Museums and science centres as sites for deliberative democracy on climate change

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Abstract

This paper addresses the position of the museum sector in relation to public policy-making about climate change. It is informed by the perspectives of museum and science centre visitors and leaders canvassed as part of the Australian Research Council Linkage project, '*Hot Science, Global Citizens: the agency of the museum sector in climate change interventions*'. We apply complexity theory to evaluate the claim that museums are a site for the enaction of deliberative democracy. In doing so, we reveal a cultural opportunity for cultural institutions to play a more expansive and explicit role in brokering social futures for communities confronted by climate change.

Key words: museums, science centres, climate change, policy, deliberation, complexity

Introduction

Our discussion in this article builds upon the argument advanced in Cameron (2006) that a certain reconsideration of the 'political' work of the museum in institutional and public discourse is desirable for the salience of democratic decision-making as regards 'hot topics' in public debate. This has a particular trajectory in the case of climate change, where the diversity of knowledge, opinion and interest creates a complex debate that many citizens find to be frustratingly opaque. This debate also includes the projection of exceptionally high stakes in many cases, with many scenarios in the discussion suggesting the need for dramatic reform of living systems and lifestyles, as well as the posing of threats to the long-term survival of human beings as a species. Such scenarios generate profound affective considerations (O'Neill and Nicholson-Cole 2009). The agency of museums in the public debate about climate change is heavily influenced by this potent mix of information, political interest and affect, which can result in an immobilization of their agency.

Against immobilization, this article expounds the potential for museums and science centres to develop citizen capacities for living creatively with the opportunities and threats posed by climate change – as both physical reality and social discourse. This provides another leverage point within Cameron's complexity approach to museum practice, seeking moves beyond practices based upon 'the production of science statements to reform behaviour' and towards 'systems of open peer review and complex reflexivity, facilitating creative dispositions in the future-present' (2011, in this issue). This paper articulates with the movement made in Cameron's paper whereby climate change is shifted, within museum practice, 'from a problem to be solved, to [generating] complex reflexivity and creative imaginaries' thereby drawing on the qualitative findings arguing for a re-framing of these processes within a deliberative framing.

Museums, public confidence & climate information

The *Hot Science Global Citizens* project has generated a substantial body of empirical research deploying both quantitative and qualitative methods across Australia, and in New Jersey and New York in the USA. This body of research comprised a general demographic online survey involving 2100 participants (1500 in Australia and 600 in the US); focus group research with museum and science centre audiences involving 12 groups in Sydney,

Melbourne and Jersey City convened on the basis of six groups of older and younger families and six groups of adults (single income no children, 35 to 60 years; double income no children 25 to 30 years). This was complemented with a series of one-on-one institutional interviews with CEOs from the five partnering institutions and a series of interviews with staff in visitor services; curatorial; science communication and education areas.

The survey and focus group research clearly demonstrates the potential for museums to provide crucial context to citizens in the public debate on policy proposals aimed at mitigating the ecological damage caused through anthropogenic climate change. To this end, museum visitors in Australia and the United States expressed typically high levels of confidence in the information provided by scientific and cultural institutions, including that pertaining to the science of climate change (Cameron *et al.* 2011). By the same token, there was a strong view amongst visitors that institutions ought not to be a site of direct decision-making regarding the management of the risks of climate change.[1] Visitors were firmly of the view that the museum or science centre is not the proper place for political decisions on policy, rather it should be a place where information is available, which may – at the audience visitor's discretion – be taken up for the purpose of understanding and choosing policy options.[2] Others argued for opportunities in between these two positions - that institutions may advocate on behalf of citizens and their views in the policy process as a facilitator or platform in which opinions might be expressed. In this article, we discuss some significant findings that operate in between these various positions that may inform museum practice and re-articulate the agency of natural history museums and science centres in the public debate on climate change. The pertinent findings may be grouped under the rubrics of *information and education*, *governance and decision-making* and *affectivity*.

Information and education

Both our survey and focus group data demonstrated a strong sense among visitors that they lacked adequate information about climate change. In the online survey, 40 per cent of visitors felt that they were 'somewhat' informed – choosing a rating of '3' on a scale of 1 to 5 (Cameron *et al.* 2009).

Visitors also expressed a substantial appetite for more information on ways of managing, mitigating and/or reducing the effects of climate change in their personal lives. This included a desire for information and education on ways to reduce greenhouse gases and their potential impacts, and on changing one's lifestyle to manage climate change. Visitors also sought greater and more up-to-date information on the development of renewable energy technologies (Cameron *et al.* 2009). Importantly, across the qualitative data visitors identified a role for museums in providing this information and education. Such information provision within museum space complements the strong reliance on local knowledge as well as family, neighbourhood and community-based practices to mitigate climate change (Cameron *et al.* 2009, 2011).

The museum's role as a space for the credible development and dispensation of scientific information was also emphasized. One focus group participant put it as follows:

> If there were a place that [the public] could learn all about the science behind climate change and what science is actually doing towards solving the problem they would feel less defeatist about the whole thing.[3]

Another demonstrated the urgency that is attached to information provision, saying that:

> Someone's just got to take a stand and say right, these are the facts, let's put them out into the wider community.[4]

Governance and decision-making

Visitors felt that all tiers of government, along with transnational corporations, are the most responsible for making decisions in response to climate change (Cameron *et al.* 2011). Within this, there was a strong push for more consultation by government and more

opportunities for citizens to influence government decision-making.[5] Some 95 per cent of participants in the online survey reported having little to no influence on decision-making about climate change, with their input generally limited to poll-based activities such as voting (Cameron *et al.* 2011).

To be sure, it is not that visitors are unfamiliar with the policy proposals currently under discussion in Australia and the USA (and in other western industrial democracies). Through our research, visitors made themselves heard on policy preferences and policy positions currently under examination in Parliamentary law and policy-making and public debate around matters such as energy consumption and production, carbon trading and international agreements (Cameron *et al.* 2011). Visitors also expressed preferences regarding modes of interaction with government decision-making (Cameron *et al.* 2011).

Affectivity

High degrees of concern, anxiety, uncertainty, frustration and feelings of helplessness amongst visitors in relation to climate change can be identified from our data.[6] Of the range of possible feelings presented to visitors in the quantitative survey, the majority (62 – 68 per cent) chose 'concerned', which was followed in quantity by 'frustrated' (33 per cent), with 'unsure', 'anxious' and 'ill-equipped' following in that order (Cameron *et al.* 2011).

From the findings under the three rubrics above, a number of issues are raised that implicate museums as public institutions who do cultural work. Citizens express a desire for more and better-quality information on climate change and how citizens might live with/in it, improved integration of citizens into democratic government decision-making, and the provision of cultural resources for promoting emotional resilience in the face of an uncertain and sometimes frightening social future.

Indeed, when put to them in a focus group setting, visitors strongly supported the notion of museums and science centres operating as strategic sources of information to this end. Visitors saw a significant role for museums in providing and weighting the information about climate change and possible government, community and individual responses to it, whilst allowing visitors to make up their own minds as well as promoting and generating a sense of individual and collective empowerment to act on the problem/s of climate change as argued in Cameron's paper (this issue). The following comments made in focus group discussions, as referenced in Cameron's paper, are indicative of this multi-laminar information and decision-making process:

> A good way of coming and not getting one opinion thrown in your face, [to] make up our own minds ... I think [a museum can] state the facts and it's what I expect of a museum. I expect fairness.[7]

> If it was a museum ... it kind of has everyone's opinion. It doesn't force one opinion ... if it was made to lean towards a certain way, then people would feel they have to be a certain way to come to a museum and I think it could make a lot of people feel they couldn't come here ... I think if you presented all of the facts, then people would make ... their own decision.[8]

In terms of a role for the museum in the climate change debate, institutional impartiality is explicitly bounded in this comment:

> Male: ... they ideally should say something like we should be reducing carbon emissions because ... science suggests that could help. They don't need to say we should reduce it by 35 per cent.

> Male: That's a political decision.

> Female: Yes that's right.[9]

This positioning of the museum and/or science centres as places in which citizens are informed about the effects of climate change and possible mitigations, based upon scientific opinion, is also borne out in our quantitative data. The majority of those surveyed agreed that

museums and science centres should communicate the up-to-date science of climate change: 76 per cent of Australian and of US 74 per cent samples in relation to museums, and 83 per cent and 74 per cent respectively for science centres. There was a similarly significant agreement with the potential positioning of museums as 'places that provide access to a range of resources on climate change' (74 and 75 per cent for Australian and 73 per cent and 70 per cent for US museums and science centres) and 'places that promote climate change action by providing information on how individuals might change their lifestyles and consumer choices' (70 and 73 per cent for the Australian and 72 per cent and 69 per cent for the US samples).[10] Moreover, our research also suggested that there is a serious concern about the quality of and partisan nature of the arguments and information on climate change presented through the media with 57% per cent of respondents in the online survey in Australia and the US having little confidence in information from commercial media (Cameron *et al.* 2009).

This injunction from citizens to 'give us the information so we can make up our own minds' is the foundation of the concept and practice of deliberative democracy in western contexts.[11] Indeed, the role of deliberative processes in contextualising and facilitating difficult policy decisions is, by now, well established. The following section considers the linkages between museums and science centres as public institutions and the growing practice of deliberative democracy.

Museums as sites of deliberative democracy

Taken together, these data may suggest a role for museums as sites that facilitate deliberative democracy, insofar as that notion involves public deliberation on policy proposals through the provision, to citizens, of 'a range of experts and as much information as they need' to make a decision, in the words of Lyn Carson (2010). Crucially, in such a space of deliberation, 'all interests, all perspectives should be available to participants – all barrows should be wheeled into the room.' In a space where this is provided, Carson claims that 'citizens are remarkably good at weighing up the strengths and weaknesses of arguments and arriving at a considered, collective judgement.' Importantly, the space 'must have impartial facilitators who can help the group reach its own judgement. The environment must stimulate inquiry and respectful discussion.' Finally, 'deliberative public participation is necessary to inform and monitor public policy formation in contexts that are contentious and long-term' (Carson 2010).

Whilst Carson is describing a more controlled or differently structured environment for democratic deliberation (a Citizens' Assembly on climate change convened by the Australian Government), the principles of availability of information, access to expertise, opinion sharing, and political impartiality (as in not led by governments and/or political parties) look like an appropriate response to the deficits in information and consultation identified by the museum-going public on the subject of climate change. Furthermore, a deliberative practice – whilst it will include coming to specific positions on policy – coincides with the public role expected of the museum as a quality assurer, facilitator weighter of information and as systems of peer and open review as suggested by Cameron in this issue.

Indeed, and within a general frame promoting museums as civic agents,[12] there has been much made of the potential for museums to operate as spaces of deliberative democracy; from programming for scientific citizenship (Bandelli 2010) and holding citizen consultations in the museum itself (as in the role of Cité des Sciences de l'Industrie, Paris and the Boston Science Center in WWViews on global warming),[13] to academic propositions casting the 'museum as agora' (Einseidel and Einseidel 2004) or direct appeals to museums to '[become] a loci of deliberative democracy' (Bienkowski quoted in Feeney 2010). There is also a growing energy for deliberative processes across the western public sphere, which has intersected with the demand for governmental action on climate change. This was expressed in the Australian context when the Prime Minister proposed the aforementioned Citizens' Assembly on climate change during her pitch for re-election in September 2010. At a global level, it is evident in programmes such as the WWViews on Global Warming forum (2009) that fed results from local deliberative processes around the world into the United Nations Framework on Climate Change, Conference of the Parties, (COP 15) in Copenhagen,

December 2009. In a recent Sydney ideas forum, Lars Kluver, Director of the Danish Board of Technology (2011) argued that, in a contemporary world characterized by complex and global problems such as climate change, new structures need to be set up to bridge the emerging democratic gap between global policy makers and citizens, as more decisions become global in scale.

> Just taking political decisions on policy is no longer enough, rather for policies to be made effective and viable the formal political process must develop forums to strategize with citizens. Citizens have different expectations, capacities and skills than before due partly to the rise of the Internet and social media. They are also less confident in government, are better at governing themselves and less amendable to be governed.

This statement is further substantiated by the Hot Science findings where 66 per cent of those surveyed across Australia and 72 per cent in the US were not confident in information coming from the government, that decision-making processes involving citizens must operate crossing all levels of governing and strategic policy making (Cameron *et al.* 2011). Proponents of deliberative processes within the context of social media argue that expert rule is now giving way to shared government in which citizens can be mobilized, empowered and engaged in problem solving. Herein museums and science centres have the potential to operate in global governance arenas in a greater capacity as places for strategic work on policy in conjunction with and beyond current concerns with building global mitigation mechanisms.14

The notion of deliberative democracy in the context of climate change, in particular, presents a new challenge for museums, in requiring them to engage with content beyond that strictly marked as 'science', and as a space with the potential to build citizen capacity and an engaged citizenry in collaborative decision-making around climate change. Beyond science, they are challenged to address the interests at stake and the power relations of climate change within each of these with a view to their examination and to making decisions.

Cameron's analysis of the research (this issue) indicates an emerging tension between the institutional views of science and the expectations of audiences where the latter acknowledge the complexities of science including those of deniers arguing that institutions must go beyond and represent all arguments, making judgements and lending weight to different theories.

> The quality of the science by scientists that believe in global warming is good, not necessarily as good as the people that would say its natural ... you've got to take both sides into consideration ... you can't unequivocally say one's right and one's wrong, you've got to lend different weights to different theories.15

While acknowledging the complexities and difficulties of providing certitudes, science research information is articulated accordingly between different forms of the museum. For many science centre CEOs, science is the only legitimate content source and organizing narrative from which actions and solutions could be formulated. Responsibility here was expressed in terms of providing certain science rather than the wider presentation of a range of views and their ideological framing (Cameron 2011, this issue).

> Media ... it's confusing ... Antarctica is growing, ... is it getting thinner? All those viewpoints have been put forward [but] it's hard to make sense of confusing messaging ... complicated issues like climate change, it is challenging to know what's going on ... it's very clear that scientists understand.16

An interview with an Australian federal parliamentarian revealed a perspective on the relationship between political decisions on policy and the roles of museums and science centres in mediating between formal politics and communities, in regards to the monitoring of policy on the basis of expert, scientific evidence as well as the potential for scenario building as it connects with policy under the different conditions of warming for/from the work of government. To wit:

> I think that provided the museums stick to the science, they are absolutely entitled to be in this area and have something to say, but when we get down to

debating the merits of individual policies, that is difficult terrain. To explain what I mean, the science can say we need a cut of carbon emissions by 60 per cent by 2050 or 80 per cent by 2050, and museums can be pointing out the views of scientists or even competing views, but certainly United Nations framework convention on climate change. All that kind of debate about the level is perfectly reasonable to say - Australia is tracking at such and such a rate and here is what we've been doing historically and show how the carbon has been on the rise and say "well last year our carbon emissions went up by one per cent" whatever and say "in order to meet the carbon targets that scientists say are necessary to reduce or avoid the risk of dangerous climate change, we will need to change direction and adopt one or more of the following solutions" and I think provided it's expressed in that sort of way where it's a very science-based approach and doesn't go that next step towards expressing a view about the present renewable energy target or the CPRS or about clean coal initiatives ..., then I think it's on firm ground, on the science-based ground, rather than on the policy ground where inevitably whatever you say, there will be disputation about that.[17]

When respondents were asked specifically about the role of museums and science centres as places for policy critique as, 'Places that take a critical stance on government climate change policy and decisions' 57 per cent of Australian museum and 65 per cent of our science centre sample said institutions should be taking on this role. Similar ratios were expressed by US respondents.

This statement caused consternation for many respondents, as one seen as too political. One respondent stated: 'having opinions from a museum standpoint is very scary'. A number of discussants, however, suggested that it was important for institutions to take a critical stance or review policy, albeit at a distance, mediated through the institutions' information, peer review and quality assurance mode in the context of generic scenarios rather than specific policy. It was considered proper in many cases for the institution to take a critical stance, if that stance emerged from the institution's scientific knowledge. In this sense the institution would itself be a legitimate contributor to discussion within a deliberative process and may play a role as a 'secondary association' in 'institutionalizing deliberation'.[18]

Rather than actually saying the government could decide A but we did B, I think they could say best science thinks we should do A and people realize the government's done B.[19]

Further to this, the Hot Science research details opportunities for museums and science centres to act as deliberative and congregational spaces, in facilitating ideational inputs into climate change policy as mechanisms for detailing social future scenarios crossing a range of stakeholders and interests. This was expressed in the statement, 'Places that promote collective action by bringing the sectors - government, business, scientific organizations, media and non-government organizations together with citizens to make decisions about climate change matters'.

In Australia, 74 per cent agreed that museums should take on this role with 76 per cent of science centre audiences supporting this scenario. In the US, 69 per cent said that museums should do so whereas 68 per cent said that science centres should be performing this function. This agency was seen as of greater importance for the Australian museum sector.

Participants welcomed the idea of museums facilitating exchanges between the nominated sectors and communities.

It would be great if that would happen. It would be amazing.[20]

Discussions would be great ... that would give us another place where we'd actually have some voice more than just voting. [21]

I think it's going above what I expect from a museum … it's a great idea.[22]

Further, a range of opinions and cross-sectoral views was seen by the discussants as a

means for expressing community priorities, opinions and accessing good ideas and options.

> I think it would be good for us to make decisions what we feel is important to us and then they gather that information ... and we say "Listen we think this is a problem" ... and then for the government maybe ... to work with the community and the museums.[23]

This was contingent upon institutions being able to satisfactorily 'walk the line' between information and politics or science and policy. Broadly speaking, this subjective goal entails museums being 'employed [as] a platform' for parties to perform these conversations and for the community to be informed by the institutions, whilst being careful not 'to come out too heavily on either side.'[24]

Ideational inputs into cross-sectoral conversations such as these, according to political theorist Chris Ford (2011), can be transformational. Ford (2011) argues that tensions in political ideologies in policy debates can act as drivers for deliberation contributing to the cognitive fitness of policy over time as well as bringing about changes in lifestyles, relations, visions and political forms. To this end, museums and science centres can operate within spaces between formal politics and communities and in difficult debates around policy through the facilitation and brokerage of deliberations involving cross-sectoral stakeholder groups together with research. That is, by monitoring policy in a generic form at a distance as mechanisms for detailing multifarious social futures against various disciplinary, lay expertise and local knowledge, in imagining scenarios as potential policy positions, and ways to live in the world differently under the conditions of climate change.

We translated this statement into a programming idea; 'Museum programming will help mediate between politicians, climate change experts, activists, industry groups and communities to prepare global citizens to participate more fully in climate change decisions.' Focus group discussants responded enthusiastically. Although several saw this as unfamiliar territory, many welcomed the opportunity to bring together the expertise of institutions as systems of peer review, open review and quality assurance, with assemblies of collective intelligence in planning and critiquing generic policy options as a conduit for the dissemination of ideas to other governing agencies.

> Definitely a big challenge, a new endeavour to get out there, no one's actively going out to try and find a solution. I think a museum could bring a lot of people together to get a voice. A lot of people make decisions and discuss what's happening and also given the facts of the research.[25]

> They can collect ideas from the communities or individuals and then they can respond then they can maybe develop a plan or policy.[26]

This deliberative space was seen as a precursor for action, 'It would give a place to come for a time to get some action or some talks underway to get some action'. [27]

A deliberative frame in the context of complex thinking also involves relational work, detailing different pathways, scenarios and entanglements or as Bruno Latour (2005) suggests as a trail of associations between the human and non-human, and in the words of Mol and Law (2002), different multiplicities and multiple effects and different forms and states.

The sharp line between an institutional role as facilitator and that of advocate, in regards ideational inputs into policy, was tested through the statement: *Places that lobby on climate change matters with other agencies* and advocacy. Unsurprisingly, this proposition caused consternation. In this context, most discussants saw museums and science centres as centres for the gathering and collation of ideas.

> I think a museum can have a really good discussion that can be recorded and used for someone else without the museum being too one-sided or taking any sides.[28]

Vote Science 08, Liberty Science Center, Jersey City, US:

A case study of the Liberty Science Center's 2008 'Vote Science' programme demonstrates the opportunities, suitability and the limitations of the museum as a site of deliberative democracy in regards to the political process, decision-making and policy. *Vote Science 2008* was an engagement with the 2008 US Presidential election, focussed around the following mission:

> Science and technology affect every aspect of our lives. In the US, much of the future of these fields depends on legislation controlled by the government. By voting, citizens elect those who decide the direction of scientific and technological research and policy, who controls and manages funding and how scientific discoveries are shared with the public.[29]
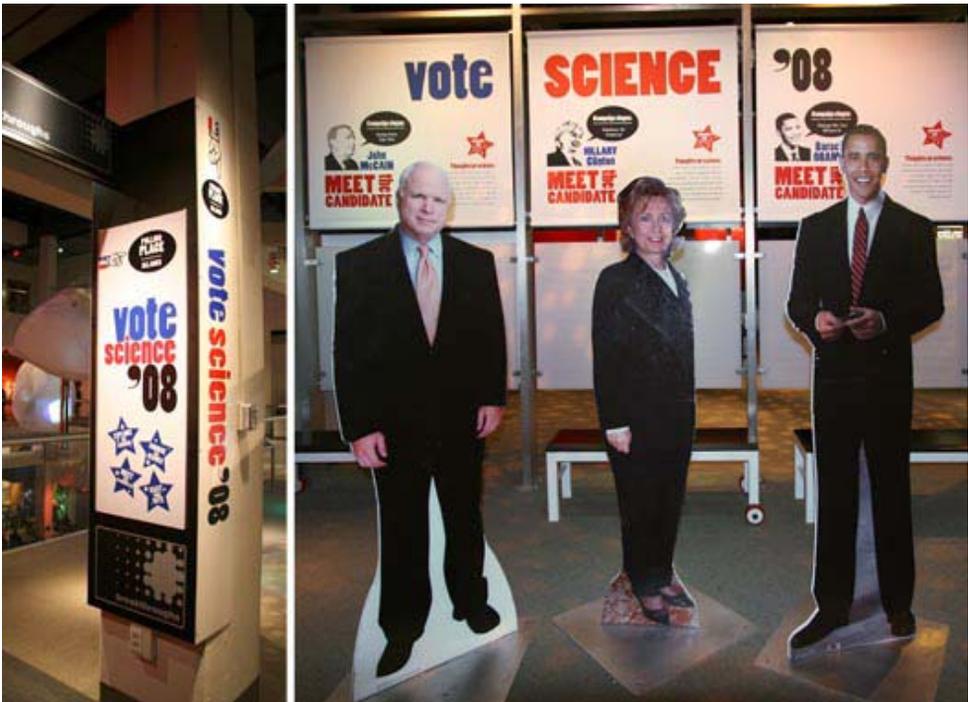

Fig 1. Vote Science 08, Liberty Science Center

The exhibition was designed to educate the museum-going citizenry in the relationship between scientific findings in relation to stem cell research, energy consumption, carbon emissions and science education – and the political process, the policies debated by citizens and implemented by governments on these topics.

Consequently, it included education on the processes of government and how decisions related to science are made, including often less publicly understood aspects such as government budget committees and the appointment of political advisors. Policy-making and the role of political interests were concertedly de-mystified for this pedagogical purpose. The 2008 election itself was contextualized in detail, with information provided about the candidates for President and their policy platforms. The exhibition also simulated a number of election activities such as asking visitors to register their policy preferences, providing a voting booth, and providing a facility with which visitors could make and wear campaign

buttons reflecting their political position. Indeed, *Vote Science* took visitors through most aspects of policy deliberation on the key issues where the physical sciences play a decisive role, with the explicit effect of assisting visitors (including those who would not be voting in the election, such as children, overseas visitors and unregistered voters) to make a decision on their policy preferences. Arguably, emphasizing the performative nature of the policy-making process, and deconstructing political decision-making through a reflexive modality untied the simulation of decision-making from the *politics* of decision-making. The exhibition succeeded in demonstrating the entanglements between politics and science while separating the institution's intervention from policy directives, thereby maintaining the separation between the museum, science and politics that the subjects of *Hot Science Global Citizens* seek to protect, and this even though the most recognizable hallmarks of a political process were present.

From this study of a museum exhibition, it is clear that the discursive separation of the museum from politics and the politics of science may be maintained even when the political realm is explicitly invoked. Is *Vote Science 2008* a case study in deliberative democracy and, moreover, a demonstration of the museum as a site of deliberative democracy? Being a facilitated process of public education and consultation for decision-making, we suggest that the answer is 'yes'. However, we also think that it demonstrates the capacity for the museum to operate inside and outside the (heavily contested) boundary between public and private spheres.[30] As a public institution, Liberty Science Center here is providing education through performative and reflexive processes about certain workings of the public sphere, though it is designed for private use.

This contention is buttressed by the data from *Hot Science*, which maintains a clear role for the museum in publicizing discovery for the purpose of informing domestic or private behaviour.[31] In this sense, the museum, as Jennifer Barrett has shown, has never functioned as an exclusively public sphere (Barrett 2010). And, it is public sphere operations that are emphasized in the theory and practice of deliberative democracy.

It is at, and from, this limit that we enter into our elaboration of museums as sites of *complexity*. Within this, deliberation can be understood as a *modality* of the open peer review posed by Cameron (2011, this issue).

Many interviewed, including CEOs and audiences alike, acknowledged that the new subject matter of climate change and its implications was inherently complex and political, a subject in which different ideologies and beliefs operate on each other, often defying consensual solutions.

Although a deliberative model acknowledges the multiple (Benhabib 1996; Dryzek 2002), this modality still moves towards a consensual position. Therefore, many still believe that consensus is possible on which directed action might be based, and certitudes available if the complexities of the various positions are clarified and synthesized:

> There's so many variants and everyone's got different views and some views are more idealistic than realistic so it's really hard to tell and since all this media, it's so filtered as well. It's hard to get out what it is that's actually going on.[32]

In turn, many CEOs articulated their potential unique contribution to debates as mediating controversies, untangling the complexities and illuminating them to supply certitudes.

> In many areas of public debate, there's lots of heat and not much light, what is desperately needed is a trusted source of information [to which] people can turn to understand issues better ... museums are in a great position to be part of public dialogue. I'd like to see this happening ... it's a responsibility we have.[33]

This analysis of deliberative democracy and the possible debates that it produces for the museum reveals the status of information as a political technology and its deployment in the opening up and shutting down of zones of dissensus (Barry 2001). To be sure, as Barry puts it, '[t]oday, the individual citizen is increasingly expected, and increasingly expects, to make his or her own judgements about scientific and technological matters' (Barry 2001: 127-8). This, within the presumed and ultimately false divide between science and ideology, is brought to bear on 'the political anatomy of the museum visitor' (Barry 2001: 131).

Beyond deliberation: museums in/and complexity

The focus group findings across all the samples demonstrate a strong desire for further information and education on the physical and social implications of climate change and the debate surrounding it. Within the group discussions, there was some tension identified between information and education – where 'knowing about something' was distinguished from 'doing something about it'. We pose this tension as a hinge to distinguish the deliberative from the complexity approach. In such a way, museums are located within the rhizomatic structure, whereby institutions operate within the 'open system of peer review' that characterizes the broader climate change mediascape of which, for audiences, museums are a part (Cameron 2011, this issue)

A blunt instrument for assessing the museum's activity beyond the public sphere is its articulation with the corporate sector. In the following quote from a museum CEO, collaboration with a major mining company is not considered to be a political problem for the museum in itself – the company is not seen as benefiting from a particular ideological position, unlike the environmental activist organization it is contrasted with:

> If an [environmental activist NGO] came to us and said we are going to meet with the Federal Minister and lobby about some aspect of conservation policy [for example] would you come with us, we would probably say no because it puts us into bed with a vested interest group. The same way as if, we [currently] work with [transnational mining company], but if [they] said we want you to sit down beside us while we lobby the Federal Environment Minister about some aspect of whatever we would say no to them as well because we can't do anything that jeopardizes our independent position.[34]

Here, the definition of impartiality is mediated by the perceived boundaries of the public sphere, outside which the mining corporation is more able to sit comfortably in relation to the museum than the environmental lobby group. Therefore, discursive moves that are made outside of public speech will not be registered by the deliberative model.

There are a number of important critiques of deliberation as theory and practice, mainly concerned with its investments in calculation and rationality. Influential political philosopher, Iris Marion Young, argues that a deliberative model of citizen involvement is unable to create equal ground due to the presence of social inequality. For Young, the deliberative form relies on the existence of a public space purified of class, race, gender and other such stratification at work in society, which is, of course, not possible to construct (Young 2001). Beyond this, political theorist Frank Fischer (2004) has suggested that deliberation does not account for or support the role of affect, or the emotions, in debating policy decisions. In view of such critiques, researchers such as Anna Zachrisson (2010) suggest that deliberative models of public decision-making ought to be utilized in concert with other devices of political participation.

These critiques are applicable to the data gathered in *Hot Science* and their museum context. Firstly, museum visitors reflect social inequality with diversity in gender, age, income and geographic location, all of which were targeted and registered by our data (Cameron *et al.* 2010). Second, emotions are a significant factor in considering visitors' positions on climate change. As discussed above, high degrees of concern, anxiety, uncertainty, frustration and feelings of helplessness were registered amongst visitors in relation to the particular topic of climate change.

Third, as many museum leaders reflected in our interviews with them, museums have a diversity of stakeholders and forms of management incorporating government, corporate and community stakeholders. As such, museums are not equipped or intended for straightforward input into informing and monitoring government policy.[35] Central to this is an appreciation of the extant politics of museums and science centres as institutions that are part of public, social governance and simultaneously of corporate governance. As our interviews with senior institutional staff demonstrated in particular, museums are implicated in the work of state governments through legislation, public funding regimes, and their articulation with public agencies such as schools (where, for example, they play an active role in shaping and delivering curricula (see e.g. Zarmati 2009). At the same time, funding from

transnational corporations constitutes a significant part of the museum's operational costs and represents a long-standing relationship between museums and the corporate sector in the western world. Mindfulness about avoiding 'biting the hand that feeds us' was a recurring trope in our interviews with senior institutional staff, expressed with regard to their various local contexts. Still, one leader made the point that funding is one of a number of issues influencing institutional direction, including the cohesion of the staff team around an institutional vision, as well as 'the appetite by the leadership, the appetite by the ... trustees ... [and/or] what the chosen values and orientation of the mission and vision of the institution is'.[36] A complexity (Mol & Law, 2002) framework, we argue, is able to take these diverse, imbricated factors into account without assimilating them to a single category such as 'deliberative democracy'. Indeed, as Joseph Femia has shown, deliberation can be critiqued as being unable to 'cope with the incalculable complexity of modern society' (Femia 1996). Andrew Barry notes, moreover, that we can 'consider complexity as an index of irreducibility', which exceeds models of government that seek to 'reduce complexity and produce a unified political and economic order, an order that can be summed up' (2002: 142). Climate change, as we put to the research participants, is a 'complex cultural, political, technological, economic and scientific issue'. As the discussion above suggests, a deliberative model, though useful to the policy development project of decision-making and contextualization, is quickly exhausted by the complex and holistic nature of the 'wicked problem' it may be charged with solving (see Chapman, 2004), due to its confinement to the public sphere proper.

　　The context in which museums and science centres are located, here, suggests a role for them that extends beyond the facilitation of deliberation and into an understanding of the institutions as 'complex adaptive systems' (Chapman, 2004: 51) with 'partial connections' (Strathern 2004) across the hybridized public and private spheres. As Thompson (in Mol & Law, 2002: 186) observes: 'successful complexity lies precisely in assiduously tending linkages whilst avoiding either reductionism or holism.' The requirements for this include practices of 'relentless pluralism' and rigorous 'moral brokerage'.

　　As Cameron has indicated (see article in this issue), the museum is particularly challenged by the demands of complexity, given that the institution and its practices are premised on the removal of complexity. Cameron (2011) also notes the propensity for this same sensibility to lead to an institutional conceptualization of climate change as 'a problem to be solved' as opposed to an engagement with its complexity. This precludes creative approaches. It is also premised within a cognitive form of reflexive engagement whereby aesthetic or emotional forms of reflexivity are sidelined. Linear conceptualization and cognitive reflexivity are, perhaps, at their best when deployed through the deliberative model; however, this also delimits the possible creative and complex role that museums and science centres could enjoy.

　　Indeed, the ideological complexity of climate change (see e.g. Hulme, 2009) intersects with calls for the museum to embrace complexity and horizontality. Institutional culture in museums tends towards the conflict averse, a consequence of trading on impartiality as a source of visitor empowerment (Cameron, 2011). Museums also treat information as politically neutral and communication as one-way (Hodge 2009), in turn a consequence of a content production system that is centred on the removal of (rather than engagement or reckoning with) complexity. One CEO alluded to the movement that is required out of this mentality, as follows:

> It's got to become a two-way thing. We've got to stop being control freaks and being afraid of debate... we can't control it, we become participants and observers and learners...[37]

Brokering complexity: museums and social futures

'Perhaps', suggests British museum practitioner Brigid McKenzie, 'museums offer us a way to see different ways to live and be productive, by showing us how different cultures have lived in the past [and live now], by inspiring creativity, or offering opportunities to do voluntary work or information learning' (McKenzie, 2010). Indeed, our research demonstrated the role of the

museum in catalyzing profound attachments to alternative social futures – particularly around the organization of domestic life. The museum was widely perceived as having strength in its longevity, well beyond the election cycle of governments and hence the information that comes from government. The museum may, thus, be understood as a site for building communities and networks around these futures. This relational work of the museum also serves to socialize (and thus mitigate) affects such as frustration and despair. In the words of the Climate Change Communication Advisory Group (CCCAG), in their advice to the UK government: 'people who feel socially supported will be more likely to adopt adaptive emotional responses' (2010: 7).

Within this, museums are also charged with a responsibility to broker information in a complex political scene. Part of that complexity is its temporality. In the words of Dipesh Chakrabarty (2009), 'we normally envisage the future with the help of the same faculty that allows us to picture the past'; however, the climate change debate generates a different temporality, one that suggests we need different ways of envisaging the future. The museum is implicated in that trajectory, but cannot completely alter its mission to collect, educate and entertain. Hence, museums may be usefully conceived here as *brokers* of information about alternative social futures: how might we live more creatively, live with less, live with new paradigms?[38]

Focus group participants regularly flagged the role of brokers in the complicated scene of climate change. One participant raised the following challenge to the museum:

> Don't just show me your point of view, show me all the points of view, or the main one. Everyone's got a point of view but show me the ones that matter.[39]

Brokerage involves collection and prior judgement, but is not reducible to either a political or an apolitical decision, which may be inferred from concepts such as 'deliberation' or 'deliberative democracy'. The museum can remain an 'honest broker', in the words of one CEO, by drawing on its relational (community-building) and aesthetic (imaging social futures) resources to inform visitors about alternative modes of living. Focus group participants responded enthusiastically to the suggestion that museums take on a greater agency as spaces for public lectures or public information sessions: 'they could be sort of a nexus to disseminate the information' as one participant put it.[40]

Our focus group data foreshadowed this role for the museum in other ways as well. Visitors remained positive about the use of interactivity and the pursuit of a more horizontal use of the senses now common to science communication and museological practice. One focus group participant raised the following suggestion for a walk-through exhibit:

> That's the present, and when you walk through, people can see what's going on and [sequential section] what's happening over time. Every step could be 50 years or something, [so you can] see the climate over the years so it's not going in one ear and out the other...[41]

Strong support for scenario-building was evident; with participants regularly praising the visceral experience of exhibitions such as the Australian Museum's *Climate Change: our future, your choice* (2008-2009) where, for example, visitors could see what Sydney could look like if sea levels continued to rise. Exhibition project co-ordinator, Catherine Cooper (2010), described it as follows:

> We had much advice from our scientists ... they helped us to recreate an accurate picture of the Great Barrier Reef changing from 2009 to 2020. We wrote the evening news for 2050 and recorded our scientists lamenting over the sulphur that had been pumped into the sky to cool the planet, or awarding Nobel Prizes to colleagues who had developed cheap solar panels. Museum staff volunteered to take on new roles as journalists, protestors or politicians in 2050 ... we helped our visitors to imagine the future in concrete ways.[42]

A suggested limit on these displays relates to its emotional or affective range. This 'imaging the future' conjunction might pay greater attention to entraining affects such as passionate excitement and curiosity about the possibilities for living differently, as well as or instead of

the fright, despair, depression, or frustration that may be associated with images of a catastrophic future. To do so is to exploit further the museum's great strengths, as practitioner Bridget McKenzie has put it: 'museums have developed powerful interpretive strategies so that there are closer links between our emotional response and our grasp of big ideas' (2010). In the words of one focus group participant:

> You actually go into a museum because you're inquisitive and with that there's word of mouth and you tell your friends [to] go to this museum. I think it's a great place to be able to facilitate that.[43]

This vision of mobility may be usefully contrasted with another focus group participant, 'Fear is a motivator, but it's also a source of paralysis'.[44] The effects associated with curiosity led one participant to re-imagine the museum as a site concerned with the future:

> To me, the expectation of the museum is just to go to explore the past and I just found, out of curiosity, that it can act as more about the future...[45]

In another focus group, a participant mused that:

> I've been to a lot of museums around the world, you look and you admire but then you kind of think okay what have I got to contribute to this ... I'm looking at the past, I want to look to something towards the future too to see what I have left behind...[46]

The role of broker is particularly significant to the age of 'Museum 2.0' or 'Museum 3.0', as some in the sector have begun to refer to the contemporary requirements on their practice. Brokerage is aided and informed by the contemporary relationship between museums and web 2.0 – where the visitor-citizen will go to the web for information. Our data suggest that museums could be exploiting that relationship further.

Conclusion

The data produced by *Hot Science Global Citizens* and discussed in this paper (i.e. visitor expectations/issues & CEO/staff narratives about what the museum negotiates as a public institution) give rise to a deliberative role for the museum in the public debate about climate change. However, the deliberative model has some significant limitations when understood within a complexity frame.

Approaching the role of museums and climate change from a complexity perspective provides a space for deliberative democracy, as well as other frameworks to be considered by the institution and deployed as required. Our musings pose new opportunities for institutions in the face of the demands of climate and change, that is, in deploying the creative capacities of audiences for deliberation and complex thinking. While complex thinking cannot precisely predict long-term, significant and irreducible uncertainties, complex along with systems thinking through multiplicious inputs has the capacity to alter a system and the means to govern.

Notes

[1]   HSGC Focus Group Transcript, AM#3

[2]   HSGC Interview Transcript, AM#2

[3]   HSGC Focus Group Transcript, AM#1

[4]   HSGC Focus Group Transcript, MV#1

[5]   This is a pervasive finding in research on public participation in decision-making in industrial democracies

6   This is borne out in other research on public responses to climate change; see e.g. Scott East's article in this issue, see also Climate Change Communication Advisory Group 2010.

7   HSGC Focus Group Transcript, AM#2

8   HSGC Focus Group Transcript, AM#2

9   HSGC Focus Group Transcript, AM#2

10 From HSGC Report 9, 2010. 'Summary of museum and science centre positioningstatements and roles

11 See also projects aimed at mobilising 'collective intelligence' such as MIT

12 See e.g. Cameron 2006, after D. Cameron 1971

13 WWViews on Global Warming was an international effort to gather public input for TheUnited Nations Climate Change Conference in Copenhagen, Denmark (COP15). In the words of its organizers: 'With the participation of more than 4,000 ordinary citizensgathered in 38 countries worldwide, WWViews was the first and only initiative taken to produce a trustworthy, detailed and in-depth snap shot of the global public opinion of the climate negotiations at COP15.', see <http://www.wwviews.org/>

14 HSGC Interview Transcript, LSC#3c

15 HSGC Focus Group Transcript, AM#3

16 HSGC Interview Transcript, QU #2sm

17 HSGC Interview Transcript AFP#1

18 See Elstub, Stephen. 2007. 'Overcoming complexity: Institutionalising deliberative democracy through secondary associations', The Good Society, Vol. 16, No.1, pp. 14-22. Available at <http://130.102.44.245/journals/good_society/v016/16.1.elstub.pdf>

19 HSGC Focus Group Transcript, AM#2

20 HSGC Focus Group Transcript, AM#3

21 HSGC Focus Group Transcript, AM#3

22 HSGC Focus Group Transcript, AM#4

23 HSGC Focus Group Transcript, 4, LSC#4

24 HSGC Focus Group Transcript, LSC#2

25 HSGC Focus Group Transcript, AM#1.

26 HSGC Focus Group Transcript, AM#1

27 HSGC Focus Group Transcript, AM#3

28 HSGC Focus Group Transcript, AM#1

[29] Liberty Science Center, Vote Science 2008

[30] See Barrett 2010 on the problematic public/private distinction.

[31] Hot Science Global Citizens reflects a similar performance to that of Vote Science in that the process of policy deliberation was convened through the museum. Visitor's policy preferences regarding climate change were canvassed and reported on, as discussed further in Cameron *et al* 2011.

[32] HSGC Focus Group Transcript, AM#2

[33] HSGC Interview Transcript, MV#3sm

[34] HSGC Interview Transcript, AM#2

[35] HSGC Focus Group Report 2

[36] HSGC Interview Transcript, LSC#3

[37] HSGC Interview Transcript, AM #2

[38] See Scholars Concerned for Life in the Anthropocene, 2010

[39] HSGC Focus Group Transcript, AM#2

[40] HSGC Focus Group Transcript, AM#1

[41] HSGC Focus Group Transcript, AM#

[42] HSGC Interview Transcript, AM#1

[43] HSGC Focus Group Transcript, AM#2

[44] HSGC Focus Group Transcript, MV#4

[45] HSGC Focus Group Transcript, AM#3

[46] HSGC Focus Group Transcript AM#3

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