

Seen but not Heard? Assessing the Impact of STS in Legal and Regulatory Settings Involving Controversial Science

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Abstract

This paper examines some of the issues involved in making assessments of the impact of STS scholarship in controversial legal and regulatory settings. Three case studies are used: my personal experience as a member of a committee which provides advice to Australian science policy makers in relation to health issues associated with mobile telephones; the impact of recent STS citations in the US legal system; and the reception by US courts of STS expertise in litigation involving fingerprint evidence. In the first case study STS perspectives were available but ignored, in the second, cited, then marginalised, and in the third, openly resisted. Four factors are considered as explanations for these patterns of resistance: *recognition/identity, articulation and translation, match/mismatch of knowledge frameworks, and political implications.*

Introduction

I will use the following discussion to provide a sketch of some of the issues involved in assessing the impact of STS in controversial legal and regulatory settings. As STS is such a broad intellectual field it is difficult to, in any simple sense, map all the different ways STS ideas may have impact in policy settings. The vocabularies used in various regulatory contexts frequently provide subtle traces of their exposure to concepts drawn from STS (or fields loosely associated with it). References to paradigms, falsification; 'norms of science'; the 'precautionary principle'; acceptable risk, and public understanding of science, are increasingly common. How much these references actually reflect the accommodation of STS perspectives is a complex question whose answer will vary according to considerations, such as the way STS is defined to start with, and the specific political negotiations of any particular time and place (Coopmans,

Neyland & Woolgar 2004). This concern for sociological/contextual detail should not, nevertheless, discourage the possibility of making some preliminary generalisations about, how in similar social contexts, there may be similar patterns in the uptake, or failure of the uptake, of STS perspectives. I have chosen three case studies which are similar in that in each instance regulators/decision-makers were faced with addressing the challenge of putting epistemology into practice: that is, defining what should count as science or valid expertise in a legal/regulatory setting.

The first case study recounts my experience as a member of a committee that provides advice to Australian science policy makers in relation to health and safety issues associated with radiofrequency technology (mainly mobile telephones). The second looks at the impact of recent STS citations in the US legal system. The third draws on the reception by US courts of STS as a field of expertise in litigation involving fingerprinting evidence. In the first case study STS perspectives were available but ignored, in the second, cited, then marginalised, and in the third, openly resisted.

In my concluding discussion I will use these case studies to draw some tentative conclusions about the factors that condition the reception and uptake of STS perspectives.

'Mobile phones': The Australian Committee on Electromagnetic Energy Public Health Issues

The official task of the Australian Electromagnetic Energy Reference Group (EMERG), of which I was a part, was to provide community input to the Committee on Electromagnetic Energy Public Health Issues (CEMEPHI). CEMEPHI had representatives from the Department of Communications, Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), The Australian National Health and Medical Research Council (NHMRC), and Australian Communications Authority (ACA). CEMEPHI co-ordinated, via the NHMRC, scientific research in Australia into radiofrequency and electromagnetic radiation health issues, Australian participation in the World Health Organisation (WHO) Electric and Magnetic Fields (EMF) programs, and a public information program (co-ordinated by ARPANSA).

EMERG's membership was made up of representatives from the telecommunications industry, the health sector, consumer organisations, academics, local government and community groups. EMERG met formally two to three times a year and communicated in between these meetings via a steady but low volume of email (for commentaries on the culture of Australian EMF regulation see Mercer 1998 and 2001).

Early in 2003 EMERG was asked to provide comments in relation to updating a series of CEMEPHI/ARPANSA *Fact Sheets*. These sheets could be downloaded from the Internet (http://www.arpansa.gov.au/eme_pubs.htm) and covered issues ranging from: *Electromagnetic energy and its effects* [e.g. health effects], *Government action on electromagnetic energy public health issues*, and *Australian Research into EME*. The *Fact Sheets* were easily publicly accessible, the sort of thing a diligent high school/university student, council planner or interested member of the public would uncover with most basic Internet searches, and they are 'authoritative', appearing with the header of the Logo of ARPANSA and the Australian Government's 'Coat of Arms'.

When our group was provided with an opportunity to comment on drafts of the *Fact Sheets* I raised a number of objections and suggestions that were emailed to the relevant ARPANSA members of CEMEPHI (Mercer 2003). Some basic editorial suggestions were accommodated such as putting dates on the sheets so readers would be able to judge their 'use by date'. Nevertheless, in my main area of concern, which intersected with my STS 'expertise', my views were ignored. Specifically, I had noted the lack of consistency across the *Fact Sheets* in how strictly ARPANSA applied their criteria for substantiated scientific evidence to different scientific studies. In *Fact Sheet 1: Electromagnetic energy and its effects*, two criteria were specified for what constituted 'substantiated science' these were basically, (a) publication and peer review in the international literature, and (b) independent verification of research results.

In *Fact Sheet 2* it was claimed that 'there is no substantiated evidence' for adverse health effects from the use of mobile telephones or living near base stations. This statement involved a strict interpretation of the criteria for substantiated evidence and relied on implicitly dismissing a number of peer reviewed studies on the basis of disputed, often informal criticism

that they were difficult to replicate or methodologically flawed. The work on mobile phone risks of Swedish Oncologist/Epidemiologist Lennart Hardell was an obvious case in point. A number of Hardell's studies satisfied criterion one (publication in international peer reviewed literature) but failed criterion two (independent verification of research results) depending on what value was placed on the credibility and independence of various criticisms of his studies. Such judgements were not straightforward given many of the critiques of Hardell's work have been shaped by the adversarial demands of mobile phone litigation (Edmond & Mercer 2004a; *Newman vs. Motorola* 2002; Slesin 2002b).

Given CEMEPHI/ARPANSA's implicit interpretation that Hardell's work was scientifically unsubstantiated, and therefore, unworthy of acknowledgement, I found it surprising that in their next fact sheet their earlier austere attitude towards 'substantiated science' no longer applied. In *Fact Sheet 3* a variety of pilot studies which had not been peer reviewed, and one controversial study which had been published in an international peer reviewed journal by scientists based in Adelaide University were reported (Utteridge et. al. 2002). The pilot studies would not satisfy criterion one, and the published study, criterion two. Like Hardell's studies it has been subject to intense criticism by various scientists in informal scientific literature (Slesin 2002a). It is interesting to note that these studies reinforce the notion that there are no health risks from RF.

In my comments sent to ARPANSA/CEMEPHI I suggested that the status of the studies in *Fact Sheet 3* should be made much clearer and the overview of the 'Adelaide study' redrafted. My comments regarding the consistency of the application of their criteria for 'substantiated science' in the *Fact Sheets* were ignored. I received no feedback: not even unfavourable comments.

The reception of STS in legal settings

In recent times STS discourse has enjoyed increased exposure in a variety of legal settings. This has been most conspicuous in the US and other common law jurisdictions in debates involved with setting the appropriate standards for the admissibility of scientific evidence. The 1993 US Supreme Court

Daubert decision is possibly the best-known case representing this trend (Edmond & Mercer 1998a; Jasanoff 1995). *Daubert* overturned the long-standing so-called *Frye* test. The old standard was in a sense sociologically orientated, it set the barrier for the admissibility of scientific and technical evidence into courts according to whether or not a scientific principle/practice etc. was generally accepted by a relevant scientific community. The new test is, in a sense, more overtly epistemologically orientated (Edmond & Mercer 2004b), it grants power to judges to act as 'gatekeepers' who are expected to utilise a non-exhaustive, philosophically inflected, checklist for what constitutes proper science. For STS purposes *Daubert* is especially significant because the Supreme Court cited as authority for its checklist, a number of secondary 'non-legal' authorities from the philosophy and sociology of science. Sheila Jasanoff, Karl Popper, Karl Hempel and John Ziman all received 'cameos'.

In an attempt to try to map what influence, if any, these and other citations of science studies may have had on US jurisprudence I conducted (with Gary Edmond) a number of surveys and analyses of citations of STS in US courts and relevant secondary legal literature (Edmond & Mercer 1998b; Edmond & Mercer 2002; Edmond & Mercer 2004c). As far as possible we tried to link these citations with the context in which they were being used, and assessed their effect on broader patterns of litigation. We also compared the legal uses of other secondary, non-STS, non-legal commentaries on science. In our studies we found that when STS literature was being cited it was often for propositions that were widely displaced from the way these concepts were generally understood in science studies. For instance, Jasanoff's work has been cited in secondary legal literature for the need for judges to become more conversant with the scientific method, her original study in fact pointed in the opposite direction, for judges to move beyond simple positivist understandings of the nature of science (Edmond & Mercer 1998b).

STS scholarship was also treated strangely in the judgement itself: as if competing philosophical and sociological models of science were simply compatible and interchangeable. There was no recognition that Popper, Hempel and Jasanoff offered different images of science. The *Daubert* checklist is eclectic and syncretic and philosophically incoherent (Haack 2001).

Another observation we made was that, as far as the citation of secondary non-legal sources were concerned, both in terms of the quantity and in consistency of uptake of ideas, literature drawn from politically conservative industry backed 'think tanks' was far more successful than STS literatures. In particular the polemic of the 'neo-con' Manhattan Institute's Peter Huber (Huber 1991; 1999), which at times has been explicitly critical of science studies perspectives, appears to have exerted the greatest influence (Edmond & Mercer 2004c; Mone 2002).

STS expertise as 'junk science'

One of the by-products of US courts becoming more pre-occupied with 'gate-keeping' and assessing the quality of scientific and expert evidence has been for a variety of challenges to be made to some traditional forensic science techniques. Fingerprint evidence in particular, which has traditionally been valued as the benchmark for reliable forensic evidence, has recently been subject to legal challenges. In part, this trend has been encouraged by the work of STS scholar Simon Cole. Cole has written a widely acclaimed history of fingerprinting, exposing its practices as far less exacting, and open to interpretation, than traditionally believed (Cole 2001). Cole has in a number of recent contexts gone beyond academic critique and appeared as an expert witness. His experiences as an expert witness (so far) are quite sobering for STS. His evidence has regularly been excluded from being heard in pre-trial hearings. One of the issues raised in these pre-trial hearings has been whether or not Cole's testimony on the history of fingerprinting, and the reliability of its practices, can be classed as expert opinion. Judges tend to have rejected Cole's evidence based on difficulties in being able to define what sort of expertise Cole's STS knowledge constitutes. In one New York case, Justice Michael Brennan colourfully rejected Cole's STS evidence:

[W]hat Dr Cole has offered here is 'junk science'(...). To take the crown away from the heavy weight champ you must decisively out score or knock him out. Going twelve (12) rounds will just not do. What Dr Cole has offered here is interesting but too lacking in scientific method to even bloody the field of fingerprint analysis as a generally accepted scientific discipline (Hyatt 2001, 5).

Cole has reflected on these difficulties considering questions such as: how far for the sake of engagement and recognition of his STS expertise should he depart from traditional STS agnosticism in defining things like the scientific method? And, should he present himself as a fingerprinting, rather than an STS, expert? (Cole 2004; Lynch 2004a).

Difficulty in fitting STS into the policy frame

In the three case studies above STS advice/perspectives whilst ‘proximate’, explicitly cited, and intimately relevant to the issues at hand, experienced difficulties in being taken up or exerting influence. I have identified four factors that help explain these patterns of resistance to STS:

- Recognition/identity: *The problems surrounding the ambiguity of the identity and epistemological status of STS scholarship.*
- Articulation and translation: *The difficulty in framing STS advice in ways tractable for decision-making.*
- Match/mismatch of knowledge frameworks: *How far the epistemological frame implied by the STS advice fits in with or challenges the epistemological frame adopted by the institution receiving the advice.*
- Political implications: *The way possible implications of STS advice conform with or challenge political orientations of dominant stakeholders.*

Recognition/identity

In my first example, I suspect that part of the source of resistance to my STS advice was that CEMEPHI/ARPANSA had difficulties recognising/classifying the nature of my expertise. Whilst I was formally listed as a representative of an international organisation known as the *EMR Network*, the relevant committee members were also well aware of my STS academic credentials and university affiliation. This did not stop them raising persistent questions and confusion about the nature of STS: did STS represent: activists, industry representatives, consumer associations, or scientists? And did STS advice

represent ‘science’ or ‘policy’ advice? It would be consistent with these experiences to imagine CEMEPHI/ARPANSA dismissing my comments on the consistency of the fact sheets as scientific opinions falling outside my area of STS expertise or as legitimate representations of my stakeholder interests.

These types of issues also appear to underpin the problems faced by Cole in having his expertise on fingerprinting admitted to US courts. As noted above, the status of Cole’s STS knowledge claims were frequently measured unfavourably against artificial ideal images of the norms and methods of the ‘hard sciences’. Cole also found himself often being confronted with the task of ‘speaking for the field of STS’ and being drawn into providing a simple demarcation criterion to define science, something most recent STS scholarship has resisted (Gieryn 1998). Unlike most branches of the natural sciences it is much more common for social sciences to be more reflexive about the objects of scholarship and appropriateness of their research methods. Unlike natural scientists, Cole could not as easily draw upon traditional (albeit flawed) ‘ideologies of science’ (Mulkey 1979).

The citations of STS in *Daubert* offer a slightly different version of the problem of ‘recognition’ to the other case studies. The citations to STS entered the Court by way of a variety of *amicus briefs* (submissions from interested parties) some of which clearly indicated their debts to STS scholarship (Edmond & Mercer 1998b; Jasanoff 1995). It would appear that the Court cited STS sources in part then, because they added authority, or at least indicated a degree of worldliness, to their judgement. The way the Court and later jurisprudence and legal commentary re-interpreted then marginalised STS, suggests that the problems of uptake or accommodation of STS perspectives involves the challenges of ‘translation’ as well as ‘recognition’.

Articulation and translation

As I noted above, in tracing the impact of STS citations on US jurisprudence following *Daubert*, there is a pattern of citation for propositions that seem inappropriate or trivial and that judges preferred to cite non-STS literature

emanating from politically conservative 'think tanks' to describe science. Unlike the STS literatures which tend to be written primarily for academic audiences, and make propositions of a more general philosophical and sociological nature, a notable feature of this more 'successful' secondary non-legal, non-STIS literature, has been the way it has been framed to directly advise judges how to interpret and apply the *Daubert* criteria to specific examples (Edmond & Mercer 1999; Foster & Huber 1997). It is possible to speculate that noting philosophical subtleties; acknowledging criticism; and addressing complex matters of interpretation, as would be typical of social science discourse, may be less well suited to the requirements of judges, regulators and decision makers who may be searching for simple models to guide their practice (Edmond & Mercer 2004c; Mercer 2004). These problems of complexity and purpose may limit the possibility of effective translation of STS ideas into legal and regulatory contexts. They are also often underpinned by the incompatibility of the epistemological frame most STS claims are made within relative to the epistemological frame familiar to most legal/regulatory audiences.

Match/mismatch of knowledge frameworks

It has been noted in a number of contexts that many legal and regulatory institutions, particularly the former, exercise a strong tendency to legitimate their decisions and activities using justifications that mirror ideal images of scientific practice. Many legal/regulatory institutions, for instance, articulate their activities within the framework of legalism. Legalism can be characterised as the belief that the legal process can provide socially optimum outcomes to conflicts by carefully clarifying factual from evaluative issues and provide rational apolitical decisions (Wynne 1982). STS views of the nature of science and technology frequently challenge the implicit models of knowledge such organisations use to legitimate their activities. For instance, STS approaches frequently emphasise themes such as: the political nature of expertise; that expert and scientific disagreement over fact may be legitimate; and, that attempts to separate facts from values can be complex and dependent on

various politically charged evaluative frameworks (Edmond & Mercer 2004b). These insights imply that it should be expected that legal and regulatory institutions themselves embody various political assumptions into their decision making frameworks, and that setting the boundaries about what should count as science and policy are open to political interpretation (Jasanoff 1987).

A more thorough and academically sensitive attempt by the Supreme Court to interpret the STS literature they cited in *Daubert* is likely to have made it more difficult to generate their politically powerful, but philosophically incoherent, checklist, it may have also invited unwanted reflection on the processes of judging and the status of legal knowledge itself.

In the much more mundane context of my first case study, *ARPANSA's* acknowledgement of the legitimacy of my STS input relating to questions of the scientific consistency of their *Fact Sheets* may have potentially destabilised the customary boundary they held between science and policy. This boundary privileges a strong degree of autonomy to *ARPANSA's* judgement on matters it interprets as scientific.

Political implications

This final category recognises the fairly straightforward point I acknowledged at the beginning of my discussion: that the particular political circumstances in which STS knowledge is attracted to, or drawn upon, will also shape its reception and use. Whilst these considerations imply an empirical analysis well beyond the scope of my current discussion, it is still possible to sketch some of the political contexts explaining the cool reception of STS in my cases studies. In the first and third case studies STS perspectives could be associated (even if it was not their intention) with challenges to powerful political interests.

For instance, in the first case study, there has been a strong recent trend for a number of key regulatory institutions to try to achieve closure of the question of the potential health effects of RF radiation. This trend can be tied to the huge economic value of mobile telephony (Graham-Rowe 2003). Considering this context, it is quite predictable that the promotion

of any perspective that could be interpreted as a possible challenge to the scientific views of an emerging regulatory 'consensus', even if just to seek consistency in the application of standards for what should count as valid science, would be discouraged (Mercer 2001).

In the third case study, the admission of Cole's evidence into courts critiquing fingerprinting offered the possibility of undermining one of the traditionally most important areas of (primarily) state backed forensic evidence. It is interesting to speculate that the political resistance to Cole's evidence could well be moderated by the shift in political influence of fingerprinting experts subsequent to the rapidly expanding legal uses of DNA evidence (Lynch 2004b).

In the case of *Daubert* a factor contributing to the relative success of non-STS non-legal secondary literature can be tied to the fact, as I noted above, that, unlike STS literature, it was directly backed and promoted by various political lobbies who, in a sense, seized on the Supreme Court's search for a definition of science to promote their own conservative political visions (Edmond & Mercer 2004a).

Concluding comments: Strategies and dilemmas in being 'heard'

Considering the categories above, it is possible to make a few concluding remarks about ways that STS may be more able to be drawn into, and shape legal and regulatory decision-making. Following Evans and Collins, in their recent call for a 'third wave' of science studies, 'STS' may have to reflect more overtly on the normative implications of STS 'work' and devote more effort to explaining what the field as a whole may have to offer to decision makers (Collins & Evans 2002). Such publicity 'drives' and attempts to define a public/policy STS 'persona', nevertheless, need to be done with some subtlety and cognisance of the diversity that helps make STS such a rich and worthwhile academic field. It is also important to remember not all STS scholars see that their primary role is to aim to effect political or social change (Lynch 2004a). Publicising STS's practical value must be done whilst still recognising its diversity.

Apart from maintaining STS's visibility there is also a need to maintain effort to work on ways to effectively translate STS ideas into contexts where they may be able to inform answers to social problems involving science and technology (Latour 2004; Woodhouse et. al. 2002). But, yet again, there are caveats, in doing this we need to be cognisant of the problems of partisanship. In the enthusiasm to provide knowledge that can be translated into practice care needs to be taken to consider how much we may lose qualities distinctive to STS scholarship (see discussion in Ashmore & Richards 1996).

Finally, in a broader context, it is worth remembering that STS may have already indirectly contributed to removing some of the obstacles to its uptake in legal and regulatory cultures through exerting subtle influences on broader culture. STS scholarship has, for instance, contributed to growing social concern with the risk society (Beck 1992); helped articulate ways of dealing with scientific uncertainty such as the 'precautionary principle', and influenced broader public understandings of science (Irwin 1995). It is also worth remembering that science and technology themselves are also not static entities. Shifts in the institutional and social structure of science may also make technocratic/legalistic discourses increasingly less workable/credible in legal and regulatory cultures by inviting alternative approaches to regulation more responsive to STS perspectives (Flyvberg 2001; Nowotny, Scott & Gibbons 2002). Unfortunately, these trends are not without their contradictions and it may well be that the possibilities for forms of greater 'reflexivity' about the nature of science, technology and politics may prove unsustainable in the light of repressive political responses to new forms of social uncertainty emerging in the contradictory post-September 11 world of the 'war against terror', rapid globalisation and 'cyberculture'.

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