

Is it good science? Activism, values, and communicating politically relevant science

Gwen Ottinger

Abstract

The validity of citizen science conducted by community activists is often questioned because of the overt values that activists bring to their investigations. But value judgments are a necessary part of even the best academic science, and scientists whose findings suggest the need for policy action can learn from the example of citizen scientists. Communicating clearly about value judgments in science would give the public a better basis for distinguishing between responsible and irresponsible research on controversial issues.

Recently I was contacted by a journalist writing a story about a new report on the environmental and health effects of fracking. The report had been written by residents of communities near natural gas drilling sites, and it drew on data from air monitoring with homemade “buckets,” a practice I have studied for over a decade. Noting that the report’s authors are opposed to fracking in their communities, she asked me if their data could really be trusted: “Is it good science?”

The question is central to much hand-wringing over the blurring of the lines between science and activism. It implicitly equates “good science” with “objective” science, science untainted by any hint of “politics” or social values. With objectivity as a litmus test, any scientific claims made by scientists with a position on an issue are automatically suspect, no matter how well grounded in evidence they may be.

However, as I explained to the reporter, the sharp distinction between objective science and value-laden science crumbles under close examination: one cannot do science without making value judgments. As a result, I suggested, the way to assess the reliability or trustworthiness of science is not to scrutinize investigators’ personal views on the issue; the fact that the citizen scientists had a position on fracking did not automatically make their study “bad science.” Instead, drawing on the insights of philosophy and sociology of science, we should evaluate scientific claims by asking *what* values inform scientific claims and *how* they came into play in the research process — questions that apply equally to citizen science, with its overtly political agendas, and academic science, with its aura of objectivity.

Contrary to popular perceptions, all science involves values. To do their work, scientists must make judgments about what research questions are worthwhile, how they should talk about their findings, and whether they should err on the side

of false positives or false negatives [Elliot, 2011]. Often a discipline will have an accepted way of answering these questions — requiring a certain level of statistical significance before accepting a hypothesis, for example — but those disciplinary standards still represent value judgments.

Citizen science linked to activism¹ differs from academic science not in *having* values, as the reporter suggested, but in making the value judgments necessary to science *differently* than academic scientists would. Communities that use buckets, for example, think it worthwhile to study air quality near petrochemical facilities and other “hot spots,” where environmental regulators historically looked at overall air quality for a region [Ottinger, 2010]. Citizen scientists also have different values in assessing evidence. Academic epidemiologists, for example, favor false negatives, where communities doing “popular epidemiology,” tend to prefer false positives. If chemical contamination may be causing disease, they would prefer to err on the side of caution and act to protect people’s health, even if their evidence does not meet epidemiologists’ standards for statistical significance [Brown, 1992].

Philosophers who reject the idea that science should be value-free suggest that scientists should be transparent about the value judgments they make in their work. Doing so, they argue, would help policy makers and the citizenry to better understand how to assess information, especially in light of competing scientific claims [Douglas, 2009; Elliot, 2011]. Citizen science contributes to this transparency: by making value judgments differently, citizen scientists expose the taken-for-granted values inherent in academic and regulatory science, inviting broader discussion of our priorities: certainty or protectiveness? Fine-grained attention to problem areas, or understanding of broader trends?

Equating “good science” with “value-free science,” as most people do, robs us of the opportunity to have a critical discussion of our values. It also, I contend, makes communication harder for scientists whose responsible, thorough, rigorous research has led them to conclude that policy action is imperative. How are they to convince the public that *their* facts should be trusted? If objectivity is the ideal, then any science that can be shown to have values — as all science can — is too easily dismissed as “just political.”

Abandoning a value-free ideal and talking about value judgments would offer a way to distinguishing between equally responsible scientific studies with conflicting implications for policy. If scientists were more transparent about how they chose research questions, metrics, and standards of proof in a way that present them not as inevitable but as reasoned judgments from a particular perspective, the public would be better able to weigh heterogeneous scientific claims.

There are, of course, notable cases of corruption in science, where inconvenient data were suppressed or corroborating data fabricated [e.g. Oreskes and Conway, 2010; Proctor, 2012]. But the corruption was not a result of scientists’ *having* values, but of their allowing them to play a *direct* role in their collection and interpretation of data [Douglas, 2009]. In short, scientists’ explicit desire for a particular outcome colored important aspects of their investigation, such as deciding which measurements to include in a data set or whether to report results at all.

¹In contrast to citizen science in which citizens collect data in the service of academic scientists’ projects. I describe this variant as “social movement-based citizen science” [Ottinger, Forthcoming].

Science, including citizen science, should be able to inform political action without being dismissed as “activist.” To achieve that end, we need to broaden our definition of “good science.” While we ought to exclude corrupt science that makes inappropriately direct use of values, we should also accept that responsibly conducted research necessarily involves value judgments, and that those value judgments may differ between citizen scientists, academic scientists, and regulatory scientists [Liévanos, London and Sze, 2011] or even across academic disciplines [Sarewitz, 2004]. For science communicators, the challenge then becomes transcending the value-free ideal and communicating the heterogeneous values of scientists in a way that enables a richer public discussion.

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Author

Gwen Ottinger is Assistant Professor in the Center for Science, Technology, and Society and the Department of Politics at Drexel University. Her book, “Refining Expertise: How Responsible Engineers Subvert Environmental Justice Challenges”, won the 2015 Rachel Carson Prize from the Society for Social Studies of Science. E-mail: ottinger@drexel.edu.

How to cite

Ottinger, G. (2015). ‘Is it good science? Activism, values, and communicating politically relevant science’. *JCOM* 14 (02), C02.



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