the opportunity to exchange their opinions and share information. This emphasises the importance of moving away from educator-centred pedagogy so that learners have more chance to be involved in and negotiate learning. As the following quote from one ‘Already converted’ participant illustrates, some felt that it was critical for learners to be involved in the learning process: *‘I think you learn much more by talking to people than sitting at a talk being orated at’* (Section 5.4.3 will revisit this point).

Most presentations fell short of stimulating conversations among attendees which create opportunities for social learning as people, individually and collectively, enabling them to consider new patterns of thought and behaviour. Findings show that, while some learners (mostly 'Early aware') expected or were content with a 'sit and listen' format, most expected, or retrospectively would have appreciated, opportunities to be involved more actively and interact with others. Generally, they recognised the benefits of and the need for additional interaction and discussion (Section 5.4.3 revisits this point). They would have liked the opportunity to take a more active role in the learning process. For example, learners expressed a clear preference for interactive and active learning approaches or, as one 'Already converted' commented: *'it would have been good to come together and do something pro-active together, not just passively listening'*. This implies that a number of participants felt that their learning could have been enhanced by opportunities for interactive learning.

Many participants commented that the TCP talk was *'too long'* or provided *'too much information'* but *'not enough interactions'*. Some learners noted that the limited time and space to interact with the educator and fellow attendees resulted in missed opportunities for further learning. Some participants suggested that the slideshow could present a relatively short and relevant content on climate change that could then be used to launch a discussion on the topic either led by the educator or within small groups. These recommendations indicate that a transmissive approach relying on content could be used as a 'foundation' to initiate and facilitate group or community dialogue on climate change. This is consistent with social learning theory as noted in Chapter 2.

Thus, this research indicates the possibility of interplay between the transmissive (instructive) and transformative (interactive) approaches. A talk or one-way transfer of information can be used effectively in an active learning framework in conjunction with interactive and participatory methods, allowing both dissemination and dialogue to co-exist dynamically and shape each other (Singhal 2005). Indeed, both the literature on social diffusion and interviewees' responses in this study concur that these two approaches can be complementary rather than mutually exclusive. This is also consistent with the literature on environmental education, as shown in Chapter 2, where learning for change requires process-oriented, interactive and participatory approaches.

Social diffusion theory, reviewed in Chapter 2, draws attention to the importance of interpersonal communication and social interaction as key elements to facilitate social change. The theory emphasises the social dimension of learning; learning is viewed as a social and communicative process. As Rogers (2003, p. 19) states 'diffusion is a very social process that involves communication relationships'. Social diffusion theory also indicates that different

communication channels are needed at different times in the innovation-decision process and with different adopter categories (Rogers 2003). In this study, interpersonal communication and opportunities for social interactions were, or would have been, effective approaches for all learner groups.

Results show that all learners were already exposed to climate change information and they welcomed, or would have welcomed, opportunities to discuss climate change with the educator and fellow attendees. Likewise, a number of learners were motivated for social reasons to attend a TCP event. For example, a large number of 'Already converted' were hoping to meet like-minded individuals who shared similar interests in or concerns about climate change, to develop more collective action. Most of the 'Early aware', were interested in finding out what others in their community were doing about tackling climate change. While some of the 'Early aware' were satisfied with a 'talk' format, most were also looking for opportunities to interact with others to find out what others in their communities were doing and to share information. This is consistent with the behaviours of the early majority in social diffusion (Rogers 2003) who look for social proof, especially from 'people like me' as potential motivation to engage further. Such people are keen to take action, but they want to find out how their actions fit within the accepted social norms as they do not want to be identified as being outside the mainstream. This implicitly suggests that, in their attempt to act on climate change, they need to know that others are also taking similar action. Likewise, such knowledge might also increase their sense of efficacy as they strongly believe that their own actions can make a difference only if others are doing it too. The 'Doubtful' group alluded to uncertainties in science. They wanted social interaction to enable discussion of different viewpoints and what they saw as '*both sides*' of the climate debate.

This study shows that providing more information on climate change without offering space to discuss its implications is not sufficient to facilitate learning for change. It indicates that enabling the three groups to learn more effectively involves, to various extents, more interactive ways of exploring climate change (problem and possible solutions) and time for social interaction. In summary, this study suggests that the ability to encourage community dialogue goes beyond conveying information. It is about capitalising on community settings to create a social learning environment for people to come together and explore possibilities and actions at both the individual and community levels.

5.4.2 Capitalising on community context to facilitate learning

Evidence in this study shows that TCP events tended to emphasise participants learning as individuals rather than as members of a community, or as a community. Although TCP events

were held in community settings, they were limited in capitalising on the social dimension of learning. They could have used the community setting to better encourage and enhance group learning. This study reveals the need to create opportunities to draw participants together around the topic of climate change; and to show them how they could learn about and take action on climate change as existing or potential communities, whether as neighbours, co-workers or members of the same club or organisation.

The advantage of a community setting is that the different levels of expertise, interest and experiences that exist within a group might allow for a broader range of meanings to be shared. The program could have capitalised on the existing knowledge, experiences and skills of these adult learners (as discussed in Section 5.4.1). Shared learning experiences can facilitate shared viewpoints and ways of thinking and feeling that give learners a sense of belonging and a feeling that *'I am not alone'*. When learners understand that their beliefs and understanding are shared by others, it can increase their awareness of potential support and promote social learning. It gives them an opportunity to identify with 'people like me'.

The TCP program aims to move away from mass public education towards a more targeted community-led endeavour. The TCP model seeks to capitalise on networks and communities to promote understanding, action and dialogue on climate change. Communities in this model become the learning setting or, in other words, the context in which learning takes place. Observational evidence, however, indicates that most TCP events in this research failed to capitalise on these group or community settings, as attendees were addressed mostly as individuals and not as group members, members of community or as a community.

Some participants wanted to get a sense of how individual actions fit into a collective context. For example, some respondents felt they were taking action in isolation and doubted the efficacy of their individual actions to solve this immense problem. TCP presentations, as community events, could help overcome this sense of isolation that individuals may experience by creating a sense of collective. They could do this through the content (as discussed in Section 5.3), by showing that others are taking action too, or by allowing time and space for interaction. This is in line with Segnit and Ereaut (2007) who suggest that individuals tend to have a greater sense of individual agency if their individual actions are taken as part of an imaginable group or collective. Furthermore, the interview data indicates that other respondents felt able to achieve more as a group than individually. For example, some learners believed that the response to climate change had to be collective. This suggests that a sense of efficacy could be more effectively fostered at both the individual and the community levels by allowing attendees to participate as a group, build relationships and discuss possible collective actions (individual actions as part of a collective and/or group action) and enhance capacity building and learning

capacity at both individual and community levels. Despite community being the context in which the educational program took place, most TCP events offered limited space and processes where participants could interact in a group and discuss how climate change could be addressed at the collective level.

Most learners attended a TCP event hoping to meet like-minded individuals interested in climate change and possibly in doing something about climate change. For example, some participants were motivated to interact and network with fellow attendees in the hope of staying in touch after the TCP event and get together as a group to share information (i.e. create a learning community⁸⁷). This would give them support to implement individual and possibly collective change. As one participant stated: *'I originally hoped that the forum would result in at least one small group of interested people deciding to meet regularly to carry through recommendations for some positive action in local community'*. Yet, evidence indicates that attendance at TCP did not lead to the formation of new group or networks or encourage existing ones to take collective action.

Observational evidence indicates that the focus of most TCP events was on the educator; the current educational process relied on attendees 'learning' from educators. However, findings show that a number of learners were socially motivated to attend a TCP event so that they could learn from fellow attendees rather than just from the educators. For example, some respondents believed that attending a TCP event would provide a good avenue to learn how other people in their community felt about and acted on climate change. This suggests that some participants casted fellow attendees as potential resources⁸⁸ in the learning process. Findings suggest that these resources could take the form of sharing and discussing useful information on climate change science or solutions or building personal relationships through networking for future social support and potential collective action. Learning opportunities could be expanded by creating time and space for attendees to interact and discuss the topic and facilitate a more co-learning process. This suggests that learning opportunities might be enhanced by a more learner-centred approach and spaces and time for interaction and by placing less emphasis on the 'expert' delivery and the slide show, which comprised the majority of the available time, and more on social interaction and discussion.

⁸⁷ From a social learning perspective, a learning community is defined as a group of individuals who come together to discuss various insights and solutions to specific problems and form networks to promote continuous interaction and communication (Krasny & Lee 2002).

⁸⁸ Although this research did not specifically address 'social capital', the idea of resources is linked to the concept of social capital, defined by Coleman (1988), as the resources accumulated through relationships between people. Agyeman & Angus (2003) also believe that social capital relates to the resources available within social groups, such as families, communities, firms and social clubs, and their networks of mutual support, reciprocity, trust and obligation.

Findings indicate that TCP could capitalise more on its face-to-face approach by facilitating two-way communication, discussion and interaction supported by the slideshow, rather than placing most emphasis on the slideshow. This suggests that promoting a horizontal process of learning between educators and attendees and among fellow attendees could be more beneficial to facilitate both individual and collective learning. I recognise, however, that a change of learning approach can be difficult and challenging. Moving towards co-learning and more dialogic and interactive learning approaches implies developing a different format, (although educators could still use the slideshow to some extent as support), a different role for both educators (moving from a 'lecturer' more towards a 'facilitator' role) and for learners (more active role in the learning process). Also, it would present challenges to educators, who would be '*put on the spot*' to answer questions and to learners, who would be required to take a more active role in the learning process.

In this study, most educators were happy to follow the AIC structure. Others recognised the need for more interaction, however, they cited the TCP format and time constraints as the most important challenges they faced in implementing discussion. Yet findings in this study show that more time dedicated to questions and interaction would respond better to most learners' needs and interests. It is important to note, however, that involving learners in the learning process requires educators to shift towards a new role of facilitator and co-learner and spaces for interaction and discussion need to be created. Such shifts might be challenging for some educators and also for some learners too. As Kelsey and Dillon (2010) state, dialogue can be difficult due to its less predictable nature, the level of uncertainty about how the process will unfold and a certain degree of messiness. As a result, dialogue is that it is far more challenging than transmitting information. In addition, evidence in this study shows that there are challenges to engage others on what is commonly perceived as a complex, emotional and loaded issue. Such social learning relies heavily on the skill of the facilitator, so there is a need for training and support so that educators can take on this new role.

This discussion points to the importance of interaction with others, particularly in a non-hierarchical learning atmosphere. This leads us to the next section, which looks further at the role of social interaction as a catalyst for learning and change.

5.4.3 The role of social interaction as catalyst for learning

One of the most significant themes that emerged from this study relates to social interaction. The concepts of social interaction, learning and change revealed in this study complement each other. Findings suggest that individual and collective learning may be generated through social interaction. This section explores this theme further.

Observational evidence and interview data indicate that opportunities for social interaction and conversation were minimal elements of most TCP events (often limited to short ‘question and answer’ sessions) despite a strong interest expressed by most participants. As one educator stated: *‘I simply followed the structure of An Inconvenient Truth slideshow and encouraged questions from the audience’*. Some educators, however, showed some initiatives and made conscious efforts to ‘build’ in space and time for social interaction and dialogue as part of the structured event or informally after the event. In these instances, there was social interaction between educator and attendees and among fellow attendees at some TCP events. Some learners also shared knowledge informally during breaks, if breaks were scheduled during the TCP event, or at the end, either as part of the event or informally, based on learners’ own initiative. Interview findings show that, when interaction did happen, comments were very positive. Information sharing, discussions and opportunities for networking were seen as an important part of their learning experiences. These findings are consistent with a social learning perspective that recognises the social dimension of learning and thus the importance of interaction with others. Social interaction can enhance a social learning process where everyone learns from and with everyone else. Learning, in this context, is understood not just as a transfer of knowledge but also as an active and interactive process between educator and attendees and between fellow attendees.

When participants were asked in interviews what facilitated their learning (or what would have facilitated their learning) at the TCP event, most mentioned opportunities to interact with their peers and educators. This reinforces the role of social interaction as catalyst for learning. When interaction and discussion were limited or did not happen, all learners groups, including the ‘Doubtful’, saw this as an important omission. This suggests that not allowing time for reflection and interaction after slide show presentations might have resulted in missed opportunities for learning and change.

This study shows how important these conversations are in creating a social learning environment that might provide opportunities for learning and change. Some learners saw dialogue and interaction as catalysts for learning because of the opportunity to be exposed to different points of view and reflect upon their own perspective. This is consistent with social learning theory in environmental education (see Krasny & Lee 2002; Wals 2010), where reflecting on one’s perception, sharing and being exposing to different opinions is seen a critical process in learning for change. Furthermore, findings are also in line with social learning in the diffusion theory (see Papa et al. 2000; Rogers 2003), where conversations can help create a social learning environment in which participants can learn from each other by discussing the content presented to them, sharing or evaluating previously held ideas and understanding, considering options and identifying steps to initiate individual and collective change.

Results demonstrate that, when social interaction took place at TCP events, it influenced some learners' understanding and outlook on the issue. For example, some participants credited social interaction with adding to their knowledge and understanding of the issue; this points to benefits of social interaction for learning and change. The interview findings indicate that some self-reported changes by learners, as a result of attending a TCP event did not come from the slide show itself but from interaction with educator and/ or especially with fellow attendees. Most learners appreciated or would have appreciated the opportunity to talk to the educator and also learn from fellow attendees.

This study also helps to illustrate how social interactions can facilitate learning outcomes. Detailed comments from interviews identified a range of benefits or potential benefits of social interaction including: Being exposed to different view-points and reflection upon their own perspective; processing and sharing information together and participate in co-learning which may foster further learning; answering each other's question as group; comparing, interpreting and validating the content presented; stronger recollection of information; meeting like-minded people with a potential for networking outside the TCP event; mixing, talking and airing issues with like-minded people; reinforcement of pre-existing understanding, views and beliefs; learning how others in their community feel, think and act on climate change; identification of others who share similar interests in their community- findings suggest that group context can increase awareness of potential support for further learning and action.

As these findings show, social interaction can facilitate shared viewpoints and ways of thinking and feeling; and/or offer learners different perspectives and ways of understanding climate change. Social interaction can also promote social learning as the following quote illustrates: *'I knew some of the attendees but interestingly enough I did not realise that they were so conscious and interest in the topic'* (An 'Already converted') and opportunities to identify *'people like me'*. These findings demonstrate that interacting with others also helped reinforce some learners' previous knowledge, attitudes and behaviours. In addition, social interaction could help facilitate social relationship building and networking around the topic of climate change. Networking in particular was mentioned by many participants as useful for both sharing knowledge and building relationships, and often in the context of learning and change. As seen in Chapter 2, networking is at the heart of social learning and change; this supports the need to build strong networks to bring about change. In this study, social interaction had a relatively substantial impact on some participants; it gave them the opportunity to discuss issues with others in more depth, airing a range of views. In these instances, conversations were the site for

exchanging information and ideas, for making contacts and potentially building relationships and communities⁸⁹.

Evidence in this study also indicates that certain processes such as social interaction, group discussion and deliberation can facilitate positive cognitive, affective and potentially behavioural benefits. Cognitive benefits of social interactions were linked to processing information, sharing ideas, reducing uncertainties and building new knowledge. Findings support suggestions in the literature that interpersonal communication, especially with like-minded or trusted individuals, is crucial in reducing uncertainty (Rogers 2003). This is consistent with social diffusion theory, which defines the innovation–decision process as an uncertainty reduction process. This research has, to some extent, demonstrated this process in action. Information and knowledge related to climate change includes many complexities and uncertainties; as some participants interacted with each other, their uncertainty on different aspects of climate change was reduced.

Participants commented on the large amount of information presented and the limited content on solutions⁹⁰; this often left them with numerous questions. Interaction with educators and/or fellow attendees offered opportunities to ask questions. When available, space and time for interaction and conversation helped clarify and reduce some of these uncertainties. As one ‘Already converted’ participant stated, *‘It was all of this information in one go ... I wanted to process it with my peers. We talked about the presentation and, when any of us had questions, we tried to figure out the answers ourselves. It was really good’*. This shows that information might be understood better when individuals have the opportunity to discuss it as a group rather than trying to understand it alone (CRED 2009). These findings are consistent with Fritze et al. (2008, p. 6) who stated that ‘Individuals further make sense of the information that they receive about climate change by talking to others, sharing views and reality testing their appraisals’. These findings clearly show the limitation of the belief in ‘facts speak for themselves’ (Kelsey 2003, p. 423) and the need to create time and space for knowledge to be shared, negotiated and built.

⁸⁹ Although this research does not specifically address the concept of social capital, this discussion on social interactions and dialogue offers insights into how facilitating dialogue and creating time and space for interaction and networking in community settings has the potential to help increase social capital or the social fabric necessary to resolve collective issues. Social interaction is seen as an essential ingredient in the building of social capital, loosely understood here as informal networks of trustful relationships that support collective action. As Moser and Luganda (2006, p. 19) state, ‘measures of social capital are elusive but the notion reveals an understanding of communication as a two-way exchange’.

⁹⁰ Observational evidence indicated that when interaction did happen between educators and participants or among participants, conversations often evolved around solutions or what could be done as individuals, collectively, as a nation, and globally.

Social learning emphasises learning through interactions between people (Kilpatrick 2002). When structured and informal opportunities for interactions were part of a TCP event, these were important contexts for active individual and social learning as they provided opportunities for attendees to share, test and build their knowledge, ideas and practices. This study therefore concludes that social interaction can be used as a crucial mechanism for learning through both information sharing and discussion.

Findings suggest that affective benefits can result from support and affirmation provided by social interaction. Interactions can help meet social motives and affective needs by allowing space for participants to speak up and share their views, experiences and feelings, and by providing support and encouragement, such as social validation and confirmation that there are *'people like me'*. Social interaction can also help counteract the feeling that there is too much information, which at times can be disempowering or overwhelming. This suggests that like-minded people can play an important role in shaping positive affective engagement on climate change and may counter negative emotional responses. Potential behavioural benefits may result from the opportunity to find out what others are doing, discuss the feasibility and logistics of possible individual as well as collective action and also from the recognition that there is social support to take those actions.

Evidence in this study indicates that positive learning experiences and outcomes (cognitive, affective and behavioural outcomes) can be facilitated by certain processes such as interaction, group discussion and deliberation. Social interaction was an integral to the learning process and thus a crucial element for facilitating learning for change. This study exposes the social dimensions of both learning and change and indicates the need to maximise opportunities for co-learning and interaction.

5.4.4 Conclusion

This study underlines the potential of social interaction and dialogue to play a bigger part in community educational programs like TCP. It offers insights on using social interaction and dialogue as a learning process. This study concurs with Collins & Ison (2009, p. 366) who state that 'social learning ... requires that particular attention is paid to the design of learning processes'. Thus, evidence in this study exposes the need for learning processes that promote the interactive nature of learning in which individuals and groups are active in the processing, interpretation, validation of information and sharing and construction of new knowledge.

The prevalence of TCP events structured as information dissemination sessions indicates that the stated intention of TCP events to serve as spaces for community discussion on climate

change was not supported by the lack of or limited interaction between educators and attendees and among attendees. Findings in this study indicate opportunities for further learning and potential individual and community change were lost due to the strong focus on prescribed content over social processes. As a result, TCP remains essentially information driven and falls short of its goal to facilitate community dialogue on climate change. This study exposes the need for a more interactive and dialogic model of learning where knowledge is not solely understood as a body of facts that can be transmitted from a source to a recipient but as constructed through social interaction in specific contexts (Kelsey 2003).

This research reflects an understanding of learning as a social process. Findings highlight the social dimension of learning through social interaction and active involvement of all learners in the process. This suggests that the process of discussion itself generates learning among participants and points to the crucial role of social interaction as a catalyst to learning. Results in this study also show that climate change is inherently complex, dynamic and uncertain and filled with emotional issues. Results indicate that complex issues such as climate change call for more than message transfer in order for people to share, process, reflect, discuss and negotiate understanding of the problem and potential solutions.

Findings show that there are strong links between learning process and the role of learners and educators (see Figure 9). This model of learning requires the development of specific roles for all participants, and this has strong implications for both learners and educators.

5.5 The educator

While the previous section touched upon the role of educator in the learning process, this section explores the relationships between educator, learners and content (Figure 10).

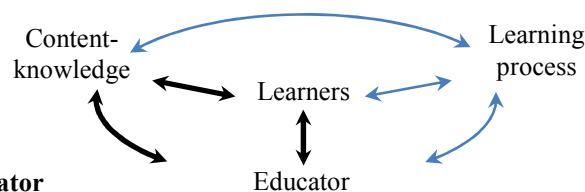


Figure 10 The educator

Evidence in this study shows that an educator's characteristics (i.e. identity and perceived attributes) influenced learners' evaluations of their learning experiences at a TCP event. This indicates that a relationship exists between a learner's perception of an educator and their

assessment of how TCP might have affected them. Evidence also indicated a relationship between the perceived credibility of an educator and the content presented.

As shown in Chapter 3, TCP identified and enlisted the support of key individuals to educate others in their social networks and communities on climate change. This section examines the crucial role of these individuals (who could be referred to as ‘messengers’ in the climate change communication literature, ‘informal opinion leaders’ in the language of social diffusion theory, or ‘educators’ in the environmental education literature⁹¹, as discussed in Chapter 2) on learners’ experiences and outcomes. This research showed that educators can enhance or inhibit learning experiences and thus play a critical role in facilitating learning for change.

While, in some instances, the match between educators, content and learners resulted in positive outcomes, such as validation, motivation and credibility of information, in other instances, the combination resulted in either minimal or counterproductive outcomes.

5.5.1 Challenges to identify the 'right' educator for specific learner groups

The key message is that it is critical to achieve a match between educator and learners to facilitate learning for change. TCP initially tried to start from the learners by selecting key individuals in different communities to act as educators, assuming that they would know their audiences and tailor their presentation accordingly. The aim was to avoid a ‘one size fits all’ approach and rely on the credibility and legitimacy of educators. This study, however, shows limitations and challenges in putting such model into practice.

The notion of using individuals considered to be ‘like’ members of the target groups to educate their peers was based upon an assumption that messages may have greater credibility when they come from someone who is seen as similar to the audience. In the context of the TCP educational program, this means that selected educators should be trustworthy, reliable and credible opinion leaders in the eyes of the people they seek to educate and engage on climate change. TCP assumed that, because educators would nominate their own audiences, they would appear credible by virtue of association. The assumptions behind the model is that educators, as peers, would be seen as credible and trustworthy or as sharing similar backgrounds, interests and concerns with the learners. They could help their peers understand what climate change meant to them, in their particular contexts, and how they could respond effectively in the

⁹¹ Although each of the terms ‘messenger’, ‘informal opinion leader’ and ‘educator’ come from distinct literatures and thus can be viewed as very different concepts, in the context of this study, these terms are often used interchangeably. TCP educators are viewed as community opinion leaders.

language of the participants and understand the local context in which learning and change takes place.

However, findings in this study show that this can be difficult to implement. For instance, these key individuals self-identified⁹² as ‘community opinion leaders’ to educate their social and professional networks on the issue of climate change; however, they had not been identified as ‘opinion leaders’ by the target audiences. Furthermore, educators were not always internal to the social groups they addressed, as one educator stated: *‘Generally, I spoke to community groups who I had no direct connection with and professional bodies and organisations that I approached and offered to speak to’*. Indeed, TCP educators were sometimes part of the communities (communities of place or community of interest) or groups they addressed, but sometimes they were external (such as in guest-speaking roles). The credibility and trustworthiness assumed by association in the program were therefore not always a reality. This presented a challenge for TCP educators to ‘know’ their audiences and for their audiences to ‘know’ them. In these instances, most educators were expected to make judgements about what participants knew and what their interests and needs were. Findings show that, in some cases, this was problematic and educators underestimated learners’ knowledge or failed to meet their needs or matched their interests. In addition, it is important to remember that TCP educators were tied to TCP project even if customising was encouraged.

Another challenge identified in this study is that it is difficult to train a diverse set of community opinion leaders to reach out to others. Failure to select appropriate community opinion leaders as educators might be counterproductive to the intended outcomes; for example, some learners reported a failure to engage with the educator. On the other end, responses from some participants illustrated that the ‘right’ educator can considerably enhance the educational experience.

5.5.2 Perceived key attributes of educator including credibility

Most learners attended a TCP event looking for credible and trustworthy information and educators. This section looks at the perceived level of credibility of educators and its impacts on participants’ experiences.

In this study, learners used personal attributes such as likability, enthusiasm, communication skills, openness, passion, honesty, commitment and *‘walking the talk’* to determine an

⁹² As seen in Chapter 3 (see Section 3.3.1), TCP relied on a self-selection model to identify and recruit opinion leaders. A call for volunteers was placed on the Australian TCP’s website and interested individuals filled out an application form.

educator's credibility and how likely they were to pay attention to what the educator said. Such results are consistent with psychology and risk communication literature (e.g. Cialdini 2000; Slovic 1999; Wolf et al. 2010) in that people use heuristics or mental cues (especially in the context of information that is complex or difficult to understand) as trust or credibility stand-ins such as credentials or expertise. For example, in this study, learners talked about *'He is someone like me'* or *'Oh, he is an academic, he's got to be good'* as indicators of perceived credibility. This shows that history or context outside the educational event is just as important as what happens at the event.

This study suggests that, while credibility and trust can be based on an educator belonging to one's own social group, or in other words 'People Like Us' or 'PLUs' (Agyeman cited in Chess & Johnson 2007, p. 230), they can also be based on perceived expertise and authority. Some learners preferred to hear from and were more receptive to messages from 'PLUs' while others preferred to hear from individuals who they saw as an expert or authority on the topic.

There were concerns in some instances about the credibility of the educator. For the 'Doubtful' group, educators perceived as less credible helped to support their arguments, reinforce their uncertainty and maintain their previous attitudes; i.e. the educator undermined the importance and credibility of the content and triggered additional scepticism. For the 'Already converted' group, educators perceived as less credible did not affect their level of conviction as they were already convinced. However, it led to disappointment with the learning experience. On the other end, an educator perceived as credible enhanced their learning experiences. For the 'Early aware' group, the level of perceived credibility was important as they were looking for validation or social proof (Cialdini 2001; Rogers 2003) either from someone like them or someone in a higher position. They found it valuable to hear from someone who was perceived as an expert on the topic of climate change or at least someone who knew more than them and had the ability to provide the information in an engaging manner.

Participants in this study identified a range of characteristics they felt made TCP educators effective as climate change educators. For example, a number of respondents rated having a 'knowledgeable' educator who could answer questions as highly important to their satisfaction of the educational experience. The concept of authenticity also emerged from the interviews, including the ability to *'speak convincingly and honestly'*, as a factor that compelled learners to take notice of what the educators were talking about. Evidence shows that some learners discounted 'scripted' educators, who seen as solely a conduit of information without real ownership.

Another important aspect was the association of TCP educators with former U.S. Vice President Al Gore. While, in some instances, the association with this high-profile advocate was positive, it was negative in others. For example, some learners saw the link with Al Gore as an enhancer of educator's credibility. For other learners, such a link affected educators' perceived credibility as they were seen as '*parroting*' Al Gore and not speaking from their own perspective or owning the material presented; thus they were perceived as '*scripted*' educators and not '*authentic*'. A minority of learners reported being sceptical of Al Gore and thus being sceptical of the overall project, including the TCP educators.

Most learners wanted more updated information or a different perspective on climate change. Thus, they either sought out educators who they perceived as being more knowledgeable than themselves or having different knowledge and insights. Some learners expected experts on the topic of climate change or expert opinion leaders. For example, the 'Doubtful' group saw scientists as the most credible educators as they questioned the science behind climate change and thus were looking for expert answers. Other learners expected someone who was like them but was more knowledgeable on the issue, thus acknowledging the credibility and legitimacy of 'PLUs' (Agyeman cited in Chess & Johnson 2007, p. 230). These findings are consistent with literature that shows that people tend to associate with people much like themselves, a commonly observed principle called homophily (Rogers 2003). Homophily, in this context, refers to educators and learners sharing similar attributes and interests, while still being different in certain aspects, as a certain degree of heterophily is needed for diffusion (Rogers 2003). In this case, participants were more receptive to information from an educator perceived as similar to them than from someone outside the community.

Two categories of opinion leaders have emerged from this study, which could be described as peer and expert⁹³. Some educators were perceived as experts or credible authorities (often due to their academic credentials or positions) able to explain the evidence, while other educators were seen as people who had an understanding of participants' contexts and interests and could relate to them. These findings are consistent with Moser and Dilling (2004) who stated that credibility and legitimacy are not innate qualities but are attributed to speakers and information by the audience in a specific context.

5.5.3 Link between perceived credibility of educator and content

The following comment by a 'Doubtful' participant points to the relationship between the content and the educator, and illustrates the subject of this section: '*The information was there*

⁹³ These findings are congruent with the findings of Locock et al. (2001) in their study of health practitioners who found that there were two types of opinion leaders: peer and expert.

and reasonably scientifically backed-up. But sometime the information is only as good as the person who presents it'.

Perceived credibility or lack of perceived credibility of an educator can reinforce or undermine the perceived credibility of the content-knowledge presented. Results in this study support suggestions from the Frameworks Institute (2002, p. 22) that 'messages can be reinforced or undermined by their attachment to a spokesperson'. In some instances, educators played an important role in establishing or reinforcing the credibility of the content-knowledge conveyed, and this was based on the attributes described in Section 5.5.2. Educators were sometimes recognised by participants as credible sources of information based on perceived authority, credibility, likeability or homophily. In such instances, educators gave 'seals of approval' (Moser 2010a, p. 40) to the content-knowledge. In other instances, educators reduced the perceived credibility and legitimacy of the information based on their perceived bias, personal agenda or limited knowledge on the topic. Sometimes, participants accepted the content presented as credible, but they did not see the educator as credible or trustworthy. For the 'Doubtful' group in particular, a perception of bias or lack of expertise damaged the credibility and trust of both educator and content-knowledge.

These findings illustrate the relationship between the content-knowledge and the educator can reinforce or undermine the credibility of either or both.

5.5.4 Challenges to match educator with relevant content

Although findings show that history or context outside of the educational program is important in establishing the perceived credibility of educators, expertise on the content presented and the ability to explain the slides adequately and answer questions are equally important. However, in order to match educator to content, the educator must also have knowledge of the learners' interest in and ability to take in the proposed content. A perceived good level of understanding of the content material presented as well as being open to questions and discussion were listed as crucial by most participants from all groups.

This study exposes the need for the educator, learners and content to match. This is echoed in the climate change literature (e.g. Agyeman et al. 2007; Moser & Dilling 2007). This reinforces the argument made in Section 5.2 that learners should be the primary concern. Findings suggest that educators were often primarily concerned with the message or information they wanted or were asked to convey and rushed over the critical question who they were trying to educate. Educators must have a close understanding of both the content and the learners in order to

present the content in a relevant way. Without a solid understanding of the participants, TCP events often failed to meet their needs and interests.

Perception of an educator's credibility can depend on the content presented. The content presented is also closely linked to an understanding of a learner's interests and needs and the relevance of the content. In some instances, the educator was not perceived as having a good understanding of the audience he or she was presenting to and lost credibility, as exemplified in this comment: *'I don't know if the presenter had an understanding of the group that he was presenting to ... It is just that I did not think the content suited our group'*. This indicates that while an educator can have a strong content, if that educator does not understand the learners, their understandings, concerns, interests and needs, and why they choose to attend the educational event, learning outcomes will be limited.

TCP recruited educators from various backgrounds and sectors to enable them to effectively reach different audiences and present information on climate change in ways specifically relevant to them. While they aimed to help framing climate change to specific audiences and move beyond climate change being framed primarily as a scientific issue, there was still a heavy focus on science and thus limited customisation of the content for different audiences. However, comments from learners and observational evidence show that the strong emphasis on science (as discussed in Section 5.3) posed challenges for most educators. In some instances, educators were seen as not able to explain the content adequately, which set them up for a loss of credibility. This is especially relevant for the 'Doubtful' group who was not convinced about the climate science and for the 'Already converted' group who was already quite knowledgeable on the topic.

TCP initially recognised the need for a broad range of educators to reach different communities with different understandings of climate change, and they developed a model based on this. Such content also undermines the model on which the TCP program is based: the recruitment of diverse key individuals to introduce novel voices to speak out on climate change and use different frames to help different communities understand what climate change means to them and how they can effectively respond in their particular contexts (Gaillard 2008).

This study exposes the need for educators to be consistent with the way the issue is framed or else the importance and credibility of the content, and possibly both content and educator, may be undermined. This is in-line with literature on framing (Frameworks Institute 2002; Lakoff 2004) and climate change communication literature (Chess & Johnson 2007; Moser & Dilling 2007) that states that 'messengers', or in this study educators, are part of the frame.

Although TCP recruited a broad spectrum of educator to join the public discourse on climate change as legitimate educators and broaden how climate change is perceived beyond a primarily scientific or environmental issue, its effectiveness because of its content emphasis on science. TCP missed the opportunity to move climate change beyond a primarily scientific issue because of its strong focus on science-content. Yet, TCP insists that the scientific framing of climate change is the most compelling and crucial story to be told regardless of the background and insights from TCP educators. This indicates that despite recognition of the need to broaden the range of educators to reach different communities with different understanding of climate change, TCP remains guided by the assumption that evidence of climate change is the most effective way to move people to action. This was evident in the heavy content on science at most TCP events.

TCP educators were encouraged to customise their presentations; however, they were restricted in this because they were also asked to follow the sequence and content of the Al Gore slideshow. These constraints often made it difficult to match educators with this scientific content in order to facilitate learning. Focus on science was also a common concern expressed by educators - challenge of explaining science when it was not area of their area of expertise or background.

5.5.5 Conclusion

This study exposes the need for a match between educator, content and learners. Educators can enhance or inhibit participants' learning experiences and thus play a crucial role in facilitating learning for change. Findings are consistent with climate change communication research (e.g. Moser & Dilling 2007) that recognises messengers as critically important in the communication process and in establishing the credibility of the information conveyed. Findings in this study indicate a strong link between educator, learners and content (Fig. 10); and along the lines of Moser & Dilling (2011, p. 167), this study shows that 'there is no simple guidance as to who will be trusted, credible, and who the "best" messenger is - it all depends on the audience and context, and must fit the frame'.

5.6 Facilitating wider community learning

This section explores the relationships between an educational program and the broader context in which learning takes place (Figure 11) or as one 'Already Converted' aptly stated: *'It is really*

a matter of how the event fits into an overall social dialogue. How is it encouraging people to take ideas away with them and engage others?’

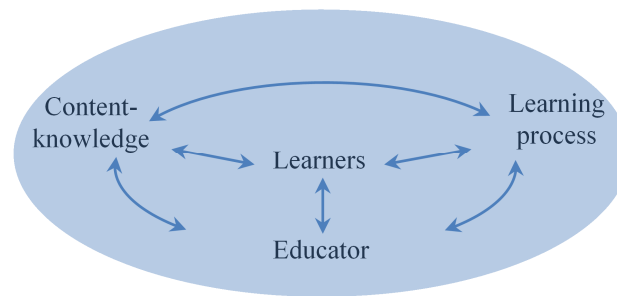


Figure 11 Wider community learning

This section investigates whether TCP has been effective in meeting its goals of ‘spreading the word’ and ultimately initiating and facilitating wider community learning and dialogue about the climate crisis and its solutions. The key question was: ‘Does a TCP event promote learning and change beyond the event boundaries?’ To investigate this question, I explored whether attending a TCP event led to changes in participants’ interpersonal communication behaviour, that is, if participants felt encouraged to talk to others about climate change as a sign of social learning⁹⁴.

One of TCPs’ aims is to prompt further conversation about climate change, or as this TCP educator stated to her audience: *‘What I am trying to achieve here is to give you ammunition and enthusiasm when you are trying to engage with others on climate change’*. Interview findings suggested that TCP events were limited in inducing conversation about the climate crisis and its solutions in the various communities. This indicates that TCP fell short of its main objective.

In the TCP model of learning, positive social changes are sought to occur through an intentional process of information transmission and sharing by interpersonal communication; this in turn stimulates dialogue, which influences further information transmission and sharing (see Singhal 2005). In accordance with the social diffusion theory, interpersonal communication serves as an exposure bridge to a larger community. Conversation is seen as a vital part of the process of information flow, social learning and ultimately change at both individual and community levels.

⁹⁴ As Reed (2010) stated, for broader social learning to occur, what individuals (in the context of this study, TCP participants) learnt (at a TCP event) must diffuse to members of the wider social units or communities to which they belong.

Participants were encouraged to ‘spread the word’, that is, to pass on what they had learnt to others in their networks. This draws on social diffusion, which described how learning and change spread through communities and social networks. ‘Spreading the word’ is seen as a social learning process and mechanism for social change (Rogers 2003; Leiserowitz 2004). As seen in Chapter 2, social diffusion refers to the spread of an innovation within a social system where the term ‘spread’ denotes flow or movement, typically via interpersonal communication and influence (Rogers 1995).

The role of the educator, as defined in the TCP model, is to educate and create change within their peer groups and communities. In other words, they should start conversations about climate change in their homes, workplaces, schools, and professional and social networks not only to increase understanding of climate change and its solutions but also to facilitate broader dialogue and action on the topic. As one TCP educator said: *‘We have to create community dialogue’*. The hope behind this learning model was that attendees would in turn share insights that they gained from the TCP event with their social and professional networks in order for the message to spread throughout the broader community and create a grassroots groundswell of opinions and action. Interview findings suggest, however, that most TCP events fell short of spurring conversation between TCP participants and non-participants.

Results show that attendance at a TCP event was not always enough to lead a participant to talk to others about climate change. For example, some learners mentioned attending to friends or family but in a passive way, rather than using this to engage others in an in-depth conversation about climate change. Only a few interviewees reported that TCP motivated them to be more vocal. Results showed that the level of worry and motivation for action were momentarily aroused for some ‘Already converted’ and ‘Early aware’ after a TCP event, leading them to express the intention to engage others in climate change. For example, one ‘Already converted’ commented: *‘I suppose because the presentation jolted me to understanding the severity or you know the fact that we need to do something straight away also encourages me to be more vocal. It’s time to start contacting people, sending emails’*.

Evidence indicates varied reasons behind the lack of conversation on climate change as a result of attending a TCP event. Some of these were linked directly to the TCP event while others were external. The most common reason linked to TCP reported by the three learner groups was that they did not learn anything new, so they did not feel the need to talk about the TCP event to others. Thus, there was no learning to be transferred. Other common reasons were: no new or updated information on climate change science; limited novel or further actions or insights on alternative solutions; and no increase in motivation as a result of attending a TCP event. For some, while they enjoyed the TCP event, it did not increase their perceived ability to understand

or more accurately explain and talk about the topic (the scientific, social and political dimensions of climate change) with others.

Other reasons were linked to factors external to the TCP events. For example, respondents felt that the people they usually talked to about climate change already knew the information TCP gave them; they thought that not everyone believed in climate change making it challenging to engage them on the topic; they perceived that there were a lot of sceptics in the broader community; they felt that not many people were willing to discuss climate change or take action or that others were not responsive to the issue; they did not want to be seen as conveyors of doom and gloom or as lecturing or preaching; talking about climate change was perceived as linked to a sense of identity often perceived as ‘greenie’; they did not feel they knew enough about the topic to engage others; and they felt that it was hard to be positive about climate change or as one ‘Early aware’ participant stated: ‘*let’s face it, it is a depressing topic*’.

A key finding in this study relates to climate change as a topic of conversation, which was constrained by an array of factors. This has implications for the way we talk about climate change and how the topic is presented and discussed. Findings suggest that focusing the discussion on the evidence of climate change and the fear of consequences, rather than on solutions, possibilities and examples, may hamper the desire to discuss the topic, which is perceived as too ‘*depressing*’ or ‘*risky*’. Even for the ‘Already converted’, who talked about the issue more often than the ‘Early aware’ and the ‘Doubtful’, the topic could be challenging at times. For example, an ‘Already converted’ participant stated: ‘*Global warming is a complex issue and people don’t always want to talk or think about it because it touches upon human responsibility. The issue has also been transformed into a political issue and political issues are not always easy to talk about either*’. The fact that this participant used the term ‘global warming’ rather than ‘climate change’ highlights the complexity of understanding the issue⁹⁵ and thus responding to it. Climate change terminology itself makes it difficult to talk about the issue as the use of different concepts can lead to a perception of confusion, uncertainty and complexity and can evoke different reactions and understanding. Moreover, the quote above also portrays climate change as a political issue, which is hampered by political partisanship⁹⁶ and as such possibly divisive. As Abbasi (2006) states, many people avoid raising issues that have partisan content because of the risk of damaging relationships with family members or

⁹⁵ There is a subset of climate change communication literature looking at distinctions in public perceptions of ‘global warming’ and ‘climate change’. For example, a study in the UK (Whitmarsh 2009) shows that the choice of terminology significantly affects how people understand and evaluate the issue. The terms ‘climate change’ and ‘global warming’ have different connotations and evoke different reactions and perceptions suggesting important implications for researchers, communicators and educators.

⁹⁶ There is a growing body of work (e.g. Hamilton 2010; Maibach et al 2011; McCright & Dunlap 2010) suggesting that beliefs in climate change are strongly influenced by political ideology and affiliations.

friends. Climate change appears to have fallen into this category of risky issues, which impedes the flow of information and dialogue.

In addition, the nature of climate change makes it challenging as a topic of conversation. Evidence shows that climate change was perceived as a complex and loaded issue. For example, participants depicted climate change as: an emotionally charged topic⁹⁷; a political issue; an issue still with a strong scientific focus (making participants anxious about discussing the topic with others as they did not feel they knew enough or could explain the science); an issue with various and complex solutions (making it hard to talk about potential solutions and their efficacy); a controversial issue with conflicting views that can provoke strong reactions and create debates; and an issue linked to social identities⁹⁸. It is also difficult to be knowledgeable on all the scientific, social and political dimensions of climate change, making it a very challenging topic of conversation.

The reasons listed above by participants in all three learner groups were a clear indication that engaging others on climate change was seen by many as a real challenge. For example, in her second interview one 'Already converted' participant stated: *'I still find it very challenging to speak to people who are not really on board with climate change'*. This study indicates that talking to others can be challenging and potentially costly (emotionally and socially) for individuals. Other researchers (e.g. Dilling 2008; Dunlap 1998; Moser 2010b) have also identified challenges and costs. This study adds empirical evidence of the challenges of communicating climate change highlighted in Chapter 2. While this section examines talking about climate change from the perspective of learners, it is important to highlight that similar challenges also apply to TCP educators.

Educational programs like TCP provide an opportunity to push alternative narratives not readily available in traditional news coverage, for example, and to find new ways to talk about climate change; this can create possibilities for dialogue and opportunities for community events to create a safe environment where the topic can be discussed more openly.

⁹⁷ While conducting interviews, I noticed at times that talking about climate change raised emotional concerns including fear, guilt over their own action, desire to do something, desire for others to act too and frustration at the slowness of societal responses. In addition, some interviewees were happy as this was an opportunity to discuss the topic 'openly' and express what they felt.

⁹⁸ Crompton and Krasser (2009, p. 11) state a defining feature of a person's identity is his or her social identity, or the group to which that person feels he or she belongs. As Moser (2006b, p. 112) states individuals form social identities and if engaging in action on climate change portrays a particular social identity, produces a social stigma, or is in conflict with people's desire identity and accepted norms, they are unlikely to engage in this particular type of action.

Furthermore, findings in this study have serious implications for TCP as a community-based program underpinned by a social diffusion model which is driven partly by interpersonal communication, social interaction, and that aims to engage individuals and communities in dialogue on climate change towards action. Results pose challenges for TCP to meet participants' desires and encourage more dialogic educative and learning experiences on a risky, complex, controversial and often 'doom and gloom' topic like climate change.

5.7 Conclusions

Perhaps the clearest message emerging from this thesis is that effective climate change community-based education starts from the learners and involves careful consideration of content, educator and learning processes in relation to the learners, as presented in Figure 12. It is also crucial to understand and capitalise on the context in which learning takes place.

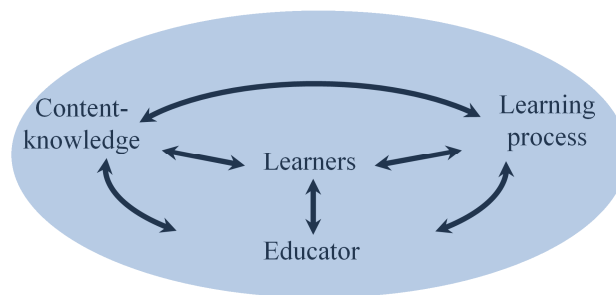


Figure 12 The relationships between key elements in the learning system

This research has explored the interrelationships between elements of the learning system, and between cognitive, affective and behavioural engagement. This indicates the complexity of learning and change and of facilitating learning for change and implies that the learning model must be carefully developed in relation to the intended outcomes. It should consider the learners, content, process and educator. The case study in this research offers an example of how complex this dynamic learning system can be, including the four elements of learning and the learning setting (in blue). Although all the elements are key, during this research, it became obvious that learners contributed most to the overall system, because they were the most dynamic and influential. As such, the 'learners' element drove the other elements (content, educator and learning processes). This reiterates the importance of understanding who participates in a program, why they choose to participate and what and how they want to learn. Learners should be considered when determining all aspects of an educational activity, including the scope and purpose of an educational program, in other words, to what can or should be achieved with specific learner groups.

This discussion has indicated that a deficit model approach does not appropriately inform effective climate change education. Evidence in this study clearly shows that the majority of learners were not deficient in awareness or basic understanding of climate change. This indicates that different learning approaches are needed in order to move learners along the engagement continuum on climate change and facilitate learning for change (Appendix 9 provides examples of a range of educational programs that could be offered to each learner group).

In terms of content-knowledge, this study suggests that the answer to further engaging most learners in climate change may not lie in increasing the reality or urgency of climate change itself (through science content) but rather in findings ways to boost learners' sense of self and collective efficacy and offer content on possible solutions at all levels and ways forward at both individual and collective levels. Effective climate change education efforts now must move beyond the science of climate change and provide opportunities for people to translate their concerns into practical action, to engage on the issue in the private and public spheres and in their multiple roles as individuals, consumers, citizens, and members and participants in various communities, networks and organisations. This highlights the need to customise the content to different learners and provide range of opportunities for action that span different scales as well as different types of involvement.

In terms of learning processes, results in this study suggest that engaging with a complex issue like climate change calls for more than just knowledge transfer. This study highlights the importance of learning approaches that challenge the belief that 'the facts speak for themselves' (Kelsey 2003) and instead promote the active roles of learners and educators, and the social nature of learning and change. Evidence indicates that it is critical to maximise the social dimension of learning by focusing less on transmitting a prescribed content and more on designing learning processes that promote co-learning and interaction. Social interaction and dialogue should a critical role in climate change community-based educational programs like TCP. This study suggests that the TCP model would benefit from revision to fully capitalise on social diffusion and social learning processes and to facilitate learning for change.

This discussion has noted that involving learners in active learning experiences is critical. Involvement in such activities support a more social learning process, an important aspect of climate change education; and might support learning beyond one-off educational event. It is critical for attendees to have opportunities to interact with others (a key element of social learning) to generate discussion on climate change, to build and strengthen networks and to build social support. This would help attendees see that they can be part of the broader response

to climate change, ‘the big picture solution’, and that they are not alone. It is also critical that audiences be addressed as existing or potential new social groups, rather than as aggregates of individuals, in order to capitalise on the group or community learning setting, which is part of the TCP model. This would encourage not only individual action and behavioural engagement but also collective actions towards social change at the community and broader societal levels.

Chapter 6 - Lessons learnt: concluding discussion

Nothing is really going to happen if you just tell people who are already converted and already worried about these issues to change to efficient light bulbs, for example.
(An 'Already converted' participant in this study)

6.1 Introduction

My aim in this chapter is not to summarise what has gone before but to expose what I believe is the most relevant and compelling findings of this thesis. The chapter first discusses what was found and several implications for practice. It then concludes with a discussion of the study's limitations and opportunities for further research.

What I have learnt during this study is that there are individuals and groups in society who actively engage on climate change. They already use energy-efficient light bulbs and they take actions in their homes, workplaces and communities. Yet, they believe that effectively tackling climate change and creating a more sustainable world, is going to require urgent and significant concerted efforts and societal changes. Many want to something the opportunity to become more involved and be part of this collective effort. These individuals and groups are interested and motivated, so climate change education for them should be made empowering and full of opportunities.

Moreover, social diffusion theory suggests that we do not need to engage everyone to achieve effective change; if 10% to 20% of a population is committed and active, this is enough to create significant changes by taking action to normalise climate-related behaviours and put pressure on politicians and industries. Educational efforts should therefore aim to empower, enable, motivate and educate these individuals and groups. They should become a key concern, especially since they are the easiest audience to reach as they commonly self-select to attend community events and learning opportunities. Thus, educational programs need to offer them ways to meaningfully engage in the process of bringing about change. This begs the question of how. The section below discusses what was found and several implications for practice. It also offers some recommendations for TCP at this particular point in time.

6.2 Facilitating learning for change

TCP events were originally developed for reaching and educating the unaware, the not yet engaged or those less knowledgeable on climate change, in the hope of increasing public awareness of the climate crisis at the grassroots level and generating greater public concern and action. This study, however, clearly indicates that, instead of attracting these target audiences, TCP events largely attracted people who were already aware of climate change, were quite knowledgeable and took some actions on climate change. These individuals were labelled the ‘Already converted’ in this study and made up 60% of participants interviewed. I therefore argue that a revised model of learning is needed for TCP to deal with this change in participant makeup. This study suggests that finding ways to meaningfully educate, engage, motivate, enable and empower the ‘Already converted’ group is one of the best ways to facilitate learning for change.

In the context of this study, results indicate that TCP appealed mostly to participants who were already engaged in climate change and interested in exploring how they could make more meaningful changes in their lives, their workplaces, their communities and beyond. It can be argued that these are common findings for many community-based education programs, in that the majority of those who participate in community education programs and attend events, talks and workshops tend to be already receptive and committed or have a high level of interest or curiosity in the topic matter. This situation presents an excellent opportunity to broaden the scope, goals and means of climate change community-based education by reaching out to those adults who are already engaged, interested and motivated to work for change. This requires, however, taking community-based education beyond the simple notion of education as a tool merely for increasing awareness (for these adults are already aware) and promoting modest individual changes (for they are already taking individual actions and are interested in playing a bigger role in the change process) into the realm of empowering, inspiring and action-oriented education; or in other words, a more transformative approach to community-based climate change education.

This study also indicates that such a shift requires an understanding of community-based education as an active learning process undertaken with and by people in a group or community context. It also implies different content-knowledge and learning processes including different roles ascribed to both learners and educators in order to bring about more transformative individual and community outcomes. I also argue that a revised model is needed for TCP to capitalise more fully on social settings, in which learning takes place, to facilitate social learning and changes at the individual and community levels. This would help the program meet its goals of launching conversation and changing social norms.

Before moving further, I would like to make a few points to clarify my position. In contrast to claims in literature that educating individuals and groups who are already engaged is of limited value, this research indicates that educating them is crucial.

There is a commonly held view in the fields of both education and climate change communication that most programs attract those who have a predisposed interest in the issue. Thus, we hear that the wider public remains disengaged and educators ponder how to engage those not yet engaged. While I agree that educators should increase their efforts to reach new audiences beyond ‘the converted’ in order to mobilise a wider public on climate change, I argue that we need to better ‘equip’ individuals and groups who are already engaged as they are willing to engage further, they self-select to attend educational activities and, above all, they are key to facilitating social change.

Storksdieck et al. (2005) state that by referring to attracting individuals who are already receptive as ‘preaching to the choir’ (p. 354), this indicates that educators place little value on the activity and hence any associated outcomes with this group. When educators talk about ‘preaching to the choir’, there is often a sense of being concerned that their efforts do not yield the intended outcomes (e.g. raising awareness or reaching new audiences), and they may feel that there is little impact of their efforts. Thus, a need to reach beyond ‘the choir’ is widely called for in education and communication literature. Implicit in those comments is the belief that what is needed to bring about change are new people to join in. Consequently, education efforts tend to concentrate on individuals who are not already engaged, under the assumption that the already engaged can sustain themselves.

This study’s findings, however, suggest otherwise. The ‘Already converted’ were looking for more content-knowledge and discussion on how to bring about change. Findings show that most ‘Already converted’ reported unmet needs and expectations from the TCP event they attended. They were also socially motivated to look for like-minded individuals. Findings highlight the costs (i.e. cognitive, affective and social) of sustained engagement and thus the need for ‘Already converted’ to be socially supported. These have crucial implications for educational activities. I argue that despite the common belief that individuals and groups already engaged can sustain their engagement, they need to be supported on all dimensions of engagement: cognitive, affective and behavioural.

The literature suggests (see Moser & Dilling 2007; Storksdieck et al. 2005; Whitmarsh et al. 2010) that educators and communicators should increase their efforts to reach new audiences beyond ‘the converted’ in order to mobilise a wider public on climate change. While I agree with this, I argue that broadening public engagement should be done in conjunction with further

engaging the ‘converted’, thus deepening their current engagement with climate change. Such an argument is based on two key points: (1) TCP attracted mostly the ‘Already converted’, and (2) the ‘Already converted’ are instrumental in the social change process defined by the social diffusion theory.

As stated earlier, this research addresses a common assumption in the environmental education and climate change communication literature that people who are already engaged and receptive to the subject matter are of no or limited interest because they have already been won over and thus do not need further education. I argue that educating them is crucial; and that despite the common belief that individuals and groups already engaged can sustain their engagement, they need to be supported in all three dimensions of engagement: cognitive, affective and behavioural. Consequently, while I agree that educational programs and educators need to reach groups who are yet to be engaged, I believe that they also need to pay particular attention to those already engaged in order to sustain their engagement on climate change (e.g. offer validation) and further motivate them to action. To achieve this, however, designers of educational programs and educators have to think differently about how they can move away from disseminating information and raising awareness into the broader social change objectives of transformative community-based education.

This research shows that there is a great deal of willingness among the ‘Already engaged’ to act; therefore, there is significant untapped potential for action among this group. Thus, I argue that, instead of educators wondering *whether* they are making a difference by talking to the ‘Already converted’ group, they should be asking *how* they can make a difference within this group. Clearly, these findings pose challenges for programs and educators as they need to move away from a one-way transfer model of learning towards more dialogic and interactive forms of learning. I believe that as a community of educators we should put more thoughts into: What do individual and social groups already engaged want to know and learn? How do they learn and how do we best support and facilitate such learning? What can be achieved with them through education? What should the scope and purpose of education be? and What content and learning processes are best suited to them? This chapter seeks to offer some answers to these questions.

Implications of the study for educating the ‘Already converted’

This study clearly indicates that, in order to effectively facilitate learning for change, stronger emphasis needs to be placed on the ‘how?’ (the means of bringing about change) rather than ‘what?’ (the problem). This study challenges programs and educators to focus and reflect upon the ‘how’ question both in the content (emphasis on solutions and strategies for change) and process (designing space and time for exploration, deliberation, shared meaning and understanding).

It is clear from the results that the 'Already converted' feel that urgent action is required on climate change. Central to this group is the desire to do something meaningful. They understand the collective nature of climate change and its solutions and while they take some individual actions, they believe that it can only be 'solved' through concerted efforts, cooperation, and demand for social changes through political pressures. As individuals, they often feel restricted by a lack of clear or unified sense of how to participate and effect broader changes.

Furthermore, while the 'Already converted' feel that we have the ability to act against climate change, they are unsure that the broader social and economic transformations needed to stop the accelerating growth of greenhouse gas emissions are possible in the short timeframe required. Such uncertainty is also linked to their perceptions of a lack of commitment and action from others (people, governments, industries), further compounded by a lack of political leadership on climate change at the national and global level, and a growing culture of consumerism. This can lead to a sense of feeling alone in acting and feeling that there is insufficient support. For this group, climate change has become an emblematic issue of the current sustainability crisis that requires urgent widespread changes and commitment to transforming the ways we live. However, a lack of knowledge about how to best bring about the required changes, accompanied by limited social support and structural impediments are critical barriers for the 'Already converted' to meaningfully engage further on climate change.

Findings in this study indicate that demonstrating practical ways of acting (e.g. climate change actions), particularly those involving community or group interaction, is best suited for the 'Already converted' group. Highlighting the (emotional) reasons for action, or the urgency of action, will not be effective as the desire to act is already present and further emphasis may be counterproductive. In addition, providing time and space for social interaction and opportunities to network and scope potential collective actions will be the most beneficial for this group, as findings in this study show that the 'Already converted' need forums to discuss the issue, express their feelings, receive social confirmation, and build social support. A learning model involving two-way dialogue is thus deemed more appropriate for the 'Already converted' than the transmissive or deficit model of learning.

This study demonstrates that the roles of the 'Already converted' need to be extended beyond those traditionally assigned to individuals as consumers to encompass actions in the public sphere - civic and community engagement. It is critical, in my assessment, that these highly motivated and engaged individuals receive further information and support on how to best bring about social change. For example, it may be useful to educate the 'Already converted' about how social changes happen and show them indicators of positive changes in the Australian society and around the world. It may be empowering for the 'Already converted' to learn about examples of historical events that led to major changes; this would validate their potential roles

in citizen-led social changes. Indeed, the purpose of education for this group needs to be about empowering them to be change agents (for change at the individual and system levels). Findings show that the 'Already converted' are particularly predisposed to wanting to take or support civic or political action. They are keen to act in the public sphere yet they are unsure about how to do it and about the efficacy of these actions if taken individually. TCP could take advantage of this to promote civic education and actions. These findings indicate that participatory knowledge is crucial for this group to help them understand how they can get involved as citizens in the decisions that are made about climate change at the community and national levels and that their actions can make a difference (in other words to increase their political efficacy).

I argue, based on my research, that the goals of climate change community environmental education need to be broadened beyond scientific understanding of climate change and promote a range of relevant dimensions of knowledge⁹⁹. Importantly, the emphasis should be on educating individuals and social groups around the social and political dimensions of climate change and the roles they play in facilitating changes in these dimensions. This will help the 'Already converted' to become agents of change, make individual changes but also influence changes within systems. It is important to highlight positive actions which individuals and groups can take immediately, such as coordinating networks and stimulating connections to motivate and support change. People situated in the 'Already converted' group are the most likely to create new forms of action at the local community level and beyond. Thus, climate change needs to be defined in such a way that group or community influence and opportunities for action and for making a difference are made apparent.

The scientific focus of climate change education needs to be reassessed. This study suggests that the most compelling story on climate change is about solutions, strategies for change and alternatives and not just 'an extended lesson on science' (Moser & Dilling 2004, p. 57). As one 'Already converted' participant in this research stated: *'I think it [science] is important but it is just not something that inspires me'*. Most believe that climate change is a problem that requires immediate action and are thus interested in 'how' they can bring about change. Furthermore an emphasis on solutions rather than on science may help to move away from almost exclusive concern with present problems towards solutions, future goals and preferred futures. As Hicks (2010, p. 10) states, 'it is not about just about problem solving our way out of unsustainability but about creating alternative futures'. I advocate a stronger role for futures thinking and visioning in community-based climate change education to achieve the call by Hicks (2010) for vision and inspiration. This, I believe, provides a fascinating opportunity for further study.

⁹⁹ There is also a need to educate the 'Already converted' both about mitigation and adaptation and to explore potential mitigation and adaptation strategies at all levels. I believe, however, that learning about adaptation and mitigation is necessary for all learners at this time.

There is also a call for a pedagogy of hope as since Brazilian educator Paulo Freire (1994, p. 8) states ‘without hope, we are hopeless and cannot begin the struggle to change’. Without hope, Freire asserts, there is inaction, hopelessness, and despair. Although further research is needed to explore the relationships between hope and action and the role of hope in transformative community-based climate change education, this study’s findings suggest that creating a sense of possibility and hope is crucial to actively engage people on tackling climate change. Therefore, designing educational initiatives that help create and share alternative visions and narratives about sustainable futures is an important starting point for creating a sense of hope and as a catalyst for action. Climate change educators need to balance a realistic understanding of the challenges with a sense of possibility and empowerment. They need to offer a realistic perspective on the major challenges we face and the scope of changes required at all levels, while offering opportunities to chart a positive way forward by creating visions of alternative sustainable futures, giving positive indicators of change and calling for action.

The ‘Already converted’ group is particularly motivated by connection with people; establishing networks and social dialogue are essential for this group as they must be supported in sharing their ideas and concerns and working with others through social networks and interaction. Therefore designing educational initiatives that incorporate time and space for social interaction and dialogue is critical to help create motivation and social support. Opportunities for learners to interact with each other to participate in sharing knowledge and experiences about climate change and possible climate actions are important. Thus, this study makes a case for a more dialogic approach in climate change education.

Emphasising the content-knowledge and facilitating discussion about climate change actions, particularly those involving community or group interaction is best suited for the ‘Already converted’. Creating space and time for social interaction and dialogue will also be beneficial to build shared understanding and discuss strategies for individual and collective changes. This encourages social learning, engagement and ownership. The next steps TCP could take towards more engaging and interactive ways of exploring climate change issues with the ‘Already converted’ could include small group discussions, community forums (see Monroe et al. 2009), discussion-based activities, conversation or world café where participants are invited to discuss current issues of climate change and study or learning circles (see Clover & Hall 2010) (see also Appendix 9). Findings in this study suggest that such learning methods may be more effective than content-delivery method on facilitating learning and change as they rely on the social aspect of learning. Such methods can help create spaces conducive to co-learning. Information transfer alone is not the answer. Rather, facilitating social learning is the key for creating more possibilities for action. For the ‘Already converted’, this means that learning, reflection, sharing, co-construction, support and participation are needed. There is strong evidence in this study to

suggest that learning outcomes can be facilitated by certain processes such as small group discussions. In such settings, the educator has an important role to play as a facilitator of discussion and group interactions. This requires, however, training for educators in facilitation skills.

As stated in Chapter 5, there needs to be recognition of the difficulties of using a more dialogic approach to community-based education, including challenges for educators and for learners. However, while such an approach can be challenging, as learners are exposed to different viewpoints and have to reflect upon their own perspective, the ‘Already converted’ in this research would have welcomed such an opportunity. They felt positive about opportunities which made them think and discuss. As one ‘Already converted’ participant in this study stated: *‘Getting different opinions voiced and discussions are very powerful to get people to reflect on their own understanding of the issue and their own ideas about how change happens’*. Moreover, a dialogic approach can also encourage learners to explore issues together and build a shared understanding of climate change and its solutions.

The ‘Already converted’ as a group offer opportunities to start what Moser (2008, p. 130) refers to as ‘difficult dialogues’ but this will require careful designing (or, in the case of TCP, redesigning the program) and skilful facilitation to create a ‘safe’ learning environment and encourage social learning. This study clearly indicates that complex issues, like climate change, call for more than information transmission in order for people to actively respond. Thus, active learning processes may be the most promising for facilitating learning for change and for transformative community-based climate change education.

6.3 Limitations to this study

This study was designed to investigate how community-based education can engage individuals and communities on climate change and facilitate learning for change. It drew on theory from diverse fields: environmental education, climate change communication and social diffusion theories. The intent was to create a broader theoretical perspective building on these fields to develop a more unified conception of climate change education in community contexts. However, a number of aspects of the study might be reconsidered if research along similar lines or topics is to be conducted in the future.

One regret I have regarding my own research was my inability to provide further insights on educators. Initially I had planned to focus on TCP learners and TCP educators, to hear stories

from both sides to gain a broader understanding of the whole picture. However, as the study progressed, I ended up focusing more on learners. I believe though that it would have been extremely insightful to give appropriate focus to TCP educators to explore their perspectives on community-based climate change education, the challenges they faced and their successes. I feel there is a lot to learn from them but that task must now be left to someone else.

Although I was most interested in individuals and communities in this research, reports from individual participants (collected through a range of methods- pre/post-questionnaires, semi-structured interviews and participant observations) were used to measure social outcomes and investigate changes at the system or community level. While this approach was useful, in retrospect, it would have been useful to develop specific indicators and approaches to elicit learning and change at a more collective level. For instance, group discussions or focus groups may have been used to investigate learning processes and change at the group and community levels, in addition to or instead of individuals.

In order to explore the social outcomes of learning (outcomes produced by an educational program at the community level), data could be collected, measured and analysed at the community level (using group as the unit of analysis as opposed to individual learners). This would require a different framework with different sets of indicators for a community level exploration of group learning processes and social outcomes, such as collective behaviours/actions, knowledge, understanding and feelings towards the issue and a sense of collective efficacy. As discussed above, inclusion of focus groups may have offset the limitations of this approach.

6.4 Opportunities for future research

In terms of future research, there remains much more to be done. Findings suggest numerous directions for future research; some have already been discussed in this chapter, and some are further discussed here.

More research is needed on individuals and groups who are ‘already converted’. While research has established how difficult it is to actively engage on climate change, and much has been said about the barriers and challenges, I strongly believe that more needs to be understood about those who do make changes in their lives and their communities. This study shows that there are individuals and groups in society who do engage on climate change despite the widely perceived barriers or challenges cited in the literature. These individuals and groups are both

concerned and taking action. We need to ask: What can we learn from them that might help us understand how to motivate and facilitate change? Why do some actively engage on climate change and what can be learnt from them? Do they perceive the risks differently? If so, why? If not, what is influencing their actions? Why have they chosen to act when others have not? And mostly importantly how can education help them to both sustain their current engagement and engage further on the issue? The answers to these questions could inform TCP program design and activities as well as other educational efforts designed to compel people to action on climate change. Consequently, future research on this could contribute substantially not only to the literature but to the practice in climate change education.

While the questions above apply to audience members / participants in educational activities, they can also apply to the educators themselves. For example, in the context of TCP, volunteer educators are publically active and vocal on climate change. They too are both concerned and taking action. Once again, what can we learn from these individuals that might help us understand how to motivate and facilitate more active engagement on climate change? For instance, we can ask: Who are these individuals who decide to be vocal about climate change? What characterise them? Why did they choose to get involved in TCP? How do they see their role(s)? What happens to them in the process? Thus, I believe that educators themselves provide a fascinating opportunity for further study.

Additional research is also needed on social learning from an environmental education perspective in the context of sustainability and climate change in particular. Further research can help:

- Clarify the conceptual basis for social learning; and identify variables, indicators and most appropriate methods to assess social learning in educational activities.
- Investigate to what extent social learning occurs in different social systems /learning settings.
- Assess to what extent social learning is facilitated by interactive and participatory processes. Findings in this study suggest that social interaction can be a catalyst of learning (see section 5.4.3). However, more qualitative research is needed to explore this further and measure: the benefits of such processes on individual and group learning; associated learning outcomes; how such processes can be designed to better facilitate social learning; and to what extent this then leads to positive learning and change outcomes at both individual and group levels.

Furthermore, if more interactive and dialogic approaches are needed to engage individuals and communities, we need to understand more about the opportunities that these present and how we can do it in practice. There is a strong call for the inclusion of more interactive and dialogic approaches in both education and communication literature. Findings in this research support that call. However, it is easier said than done and thus more research needs to be conducted in

different settings to see how it could be done and what the impacts are on learners. Finally, as suggested earlier, we need to better understand the role of Futures Thinking and visioning in educational activities. I believe this provides a fascinating opportunity for further study. For example, research could examine how to include visioning exercises in community-based climate change education and the impacts of such exercises on learners' cognitive, affective and behavioural engagement on climate change.

6.5 Conclusions

In this thesis, I have argued that the role of community-based climate change education needs to be broader than simply a way of transmitting a prescribed content to passive learners. Rather, I suggest that learning for change is best served by opportunities for social interaction, interpersonal communication and social learning. Giving more information on the science and impacts of climate change to individuals and communities without offering space to discuss its implications and how we can best respond to the issue is unlikely to facilitate learning for change. We must challenge the common assumption of education as primarily a process of increasing knowledge by transmitting information. We can begin to do this by acknowledging the interactive, social and participatory functions of education. A better understanding of learners will also help us identify the most appropriate content-knowledge, learning processes and educators for particular educational programs and contexts.

Although moving from a transmissive model to more dialogic and interactive models presents important challenges to both educators and learners, effective community-based climate change education requires more interactive ways of exploring climate change (both the problem and possible solutions) and to ultimately enable social change. This study shows that the ability to facilitate learning for change in community contexts goes beyond conveying information. Instead, it is about capitalising on these community contexts to create a social learning environment for individuals to come together and explore possibilities and actions at both the individual and community levels.

Appendix 1 – Information sheet for TCP educators

October 15th 2007

Estelle Gaillard
PhD Candidate
Nathan campus, Griffith University
170 Kessels Road
Nathan, Queensland 4111
Telephone +61 (07) 373 55359
Estelle.gaillard@griffith.edu.au

AN INVITATION TO PARTICIPATE

My name is Estelle Gaillard. I am a full time PhD candidate in the field of environmental education at Griffith University in Brisbane. I am particularly interested in the processes of learning and change and how we can effectively engage individuals and communities in sustainable solutions- through changing their own behaviours as well as supporting broader social changes.

The theoretical framework at the core of my PhD research is the diffusion of innovation theory, looking at non formal education as a strategy to bring about personal and social change for a more sustainable world. The theory explains how new ideas and practices spread through certain communication channels over time among the members of a social system. In my research, I will be looking at the diffusion theory in the context of sustainability and climate change using the Climate Project Australia (TCP) as case study. I will monitor the diffusion process throughout the next year and half and ascertain the types and levels of change TCP educational outreach is able to bring about.

In order to evaluate the diffusion process and outcomes of TCP, I am looking for volunteer Ambassadors to partner with so I can attend a number of their presentations and survey audience members. Your commitment to the research, if you are willing to participate, is to keep me posted on your presentation calendar within the next twelve months (dates, location and target audience); and help me get in touch with the organisers who will be hosting your presentations in order for me to have access to audience members prior to the actual presentations via questionnaire or interviews (to be determined).

ACF is distributing this letter on my behalf since your personal information has not been released to me. If you are interested in participating or would like further information, please contact me directly (contact details on the top right of this letter). I would like to stress that participation in my research project is entirely voluntary.

Two additional documents are attached to this email 1) an information sheet that provides further details on the conduct of the research and your participation; and 2) a consent form. Please read them thoroughly and do not hesitate to contact me if you have any queries or concerns. Once you have reviewed and understood the information and if you are willing to participate, please sign the consent form and mail it back to me at your earliest convenience. The form will serve as a record of your decision.

Thank you in advance for your time and consideration.

I look forward to hearing from you in the near future.

Best,

Estelle

Appendix 2 – Consent form for TCP educators

October 15th 2007

Estelle Gaillard
PhD Candidate
Nathan campus, Griffith University
170 Kessels Road
Nathan, Queensland 4111
Telephone +61 (07) 373 55359
Estelle.gaillard@griffith.edu.au

CONSENT FORM

NOTE: This consent form will remain with the Griffith University researcher for her records.

Research Team

Estelle Gaillard - Griffith School of Environment
estelle.gaillard@griffith.edu.au

Statement of consent

By signing below, I confirm that I have read and understood the information package and in particular that:

- I understand that my involvement in this research will include:
 - Partnering with the researcher Ms. Gaillard
 - Keeping her posted on my TCP presentations within the next twelve months (dates, location and target audience)
 - Helping her get in touch with the organisers who will be hosting my presentations in order for her to have access to audience members prior to the actual presentations via questionnaire or interviews (to be determined).
- I have had any questions answered to my satisfaction.
- I understand the risks involved.
- I understand that the direct benefits to me from my participation in this research will be the provision of a summary of the overall results of the research at the completion of Ms. Gaillard's PhD; as well as insights into my role as change agent in the diffusion process of new understandings of and solutions to climate change to bring about a more sustainable world.
- I understand that my participation in this research is voluntary.
- I understand that if I have any additional questions I can contact Ms. Gaillard;
- I understand that I am free to withdraw my consent at any time, without comment or penalty.
- I understand that I can contact the Manager, Research Ethics, Office of Research, Bray Centre, Nathan Campus, Griffith University on 07 3875 5585 or research-ethics@griffith.edu.au if I have any concerns about the ethical conduct of the project; and
- I agree to participate in the project.

Name of Participant: _____

Signature of Participant: _____

Date: _____

Appendix 3 – Information sheet for participants

Estelle Gaillard
PhD Candidate
Nathan campus, Griffith University
170 Kessels Road
Nathan, Queensland 4111
Telephone +61 (07) 373 55359
Estelle.gaillard@griffith.edu.au

THIS SHEET IS FOR YOU TO KEEP

**Spreading the word for personal and societal transformation towards sustainability
A diffusion study**

QUESTIONNAIRE COVER SHEET

Who is conducting the research?

Student Researcher - Estelle Gaillard
Griffith School of Environment
(07) 3735 5359
estelle.gaillard@griffith.edu.au

Senior Investigator - Dr. Jo-Anne Ferreira
Griffith School of Environment
(07) 3735 3962
j.ferreira@griffith.edu.au

Why is the research being conducted?

As a researcher in the field of environmental education, I am particularly interested in how we can effectively engage people in sustainable solutions to combat climate change- through changing their own behaviours as well as supporting broader social changes. To address these questions, I will use the Climate Project Australia (TCP) as a case study to monitor the spread of new understandings of and sustainable solutions to climate change among individuals and communities; and ascertain the types and levels of change the TCP educational initiative will be able to bring about.

What you will be asked to do

I plan to collect and analyse the experiences of volunteer audience members who attend a TCP presentation. This will be done via 1 or 2 follow-up interview(s) over the next six to eight months. Your insights are an extremely important component of my research. Therefore, I would greatly appreciate your time and support. Thank you.

Your confidentiality

Identifiable data will be collected as your first name and contact details will be recorded on the questionnaire. This will allow the researcher to contact you throughout the next twelve months. However, your information will be stored a locked drawer in the researcher's office where only the researcher team has access to that draw. The standard University position is that all research data should be stored for 5 years in the University's control. The data will be destroyed at the end of the five-year period. In addition, you will not be identifiable in any publication or reporting.

The expected benefits of the research

While there are no direct expected benefits to you, I anticipate your participation to contribute to the improvement of the Climate Project Australia and potentially, in the future, other educational outreach tackling sustainability and climate change.

Risks to you

The risk of your potential identification has been mitigated in this research. Even though it is necessary for the researcher to collect your information in an identified form, it will not be disclosed to the Climate Project Australia presenter or other third parties without your consent.

Your participation is voluntary

Your participation in the research is entirely voluntary. You are free to withdraw at any time, without comment or penalty. You do not need to answer every question unless you wish to do so.

Mechanism for distribution and return

The distribution method means that all potential participants receive the first questionnaire at the end of the Climate Project presentation. If you are interested in taking part in this research, please return the questionnaire to the researcher with your contact details at the back. The two follow-up questionnaires will be sent directly to you by the researcher at the email or postal address you provide on the first questionnaire.

Questions / further information

You are invited to contact me (contact details at the front of this letter) if you have any further queries or concerns in relation to the research.

The ethical conduct of this research

This Griffith University research is conducting in accordance with the *National Statement on Ethical Conduct in Research Involving Humans*. If you have any concerns or complaints about the ethical conduct of the project, please contact the Manager, Research Ethics, Office of Research, Bray Centre, Nathan Campus, Griffith University on 07 3735 5585 or research-ethics@griffith.edu.au.

Feedback to you

For this research project, feedback will be an appropriate two page summary of the overall results of the research, as the reporting of individual results back to you may be impractical or impossible.

Privacy Statement

The conduct of this research involves the collection, access and / or use of your identified personal information. The information collected is confidential and will not be disclosed to third parties without your consent, except to meet government, legal or other regulatory authority requirements. A de-identified copy of this data may be used for other research purposes. However, your anonymity will at all times be safeguarded. For further information consult the University's Privacy Plan at www.griffith.edu.au/ua/aa/vc/pp or telephone (07) 3735 5585.

Expressing consent

The return of the completed questionnaire to the researcher will be accepted as an expression of consent to your participation in this research. Please retain this sheet for your later reference.

Appendix 4 – Pre-questionnaire

PLEASE FILL THIS IN **BEFORE** THE PRESENTATION

Q1. What made you want to come to this ‘The Climate Project’ presentation today?
(Please tick all relevant boxes)

- I saw the documentary *An Inconvenient Truth* and I am curious about the live Australian slide show presented by one of Al Gore’s trainees.
- I am interested in climate change
- I want to find out more about the science behind climate change
- I am sceptical about climate change
- I want to learn what I can do to tackle climate change
- Other (please specify) _____

Q2. What do you hope to get out of the presentation?

Q3. How convinced are you that the global climate is changing? (Tick one box)

Completely Convinced	Mostly Convinced	Unsure	Not very convinced	Not at all convinced

Q4. How much do you worry about climate change? (Please tick one box)

A great deal	A fair amount	Some	Only a little	Not at all

Q5. How would you rate your understanding of the CAUSES of climate change? (Please mark with an X)

Poor _____ Fair _____ Good _____ Excellent _____

Q6. How would you rate your understanding of the IMPACTS of climate change? (Please mark with an X)

Poor _____ Fair _____ Good _____ Excellent _____

PLEASE TURN OVER THE PAGE

Q7. Please indicate how much you agree or disagree with the following statements about climate change by ticking ONE box on EACH row.

	Strongly Disagree	Somewhat Disagree	Neither agree nor disagree	Somewhat Agree	Strongly Agree	No opinion/ Unsure
HUMAN ACTIVITIES are having significant impacts on the global climate						
There is a lot of disagreement among SCIENTISTS about whether or not climate change is happening						
Australia's ECONOMY will suffer if we reduce our greenhouse gas emissions						
Climate change is ALREADY having serious impacts around the world						
AUSTRALIA is particularly vulnerable to climate change						
Climate change is an urgent issue that requires IMMEDIATE ACTION						

Q8. Do you feel you can personally take action to help limit climate change? (Please tick one box)

- Yes
 No
 I am not sure

If yes, please list the actions you already take at home, at work or elsewhere:

ABOUT YOU

First name _____

Occupation _____

Gender Male / Female

Age (Please circle) 18 or under 19-29 30-39 40-49 50-59 60 or more

Would you be willing for me to contact you in the future? Yes / No

If yes, please write (as clearly as possible) your email or postal address here:

PLEASE HAND THIS SHEET TO THE RESEARCHER BEFORE YOU ATTEND THE PRESENTATION - THANK YOU VERY MUCH.

Appendix 5 – Post-questionnaire

PLEASE FILL THIS IN AFTER THE PRESENTATION

ABOUT THE PRESENTATION

Q1. How would you rate ‘The Climate Project’ presentation?

(Please tick one box on each line)

	Poor	Fair	Good	Excellent	No Opinion
The visual slides					
The scientific information					
The climate change solutions offered					
The delivery and credibility of the presenter					
The relevance of the information to you					

Q2. What, if anything, have you learnt about climate change in this presentation?

Q3. Having attended this presentation, are you more or less convinced that the global climate is changing? (Please circle)

Less convinced No Change / Unsure More convinced
 -2 -1 0 +1 +2

Q4. Did the presentation make you more or less worried about climate change?

Less worried No Change / Unsure More worried
 -2 -1 0 +1 +2

ABOUT CLIMATE CHANGE

Q5. Do you feel this presentation has helped you understand the CAUSES of climate change better? (Please tick one box)

Yes a great deal	Yes a fair amount	Yes but not too much	Yes only a little	No not really	No not at all

Q6. Do you feel this presentation has helped you understand the IMPACTS of climate change better? (Please tick one box)

Yes a great deal	Yes a fair amount	Yes but not too much	Yes only a little	No not really	No not at all

PLEASE TURN OVER THE PAGE

Q7. Please indicate how much you agree or disagree with the following statements about climate change by ticking ONE box on EACH row.

	Strongly Disagree	Somewhat Disagree	Neither agree nor disagree	Somewhat Agree	Strongly Agree	No opinion/ Unsure
HUMAN ACTIVITIES are having significant impacts on the global climate						
There is a lot of disagreement among SCIENTISTS about whether or not climate change is happening						
Australia's ECONOMY will suffer if we reduce our greenhouse gas emissions						
Climate change is ALREADY having serious impacts around the world						
AUSTRALIA is particularly vulnerable to climate change						
Climate change is an urgent issue that requires IMMEDIATE ACTION						

ABOUT CLIMATE CHANGE ACTIONS

Q8. Which statement(s) best describes the actions you are likely to take to reduce the impacts of climate change AFTER ATTENDING THIS PRESENTATION? (Please tick all relevant boxes)

8A. I intend to do nothing

- There is no point
- Nothing I could do personally could avert climate change
- It is too difficult for me to do much about climate change
- I already do as much as I can

8B. I intend to do something

- I already do things but I will try to do more
- I haven't really thought about it before but I will try some simple actions
- I would like to do something but I still do not know enough about practical and available solutions I can take
- I will join an environmental group and/or lobby the government
- I will talk to friends, family, neighbours and colleagues about climate change
- Other (please specify) _____

Q9. What messages, if any, have you taken from this presentation?

If you have any other comments or opinions you would like to share about The Climate Project presentation, the issue of climate change or this questionnaire, please write them here:

ABOUT YOU

First name _____

Occupation _____

Email or postal address (if not already provided in Part 1 of this questionnaire)

THANK YOU VERY MUCH FOR FILLING OUT THIS SHORT QUESTIONNAIRE.

PLEASE HAND IT TO THE RESEARCHER ON YOUR WAY OUT.

Appendix 6 – Questionnaire results for whole sample

This appendix presents the results and analysis for the pre- and post-questionnaires (referred to as Q1 and Q2) data for the whole participant sample ($n = 187$).

Characteristics of the whole sample - socio demographics

Overall, the sample represented a fairly wide proportion of Australian society with the average age at 43.5 years ranging from 18 to 76 years old. All age groups above 19 were fairly evenly represented (Table 6). The gender ratio was almost evenly split with 45.5% of women and 54.5% of men being surveyed, belonging to a variety of occupations represented (from student to retirees).

Table 6 Age of respondents ($n = 187$)

<i>Age Group</i>	<i>n</i>	<i>%</i>
18 years or under	4	2
19 – 29 years	40	21
30 – 39 years	35	19
40 – 49 years	42	22
50 – 59 years	36	19
60 years or more	30	16

Motivations for attending a TCP event and expectations

As shown in Table 7, 49% of respondents claim to attend a TCP event to learn more about the science behind climate change and in the hope of finding out more about what they can do to tackle climate change. However it is important to bear in mind that respondents could tick more than one box. Results seem to indicate a strong demand for both climate change science and information on solutions.

Table 7 Why did the respondents attend the TCP event?

<i>Reason for attending</i>	<i>Responses*</i>
- I saw <i>An Inconvenient Truth</i> and I am curious about the live Australian slide show presented by one of Al Gore's trainees	41
- I am interested in climate change	73
- I want to find out more about the science behind climate change	49
- I am sceptical about climate change	15
- I want to learn what I can do to tackle climate change	48
- Other	33

*Multiple responses were permitted

When asked in Q1 why they participated in a TCP event, interest in climate change was cited by a large majority of participants, which is hardly surprising (as attendance at TCP event was voluntary). Other reasons cited included: climate change solutions; up-date on climate change science; learn more beyond *An Inconvenient Truth*; and meet like-minded individuals who were also interested in climate change.

These quotes offer some insights on the motives for attending a TCP event and the expectations of the attendees in terms of the content, delivery and the educator.

- *‘Learning an effective way to present the climate change facts’*
- *‘To better understand climate change and what can be done to slow down human impact’*
- *‘Want to meet likeminded people who are interested in climate change and climate change action’*
- *‘I want to learn how other people are responding to the issue locally’*
- *‘Some credible facts I can believe and a way forward’*
- *‘Clarify some uncertainties I have about climate change’*
- *‘Further information, inspiration’*
- *‘An Australian perspective’*
- *‘Information about what can be done and how serious the problem is’*
- *‘I certainly don’t want to feel ‘doom and gloom’. I want HOPE really’*
- *‘Add to my knowledge about climate change & the evidence supporting the theory’ ‘Some practical ways we can implement in our lives to reduce climate change’*
- *‘Learning more since An Inconvenient Truth’*
- *‘Looking at more understanding and also interested in what we can do for the future’*
- *‘Updated information on climate change’*
- *‘An alternative viewpoint’*
- *‘Support local presenter’*
- *‘Information on Al Gore’s ideas’*

Responses prior to attending a TCP event

Overall, a large majority of participants was either completely (54%) or mostly (37%) convinced that climate change was happening. A large majority of participants worried either ‘a great deal’ (30%) or ‘a fair amount’ (44%) about the issue (Figure 7). These levels of worry could be due in part to the fact that many participants (93%) believed climate change was already having serious impacts around the world. Likewise, a large majority (96%) also agreed that climate change was an urgent issue requiring immediate action (mean score = 4.63, SD = 0.78; see Table 8, p. 198).

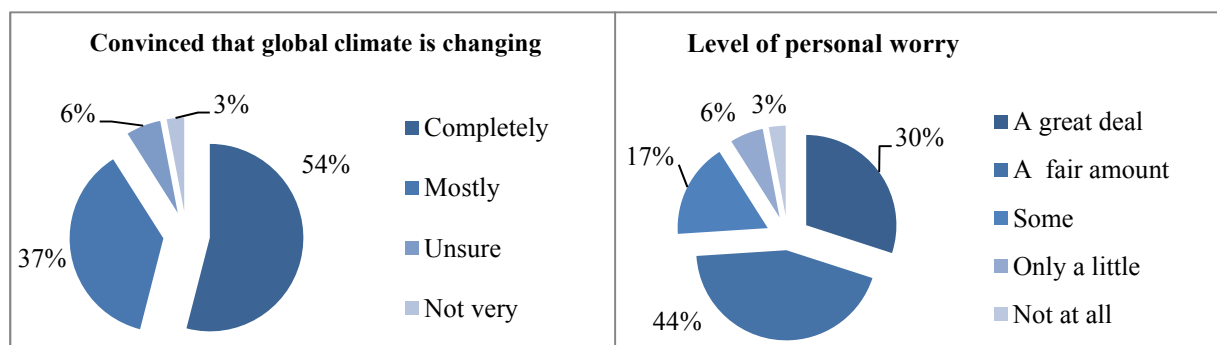


Figure 7 Pre-TCP Questionnaire - Convinced and Worried

Over half believed they were well informed about the causes and impacts of climate change with 61% rating their understanding of the causes ‘good’ or ‘excellent’ whilst 60% rated their understanding of the impacts ‘good’ or ‘excellent’ (Figure 8).

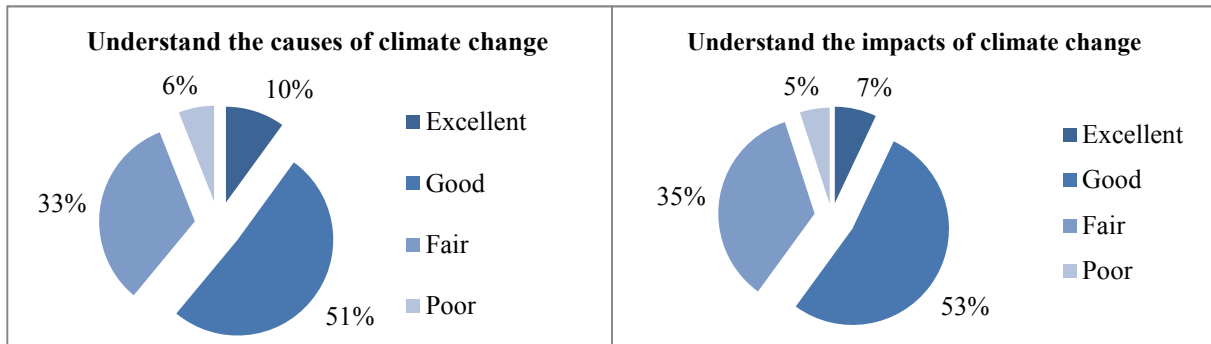


Figure 8 Pre-TCP Questionnaire - Understanding of Causes and Impacts

Further, almost all participants either strongly (79%) or somewhat (17%) believed that human activities were having significant impacts on the global climate (mean score = 4.72, SD = 0.64; see Table 8, p. 198).

Surprisingly, only 39% thought that there was a consensus among the scientific community that climate change was occurring, while 51% believed there was a lot of disagreement among scientists. Thus, many participants appeared to have already made up their minds, without waiting for a perceived scientific consensus.

Finally, a large majority of participants (86%) felt that they could personally take actions to help reduce climate change. When asked what actions they already took, most cited: The three R's (reduce, recycle, reuse), energy and water conservation at home, adoption of energy-efficient technologies, green consumerism and talking to others about climate change. Political activism was only reported by a minority.

Responses after attending a TCP event

TCP appears to have had some impact upon the whole participant sample, when comparing Q1 and Q2. It does appear that TCP did reinforce and increase attitudes about climate change among participants who were already concerned, while having a smaller impact on other participants.

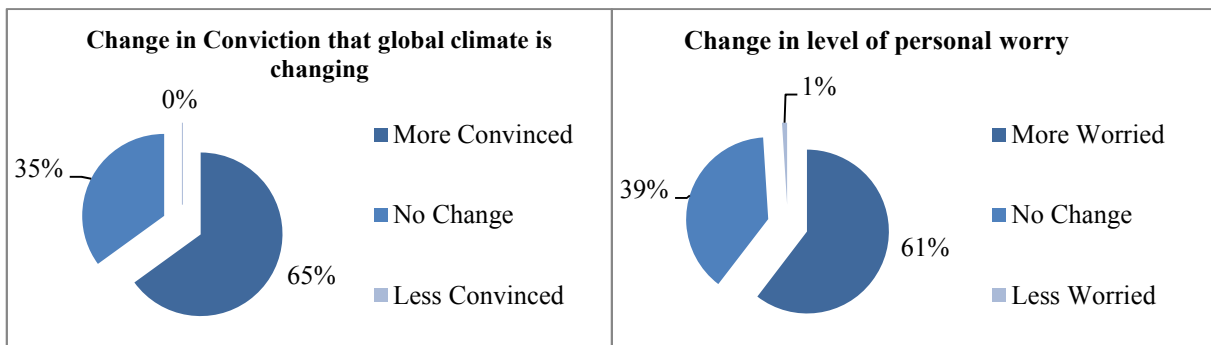


Figure 9 Post-TCP Questionnaire - Change in Conviction and Level of Worry

When participants were directly asked whether the TCP event made them more or less convinced about the reality of climate change, most (65%) said it made them more convinced while 35% said it made no difference (Figure 9). Similarly, most (61%) said they felt more worried after the TCP event while 39% reported no change (Figure 9). Thus, TCP appears to have had both an increasing and a reinforcing effect on the attitudes of some participants who were already convinced and worried about climate change and a smaller effect on others.

Results suggest that reasons for participants feeling more convinced or worried were given by others as reason for feeling no change. The following examples illustrate this point: ‘*I am more worried because it is happening faster than I thought*’ versus no change ‘*because I was already worried*’. Responses to open-ended suggest that instead of an increasing effect, TCP has had a reinforcing effect.

Overall, TCP appeared to have moderately increase participants’ self-rated understanding (see Figure 10). These results, however, need to be interpreted with caution in that respondents may well have been sympathetic to the intention of TCP and so inclined to credit it with these effects.

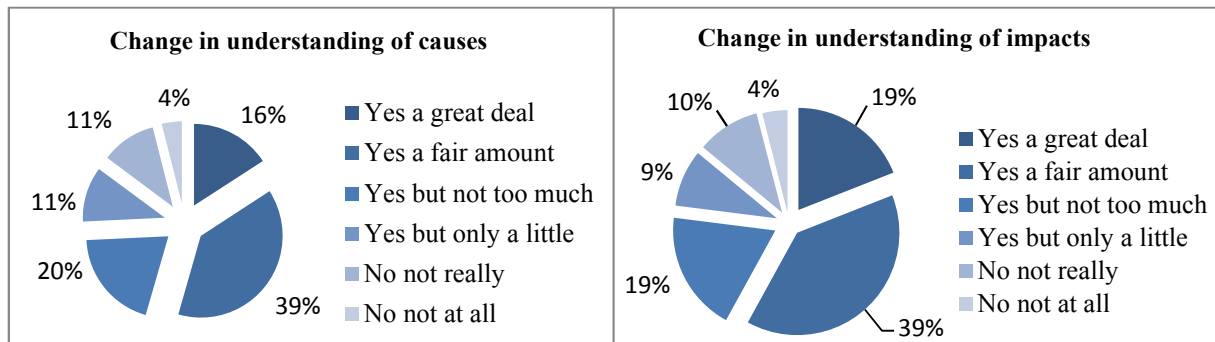
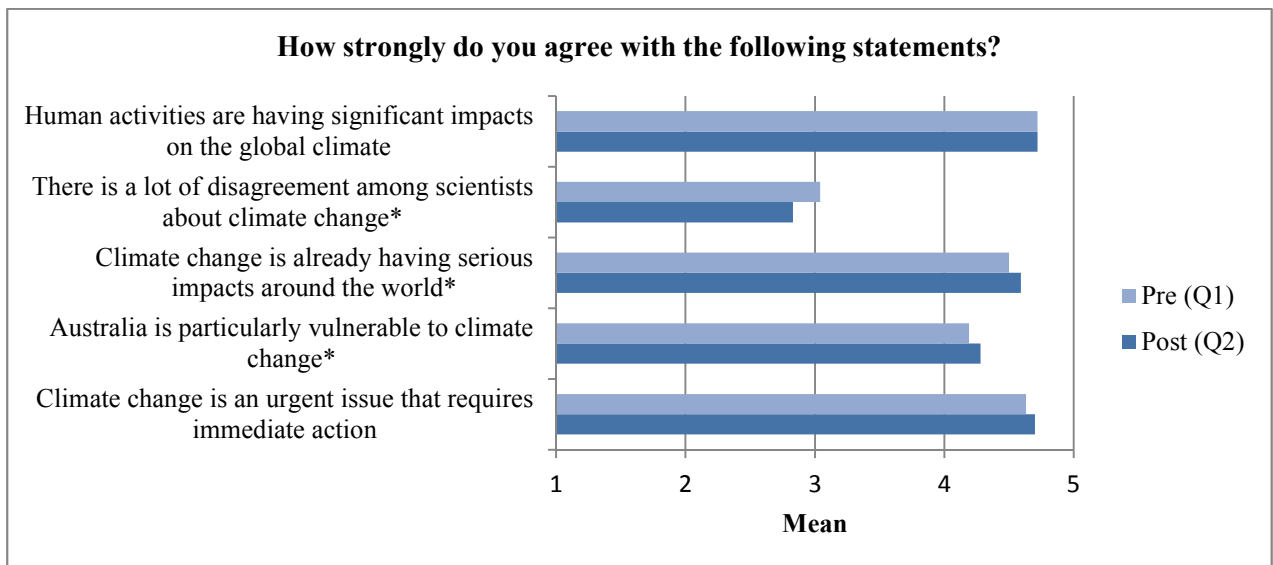


Figure 10 Post-TCP Questionnaire - Change in Understanding of Causes and Impacts

TCP appears to have led to small changes, some statistically significant, in participants’ attitudes with increase in the level of agreement with all statements below, except for “there is a lot of disagreement among scientists about whether or not climate change is happening”. In Q2, participants tended to agree less (the sample mean decreased from 3.04 to 2.83 significant at $P \leq 0.010$; see Table 8, p. 198). This indicates that TCP event increased participants’ belief in a consensus among scientists, typified by this comment: ‘*It seems to be fairly definite among scientific community that climate change is happening and serious*’.

Figure 11 Mean changes (before and after a TCP event) - the whole sample (n = 187)



The level of agreement was measured as 1 = strongly disagree, 3 = neither agree nor disagree/unsure, 5 = strongly agree in both Q1 and Q2. * The Wilcoxon matched-pairs signed rank test identified that differences between responses before and after a TCP event were significant ($p \leq 0.05$).

Table 8 Whole Sample - Pre vs. post attitudes towards climate change (n = 187)

Statement	Pre	Post	Difference	Tend to... as a result of attending a TCP event
HUMAN ACTIVITIES are having significant impacts on the global climate	4.72	4.72	0.00	Same
There is a lot of disagreement among scientists about whether or not climate change is happening	3.04	2.83	-0.21	Agree less
Climate change is ALREADY having serious impacts around the world	4.50	4.59	0.09	Agree more
AUSTRALIA is particularly vulnerable to climate change	4.19	4.28	0.09	Agree more
Climate change is an urgent issue that requires IMMEDIATE ACTION	4.63	4.70	0.07	Agree more

Table 9 Whole Sample - Wilcoxon matched pairs signed rank test (n = 187)

Statement	Direction of change after attending a TCP event	Z	P
Human activities are having significant impacts on the global climate	Same	-0.242	0.809
There is a lot of disagreement among scientists about whether or not climate change is happening	Agree less	- 2.573	0.010*
Climate change is already having serious impacts around the world	Agree more	-1.863	0.063
Australia is particularly vulnerable to climate change	Agree more	-2.012	0.044*
Climate change is an urgent issue that requires immediate action	Agree more	-1.395	0.163

*Significant to at least $P \leq 0.05$

Results reflect a heightened willingness to carry out more-climate related actions after attending a TCP event, or else continue what they were doing. TCP appears to have had some impacts on participants' motivation to act, with a large majority ($n = 158$) expressing intention to do more to help reduce climate change beyond what they were already doing prior to TCP. Only 8.6% stated that they did not plan to take action to help reduce climate change (i.e. 'I intend to do nothing'). However, these results need to be interpreted with caution given the ease with which intention can be expressed through a simplistic willingness to act and also the imperative some might have felt to produce a socially desirable response. Open-ended responses also indicate that some participants expressed the intention to do more e.g. seeking more information or talking to while others expressed were happy to continue doing what they were doing while trying a bit harder.

Additionally, open-ended comments indicate a need for more solutions exemplified by comments such as: '*More focus on actions and potential solutions would be good*' and '*more focus on what we can do*' or '*I would have like to hear more ideas beyond what I am already doing*' and '*I don't think I have learnt that much new but I guess it reinforced that we need to do something about climate change.*'

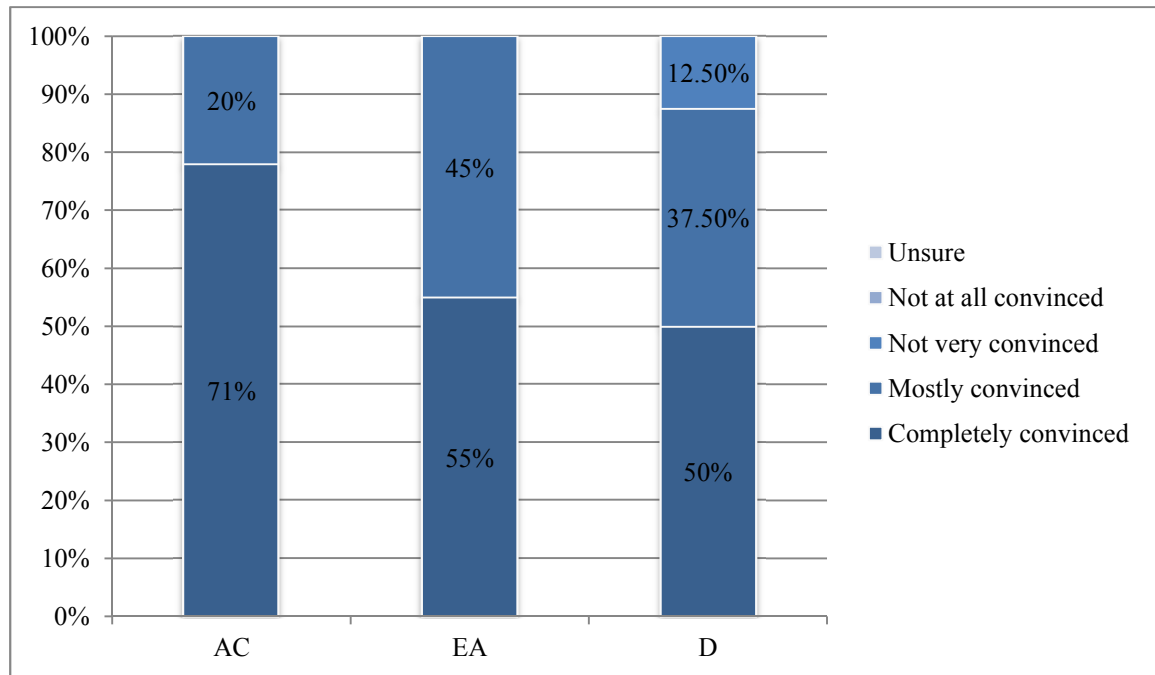
Overall, findings show that for some participants, TCP increased or reinforced their levels of engagement (i.e. knowledge, affect and behavioural intention and or actual behaviour) with climate change, while for others it had limited or no impact. This is illustrated by the range of responses below to the open-ended question: 'What, if anything, have you learnt about climate change at this TCP event?', indicating limited learning per se to reinforcement to increase in understanding, awareness and intention to act.

- *Keep working to reduce my own impacts. Don't get complacent because I do a little bit*
- *It is real, it is happening, we have to play our part now.*
- *It is happening more quickly than I realised.*
- *Reinforced my beliefs / preaching to the converted?*
- *I already knew the causes of climate change.*
- *Gets me motivated again to do more to help the situation.*
- *I have heard a lot of anecdotal evidence regarding climate change.*
- *I was already convinced that CC was happening and I was already worried before presentation. However presentation was effective. It is not all doom and gloom.*
- *The science does not add up- need more scientific background*

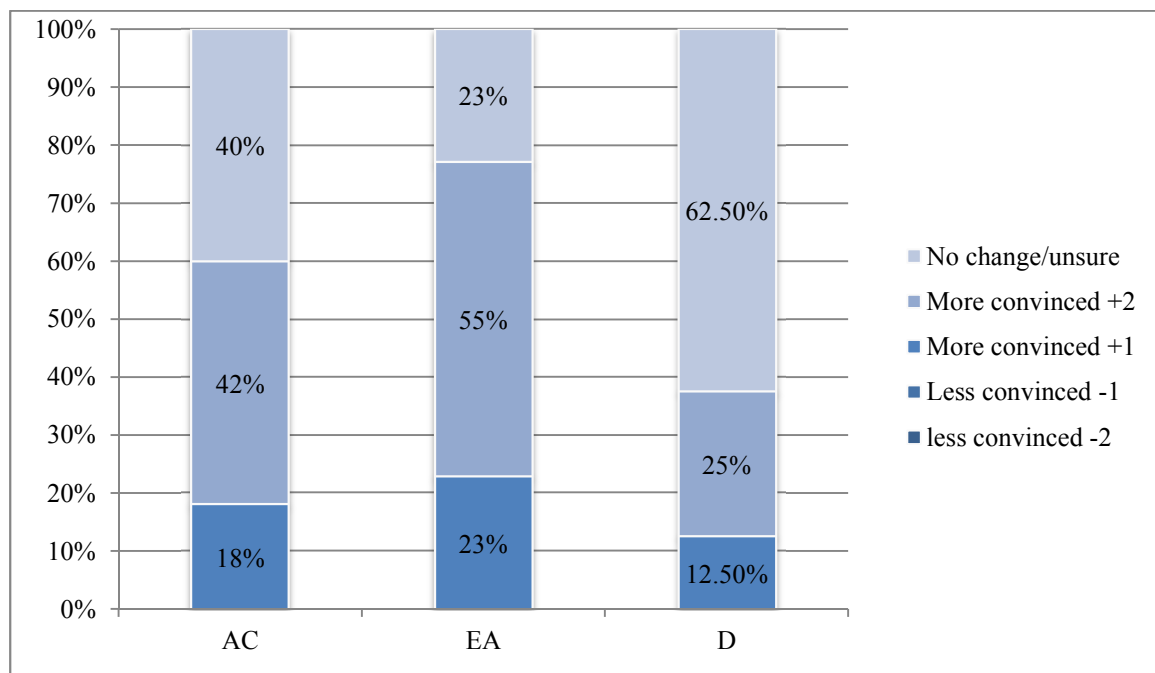
- *Climate change is more serious than I thought.*
- *The presentation really reiterated what Al Gore said which is good for those who haven't seen that presentation but a little basic for others wanting more information on science and solutions.*
- *More reconfirms my concern about impacts.*
- *That the situation is urgent and we can all make a difference.*
- *It was mostly presenting information I already knew. The science was not sufficiently in depth.*
- *Very little.*
- *New evidence for CC actually happening.*
- *Made me realise how little I really knew about climate change.*
- *Not a lot new- but increased detail.*
- *Confirmed thoughts since seeing An Inconvenient Truth.*
- *The evidence of it happening is there.*
- *Use less electricity, consume less.*
- *More scientific facts about climate change / re-instilled the facts and changes.*
- *More scary statistics.*
- *It probably presented more questions for me.*
- *Some people are more concerned but they haven't convinced me that it isn't a natural occurrence.*
- *I did not learn anything from presentation.*
- *It has verified what I suspected.*
- *We need to act now - stop talking and begin.*

Appendix 7 – Synthesis of the three learner groups

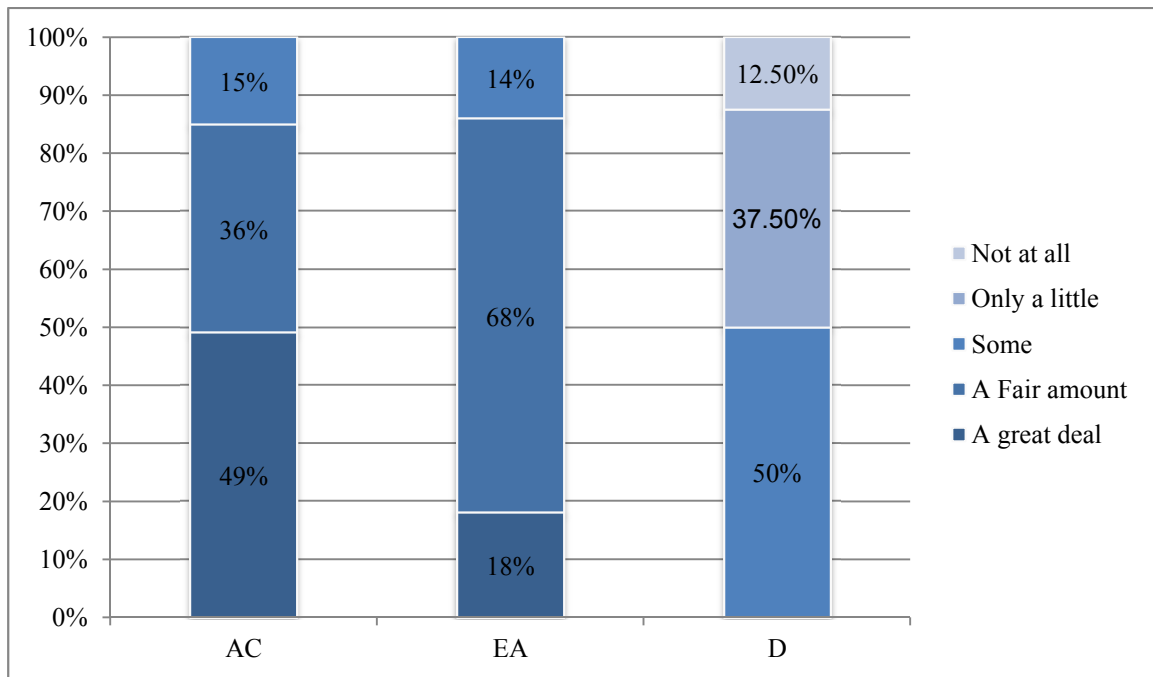
Before TCP - How convinced are you that global climate is changing? (*n* = 75)



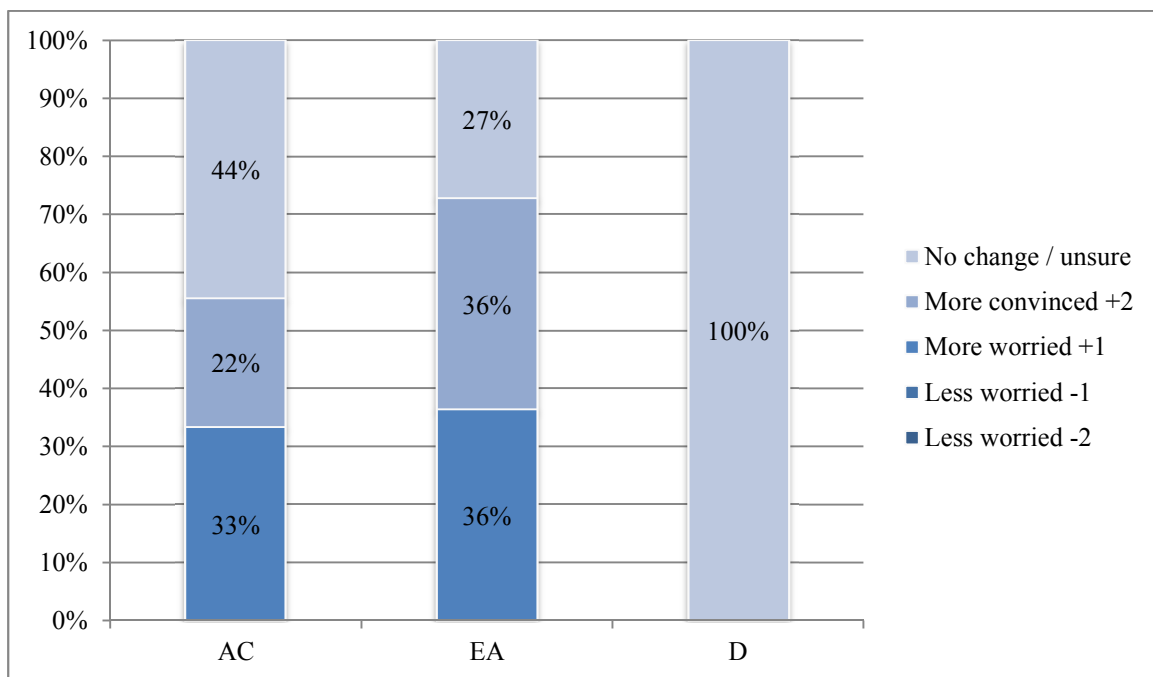
After TCP - Having attended this TCP event, do you feel more or less convinced that the global climate is changing? (*n* = 75)



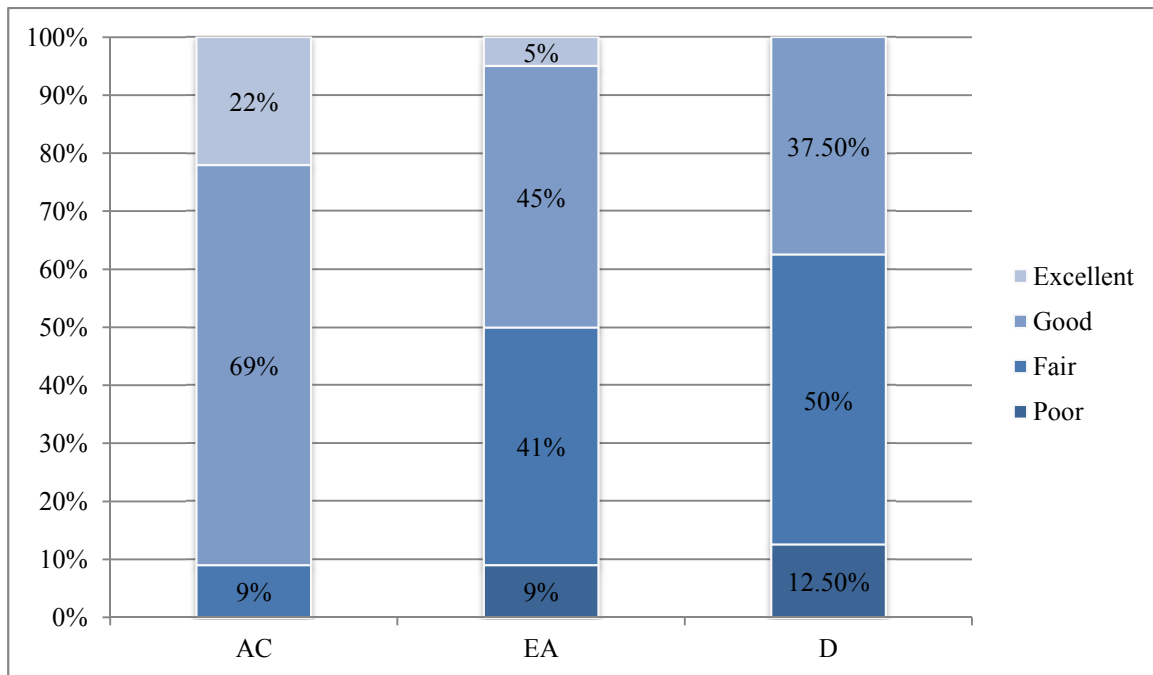
Before TCP - How much do you worry about climate change? (n = 75)



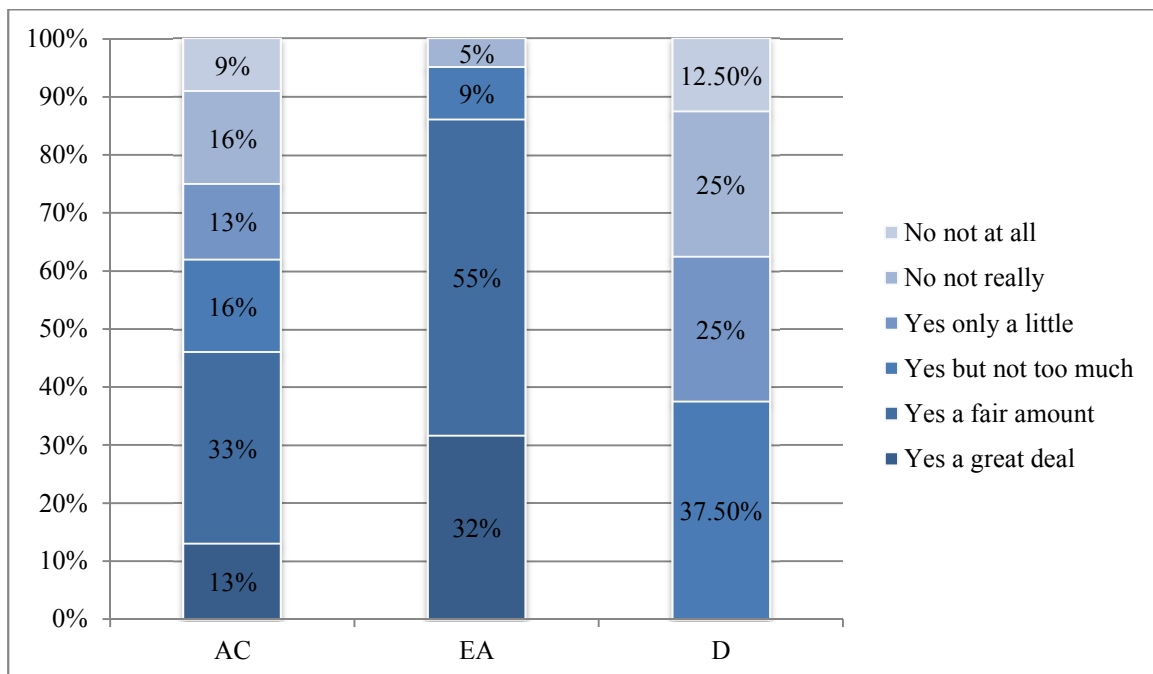
After TCP - Do you feel more or less worried about climate change? (n = 75)



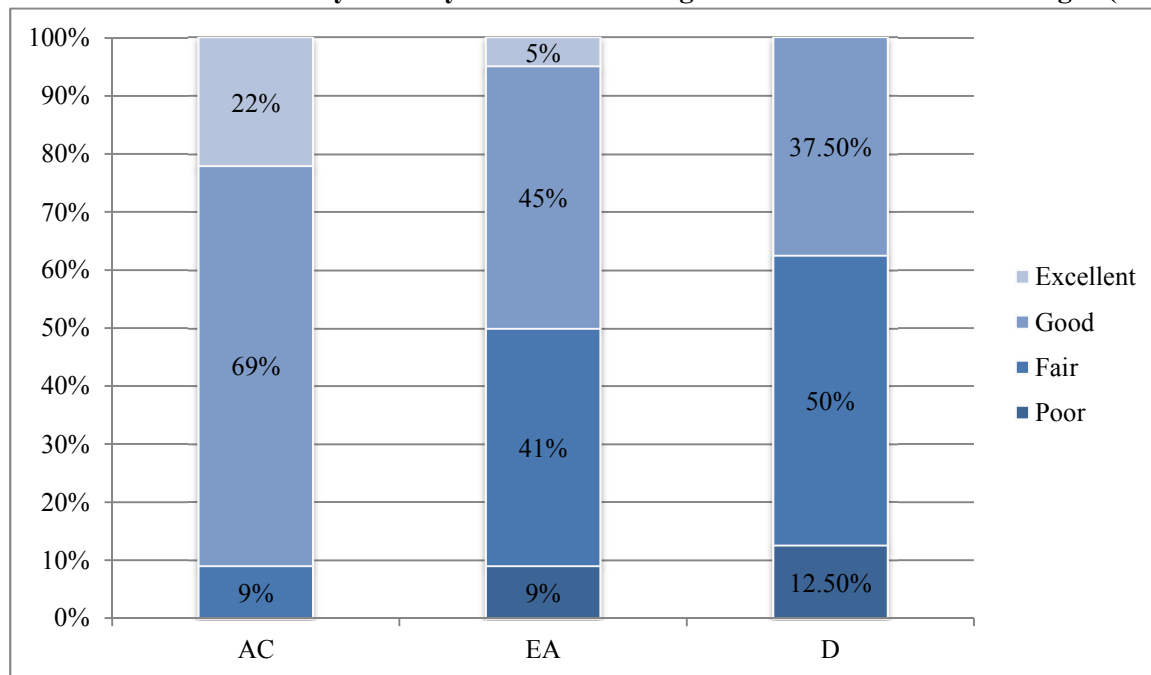
Before TCP - How would you rate your understanding of the causes of climate change? (n = 75)



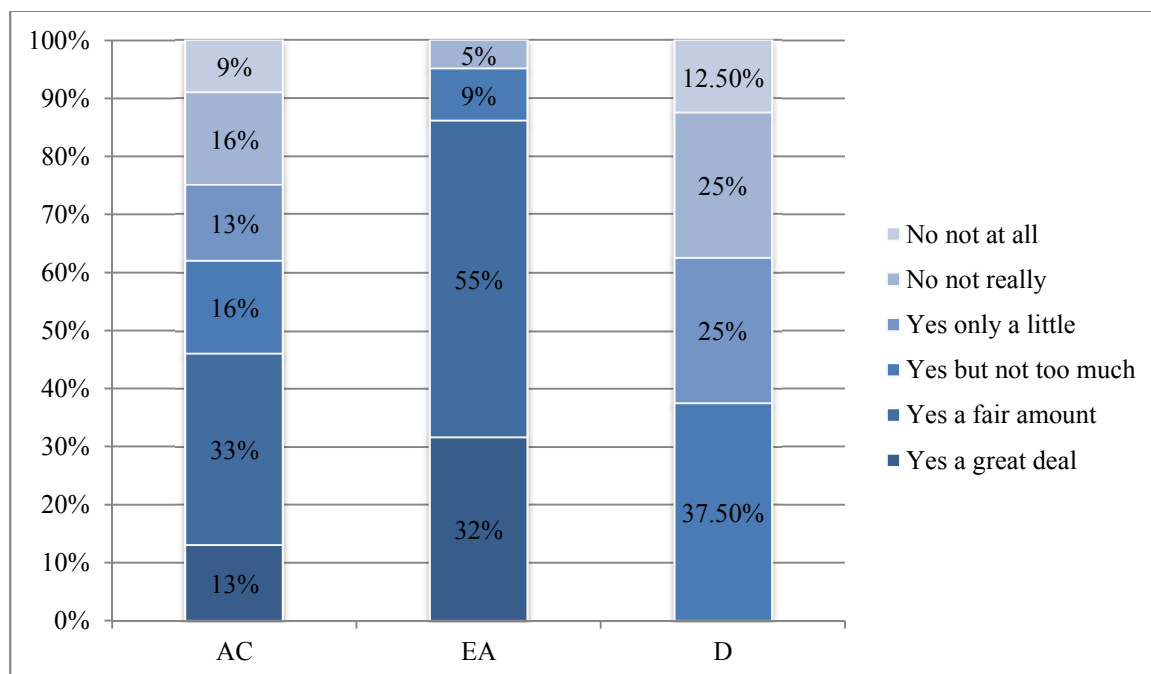
After TCP - Do you feel the TCP event has helped you understand the causes of climate change better? (n = 75)



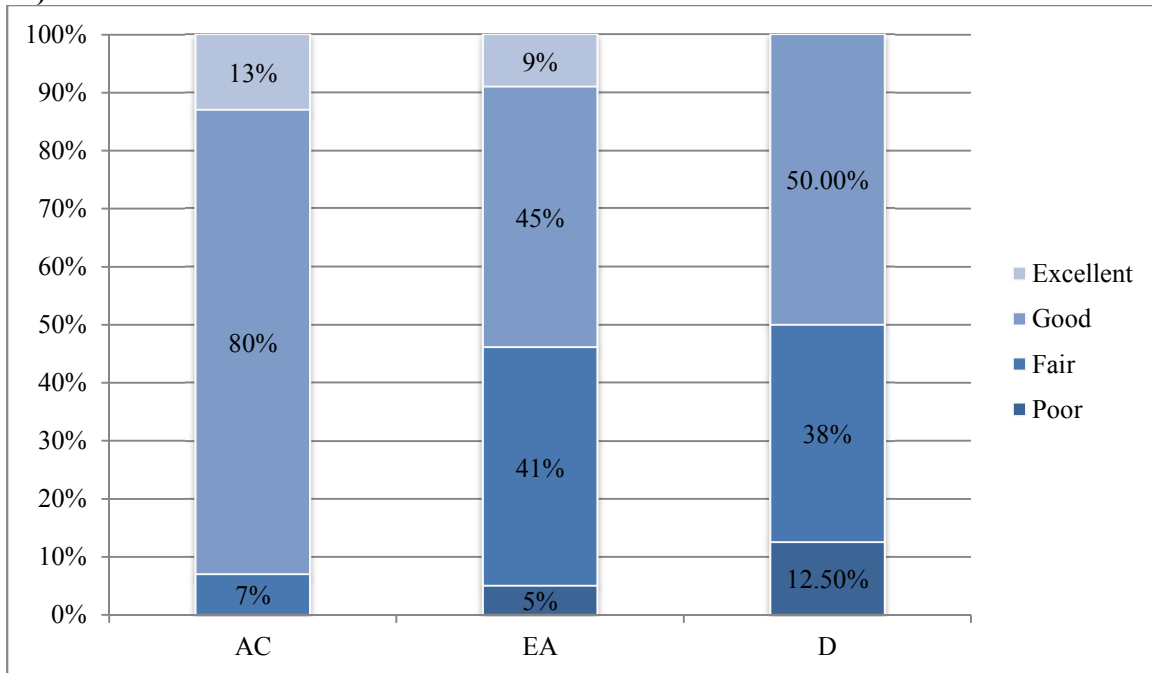
Before TCP - How would you rate your understanding of the causes of climate change? (n = 75)



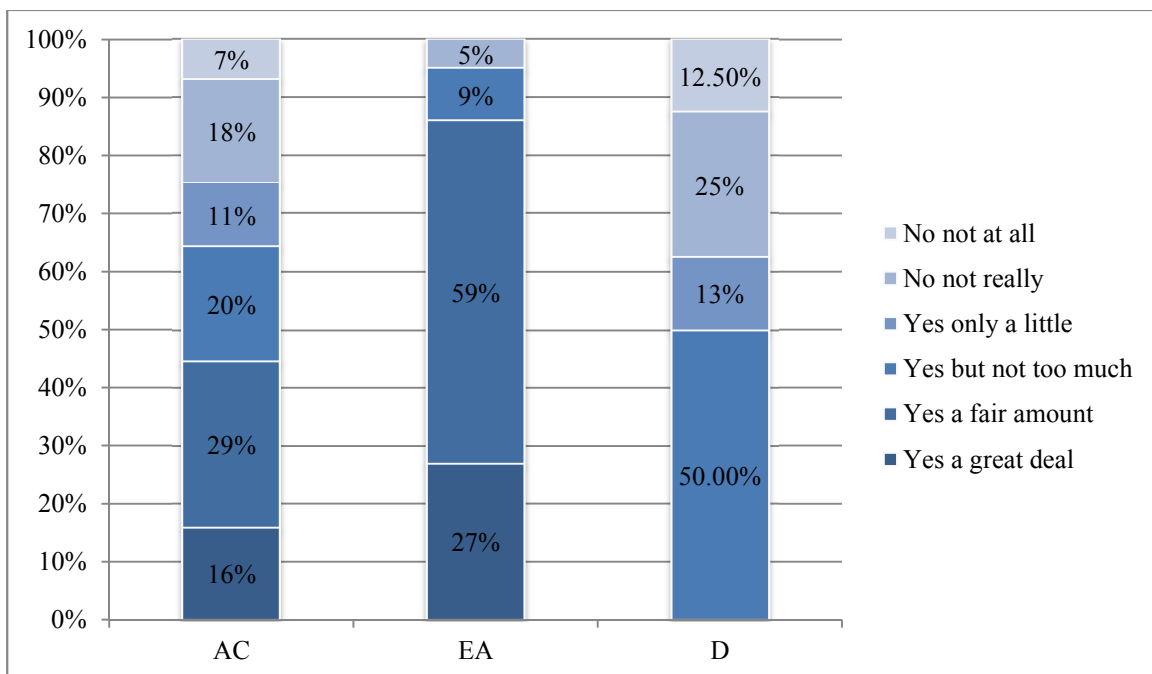
After TCP - Do you feel the TCP event has helped you understand the causes of climate change better? (n = 75)



Before TCP - How would you rate your understanding of the impacts of climate change? (n = 75)



After TCP - Do you feel the TCP event has helped you understand the impacts of climate change better? (n = 75)



Appendix 8 – Wilcoxon Matched Pairs Signed Rank Test

Table 10 The ‘Already converted’ - Pre vs. post attitudes towards climate change (*n* = 45)

Statement	Pre-TCP	Post-TCP	Difference	Tend to... as a result of attending a TCP event
Human activities are having significant impacts on the global climate	4.91	4.96	0.05	Agree more
There is a lot of disagreement among scientists about whether or not climate change is happening	2.49	2.18	-0.31	Agree less
Climate change is already having serious impacts around the world	4.71	4.73	0.02	Agree more
Australia is particularly vulnerable to climate change	4.44	4.62	0.18	Agree more
Climate change is an urgent issue that requires immediate action	4.96	4.96	0	Same

*The level of agreement in both Q1 (pre-TCP) and Q2 (post-TCP) was measured as 1= strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree / no opinion, 4= somewhat agree and 5=strongly agree

Table 11 The ‘Already converted’ - Wilcoxon matched pairs signed rank test (*n* = 45)

Statement	Direction of change after attending a TCP event	Z	P
Human activities are having significant impacts on the global climate	Agree more	-1.000	0.317
There is a lot of disagreement among scientists about whether or not climate change is happening	Agree less	-2.195	0.028*
Climate change is already having serious impacts around the world	Agree more	-2.437	0.015
Australia is particularly vulnerable to climate change	Agree more	-2.111	0.035*
Climate change is an urgent issue that requires immediate action	Same	0.000	1.000

*Significant to at least $P \leq 0.05$

Table 12 The ‘Early aware’ - Pre vs. post attitudes towards climate change (n = 22)

Statement	Pre	Post	Difference	Tend to... as a result of attending a TCP event
HUMAN ACTIVITIES are having significant impacts on the global climate	4.82	4.86	0.04	Agree more
There is a lot of disagreement among scientists about whether or not climate change is happening	3.36	3.36	0.00	Same
Climate change is ALREADY having serious impacts around the world	4.55	4.59	0.04	Agree more
AUSTRALIA is particularly vulnerable to climate change	4.09	4.18	0.09	Agree more
Climate change is an urgent issue that requires IMMEDIATE ACTION	4.86	4.91	0.05	Agree more

The level of agreement in both Q1 (pre-TCP) and Q2 (post-TCP) was measured as 1= strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree / no opinion, 4= somewhat agree and 5=strongly agree

Table 13 The ‘Early aware’ - Wilcoxon matched pairs signed rank test (n = 22)

Statement	Direction of change after attending a TCP event	Z	P
Human activities are having significant impacts on the global climate	Agree more	0.577	0.564
There is a lot of disagreement among scientists about whether or not climate change is happening	Same	0.000	1.000
Climate change is already having serious impacts around the world	Agree more	1.232	0.218
Australia is particularly vulnerable to climate change	Agree more	0.816	0.414
Climate change is an urgent issue that requires immediate action	Agree more	0.447	0.665

Table 14 The ‘Doubtful’ - Pre vs. post attitudes towards climate change (*n* = 8)

Statement	Pre	Post	Difference	Tend to... as a result of attending a TCP event
HUMAN ACTIVITIES are having significant impacts on the global climate	3.38	3.63	0.25	Agree more
There is a lot of disagreement among scientists about whether or not climate change is happening	3.88	3.88	0.00	Same
Climate change is ALREADY having serious impacts around the world	3.88	3.75	-0.13	Agree less
AUSTRALIA is particularly vulnerable to climate change	3.25	3.5	0.25	Agree more
Climate change is an urgent issue that requires IMMEDIATE ACTION	3.00	3.13	0.13	Agree more

The level of agreement in both Q1 (pre-TCP) and Q2 (post-TCP) was measured as 1= strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree / no opinion, 4= somewhat agree and 5=strongly agree

Table 15 The ‘Doubtful’ - Wilcoxon matched pairs signed rank test (*n* = 8)

Statement	Direction of change after attending a TCP event	Z	P
Human activities are having significant impacts on the global climate	Agree more	-1.000	0.317
There is a lot of disagreement among scientists about whether or not climate change is happening	Same	0.000	1.000
Climate change is already having serious impacts around the world	Agree less	-1.633	0.102
Australia is particularly vulnerable to climate change	Agree more	-0.557	0.577
Climate change is an urgent issue that requires immediate action	Agree more	-0.447	0.655

Appendix 9 – Recommendations for TCP: examples of educational strategies for the three learner groups

This study shows that TCP attracts different audiences. The three learner groups identified in this research- the ‘Already converted’, the ‘Early aware’ and the ‘Doubtful’- differ substantially with regard to climate change, their interests, needs, what they want to know and learn and how they want to learn. Thus, a range of educational strategies could be developed for and tailored to each of these groups.

Findings indicate that while the current format (lecture-style presentation) is effective for certain audiences, it is not appropriate for others. Thus, it is time, I assert, for TCP to evolve and move beyond a ‘one-size fits all’ format. I believe this presents an enormous opportunity for TCP to broaden its program, scope and goals by developing and implementing strategies for diverse audiences. Additionally, developing a range of strategies could help capitalise and leverage on the diversity of TCP educators – their experiences, interests, issue knowledge, communication skills and access to diverse social groups. This, however, requires further training on how to organise, market, tailor, conduct and facilitate these various initiatives.

Below, I provide some suggestions for TCP on the types of educational initiatives that could appeal to and be developed for the ‘Already converted’, the ‘Early aware’ and the ‘groups. My suggestions should be understood in reference to TCP at a particular point in time. Moreover, these are based on data collected from learners, something which is sorely needed in the field.

The ‘Already converted’

The AC are the easiest group to reach, given that they are already receptive and actively engaged on climate change. Yet, leveraging their current engagement on the issue into further action, including active participation in the public sphere, requires some specific educational strategies. Findings in this study indicate that this group requires more in-depth content on solutions at all levels (the ‘how’) and active learning processes that facilitate social interactions, discussion, reflection and networking opportunities.

First, the AC believe that climate change needs to be addressed through concerted collective efforts and strong leadership from governments. Yet only a few take actions in the public sphere (e.g. contact elected official) or believe in the efficacy of such actions. Thus, educational strategies should focus on motivating and empowering them to use their voice as citizens. For instance, participatory and interactive educational approaches (such deliberative forums or workshops) might help foster citizenship awareness; emphasise the importance and value of individual and collective civic engagement within society; and offer ways to participate. Such strategies can be used as exercises in civic education by maximising opportunities for AC to contribute to the public debate on climate change issues and actions.

Second, while AC express a strong desire for change, they feel constrained by a lack of understanding (or direction) on which actions to take, beyond what they are already doing, and how to instigate broader social changes. They are interested in learning how to bring about change (both at the grassroots and top levels) to effectively address climate change issues. Developing programs that maximise opportunities for informed discussion and collective action can be beneficial for the AC.

Third, it is important with the AC to balance a realistic understanding of the challenges we face with a sense of possibility and empowerment to avoid helplessness. Helping the AC focus on indicators of positive change is a powerful way to promote hope and a sense of possibility towards creating sustainable and alternative futures.

Finally, the majority of AC are interested in building networks and social support with others interested in taking action on climate change. Despite their strong commitment, the AC can feel isolated, disillusioned or lose hope at times. Thus, educational strategies that encourage sharing, collective learning, networking and social support are likely to be beneficial for the AC. For instance, study groups or a series of meeting can help provide ongoing interactions to sustain relationships and discussions and move beyond one-off interactions. These, however, are more long-term efforts, and require a new direction from TCP.

In summary, the types of programs that are likely to appeal to the AC participants are based on participatory and interactive learning experiences and discussion-based activities. Table 16 below offers some suggestions.

Table 16 - Examples of programs and activities for the ‘Already converted’

- Open or deliberative forums
- Workshops including discussions, small and large group activities and reflection
- World café
- Study groups / Learning circles
- Series of meetings
- Visioning or future thinking activities
- Discussion-based activities
- Citizens’ tutorials¹⁰⁰
- Community-based action groups

The ‘Early Aware’

The EA have a general awareness and understanding of climate change. They are moderately engaged and they are interested in learning more about the topic.

While EA express some concern about climate change, they commonly perceived it as an abstract issue, remote in time and space. Several approaches may be useful to help localised climate change (its causes, impacts and solutions) and bring the issue ‘home’ here and now. This could be done by clear imagery and discussion around how climate change might affect them, their communities and places they care about; followed by a discussion what they can do to address the issue locally. In order words, EA are likely to require more targeted and locally-based approaches which can help build local understanding of impacts (existing and future), solutions and support.

Second, EA want to be involved. Yet, they often don’t know how and where. Thus, educational strategies that provide information about what might be happening in their communities in terms of climate change and offer practical guidance on how they can get involved are likely to be most

¹⁰⁰ One TCP educator designed and conducted a series of three tutorials using the TCP slide show as background. I attended the series as part of the scoping of my study. I was unfortunately not able to collect data from participants. Based on observation though, the format was highly successful and promising as a future approach.

beneficial for this group. Additionally, for this group, it is important to articulate clear messages of what individuals and communities can do locally (and how their actions are part of a big picture solution) in the backdrop of such global issue; and the efficacy of such actions in the ‘big picture’ solution.

Third, while the EA take some actions and are motivated to address climate change, they feel limited in their ability to make a difference. They often want to know what others are doing (both in their communities and outside) as they strongly believe that their actions can make a difference only if others are taking action too. Therefore, strategies for the EA should aim to develop a sense of hope and collective (‘I am not alone’). This might come in the form of ‘success’ stories or case studies – examples of individuals, groups and communities who are successfully engaging with climate change is likely to be beneficial for this group. Furthermore, there suggests a need for designing strategies that provide avenues to learn how others in their communities feel, think and act on climate change; and that incorporate processes for interacting with each other and sharing information, ideas and insights. For this group, a talk or presentation can be used effectively in conjunction with interactive and participatory methods. For example, the TCP slide show could be used as a foundation to launch into more interactive learning activities such as discussion led by educator or within small groups.

In summary, strategies (see Table 17 for some examples) designed to provide information (i.e. local impacts and solutions in the backdrop of global climate change), enable participants to ask questions and create an open atmosphere for discussing the issue are likely to be most beneficial for this group.

Table 17 - Examples of programs and activities for the ‘Early aware’

- Workshops on local climate change challenges and options
- Series of community-based forums on different aspects of climate change that matter to intended participants and relevant to their local contexts
- Use of success stories, examples and case studies
- Combination of talk/presentation and a facilitated discussion about climate change

The ‘Doubtful’

The D are interested in climate change and willing to listen and discuss the topic. Although they question the science behind climate change, they are open to changing their minds about the issue. This presents an opportunity to develop programs that enable the D to participate in discussions, voice their opinions and ask questions. Findings in this study indicate that the D are primarily interested in science and scientific arguments behind the causes, impacts and potential solutions of climate change. They value opportunities for social interaction to enable questions and discussion of different viewpoints.

First, the D question the science behind climate change and ask questions such as ‘How do we know if it is true?’ and ‘Can we trust the science?’ Consequently, availability of meaningful information, access to credible scientific experts and opportunities to ask questions should be important aspects of educational strategies for the D. However, rather than one single expert presenting information, a group or panel of experts might be most beneficial to show that there is only one way to look at climate change and to acknowledge that the issue is complex.

Second, the D are more likely to hold important misconceptions (e.g. conflating global climate change with weather; believing that climate change is mostly due to natural changes in the environment). Thus, it appears important to address such misconceptions with this group. However, it is crucial for

educational initiatives to focus on discussion and learning rather than on convincing and trying to win them over. Using persuasive tactics can create defensive postures and become counter-productive. Instead, creating spaces for questions and debates will be most beneficial for this group. For example, educational strategies could use credible experts to discuss different perspectives, answer questions and explain misconceptions. It is important to note that non-emotional approaches should be adopted for this group.

Third, the D appear quite willing to support and take sustainable actions (e.g. energy efficiency, conservation measures etc...) in the context of their own lives. They are also willing to listen and consider different viewpoints on climate change. This presents an opportunity to engage them in dialogue and frame climate change in ways that might resonate and connect with them. This suggests that the D can be reached by talking about topics they relate to such as sustainability, energy security or stewardship. Furthermore, highlighting the multiple benefits of climate change action (e.g. environmental, economic and social) for moving toward a more sustainable future might be helpful to engage the D.

In summary, discussion-based activities and space for people to express their opinions and debate the science, critical nature of the problem and/or solutions are likely to be effective for this group. Dialogue events (Lehr et al. 2007) or face-to-face events that bring scientific and technical experts, social scientists, and policy-makers into discussion with audiences about climate change may provide fruitful avenues for the D. Table 18 below offers some examples.

Table 18 - Examples of programs and activities for the ‘Doubtful’

- Deliberative forums structured around presentations from a diversity of experts followed by facilitated discussion
- Series of meeting with panel of experts with different level of expertise (e.g. science, economy, business, social justice) with opportunities to ask questions
- Discussion-based activities led by a skilled facilitator
- Scientific Café

Summary

In this Appendix, various educational strategies have been suggested to broaden the TCP and reach different audiences on climate change. These should be understood in reference to TCP at a particular point in time. New and alternative strategies to educate and engage individuals and communities in exploring climate change issues are critically needed and this Appendix offers some suggestions.

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