Citizen Science and Social Responsibility

Alexander Christian   Christian J. Feldbacher-Escamilla

Spring 2019

Project Information

Publication(s):

- Christian, Alexander and Feldbacher-Escamilla, Christian J. (submitted). "Citizen Science and the Social Responsibility of Science". In: *manuscript*.

Talk(s):

- Christian, Alexander and Feldbacher-Escamilla, Christian J. (2019-06-06/2019-06-07). *Citizen Science and Social Responsibilities of Scientists*. Conference. Presentation (contributed). Citizen Science: New epistemoogical, ethical and political challenges. Université Jean-Moulin: IDEX.

Introduction

Philosophers of science as well as scholars in science and technology studies increasingly focus on the participation of laypersons in research processes.

This is sometimes also described as citizen science and participatory science.

In this talk we want to focus on the interaction scientists/laymen with respect to social responsibility.

We argue that . . .

- on an individual level ↑interaction ⇒ ↑awareness of social responsibility
- and that via institutionalisation this phenomenon can be aligned with social responsibility on the social level as discussed, e.g., in approaches of well-ordered science.

Contents

Social Responsibility Through Contact

Motives of Scientists

What motivates scientists to do research?

Science studies repeatedly mention 4/5 motives.

So, e.g., James G. Crowther, an early pioneer of science studies summarises:
> "The personal motives that direct scientists to engage in research are of at least five sorts. The one which is best known, and most frequently announced by scientists themselves, is *curiosity*, or the desire for understanding for its own sake. Another very powerful and general motive is the desire for *reputation*. A third is the need to *earn a living*. A fourth is the desire to *enjoy oneself*. A fifth is the desire to *serve humanity*." (Crowther 1941, p.511)

Roughly: ❓ *curiosity*, ♘ *reputation*, 💰 *money*, 👥 *public interest*

These are also motives investigated in quantitative STS (cf. Bignon 2016).

Our focus: acting in the interest of the general public 👥

Example: Case of Contact

In the 1930s, sociologists studied the daily routine of long-term unemployed.

⇒ Marienthal case:

© Hans Zeisel, 1931

- Marienthal, village in Austria
- 1931: shutdown of local company
- ⇒ most residents became unemployed
- Study of Jahoda, Lazarsfeld, and Zeisel (1933/1975): socio-psychological effects of long-term unemployment investigated via participatory observation
- Undermined common assumption: long-term unemployment does not result in revolutionary tendencies (rather in resignation)

Scientists realised dire need of help by psychologists and social-workers.

Empirical sociology ⇒ identification of psychological research questions

Analysis: Axiological Feedback Loop

In the paper we list several such cases.

A common pattern of these cases:

- Scientists put forward a research agenda
- They do field work ⇒ close contact with laymen
- Interaction ⇒ re-setting/putting forward new agenda

Feedback with research process

We distinguish two forms of feedback loops:

epistemic   vs.   axiological

Epistemic: about epistemic elements of the research agenda (methods, etc.)
Axiological: about the formulation of research questions themselves

Analysis: Features of Axiological Feedback

This kind of axiological feedback loop has the following characteristics:

- Micro: Feedback happens on a *micro*-sociological level of individual interaction (differs from macro-level deliberation of research agendas).
- Unintended: Such feedback is typically unintended, i.e. not part of the researchers' agenda.
- Implicit: Such feedback is not governed by explicit rules of agenda setting.

These axiological feedback loops are micro-level processes that are implicit, i.e. without particular rules for agenda setting, and unintended.

They lead to a focus of scientific motivation towards 👥 *public interest*.

These are cases of increased social responsibility of scientists via "contact".

Well-Ordered Science and Social Responsibility

Social Responsibility of Science: General Principles

It is universally recognised that social responsibility of science consists at least in (see inter alia Shamoo and Resnik 2015, pp.283-302):

- Benefits: Science should aim at providing benefits.
- No Harm: Science should aim at prohibiting harm.

Example for social responsible research: medical research about emerging infectious diseases/risk assessment

Example for irresponsible research: biased research agendas

10/90 gap

Social Responsibility of Science: Kitcher's Approach

Philip Kitcher addresses the question of social responsibility of science with his approach of well-ordered science (cf. 1993, 2001, 2011).

The approach aligns with:

- Pragmatism: Scientific endeavours are thoroughly influenced by societal interests.
- Objectivism/Scientific Realism: Still, science can ultimately provide us with true descriptions.
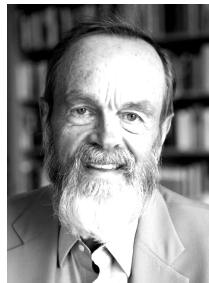
Well-ordered science seeks . . .

- . . . to represent justified interests in our society,
- . . . to answer research questions which are chosen in accordance with societies informational demands,
- . . . to be able to safeguard the epistemic integrity of research processes by ensuring the procedural and productive objectivity of science.

Well-Ordered Science: Science & Democracy

Rough deliberative procedural model of well-ordered science:

1. Interchange between scientists and laymen, representing diverse groups in a society, where scientists inform about possible aims, methods, and risks, and laymen communicate their preferences. The first step is preparatory for overcoming the epistemic divide.

2. Formulation of an unordered list of informed preferences.

3. All participants of the deliberative process vote on the preference list.

⇒ Resulting list represents the research agenda of well-ordered science

Well-Ordered Science: Features

The deliberative model covers three important scenarios

1. Agenda-setting in order to represent societies' interests in long-term research planning ⇒ public forum
2. Risk assessment under pressure ⇒ closed forum
3. Certification of knowledge ⇒ semi-public and public forum

In all these scenarios well-ordered science is an ...

- intended result on a
- macro-sociological level (public or a semi-public forum), which is based on
- explicit rules of interaction via deliberation between scientists and laypersons.

Well-Ordered Science and SR trough Contact

Observe:

- First part on social responsibility via "contact": axiological feedback:

  micro   implicit   unintended

- This part on social responsibility via "well-ordered" deliberation:

  macro   explicit   intended

In the final part: Recent tendencies to institutionalise the interaction between scientists and laypersons align axiological feedback loops with the approach of well-ordered science.

Institutionalisation

Responsible Research and Innovation

Impact on science's axiology by public engagement is more and more demanded/regulated via responsible research and innovation (RRI).

Characteristics of RRI:

> RRI is a means to "focus research and innovation on societal challenges" by involving all relevant stakeholders in the research and innovation process, allowing for influence of scientific values and visions, providing particularly relevant risk assessment, and framing responsibility in collective terms (cf. Smallman 2018, p.244).

Forerunners of RRI (cf. Smallman 2018, pp.242ff):

- *Deficit model*: Reservations of public towards science should be overcome by informing and educating public through science 👥 ← ✈
- *Dialogue model*: E.g. US and EU adopted *Participatory Technology Assessment (PTA)* policy 👥 ⇄ ✈

RRI: Example

Particularly in recent EU science policy, RRI plays an important role.

This can be observed, e.g., when considering policy statements:

> "Public engagement (PE) in *Responsible Research and Innovation (RRI)* is about co-creating the future with citizens and civil society organisations, and also bringing on board the widest possible diversity of actors that would not normally interact with each other, on matters of science and technology." [...]
>
> "Ideally this *engagement would be embedded in the research design and process from an early stage, and in an iterative fashion,* so that the learnings can contribute to enriching the process and outcomes (citizen science actions could also fall under this category)." (cf. European Commission 2019, our emphasis)

... iterative fashion ≈ feedback (🔁)

The EU also funds projects which aim at working out methods of RRI. (E.g., RRI tools and, more recently, CIMULACT.)

RRI, Citizen Science, and Institutionalisation

RRI is sometimes also considered to be synonymous with a particular notion of *Citizen Science*.

Citizen Science (CS):

- Contributory CS: Citizens are asked to participate in scientific data collection
- Participatory CS: Interaction between science and the public where citizens are particularly asked to contribute to the process of agenda-setting and to widen the societal perspectives of science (cf. Smallman 2018, p.249)

Institutionalisation: axiological feedback loop $\Rightarrow$ participatory CS

A note aside: Smallman (2018) even distinguishes US notion of CS (contributory) and EU notion of CS (participatory).

Institutionalisation and Well-Ordered Science

Given this form of institutionalisation, one can observe:

$$\text{Axiological Feedback} \quad \underset{\text{Institutionalisation}}{\Rightarrow} \quad \text{Well-Ordered Science Deliberation}$$

Institutionalisation happens at a meso-/macro-level, is more or less explicit (e.g. as a funding requirement), and intentional ("early stage").

Axiological Feedback Loop:

micro	implicit	unintended

Institutionalisation:

±micro/macro	±implicit/explicit	±intended

Well-Ordered Science Deliberation:

macro	explicit	intended

Summary

- We briefly characterised motivators in science $\Rightarrow$ public interest
- There is a phenomenon which occurs in course of interaction science/laymen $\Rightarrow$ axiological feedback
- Axiological feedback loops generate awareness $\Rightarrow$ social responsibility
- They are micro-implicit-unintended
- We discussed an influential approach on science and social responsibility $\Rightarrow$ well-ordered science
- Well-ordered science is macro-explicit-intended
- Institutionalisation of axiological feedback loops aligns these loops with well-ordered science.

References I

Bignon, Isabel (2016). "Scientists, Engineers, or Both? Motives and Preferences of Technical Professionals in Today's Scientific R&D Organizations". PhD thesis. Washington, DC: George Washington University.

Christian, Alexander and Feldbacher-Escamilla, Christian J. (submitted). "Citizen Science and the Social Responsibility of Science". In: *manuscript.*

Cochrane, Archibald L. (1989). *One Man's Medicine. An autobiography of Professor Archie Cochrane.* with Max Blythe. British Medical Journal.

Crowther, James G. (1941). *The Social Relations of Science.* New York: The Macmillan Company.

European Commission (2019). *Public Engagement in Responsible Research and Innovation.* URL: https://ec.europa.eu/programmes/horizon2020/en/h2020-section/public-engagement-responsible-research-and-innovation.pdf.

Galiay, Philippe (2016). *Open Science, Citizen Science, Responsible Research and Innovation.* Tech. rep. Berlin: Citizen et al. URL: https://ecsa.citizen-science.net/sites/default/files/galiay_philippe_-_open_science_citizen_science_and_responsible_research_and_innovation.pdf.

Jahoda, Marie, Lazarsfeld, Paul F., and Zeisel, Hans (1933/1975). *Die Arbeitslosen von Marienthal: Ein soziographischer Versuch über die Wirkungen langandauernder Arbeitslosigkeit.* Frankfurt am Main: Surkamp.

Kitcher, Philip (1993). *The Advancement of Science. Science without Legend, Objectivity without Illusions.* New York: Oxford University Press.

References II

Kitcher, Philip (2001). *Science, Truth, and Democracy*. Oxford: Oxford University Press. DOI: 10.1093/0195145836.001.0001.

— (2011). *Science in a Democratic Society*. Amherst: Prometheus Books.

Lewenstein, Bruce V. (2004). "What does Citizen Science Accomplish?" eCommons of Cornell University. URL: https://hdl.handle.net/1813/37362.

Mehlhorn, Heinz, ed. (2012). *Arthropods as Vectors of Emerging Diseases*. Berlin: Springer. DOI: 10.1007/978-3-642-28842-5.

Shamoo, Adil E. and Resnik, David B. (2015). *Responsible Conduct of Research*. Third Edition. Oxford: Oxford University Press.

Smallman, Melanie (2018). "Citizen Science and Responsible Research and Innovation". In: *Citizen Science: Innovation in Open Science, Society and Policy*. Ed. by Hecker, Susanne, Haklay, Muki, Bowser, Anne, Makuch, Zen, Vogel, Johannes, and Bonn, Aletta. London: UCL Press, pp. 241–253. DOI: 10.2307/j.ctv550cf2.24.

Appendix: Three Types of Citizen Science

"The terms "citizen science" and "citizen scientist" have at least three meanings: (1) the participation of nonscientists in the process of gathering data according to specific scientific protocols and in the process of using and interpreting that data; (2) the engagement of nonscientists in true decision-making about policy issues that have technical or scientific components; and (3) the engagement of research scientists in the democratic and policy process." (Lewenstein 2004, p.1)

Graduality, depending on the degree of agency, between being a human research subject and being a citizen scientist.

Appendix: Additional Examples for Axiological Feedback Loops

Parasitological field research about the application of parasiticides (Mehlhorn 2012):

- epistemic feedback loop: change in research design (video-tutorial about application of parasiticides, establishing contact with village elders etc.)
- axiological feedback loop: new questions from city planning and civil engineering (improvements in village planning and sanitary installations etc.)

Epidemiological research about lung-damages due to contact with coal dust (Cochrane 1989):

- epistemic feedback loop: change in research design (change in study schedules, comparative investigation of multiple industrial sites, establishing contact with workers in order to increase willingness to participate in study, shift to meta-analytical methods etc.)

Appendix: Two Comments on Feedback Loops

1. **Epistemic feedback loops** seem to be **more common**, in particular in field research.

2. **Gathering data about feedback loops complicated**, since authors generally argue for the reliability of citizen science and do not focus on the unintended dynamics between scientists and laypersons.

Appendix: Increased Moral Awareness

> *"It was also in this period [1948-1950, authors] that I had the opportunity to get to know some of the miners and to admire their curious combination of earnestness and humor. Pneumoconiosis, which affected so many of their lives, was indeed a problem worth solving."* (Cochrane 1989, p.185)

Meta-ethical analysis: Immediate contact with moral problems or suffering individuals is a **stronger motivator**, compared to internalised abstract norms (cf. debate about **moral fetishism**).

Appendix: Horizon 2020 & RRI

"[The main aim is]: To build effective cooperation between science and society, to recruit new talent for science, and to pair scientific excellence with social awareness and responsibility. [. . .] Beyond data collection and offering services to scientists, **Citizen Science can extend to upstream agenda setting**, education to science, popularisation of science, etc." (Galiay 2016, presented at a meeting of the European Citizen Science Association (ECSA), our emphasis)