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Representing climate change futures: developing the use of images for visual communication

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Abstract

Climate change has potentially profound implications for future society. How people perceive their role and the responsibilities of others in determining future climate is of great importance for policy-making, adaptation and climate change mitigation. However, for many people it is a remote problem and not one of personal concern.

The way in which information about climate change is represented affects an individual's interpretation and uptake, and how they see their present choices affecting their future and that of others. Visual communication has the potential to encapsulate abstract ideas and may carry great affective resonance. Visualisations of climate change therefore have considerable potential as a medium for communicating messages about climate change that aim to influence people's behavioural intentions. The effectiveness of visual representations of climate change as a stimulus for behavioural change has not been tested and is likely to depend on how people interpret and respond to such images.

My research aims to evaluate how visual images can be used as a means to stimulate public willingness to engage with climate change and different policy options. Firstly I present the results from 30 semi-structured interviews designed to explore how people spontaneously visualise and relate to climate change. I then present the methodological options for Phase Two, which will take place in February 2003. A series of focus groups will investigate the extent to which people are moved by visual images of climate change. The results will have applications in environmental education, science and risk communication and in public participation exercises related to climate change policy.

Paper

Introduction

Climate change is considered by some to be among the most serious threats to the sustainability of the world's environment, the health and well-being of its people and the global economy (Department of the Environment, Transport and the Regions, 2000; International Institute for Sustainable Development, 2000). The scientific consensus is that in the last century, man-made greenhouse gas (GHG) emissions have led to unprecedented rates of climate change (Department of Trade and Industry, 2002) and that they continue to do so. We do not have a sound, predictable climate future and my baseline assumption is that our long-term climate future depends on how human activities progress from now on, predominantly in terms of our GHG emissions and how the Earth responds.

Climate change consequently presents a great challenge to science communication. The aim of this paper is to present an exploration of how the use of visual images in communicating to the general public in the UK about climate change might help them move from being generally aware, to having a commitment to take action in response to climate change (a commitment refers to one being willing, or having the intention to make personal changes and choices with consideration for climate change in the future). I consider that stimulating behavioural change is the desirable outcome of science communication efforts in this context, so issues associated with the measurement of people's willingness or intent to initiate or accept behavioural change as a result of image based communication are addressed.

The research referred to in this paper is work in progress towards a PhD. It concentrates on how science communication processes using image-based representation might help to achieve decarbonisation in the UK domestic sector by stimulating individual commitment. My study involves two stages of empirical research. The first interview-based phase, designed to explore how people spontaneously visualise and relate to climate change, is complete. The second phase will investigate the methodological options to address the extent to which people can be moved by visual depictions of climate change to the extent that they will intend to change their behaviour.

The first part of this paper will present some examples of past attempts to stimulate behavioural change in the UK. I will then refer to the public perception of climate change and this is linked to an apparent attitude-behaviour divide. Thirdly, I will introduce some background and justification for taking a visual approach to the communication of climate change issues to the public. The rest of the paper deals with my methodology, initially by presenting some outcomes from the first phase of my research, and then by presenting my proposal for Phase Two.

1. Attempts to stimulate behavioural change

The general public needs to understand and accept adaptation and mitigation policies if they are to be successful, particularly if we are going to reach the 60% reduction in our GHG emissions as the Royal Commission on Environmental Pollution (2000) has suggested is necessary. People need to feel motivated to take responsibility for their personal reductions in fossil fuel consumption, link their day-to-day use of energy with fossil fuel consumption and climate change, and make behavioural changes accordingly.

Attempts have been made to raise awareness and initiate behavioural change, though not necessarily with success. For example, 'Helping the Earth begins at home' was a campaign undertaken by the Department of the Environment (DoE) in 1990-94. It was designed to help the government meet its target of stabilizing carbon dioxide emissions by 2000 at 1990 levels and employed newspaper and TV advertisements to raise public awareness of the causes and consequences of global warming so as to encourage domestic energy efficiency. Löfstedt (1995) documents that it has neither increased awareness nor people's willingness to save energy. The relative failure of this campaign can be explained by the failure of the DoE to base the communication on people's perceptions of global warming. It was hoped that scare tactics used in the advertisements would lead people to save energy – issues such as public confusion between global warming and stratospheric ozone depletion were not addressed.

'Going for Green' (GFG) was set up in 1996, the overall aim being to encourage awareness that people's choices play a role in sustainable development (Blake, 1999). Initially GFG consisted of a major advertising campaign in the national press. Individuals were encouraged to reduce waste, save energy and natural resources, travel sensibly, prevent pollution and look after the local environment. Blake (1999) states that few attempts were made to move beyond a core assumption that the main barrier between environmental concern and action is lack of appropriate information. Recent research shows that this is certainly not the case and, in a nutshell, knowledge is not enough (e.g. Blake, 1999; Bord et al., 2000).

My approach considers that effective communication to the public can initiate individual efforts to collectively reduce domestic GHG emissions. This means moving away from using science to inform the public and towards a bottom up approach focussed around understanding how people interpret the science, so that we can improve the way it is communicated.

2. Public perceptions of climate change

As a first step, it is important to understand public perceptions of climate change because they will have an impact on the success of strategies to communicate to the public the implications of climate change policies (e.g. Bord et al., 1998). Generally it appears that members of the public have some degree of awareness of climate change as an environmental, scientific and moral

issue. Yet there seems to be a low level of behavioural commitment with respect to its causes and implications locally and individually. To illustrate this point, Lorenzoni & Langford (2001) present a typology based on a study of public perceptions of climate change in Norwich, UK. They identified four categories, or types, labelled the 'engaged', the 'denyers', the 'disinterested' and the 'doubters'. Of importance to my study is the 'engaged' category, which consists of people who are aware of climate change and claim to be making small changes in their lifestyle routines to reduce their energy use! (and hence their carbon emissions), along with being in favour of climate change mitigation policies. However, Lorenzoni & Langford found that amongst the 'engagers', who only represent a minority to start with, there are very few who are deeply committed when it comes to making real lifestyle choices towards a decarbonised future. Engagers who appear to be predisposed to accept the science may still be uneasy when confronted with what the science means for their lifestyles in the future. So even amongst the most aware there still seem to be barriers preventing people from actually changing their behaviour (Kempton, 1997; Stoll-Kleemann et al., 2001).

A review of the literature suggests the following barriers (in no particular order) are crucial in explaining the apparent discrepancy between people's attitudes and behaviour towards climate change and in understanding why people fail to become fully engaged with climate change; why they can believe it to be a problem, say that they are supportive of policy development to adapt and mitigate climate change yet personally do nothing or very little to limit their GHG contribution (e.g. Bostrom et al., 1994; Kempton, 1991, 1997; Read et al., 1994; Stoll-Kleemann et al., 2001):

·Climate change has a long time horizon and global spatial boundaries making it seem abstract, distant and difficult to experience. The effects are far-off in time and space so it is difficult to imagine the result of our present activities. They are not obvious locally or within the lifetime of the present generation. The abstract nature of climate change in time and space means that it is difficult to relate to the science and difficult to see how personal efforts toward decarbonisation will make any difference.

·The science of climate change prediction is uncertain.

·The public have an uncertain and confused knowledge about climate change, particularly its causes and consequences, making it difficult to know what to do (i.e. for some, the effects are seemingly unrelated to personal energy use).

·Further confusion possibly due to the way in which the media often represent the issue (sensationalism, misrepresentation, confusion of facts etc.). This is pertinent because the media are the main source of information for the public about climate change. ·Climate change may involve a wide array of possible impacts, many connected to other sectors (e.g. health, economics etc.).

·No immediate drivers for change – other pressing short-term problems, demands and desires often take priority.

·Lifestyle shifts are perceived as unacceptable (e.g. perceived impact or cost of giving up driving, air travel, imported foods, travel miles in consumer products etc.).

·Potential for technological solutions and waiting until the science and economics are clearer are common reasons for not acting now.

·Tragedy of the commons; cause, consequence and policy options appear to be collective rather than individual responsibilities.

·Blame – political inaction, US inaction, "other people aren't doing anything, so why should I?"

·Lack of trust in politics, business, and the rest of society.

·Apparent lack of any coherent policy initiative to address mitigation (also linked to dependency on policy, regulation and pricing, in both politics and institutional contexts).

Because carbon impinges on all aspects of our lifestyles, decarbonisation efforts cannot avoid changing people's lives, perhaps fundamentally, which presents challenges for the relationship between climate change science and the public. People may begin to feel that their choices are becoming constrained and react by taking a different opinion of the science and the uncertainty. In other words, when the pressure is on and there are apparent threats to one's lifestyle, then there is a chance that the science, particularly if it remains uncertain, will be discredited. When people realise the enormity of the changes that are necessary, they are more likely to question the science. Uncertainty in science is a very important barrier to change because for example, it tends to be used in cases of scientific controversy to invalidate claims.

3. Using images as a tool for science communication

Stamm et al. (2000) refer to climate change as a mass communication problem that has yet to be solved. Trumbo (1999:421) states, "Contemporary science communication relies on visual representation to clarify data, illustrate concepts, and engage a public informed through an ever-increasing arsenal of computer graphics and new media tools." There are many well-documented advantages and problems associated with using images as a tool for science communication, generally and in the specific context of climate change. For example:

·Visual representation can convey strong messages, and make them easy to remember; Pictures can condense complex information and communicate content which is perhaps new and hard to understand; images can provide the basis for narratives, personal thought processes and conversations, which also contribute to people's memory and issue-awareness; visualisation offers opportunities to communicate ideas in an instant using many different media in a variety of contexts such as awareness raising campaigns, participatory planning exercises, education etc.

·The production of images for climate change science communication also involves an inevitable simplification of the science; problems are encountered when attempting to portray the potential benefits of climate change compared to its costs; there are difficulties in representing uncertainty and this is an important issue facing science communication generally; subjectivity, which I will come back to later.

The media and information technology are producing an increasing flow of images and pictures depicting authentic and virtual realities. Daniel & Meitner (2001) remind us of the power of visualisations to affect attention, alter interpretations of complex concepts and to arouse positive and negative emotions. Boholm (1998) argues generally that visual images in the media convey forceful symbolic messages, with great potential to communicate emotive and intuitive knowledge. The symbolism contained in a visual image causes an emotional feeling or a mood to be aroused in us when we look at a picture, and it is to some extent these elements that help to bring about a meaningful experience or interpretation (Oring, 1999). As Graber (1990:154) states, "We cannot afford to ignore the major ways in which learning is shaped by the vistas gleaned by the human eye and the cognitions, emotions, and memories that these vistas produce."

Visual imagery in the world of advertising is a core component for communication. Similarly, visual methods have been used to bring environmental issues into the public eye via emotional visual appeals, highlighting the valuable role of such 'hooks' in representing environmental issues. We can see examples of this by looking at various environmental NGO campaign material. Interest groups expend considerable resources on motivating supporters and potential recruits to contribute to their cause, and emotive appeals play an important role in the process (Huddy & Gunnthorsdottir, 2000). Generally campaigns personalise the issues, often giving them a human scale, and it is this emotional hook that is the key to making the images so powerful.

Because a person's response to an image is not simply a rational one (Myers, 1994), but has an emotional, or affective component I must consider the ethical and practical issues inherently tied to the use of visual representation of climate change science. We must be conscious that some visions might instil feelings of fear or unease about the future. This is one way in which to attract people's attention and motivate them to act, because in the case of climate change, it is difficult to appeal to people's positive desires (such as elimination of worry, lifestyle benefits etc.) when these are potentially going to be challenged. However the use of negative imagery needs to be managed carefully because anxiety responses to sustained emotional visual appeals can simply end up triggering defensive psychological or cultural responses, for example leaving the audience desensitised or with a sense of 'issue fatigue'. The important thing is that the messages we communicate are motiv! ating rather than de-motivating. A counter example is the evolution of the environmental movement in the 1970's associated with the emergence of relatively abstract images depicting the "world in space" (see for example Cosgrove, 1994). In contrast to the argument addressing the personalisation of images, this rather remote image appeared to have an impact on how people perceive the world, fostering for example the concept of a 'fragile globe'. There is clearly a fine balance involved when using visual science communication to provide a meaningful message, which initiates some response and perhaps intent for behavioural change.

The effectiveness of visual representations as a stimulus for behavioural change depends on how people interpret them and respond. Central to this paper is the issue that visualisations and pictures of the future will be subject to alternative interpretations. People's perceptions, attitudes and behavioural dispositions influence the kinds of reactions they will have to different images representing climate change, the messages they take away and whether they act on the basis of the visual communication they have received. Pictures involve the audience in constructing for themselves a range of messages (Myers, 1994). And there are many different audiences, or publics each being potentially made up of a wide range of people, who depend on an assortment of prior conceptions and perceptions of climate change, personal circumstances, other beliefs and values etc. In other words the heterogeneous nature of the audiences ensure heterogeneous interpretations.

Aside from interpretation, subjectivity is also inherent in the creation and selection of images that are used in science communication exercises. Sheppard (2001) highlights that it is the preparers of the computer visualisations who conjure up and interpret the imagery in the first place, emphasising the potential for visual communication to be biased or to put across a particular point of view. Myers (1994:144) suggests, "as texts suggest an attitude, a point of view, and a form of address, so can pictures. And as words play with meanings and associations, so can pictures." By presenting people with a virtual image or picture of a future, in whatever context, we are pre-empting or framing their visualisation based on our own information and imagination.

4. Proposed methodology for exploring the use of images

I am exploring the potential for the use of visualisations of climate change to stimulate public willingness and intent to engage with climate change and with different policy options. The purpose of this section is to propose a discussion of the methodological options for addressing if showing people images of climate change can affect their commitment to climate change solutions.

My research began with finding out how members of the public perceive climate change and how they think of it in a visual context. This first phase was designed to explore people's understanding of climate change, their feelings and their personal visualisations of climate change via a series of 30 semi-structured interviews aimed at three sample groups of 10. The second stage, to be carried out in February 2003 will take this further. Drawing upon the results of Phase One, a set of focus groups will involve the same participants to investigate whether people are likely to be moved by visual depictions of climate change to an extent that they would consider changing their behaviour.

4a. Phase One

The interviews generally aimed to evoke people's immediate images, thoughts and feelings about climate change. The initial questions were general and based on finding out what people imagine the future to be like, what their main concerns are for the future of the world, what their main concerns are facing their own lives and how climate change possibly relates to these. Some questions were then introduced with the intention to elicit the images that people had in their minds about climate change. This was followed up with some questions on their opinions about the causes of climate change; whether they've noticed any local change which might suggest climate change is happening; whether they consider that there is a moral or spiritual dimension to climate change; who they think should take responsibility for it, if at all; what they think they could do personally to lessen the effects of climate change and whether they are doing anything at present; an enquiry into the sort ! of information they think would help them to learn more and finally what they think the significance of climate change will be in future. The three groups selected to present different socio-demographic characteristics and lifestyles consisted of:

·Group one: 10 mothers living in an area of Norwich that suffers from a degree of economic disadvantage and social problems

·Group two: 10 16-17 year old students at a local secondary school

·Group three: 10 young professionals living and working in and around Norwich.

Although the samples were relatively small, the interviews very effectively identified a huge variety of perceptions within and between each group.

In general the results indicate that the interviewees were fairly pessimistic and unhappy about the future. They spoke for example about their worries and hopes concerning wars and world peace, technological changes, social disorder, pollution, population problems, water and food shortages. There emerged an apparent unease about maintaining the long-term stability of the social and environmental world. This is perhaps an indication that people are becoming uncomfortable about things that they used to take for granted, and here there is a parallel with climate change. Specifically on the subject of climate change, there was little mention of anything positive. The general feeling was that climate change in the future would be unpleasant. The images people have in their minds of climate change in particular were broadly based on three elements: media exposure, personal experience and their own imaginations. Those based on the media were generally linked to visual images on the! television and in newspapers rather than to images evoked by reading text and listening to the radio. Participants spoke of the sea level rising, polar bears on the melting ice and flooding, particularly in the context of that experienced in the autumn of 2000 in the UK. On the other hand, hotter weather (or 'heat' generally), droughts and famines were also mentioned. Some images were also linked to personal experience such as imagining hotter summers spent in the UK rather than abroad, and these were often positively associated. People could most easily conjure up images that they connected to personal conversations about climate change, instances where they had consciously thought about it, or where climate change had been the subject of documentaries or more thorough discussion on the television. Those coming from people's imaginations were often linked to their opinions on the causes of climate change and overlapped with some elements mentioned as personal experience (e! .g. hotter summers, flooding etc.). They also indicated to me areas of people's confusion, and seemed to bring together many uncertain issues, which could somehow be linked by these personal imaginations. In general it appears within this sample that people have great difficulty in relating to climate change as having much personal relevance.

Phase One highlights the differences in spontaneous visualisation that exist and the results suggest that these are linked to social class, education, life-stage and lifestyles. In terms of imagery, group one were most reliant on their imaginative representations, particularly where the

causes of climate change were concerned as well as some media depictions. Group two were more likely to associate their images of climate change with graphical or diagrammatic representations and what they had learnt at school. Group three were rather more factual in their approach to thinking about climate change and their imagery was largely related to what they had seen in the media and seemed to have a fairly accurate knowledge about climate change.

A key finding is that each group can both be linked and differentiated by their orientation to the future (or framing of the future), which is an essential factor in their opinion of climate change. Group one was particularly orientated around the future of their children and that was a commonly stated worry in terms of future climate change. Group two's frame of the future was rather more immediate and focussed on career paths and university choices. Group three generally illustrated upwardly mobile aspirations, a future in terms of career, income and family.

Future orientation is only one dimension. People's predisposition to be optimistic or pessimistic about the future for example is an important backdrop to the way they think about and visualise climate change, as is their perceived self-efficacy to do something about it. These features seem be a mixture of personality characteristics and rooted within people's social context. Also linked are other predispositions such as whether people tend to think generally about global issues or not, and what inclinations they have depending on the nature of their knowledge mix. I imagine these are somewhat more dictated by people's educational characteristics. Group one demonstrated outward feelings of individual helplessness, and expressed feelings of being unable to do anything partly because no-one else was and partly because it was difficult to do so in terms of transport and infrastructural arrangements. Group two were fairly polarised in their opinions. They were broadly either opt! imistic or pessimistic that the problem could be dealt with, or that it need not be because they felt that "it's natural, there is no problem". There was no clear rational reason for such evaluations despite this groups reliance on scientific or diagrammatical associations with the evidence. Group three took a more critical view of whether individual action could be effective or not, and demonstrated a need for factual evidence before personal compromise would become a real choice.

To summarise the main results from the first phase, I found broad differences between the groups in terms of their approach to thinking about climate change and how they feel about it but also within-group variation in terms of people's stated commitment and engagement with the issue. In general, Phase One highlights a number of different aspects and dimensions of peoples views, and Phase Two aims to explore these differences and their implications for visual communication strategies.

4b. Phase Two

The second stage of this research will involve a set of three focus groups, each being based on the same three groups as in Phase One and made up of six to eight of the original participants. This section outlines some methodological considerations raised at this planning stage. The key questions raised in the introduction to this paper, are:

·What kind of images will be used in the focus groups to portray climate change?

·What do I want focus group participants to do with the images?

·Will these images influence people's behaviour and how might this be measured?

What kind of images will be used in the focus groups to portray climate change?

The focus groups will be based around showing participants a collection of images that depict climate change. Initially I will choose these from a collection built up from the media, the Internet, artistic representations, scientific graphics etc. Those chosen (or rejected) will be checked by an expert panel before being used in the sessions, in order to avoid some of the problems of

subjective bias in sample selection discussed earlier. The variation in perceptions of climate change identified by the Phase One interviews suggest that the images used in the focus groups will have different meanings to different individuals and groups, so offering a wide range of images is particularly important.

In order to select the images it is necessary to decide on classification criteria that reflect the ways in which people conceptualise climate change (i.e. how people approach climate change, as indicated by the interview data from Phase One and by the results of other studies). Drawing on my results and the literature, I have identified the following pairs of categories which account for the main dimensions of people's views and images of climate change: Local – Global; Science – Art; Negative – Positive; Natural – Human; Present – Future; Finite – Renewable. These categories will be used to select the sample of images used in the group exercises.

What do I want focus group participants to do with the images?

I propose to ask participants, as a group, to rank the selection of images depicting climate change depending on their significance emotionally, rationally and in making people feel involved in climate change etc. This will be done more than once – with variations on the rating criteria. I am hoping that this method will reveal more about people's attitudes to climate change than was expressed in the initial interviews. This exercise will stimulate discussion about how the images make people feel emotionally, and how they react rationally. The participants will also be asked to rank the images and discuss them in terms of their potential for inducing behavioural change intentions, and discuss how far they think the visual image might take them based on a scale of behavioural changes, for example beginning with the easier actions such as switching to energy saving light bulbs right through to acceptance of a carbon budgeted regime. Whether participants feel that climate chang! e visualisation will have an impact on their behaviour will certainly be an ongoing point of discussion.

Of course, people's differential understanding and attitudes within the groups will influence how they look at the images and rate them. A key theme that links the two phases of research is that of differential meaning and interpretation. The image of a future, both imagined and in terms of a person's response, may be group- or person- pecific. This is the most important outcome from Phase One. The brief description of results indicates that people spontaneously express a range of images, often dependent on their different frames of reference. These frames also influence their interpretation of images. Whereas Phase One involved individual interviews Phase Two takes a more interactional approach (see Kitzinger, 1994). I hope that it will identify meaningful messages within each group based on what they have in common by triggering dialogue, as well as leading people to build impressions as a result of individual exposure to the images. People's interpretation is not purely b! ased on individual influences, so in a sense, by putting people into a social context then I will have the opportunity to explore the shared nature of meanings and the differences in interpretation as well. One danger in group situations is that people may feel forced toward consensus. It is important to avoid imposed consensus building within the group if the intra-group differences noted earlier are to be explored. The sessions will therefore be facilitated in such a way as to identify individual differences and encourage people to be explicit about the meaning they attach to images.

Will these images influence people's behaviour and how might this be measured?

As became clear from the interviews, the interface between climate change and the factors that are important in shaping people's lives is complex. Predominantly we face here the problem that people who express commitment and sometimes intent don't always 'deliver'. It is hard to overcome this from a science communication point of view, because even if an individual feels engaged, people find that there are constraints when it comes to making behavioural change (for example, in many cases people see themselves as being subject to financial constraints and that all the potential options for behavioural change involve some sort of extra cost to reduce carbon emissions). During the focus groups this point will be raised explicitly with participants and the

ranking exercise will help them to articulate the extent of their willingness to make changes. Given that this is an exploratory project and will not entail follow-up evaluation of behavioural change, this evaluation of willin! gness to make changes as a result of exposure to visualisations is as far as this can be taken. This limitation discussed at length in the sociological literature, remains a problem which I have to accept and keep in mind for the purposes of the study. Throughout the paper I have referred to behavioural change in terms of 'willingness' and 'intent' because the measurement of people's actual behaviour is beyond the scope of this study and ultimately must rely on their statements of intention.

5. Conclusions and issues for discussion

The attitude-behaviour divide has been a long-standing problem for several disciplines, including psychology, political science, behavioural economics and marketing. It is a real problem for me because my research is investigating how we can bring about behavioural change. I have to recognise that when people express intent but don't actually do anything, the objectives of my research may be constrained, as so many other projects have been in the past. One may question how research of this kind can be of any value if behavioural change is not a guaranteed outcome. I argue that in fact this is a reason to pursue this avenue of research because by learning to modify people's attitudinal dispositions toward climate change, people might become more receptive and willing to accept policy changes that induce individual-level behavioural change. Secondly, if this approach does stimulate gradual attitude change, it may enhance the perceived legitimacy of climate change policy measur! es and increase the likelihood that behavioural change will result. Previous research suggests visual imagery has some capacity to contribute towards this goal, and the potential to alter attitudes. Behavioural change will be brought about by a lot of different influences and I believe that visual communication can be one, and that it can be a facilitator to other methods – a valuable contribution to a bigger effort. I hope that this paper has raised thought and invite discussion on the following questions:

·Does visual imagery have some capacity to move climate change from being abstract to concrete (or distant to close)? Similarly, can people better apprehend the implications of scientific messages through visual means?

·What potential does a visual communication approach have for influencing people's attitudes to climate change?

·How can we evaluate whether showing people images will help them make a long-term commitment to climate change responses?

·What indication is there that images might motivate people to start making choices that take account of the future?

·Will visualisations of real and make-believe climate change events force people to engage with the science?

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