



TWENTY YEARS OF SCIENCE COMMUNICATION: LOOKING BACK,
LOOKING FORWARD

What is “science communication”?

Bruce V. Lewenstein

Abstract

The field of science communication goes by many names. This commentary explores the tensions between plain “science communication” and the more specific “public communication of science and technology”. The commentary argues that science communication is not just one thing — and that’s okay.

Keywords

Popularization of science and technology; Public engagement with science and technology; Science communication: theory and models

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I’m honored to be asked to reflect on the last 20 years of science communication. However, to be honest, the full title of the journal where this commentary appears (*Journal of Science Communication*) doesn’t always seem correct to me.

I take our field of interest to be “public communication of science and technology” (PCST). “Science communication,” to me, includes professional communication among scientists, so it includes journal publications, issues associated with peer review and open access, conference presentations, writing good abstracts, and so on. PCST is specifically about *public* communication of science and technology.

On the other hand, my preference also has challenges. My own research argues that the overall science communication system is not linear [Lewenstein, 1995b, 2011]. The idealized linear model of “work in the lab/field, followed by formal peer-reviewed publication, followed by public dissemination of reliable scientific information” [Garvey, 1979] describes only a small part of the overall science communication ecosystem. As scientists talk about their work in various settings (meetings, nature center presentations, media stories, *cafés scientifique*, TV documentaries, science fiction novels), they include not just fully-established, peer-reviewed results, but also their emerging ideas, insights into their work processes, arguments that they’re having trouble getting accepted by their scientific colleagues, and so on [Kirby, 2011; Gregory, 2005]. Scientists themselves sometimes

learn of new research through public communication [Lewenstein, 1995a; Clemens, 1986]. Perhaps most importantly, the process of making popular science articles, films, and other examples of PCST can itself produce new scientific knowledge [Myers, 1990; Lewenstein & Allison-Bunnell, 2000].

Although in the previous paragraph I implicitly criticized the linear model of scientific knowledge production, the work by psychologist William Garvey and colleagues that lays out that model in greatest detail also identifies the key point I want to make: it is collected in a volume titled *Communication: The Essence of Science* [Garvey, 1979]. That, ultimately, is the point: reliable knowledge about the natural world¹ does not appear fully formed, but rather is the product of a complex communication process that requires public engagement, precisely because it is through that *public* process that ideas are tested, challenged, revised, and ultimately accepted by communities (of scientists, of policymakers, of patients, and of citizens) as sufficiently reliable to be the basis for individual and collective decisions. The British physicist John Ziman, one of the early supporters of the research field that we celebrate with these commentaries, made this argument in his books *Public Knowledge* [1968] and *Reliable Knowledge* [1978].

So while I sometimes bristle at labeling our work *#scicomm* rather than *#PCST* (a label that hardly appears on social media outside references to the International Network of Public Communication and Science Technology), I admit that the broader term has both won in the marketplace of academic jargon *and* that the broader term is in fact a better description of what we seek to achieve and to study.

Which leads to my second point: the complex relationship between what we seek “to achieve” and what we seek “to study.” Science communication is both a field of action and a field of study. Many of us are in this field because we want more people to have access to the kind of reliable knowledge that science² produces, believing that access will lead to a better world. So, we work in museums, science centers, news outlets, media producers, community groups, public information offices, and so on, seeking to improve public engagement with science. But as we do so, we notice contradictions or complexities: When science serves institutional interests (such as the needs of pharma companies or government agencies), is “science” always “good”? When science (as a body of knowledge) is incomplete or uncertain, what kinds of public responses are reasonable? When scientific knowledge has been produced by different methods (such as observational meteorology vs. climate modeling), how should publics engage with disagreements? These kinds of questions lead to the “study” part of science communication.

¹Using “natural world” is itself a shorthand; we’re interested in reliable knowledge about the natural, constructed, social, and even virtual worlds — public communication of science, technology, medicine, society, and cyberspace. We should also notice the limitations of individual languages: When Prof. Peter Weingart submitted to a related journal, *Public Understanding of Science*, an article about public communication of history, I asked why he submitted to a “science” journal. The problem, he said, was that I was thinking in English. In German, *Wissenschaft* covers all knowledge.

²“Science” is also a complex term. It can mean science as a body of knowledge, science as a process (both the idealized hypothetico-deductive method and the actual messy complex social process), and science as a set of institutions (universities, research institutes, government agencies, etc.). Much more work needs to be done sorting out these different meanings and their interaction with public communication.

These questions lead to some of the tensions that so much research (including many articles in *JCOM*) has addressed in exciting ways. For example, some research focuses on how to better explain science and technology or build public engagement activities, while other analyses focus on interactions of science and society. Even among the actors and scholars who look at society, some highlight the benefits that science and technology bring (new medicines, more energy-efficient materials and ways of generating energy, solutions to pollution, etc.), while others point to the ways that science and technology are implicated in the production of pollution itself, in corporate control of food systems, in support of defense industries, and so on. And we are just now beginning to see scholarship addressing issues of deep social conflict, such as racism, colonialism, and other aspects of social and structural power.

These reflections suggest that “science communication” is not one thing, and that not everyone in it has the same goals. That’s okay. In my ideal world, science communication would be about *all* of those things. I believe the way to achieve that ideal world is to focus on the processes of science — not an idealized “pure science,” not the idealized “hypothetico-deductive method,” not the philosophically-limited “falsification” — but on the complex mix of social processes, logical processes, access to materials and resources, historical accidents, financial support, networks of connections among people and institutions, etc., that together, collectively, produce reliable knowledge. If more people understand the complexity of the “process,” then they get insight into uncertainties, Eureka! moments, dead ends, slogging through data with attention to details, mistakes, growing confidence in results, differences between scientific precision and engineering success, and so on.

As many articles in this journal have suggested, if science communication shows these complexities, then that would help combat misinformation. More people would understand why science doesn’t speak with one voice, why scientists disagree yet are moving toward more reliable knowledge, why scientists sometimes contradict themselves, why “science” isn’t just one thing, especially when we start talking about the applications of science and technology.

A journal like *JCOM* is crucial for moving toward my ideal world. We see this in its commitment to open access (thus making its articles available to practitioners as well as scholars, and to people in countries other than the well-resourced countries of Europe and North America), in its commitment to a global reach (such as its allied journal, *JCOM-America Latina*), in its publication of articles opening up new areas of research (such as the recent collection on “neglected spaces” [Wilkinson, 2021]).

I look forward to the next 20 years of provocative and probing research on the full range of activities that comprise “science communication” (including perhaps more on the interactions of communication “within” science and more public communication), as well as articles helping to bridge the ideas of practitioners and scholars.

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