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Engaging Across Boundaries—Emerging Practices in 'Technical Democracy'

Rosemary Du Plessis · Richard Hindmarsh · Karen Cronin

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This special issue examines strategies for public engagement in science and technology issues in Australia, Japan and Aotearoa/New Zealand. It traverses issues relating to new energy technologies, food nanotechnology, the environmental impacts of dioxins, toxic waste disposal, genetic modification and the way scientists engage with the social dimensions of new biotechnologies. The papers look critically at engagement across scientist/non-scientist boundaries and explore how these boundaries are confounded and reworked in particular contexts. This is an increasingly popular theme in Science, Technology and Society studies. So what distinguishes these six papers from Australia, Japan and New Zealand?

First, they are situated in the Asia-Pacific, a region that has not traditionally featured in international STS knowledge production and where theoretical perspectives and methods have until recently been clearly dominated by North American and European thinking. It is a research community in which STS scholarship and cross-national linkages are rapidly developing.

Second, the papers are the outcome of the Towards STS Networking in the Asia-Pacific Workshop, held in Wellington, Aotearoa/New Zealand on 3–5 December

R. Du Plessis (✉)
Sociology Programme, School of Social and Political Sciences, University of Canterbury,
Private Bag 4800, Christchurch, New Zealand
e-mail: rosemary.duplessis@canterbury.ac.nz

R. Hindmarsh (✉)
Griffith School of Environment, Griffith University, Kessels Rd, Nathan, QLD 4111, Australia
e-mail: R.Hindmarsh@griffith.edu.au

K. Cronin (✉)
Science, Technology and Society, Social Systems Group, Environmental Science and Research (ESR),
PO Box 50 348, Porirua, Wellington, New Zealand
e-mail: karen.cronin@esr.cri.nz

R. Hindmarsh
Centre for Governance and Public Policy, Griffith University, Kessels Rd, Nathan, QLD 4111,
Australia

2008 and organised by the editors of this special issue. This provided an important new opportunity for cross-country comparisons of STS research and offered a unique perspective on the growth of STS in different locations. The workshop led to the establishment of the Asia-Pacific Science, Technology and Society (STS) Network (APSTSN), which has a budding membership of over 130 members, and which held its first annual conference in Brisbane, Australia in 2009. The APSTSN complements more formal STS organisations at the national level in the Asia-Pacific, such as the East Asian STS Network. Its aim is to develop collegial relationships among STS scholars in the Asia-Pacific region, which (following UN conventions) encompasses STS communities in Australasia, South-East and East Asia and Oceania.

Third, the research presented in this special issue adds a new dimension to global STS knowledge. The papers indicate the diverse cultural, environmental and sociopolitical conditions under which science and technology is being developed in this region. This reinforces STS scholarship in the Asia-Pacific and the growing number of STS practitioners undertaking a wide variety of innovative research in this part of the world. With the APSTSN special sessions at the 4S/Japan Society for Science and Technology Studies (JSSTS) conference in Tokyo in 2010 and the next annual APSTSN conference planned in China (Northeastern University, Shenyang) in 2011, the scene is set for the development of a distinctive regional form of STS. This offers the exciting prospect of an engagement across the boundaries of conventional and emergent STS research—both among scholars in the Asia-Pacific and between regional and international scholars. Through collaboration with our regional colleagues we are becoming more reflective about our own practice and contributing to a distinctive regional STS that may stimulate new thinking in the global STS community.

This publication represents the first coherent body of work from APSTSN members on a specific theme. While only three countries (Japan, Australia and Aotearoa/New Zealand) are represented in this issue, the 2008 workshop was attended by participants from throughout the region and other publications are currently in train that more fully reflect the diversity of the APSTSN membership.

The six papers address an important contemporary theme in STS: practices and processes for the democratisation of science and technology. Building on democratic participatory movements on environment and technoscience, Ulrich Beck's call for a ‘technical (or ecological) democracy’ was notable in proposing a ‘utopia of a responsible modernity, a vision of society in which the consequences of technological development and economic change are debated before the key decisions are taken’ (Beck 1998: 21). Papers in this issue consider the conditions for the ‘technical democracy’ envisaged by Beck. Far from purely utopian imagining (Evans 2003; Stern 2006; Hindmarsh 2008), they address in very practical terms the strategies necessary for publics to engage with science and technology and for scientists to engage with the social dimensions of science and technology (e.g. Chen and Wu 2007; Hindmarsh and Du Plessis 2008; Cronin 2008; Fujigaki 2009). Critical attention to such practices is essential if states in the Asia-Pacific region and further afield are to better respond to existing problems with rapidly emerging new forms of science and technology and their governance. A key role for STS theorists and practitioners is to critique, explore, explain and extend expertise in public

engagement processes, recognising the historical and sociocultural conditions in each society that are productive of new forms of technology, and which also constitute the constraints under which science and technology must operate.

1 Challenges of 'Upstream' Engagement

Tomiko Yamaguchi's contribution to this issue looks critically at a small-scale consensus conference in Sapporo, Japan, that engaged citizens in deliberation about food nanotechnologies. The goal of involving members of the public in upstream discussion of a new science before decisions are made about its application and regulation is consistent with the democratisation of science and is a valuable contribution to the developing STS literature in this field (e.g. Goven 2003; Rogers-Hayden et al. 2007; Kerr et al. 2008; Pidgeon et al. 2009).

Yamaguchi's analysis of interactions during the consensus conference, particularly the comments made by non-scientist panellists, highlights a gap between the aspirations for public input into science and technology governance and the forms of engagement that often actually occur. Discussion between lay participants and scientists did not involve a two-way dialogue, but rather hierarchical interactions that affirmed scientific expertise. When scientists were not present, lay people generally had more to say about a much wider set of issues, including their personal responses to food nanotechnologies and public values relevant to the acceptance of food nanotechnologies in Japan. Lay panellists questioned the need for these technologies and were uncertain about how safety issues would be handled. However, when lay participants were asked to formulate their final assessment of food nanotechnologies with the experts present, they focused on a much narrower set of issues and largely supported the application of nanotechnology in food production and packaging. They did not want to appear 'anti-science' or negative about new technologies.

Yamaguchi suggests that it may be particularly difficult to implement consensus conference strategies in Japan because of cultural conventions relating to traditional respect for status and expertise. Yamaguchi anticipates the design of new, culturally appropriate models for engagement and argues that STS scholars have a responsibility to contribute to their development, drawing on their knowledge of local contexts and the international literature on involving citizens and scientists in science and technology governance.

2 Scientists as Citizens—Scientific Reflexivity

While STS scholars have directed much attention to engaging citizens in deliberation about science and technology, less attention has been paid to scientists and their approach to the social meaning of their science, including its reception by other citizens. Focusing on 'Citizen Scientists', Karen Cronin's paper is based on a research project that enabled biotechnology specialists and members of community organisations to discuss highly controversial applications of genetic modification (GM) in Aotearoa/New Zealand. Drawing on Irwin's (1995) advocacy of 'Citizen Science', she argues that the democratisation of science requires not only

engagement by citizens, but also engagement by scientists with the social, ethical and environmental implications of their work.

Cronin documents how some New Zealand GM scientists were challenged to consider their identities as both scientists and as citizens. This highlights the necessity of contesting assumed boundaries between 'science' and 'society' in the Asia-Pacific context and further afield. Democratisation of science requires not just engaged, active and informed 'citizens', but scientists who exhibit awareness about the relationship between scientific work and the contexts in which it is produced and applied. Her contribution to this special issue deconstructs the 'science'/'public' opposition and describes a social technology—Issues Mapping—that can support greater scientific reflexivity and facilitate dialogic engagement between scientists and community actors.

This exercise in scientist/community interaction was historically and contextually specific, occurring against the background of an acrimonious debate in New Zealand about genetic modification (see Rogers-Hayden and Hindmarsh 2002). However, it also has relevance for other countries in the Asia-Pacific and internationally. Yamaguchi's analysis of the Sapporo mini-consensus conference highlights the ongoing tendency for expert and lay knowledges to be opposed and for scientific knowledge to be prioritised by both scientists and lay participants. By way of contrast, Cronin argues that scientific citizenship for scientists entails transcending boundaries between their science and community identities. Recognising diversity among both scientists and publics is essential for developing a 'civic science' that embraces these flexible boundaries.

3 Doing Boundary Work—Community Input into Documenting Dioxin Exposure

Negotiating across the boundaries among policy, industry, science and activist community organisations was necessary when the New Zealand Ministry of Health contracted the Institute of Environmental Science and Research Ltd. (ESR) to research local residents' exposure to dioxins from a chemical plant in Paritutu, New Plymouth. The agricultural chemical 2,4,5-T (banned in many other countries) was produced at a local chemical plant from 1962 to 1987. The paper by Virginia Baker, Jefferson Fowles and David Phillips outlines the 'boundary work' involved in producing knowledge that was meaningful to the different actors in this controversy. They document the reflexivity demanded, not just of physical scientists, but of everyone in ESR's multi-disciplinary project team as they worked to produce usable knowledge in a highly politicised context.

Their account of ESR's inquiry into dioxin exposure in Paritutu illustrates that complex boundary negotiations with community members, scientists and government representatives was needed before knowledge could be produced that was seen as valid by all the relevant stakeholders. Committed to community involvement, the ESR team engaged in consultation, relationship-building, and stakeholder engagement before embarking on a scientific study of dioxin levels in the blood of selected residents. An action research strategy ensured that community activists had input into the protocol for collecting and testing blood samples (including their analysis in

an international laboratory which community activists endorsed), and ensured acceptance of the results—which demonstrated significantly higher levels of dioxin exposure in the blood serum of those who had lived for three or more years in Paritutu between 1962 and 1987.

This paper provides evidence from the Asia-Pacific region for Wynne's (1993) advocacy for 'institutional reflexivity' among science and policy organisations, and international recognition of the need to see what counts as knowledge as socially negotiated (Corburn 2005; Ozawa 2005; Sabatier and Weible 2007). Producing useful knowledge in this context required attention to procedures that were not just scientifically valid but also socially acceptable. In this sense, while the local knowledge of community activists did not have the same status as the scientific testing of blood samples, the test results were the outcome of a democratic process created by negotiations with local residents.

4 Crossing Expert/Non-Expert Boundaries—Legitimacy, Fairness and Policy Learning

The interface between policy and public engagement with issues relating to new energy generation is the focus of Richard Hindmarsh's contribution to this special issue. While Baker et al. explore the complexity of community engagement on a key environmental health issue in a specific locality, Hindmarsh looks critically at policy for community participation in the development of wind farms across the vast continent of Australia. Like other contributors to this issue, he challenges conventional science/non-science boundaries and draws on knowledge about community engagement in wind farm development in Europe, as well as the enduring social conflict around wind farm location in Australia. He advances suggestions for policy learning that will enhance public engagement in environmentally sustainable energy development and generate legitimacy and fairness through new practices and processes that offer better policy outcomes. Those policies would support collaborative strategies for renewable energy generation and democratic governance that are relevant not just in Australia, but also the wider Asia-Pacific region.

The location of wind farms has been a major source of conflict between landscape guardianship groups, renewable energy developers and the government agencies responsible for wind farm development in Australia. The federal and state governments are committed to renewable energy generation and the use of wind farm technologies as a source of energy. They are also nominally committed to community engagement in decision-making on the development of wind farms. Hindmarsh notes the alignment between policy responses by two state governments and the all-of-government Environment Protection and Heritage Council in their advocacy for an 'inform-consult-involve' position, but highlights how this more participatory model neglects to provide communities with any decision-making power about the location of wind farms. His critique is consistent with arguments by other STS scholars that the rhetoric and symbolic practices of 'public engagement' may disguise a 'business as usual' approach to decision-making. While the scope of his paper is broad, he concludes, like other contributors to this issue, that attention to

local place-based knowledge and decision-making is vital. This involves deliberative expert/non-expert or scientist/non-scientist boundary crossing.

5 Strategies for Public/Science Engagement—The Possibilities of Q Methodology

Amanda Wolf's contribution to this issue looks at what Q methodology—a strategy for eliciting information about the views of individuals on a wide range of topics—can offer to STS scholars interested in identifying commonalities on what appear to be intractable controversies. Wolf argues that Q methodology is particularly useful for exploring views on topics where the potential for shared perspectives may not be immediately obvious. Highlighting overlapping views can assist participants in moving beyond polarised positions and finding 'common ground'. The Issues Mapping strategy used by Cronin in dialogical interactions between GM scientists and anti-GM community activists had a similar focus on challenging assumptions about difference and identifying commonalities.

Wolf advocates the use of Q methodology in science and society engagement, as it enables participants to respond to everyday ordinary language statements on a particular topic, using criteria such as 'the most or least like my standpoint/view'. Participants sort an array of statements using a numerical scale to indicate their preferences, followed by a post-sort interview in which they can talk about their rankings. The Q sorts are correlated and analysed so that patterns in responses can be analysed. The data produced represent participants' engagement with positions on the particular topic at the time they did the sort (Hall 2008).

This technique has been used successfully when people with different positions on issues such as conservation or GMO's have been brought together to share their views and consider strategies for collaboration. Identification of commonalities has been helpful in building collaborative understandings and strategies against a background of overt differences (Mattson et al. 2006). Other contributors to this issue also argue that 'engagement' requires that scientists and non-scientists interact directly with each other and that expert/non-expert boundaries are challenged. Wolf suggests that this form of engagement can be facilitated by the use of Q methodology because it focuses how people see situations and issues, rather than legitimising the positions of particular groups or categories of people. It will be interesting to track how STS scholars in different parts of the Asia-Pacific region experiment with this methodology and how people from different cultural traditions respond to and adapt these new social engagement technologies.

6 The Case for Praxis—Public Participation in Toxic Waste Management

In the final contribution to this special issue, Stephen Healy focuses on a particular site for public engagement: the management and disposal processes associated with hexachlorobenzene (HCB) wastes stored by the company Orica at Botany, Sydney in a mixed residential and industrial area. His paper combines detailed attention to the debate about the use of a specific technology for disposing of this waste—Geomelt—and

a higher-level discussion of how the lay knowledge of community-based participants might be incorporated into science and technology deliberation and decision-making.

Healy advances the case of 'epistemological pluralism', an orientation to knowledge that respects different forms of knowledge and resists the privileging of scientific expertise. His paper echoes Yamaguchi's critical reflection on the privileging of scientific expertise at the Sapporo mini-consensus conference on food nanotechnologies, and Baker and et al.'s analysis of local knowledge as 'difficult data' in the evaluation of dioxin exposure in Paritutu. It is also consistent with Hindmarsh's analysis of the way planning approval processes about wind farm location in Australia have privileged the impact assessments of developers rather than the knowledges and concerns of place-based local landscape guardian groups; and it resonates with Cronin's challenge to the scientist/citizen boundary and Wolf's arguments for attention to the multiplicity of everyday understandings as revealed through Q methodology.

Drawing on Aristotle's distinction between poiesis (instrumental action to achieve a particular goal) and praxis (activity which offers both the means and the end), Healy advocates for praxis in science and technology decision-making. In the Botany toxic waste case, this requires attention not just to the outcome of strategies to dispose of toxic waste, but also to the processes associated with these technologies. Healy highlights how lay knowledge and attention to praxis gradually had an impact on the deliberation and decision-making practices of the Community Participation and Review Committee set up to oversee and advise on the management of HCB wastes. Reviewing the insights of Marres (2007) and de Vries (2007), he argues that the quality of participatory processes used in this case were crucial prerequisites to determination about technical options. It was lay epistemology that facilitated attention to onsite practices associated with waste disposal: with significant effects that would not have received attention if the focus had been entirely on both poiesis and scientific epistemologies.

7 Conclusion

The papers in this special issue consider science and technology issues and strategies for public engagement at local sites across three nation states in the Asia-Pacific region: Australia, Japan and Aotearoa/New Zealand. The authors offer critical assessments of governance processes and the continued dominance of conventional technical and scientific epistemologies, even when public engagement on controversial science and technology issues is being facilitated. At the same time, contributors point to new forms of science and society engagement—and emerging contributions by STS scholars on engagement theory and practice—which reflect the unique sociocultural conditions of this region. While highlighting processes and practices in local contexts, these papers also integrate insights from elsewhere about the successful democratisation of science and technology. They therefore contribute to both regional and international STS scholarship, and address not only engagement among local and national governments, policy experts, scientists and other citizens, but also the complex and often uneasy positioning of STS scholars as they embrace the praxis of engaging publics/engaging science.

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