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Public Science in a Wired World: How Online Media Are Shaping Science Communication

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It turns out that a special issue is as much of a social construction as any other scientific text.[1] A special issue—like a textbook, or an edited collection, or indeed a single article—holds out the promise of being complete and definitive. It suggests to the world that we, the editors and authors, are experts, and that we now tell to you the story of this field. In this case, we tell you the story of science communication online.

Of course, this is an impossible task. We make no claims to definitiveness with this collection. Our experiences over the last year as we have solicited and reviewed manuscripts have taught us how wide and diverse research into science communication in digital spaces is, as well as how haphazard any such collection of articles must be. The articles that follow provide insight into how science communication researchers are investigating public science online, but they tell just one story of the many that are possible. This story is shaped by contingencies of geography (most submissions came from, and studied, the global north) and discipline (a relatively narrow range of disciplines and approaches are represented), as well as accidents of timing (what research was being done, at what stage, at a particular moment). Just as a textbook account of science requires placing uncertainty, controversy, and contingency in parentheses (Hilgartner, 1990), a special issue renders invisible all the articles and approaches that almost made it.

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The interest we have received makes it clear that this is a burgeoning area for science communication scholarship. (This is not surprising, given that the use of social media by scientists is becoming more popular, especially on commonly used platforms such as Facebook and Twitter; Collins, Shiffman, & Rock, 2016.) More than 30 articles were submitted; at least some of these are still wending their way through the review process and will appear in later issues, while we also know of other related work currently underway in many parts of the world. Both the volume of submissions and the short turnaround between our submission deadline and this issue makes it even more important than usual to thank the editor of *Science Communication*, Susanna Priest, and the many reviewers who have been involved in assessing articles. In both cases individuals have worked to short deadlines, responded to our questions and confusions, and offered thoughtful and careful assessments that have greatly aided the process of compiling this issue. The articles we have gathered together offer insight into how our field is engaging with digital and social media, without (to say it again) providing a final verdict. Indeed, it is likely that definitiveness is simply not possible at this stage. It may still be the case that we have yet to figure out how to analyze these emerging phenomena in all their richness; certainly, many of the articles that follow are explicit in noting their limitations and the need for further research.

While we are hesitant to write an overarching story of research in this area, we can, however, discern some themes from the issue as a whole, themes that we think have some traction on contemporary scholarship. To summarize before elaborating further: technologies are not a panacea[2]; analysis of the masses of online data now available requires further conceptualization; and production and consumption of online content is complex.

A first key theme relates to the central tension between what is promised of (digital) technology and what happens in practice—a tension that relates to what Kling (2007) terms critical studies of computerization, in which one questions optimistic claims about technologies and examines actual practice. The articles that follow repeatedly interrogate new media's promise to open up science, enable dialogue, and create a digital public sphere of engagement and debate. As Mendel and Riesch note, a "loosely Habermasian public sphere and deliberative democracy" remain implicit goals for much science communication, whether on- or off-line. At least some involved in science communication have understood new media as a key opportunity for the development of such a public sphere, viewing the technology as almost inevitably opening up new kinds of engagement with science (Regenberg, 2010). And certainly there is potential for this to happen. What we repeatedly see, however, both within this special issue and in scholarship elsewhere (Peters, Dunwoody, Allgaier, Lo, & Brossard, 2014; Ritson, 2016), is that the situation is not as simple as digital

technology enabling multivocal discussions of science or even making science more widely accessible. Engagement cannot be taken for granted. Instead, there is frequently a reversion to well-established communication practices and hierarchies.

This is perhaps best demonstrated by Su et al.'s discussion of the use of Twitter in science public relations (PR). Both PR and science communication scholarship, they note, tend to take dialogue (the "two-way model") as a key aim, while social media practices are "innately interactive and dialogic." Public engagement and online media would seem to be a natural fit. In line with previous research (e.g., Lee & VanDyke, 2015), however, they found a primarily one-way, informational use of Twitter in their case study of tweets by the organizers of a U.S. science festival. Some three quarters of tweets were used for information dissemination, whether about the festival itself or the science it presented. At the same time, they did find that some tweets encouraged participation through volunteer opportunities and on-site experiences, or fostered a sense of community, such as by posting photos and videos of the events. Similarly, they identified a small increase in the proportion of such participation or community-oriented tweets over the course of the 4 years of their study. Their view is that "using social media and interactivity . . . may yield the greatest gains" for science communication; they also, however, note that *both* one-way and two-way forms of communication are important within science PR.

This point leads us to a second key theme. Our reading over the last year has encouraged us to view the use of digital media in science communication as an inherently complex phenomenon, and one that is proving hard to analyze. The rise of big data—from Twitter data sets to corpus analysis—offers unprecedented opportunities for researching science communication online, and many are taking up these opportunities with enthusiasm. But what counts may not always be readily counted: It can be easy, we have found throughout our reading, to report statistics without reflecting on the social processes that lie behind them. There is social, cultural, and psychological complexity in how people interact online (Vraga & Bode's analysis of the effects of "expert" interventions being an instance of the latter) and that complexity can be hard to capture and analyze.

For instance, we, sitting at home, may read and interpret a snarky Facebook post without even thinking about it, but how can we analyze a corpus of Facebook posts, and correctly locate the snark? Anderson and Huntington, in their examination of online discourse, focus on the topic of (in)civility and sarcasm, tones that are related to humor in their difficulty to pin down. That digital exchanges can be more uncivil and aggressive than face-to-face discussion or legacy media is a well-established concern (Turkle, 2015).

Anderson and Huntington find surprisingly low levels of both sarcasm and incivility in their study of tweets connected to a particular extreme weather event, though they do observe that "political topics drew out uncivil tones." Their analysis demonstrates some of the challenges of studying online discourse, and in particular complex forms of communication such as humor or sarcasm. If such exchanges are defined by "nonliteral language," how can we start to research the cultural contexts, communicative cues, and discursive norms that would help us to understand the use of such language?

We also find evidence of the complexity of the production and consumption of online content in the relative dearth of studies that focus on those moments of production and consumption rather than on the products themselves. Jia et al. explore the context of production by reporting on qualitative interviews with scientists who regularly engage in online science communication, examining the ways in which these scientist-communicators frame their use of social media. This gives access to some of the social complexity behind apparently straightforward products: In their sample of Chinese scientists (a community with its own specificities, as they explain), they find both a high degree of differentiation in social media use (with different platforms used for different purposes) and the coproduction of technology with social practices. New technologies offer certain affordances, but existing structures, such as social norms, institutional contexts, and political environments, also play a role in how public communication activities are articulated. In the same way, Vraga and Bode's experimental approach gestures toward the institutionally and culturally loaded ways in which consumers of tweets may respond to corrections of misinformation. It matters, in other words, who tweets and how trusted they are by different publics.

In reflecting on complexity it is fitting to mention the commentary piece included in this issue. Mendel and Riesch offer a refreshingly different perspective on the normative questions of what online science communication should look like and what we can hope for from it. Though they acknowledge the problems of incivility—and particularly the raced and gendered nature of much aggressive online discourse—they also want to move beyond debates over whether the web is living up to its potential for public engagement or not. They aim to provoke as much as to argue: "online spaces for engagement with science," they say, are "already broken in many ways. The question then becomes one of how they can be broken *better*." They suggest that this means moving beyond a model of online spaces of reasoned argument, in which "ideas of permissible discourse" tend to be defined by a limited set of already powerful groups (see also Davies, 2014; Elam & Bertilsson, 2003).Instead, they celebrate the spirit of carnival, the trickster, and the gadfly—playful and provocative acts that might be senseless or purely mischievous, but which

can "shak[e] things up, disrupt complacency, and reveal unimagined shortcomings." In this respect they return us to our first theme and to critical studies of computerization. If the central tension many of the articles in this issue point to is between what is promised of online science communication and the rather traditional forms it actually tends to take, Mendel and Riesch prompt us to question the promises themselves. What, they ask, might "radical science communication" look like?

We close with one further unanswerable question. Our theme is the mutual shaping of online media and contemporary science communication, and in the articles submitted we have read about a pleasingly wide range of online formats, from TED talks to blogs, Facebook pages, crowdfunded science, participatory campaigns, and tweets from many different kinds of actors. But, we might ask, given the complexity we have described, does it even make sense to consider these formats and platforms together? Certainly they are linked by the ways in which we access them: the familiar (to very many of us) combination of a body and a screen (whether in the form of a computer monitor, phone, tablet, or watchface). But that moment of consumption—smartphone browsing on the bus, brain breaks in the middle of writing e-mails—is exactly what seems particularly difficult to pinpoint and study. The question thus remains of the specificities of different online platforms, and what, if any, commonalities they have when it comes to consuming science. "Online science communication" remains a crude categorization—though one, as we think the articles that follow indicate, that is fascinating to study.

Notes

1. See, for instance, Latour and Woolgar (1986) and Montgomery (1996).
2. As discussed in Kling, Rosenbaum, and Sawyer (2005).

References

Collins, K., Shiffman, D., & Rock, J. (2016). How are scientists using social media in the workplace? *PLoS One*, *11*(10), e0162680. doi:10.1371/journal.pone.0162680

Davies, S. R. (2014). Knowing and loving: Public engagement beyond discourse. *Science & Technology Studies*, *27*(3): 90–110.

Elam, M., & Bertilsson, M. (2003). Consuming, engaging and confronting science. *European Journal of Social Theory*, *6*(2): 233–251.

Hilgartner, S. (1990). The dominant view of popularization: Conceptual problems, political uses. *Social Studies of Science*, *20*, 519-539.

Kling, R. (2007). What is social informatics and why does it matter? *Information Society*, *23*, 205-220.

Kling, R., Rosenbaum, H., & Sawyer, S. (2005). *Understanding and communicating social informatics: A framework for studying and teaching the human contexts of information and communication technologies*. Medford, NJ: Information Today.

Latour, B., & Woolgar, S. (1986). *Laboratory life: The construction of scientific facts*. Princeton, NJ: Princeton University Press.

Lee, N., M., & VanDyke, M. S. (2015). Set it and forget it: The one-way use of social media by government agencies communicating science. *Science Communication*, *37*(4), 533-541.

Montgomery, S. L. (1996). *The scientific voice*. New York, NY: Guildford Press.

Peters, H. P., Dunwoody, S., Allgaier, J., Lo, Y. Y., & Brossard, D. (2014). Public communication of science 2.0. *EMBO Reports*, *15*, 749-753.

Regenberg, A. C. (2010). Tweeting science and ethics: Social media as a tool for constructive public engagement. *American Journal of Bioethics*, *10*(5), 30-31.

Ritson, S. (2016). "Crackpots" and "active researchers": The controversy over links between arXiv and the scientific blogosphere. *Social Studies of Science*, *46*, 607-628.

Turkle, S. (2015). *Reclaiming conversation: The power of talk in a digital age*. New York, NY: Penguin.