The Politics of Information and Participation: Digital Citizenship and Public Science ■ Paul Dourish

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The fundamental question that motivates me in the field of DIY citizenship the question of what kind of model of citizenship is embedded within the rhetoric of DIY production and technoscientific production. One of the consequences that comes out of this is thinking about what barriers to participation are erected, potentially, by that rhetoric. And turning it around some, what are the opportunities for realigning some technoscientific power structures through practices of DIY production?

The particular thing that I'm going to use to focus this on, because it's been one that has arisen a great deal in my research area over the last couple of years, is the topic of "citizen science": for instance, where DIY technologies get deployed in support of large-scale environmental pollution monitoring and are harnessed to big science projects.

I'm taking DIY citizenship here broadly to identify a site and form of informal technology production which provides a site for different kinds of elements of citizenship practice: a site of engagement, potentially, with the state and with regulatory authorities; a site of reflection upon those forms of regulation and the kinds of representations of us and our practices, of people and their lives, that are embedded in a variety of both state and commercial processes. And as a means and mechanism of civic participation: as a place for people to get involved.

The particular focus I want to take is on citizen science projects: large-scale scientific efforts where people are interested in crowdsourcing science, if you will. On capitalizing on the large cognitive surplus that Yochai Benkler talks about and that Trebor Scholz has pointed to, a technological surplus, what we might call a geographical surplus. The fact is that we are all over in places scientists can't necessarily be, and we may be able to take advantage of this to engage in projects of variously labeled public science, participatory science, citizen science, or participatory sensing.

This is the site where I want to try to think about DIY citizenship, because these projects are frequently invested in rhetoric of participation that is very similar to what we're talking about.

There are two lenses I want to try to adopt when I'm talking about DIY citizenship and citizen science projects. One is a relationship between science and citizenship: the extent to which one's position on science and one's position on different kinds of scientific work is embedded within what it means to be a citizen, and what it means to be a participant in state processes.

Conversely, I also want to focus a little bit on the questions of scientific governance. That is, on what Tim Mitchell has called the "rule of experts," the ways in which certain kinds of technoscientific processes embed themselves within the tools of statehood and the tools of everyday regulation.

I want to do this by exploring three main themes. I think it's three; it might be four. I'm still slightly uncertain as to how to count them, but for the moment I'm going to pretend there are three. We'll collectively decide afterwards—as public science—how many of them I've done.

One is thinking about the practice of citizenship in and through different forms of scientific engagement. Another is the issue of contests of expertise that arise in the relationship between people and the scientific state. And then the last one is the embedding of particular kinds of DIY within capitalist production and consumption.

Thinking about citizenship sent me off looking at some of the literature on citizenship, in which I am absolutely not an expert. But certainly from some of the stuff that I was looking at, and that has been influential in work on public understanding of science and the state, scholars of citizenship have identified a series of criteria that are at work in the notion of citizenship.

So, the first one here is a categorical criterion, identifying citizens as members of a polity who are subject to law, subject to its particular regime of control. At the same time, a contingent criterion, which is really a formulation of citizenship as something available to those persons who are competent to govern. So, in a democratic state there's a notion that a competence to govern is one of the conditions upon citizenship.

I find these interesting and resonant when we think about forms of scientific citizenship or technoscientific citizenship: when we think about the kinds of pictures of citizenship that get embedded within a lot of DIY technoscientific production. First, it raises the question, particularly with respect to the categorical criterion, about what kinds of laws you want to be subject to, and what kinds of laws and systems of regulation are being attested to by a model of citizenship that's grounded in technoscientific performance and technoscientific inclusion.

Second, if the contingent criterion from the citizenship studies focuses upon those people who are competent to govern, then there's clearly also a competence question that underlies a notion of DIY citizenship. If your citizenship depends upon your competence to govern, then your "DIY citizenship" depends in some ways on your technological competence, which may be distributed differently than the competence to govern, but is certainly not necessarily evenly distributed in society.

I think it's important to try to focus, when we link DIY to citizenship, on the ways in which things might come across from the notion of citizenship, and be reshaped by a commitment to technoscientific production.

If we do so, then, we encounter a series of questions about who and how technologies include, and who and how technologies exclude. There's a sense in which one of the particularly vibrant notions bound up in the concept of DIY citizenship is the opportunity for a form of participation that might not be available to people otherwise. And yet that participation is itself subject to a certain kind of familiarity with, and indeed a commitment towards, a notion of technoscience. So, it's not just about what you can build, but it's also about what kind

of models of experimentation, of empiricism, of representation and modeling you buy in to.

There's certainly a notion, then, of participation and inclusion, but at the same time there is one of exclusion. We always have to be conscious of that. We're shifting balances, but we're shifting them and we need to recognize things about where we've shifted them from, where we've shifted them to, what kinds of conditions, shape and participation in these kinds of worlds, whether that's technological competence, technological access, or scientific literacy.

I'm primarily concerned about the commitment to particularly scientific forms of understanding, and particularly technological models of intervention and progress—a form of technofetishism, if you like.

It's clear that we live in a world of technoscientific governance, and part of the emergence of this right-wing contemporary neoliberal state, is one that depends upon a vast infrastructure of science. A vast infrastructure of scientific monitoring, management, regulation, prediction, and that any kind of notion of what it means to participate involves to a certain extent, if not a complicity with that, then certainly an acknowledgement and engagement with that. With the systems of expertise that are invoked by the state, with the systems of evidence and evidentiary reasoning that attend to it as well—this is also beginning to speak perhaps to the issue of contest of representation and expertise. And these things, of course, occur not solely at a national level but supranationally as well. The emergence of large-scale organizations – whether it's the International Monetary Fund or WIPO or whoever – are also driven by the same kinds of commitments.

And so, my point here, of course, is that at the same time as thinking about the opportunities for a form of DIY citizenship to destabilize and to extend right to a new set of people, we have to recognize the ways in which they're building upon a series of commitments that the infrastructure has already made.

So, there are several different readings of citizen science at work here. Many projects – environmental monitoring, birding, and so forth – claim a basis in a form of bottom-up science that incorporates people into the scientific process rather than removing it from a scientific governmental elite. And yet at the same time, we can talk about it in terms of those expropriations of labor that don't actually involve people in a scientific process terribly much: what Jason Corburn has called "citizen sensors" rather than citizen scientists.

At the same time, it's grounded a great deal on what in the literature on the public understanding of science has often called the "deficit" model. The deficit model identifies the public, essentially, as failing to understand a variety of important (scientific) topics. And the goal of public understanding of science is to educate them about that, to fill in those gaps, because then they will understand what we're trying to do. If only people knew, then they would be in a position to act differently, support emerging policies, or whatever.

And actually, even in my discipline of human-computer interaction, we find frequent manifestations of this same approach: this idea that, if I can inform somebody about, for instance, the carbon footprint of their travel patterns, then they will be in a position to make all sorts of different decisions about how they live their lives, which equally builds upon this deficit model. An example I want to draw upon is one that Brian Wynne uses in his work on the public understanding of science: the consequences in the mid-1980s for Cumbrian sheep farmers and for government scientists, of tussles that they had over the appropriate response to radioactive fallout from the explosion at Chernobyl.

The Chernobyl explosion was in late April of 1986. And a lot of rain fell in Britain – well, a lot of rain falls in Britain anyway. But a lot of rain fell in Britain in May 1986 that carried with it radioactive cesium, causing the government to need to try to figure out something they were going to do.

And for a long time they did nothing at all, and said nothing. And then after a while they decided that there was pollution that was dangerous, and particularly they wanted to be very careful about it entering the agricultural system. And there would have to be in Cumbria certain exclusions and zones where sheep wouldn't graze, and the rest of it. But they wouldn't have to last very long.

Three weeks later, they changed their mind entirely and said that there actually wasn't terribly much pollution at all; but where there was, there was a great deal of it – and the exclusions were going to have to last much, much longer.

The sheep farmers in Cumbria were deeply suspicious of this entire process for all sorts of reasons, not least, of course, the fact that if you look at the government reports, that it would appear that all the radioactive cesium from Chernobyl had all fallen within a small radius of the Sellafield nuclear fuel reprocessing plant operated by British Nuclear Fuels. The sheep farmers had been unhappy about the nuclear activities there for decades.

If you look at Wynne's work, what you can see playing out over a long period of time is essentially a breakdown that is based on the fact that the scientists know a great deal about cesium, but the farmers know a good deal about sheep. And so what the issue turns out to be, is that the models that the scientists are applying don't follow very well for the actual soil types and the grazing patterns of the sheep.

But perhaps more problematic, is the kind of failings of expertise that were associated with the sorts of predictions that the government scientists would make; and then their sudden turnabouts and recantations of their own kinds of predictions.

So, after a while, instead of operating from Whitehall and issuing these edicts that were not getting them terribly far in the north of England, people were sent off to actually take field samples as opposed to just predict things on the basis of weather models, and actually take soil samples rather than just presuming what kind of soil was there. Sadly, this only served to undermine the scientific expertise even more, as the farmers watched these people slipping down muddy fields, and penning up sheep in ways that they would never actually normally be penned up by isolating them from the rest of the populations, and so forth.

So, I think there are two things that I really want to point to here. One is that the very encounter between scientists and citizens was the point at which the credibility of government science and public science was being undermined. This wasn't a deficit model. This is actually a case where citizens —in this case the farmers—knew more about how it was the measurements were

being taken and how science was being conducted. The fact that when you measure the same thing three times in a row you get radically different numbers and you just have to decide which one is the best, it was actually this very engagement that undermines the credibility of the scientists' work.

And at the same time, the kinds of models the scientists brought systematically excluded the forms of expertise that were available on the ground through the farmers. Expertise about sheep was somehow not part of the equation.

And so, what I think we often find is – and indeed, much of these kinds of things that the sheep farmers knew about the sheep, about their grazing patterns – about the fact that these farms don't, for instance, have fences, and so one farmer's sheep don't just graze on his own land, and so forth. These are things that disappear in the kind of mathematical modeling that's necessary to any form of reasonable scientific reduction. In order to get the work done, you have to come up with these mathematical approximations; and yet it was exactly that, that were these sites of contest.

So, now when I point to the encounter – and I mean the very physical and material encounter between the scientists and citizens as one of the sites that undermines legitimacy of technoscientific reasoning – that may well be a good thing if it engenders an appropriate mutual conversation and mutual engagement.

But certainly it's an interesting case with which to think about some of the problems of the encounters that we see in civic science, or in citizen science. It points to the problems in those kinds of encounters between citizenship and science, of the power structures of science: not only the power structures that govern everyday science, but also the power structures that locate science within a policy discourse.

It's these kinds of projects, I think, which are frequently engaged in the production of scientific subjects, or they frequently are the sites of the production of scientific subjects. I mean that in three senses: the production of scientific topics that we all recognize, the production of individuals as people to recognizing them as subjects of certain kinds of science, and similarly the production of the kinds of science to which we are all subject as citizens in particular kinds of regimes.

The question is, then, to what extent any kind of engagement with the power structures is the basis of these kinds of citizen sensor projects. I should point out that I'm not simply trying to throw stones here. This is something that my own discipline is doing: last week I was at the program committee meeting for one of the major conferences in my area, and one raft of papers that were submitted for review were ones that were all about the use of Mechanical Turk as a means for testing and evaluating user interfaces.

So, I want to move towards wrapping up. The last of the points I want to quickly make – thinking about DIY and citizens and thinking about – in particular about the often countercultural and transgressive reading of DIY – that arguably it's actually really hard to think of something that is perhaps more commercialized and more commoditized than DIY. Fiona Allon at the University of Sydney has a useful book called *Renovation Nation* which includes an entire ethnographic study of Bunnings Warehouse, which is the Australian equivalent of Home Depot: I was reminded again of Irvine

"Choose life. Choose a job. Choose a career. Choose a family. Choose a fucking big television, Choose washing machines, cars, compact disc players, and electrical tin can openers. Choose good health, low cholesterol and dental insurance. Choose fixed-interest mortgage repayments. Choose a starter home. Choose your friends. Choose leisure wear and matching luggage. Choose a three piece suite on hire purchase in a range of fucking fabrics. Choose DIY and wondering who the fuck you are on a Sunday morning. Choose sitting on that couch watching mind-numbing spirit-crushing game shows, stuffing fucking junk food into your mouth. Choose rotting away at the end of it all, pissing your last in a miserable home, nothing more than an embarrassment to the selfish, fucked-up brats you have spawned to replace yourself. Choose your future. Choose life…"

→ Irvine Welsh, *Trainspotting* (1996)

Welsh's quote, where DIY becomes this iconic emblem of nonreflective middle class complacency.

The important thing here is, I think, to try to draw lessons from other sorts of forms of media studies, about much more complicated relations between production and consumption, which are at work; and to be very wary, perhaps, of the rhetoric of resistance when it's embedded within some large-scale system of commercial exchange. But I think there are actually opportunities here, because this does point us towards the way that consumption doesn't necessarily look like a simple middle class complacency, and at the same time production isn't necessarily as transgressive as it might be.

So, to close, I want to point towards two challenges. So, the first is how we might move beyond the deficit model as I have outlined it. To what extent are we able to engage the forces of DIY citizenship in the kinds of projects that we're doing, to focus on alternative epistemologies, on different models that aren't actually the same as the models that the technology was necessarily itself invested in. I actually think that Natalie Jeremijenko's work is a great exemplar of trying to incorporate a much more diverse kind of idea about the forms and epistemologies at work in the encounters of people and technology.

At the same time, the question is, can we make use of the kinds of things we talk about in the DIY citizenship context to question some of the representational reductions that are at work? Clearly, making those representational reductions—it's part of writing computer programs. It's part of building systems. It's part of what we all do. But I think it's important that we try to do it in a conscious and reflective kind of way.

And so if our focus is on making, then the other set of challenges is to be appropriately reflective about what it is we're making. Certainly, many of the projects we hear about are focused on making interventions. But at the same time we're also engaged, I think, in making publics, and I mean publics in a Michael Warner sense, of an imaginative relationship on the part of the recipient of a media object. Our recognition of the ways in which these different kinds of projects and technologies are aimed at people like me, and therefore might write the connection that I build to, who those imagined people like me, might be, through the technology, I think is an important thing to focus on.

And then finally, as well as making publics, also making infrastructures, drawing on Geof Bowker and Leigh Star's work. The idea of the infrastructure as embedded in a system of practice, and what is being produced with the technology—and it is frequently the technology that we celebrate—is actually a system of practice of encountering the world through and with that technology, of creating different kinds of positions around that technology. And that is actually where we need perhaps to focus our attention.

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