Book Review Essay

Visible and invisible workings of science communication

F. van Dam, L. de Bakker, A.M. Dijkstra & E. A. Jensen (eds): Science Communication – an introduction, World Scientific, 2020; 250pp; £50

U. Felt & S. R. Davies (eds): Exploring Science Communication – a science and technology studies approach, Sage, 2020; 250pp; £35

E. Leßmöllmann, M. Dascal & T. Gloning (eds): Science Communication, De Gruyter, 2020; 720pp; €200

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John Durant, when he was founding editor of this journal over 25 years ago, questioned the assumptions underlying the movement from which this journal got its name. He proposed that science literacy for the public should be considered in three parts: literacy about the knowledge science has produced; literacy about how science works; and literacy about how science *really* works (Durant 1994). He was drawing attention to the difference between idealised science and real science, as John Ziman (2000) went on to unravel it.

Awareness of this difference and of its implications is a key part of the necessary literacy of the science communicator. As demand and opportunity for science communicators increase, so too do training and educational offerings. It might be useful to think about these offerings in terms of their contribution to understanding how science communication has evolved, how it works, and how it *really* works. For this third dimension we need tools and knowledge from as wide a repertoire as those needed to make sense of society and culture.

These three books all address students of science communication, including practitioners who may study the topic informally or formally as part of their professional activity. But they do so in different ways and with different conceptions of students' needs. As a further expression of the diversity in views and experiences that characterise science communication, these books arise from different country and cultural settings.

The countries which have the advantage of English, the *de facto* international language of science and science communication, as their native language, are weakly represented here both among editors and contributors. The first title, edited by van Dam and colleagues, grew out of a Dutch manual. Felt and Davies are an international team, though now working together in Vienna, and their contributors are from several European countries, Israel and US. Leßmöllmann and colleagues have assembled a mainly German group of writers, but also including contributors from ten other countries.

Van Dam and colleagues set out in very readable form how science communication has evolved and how it works. Felt and Davies present a set of concepts and theories of possible relevance to science communication and, with colleagues, apply these in case studies of how science communication *really* works. Leßmöllmann and colleagues present very diverse treatments of the history, the visible and invisible workings of science communication; there are analytical and methodological approaches that are rarely seen elaborated in relation to science communication.

Book publishing in the field of science communication is heavily populated by edited collections with relatively few sustained treatments of a particular aspect or view of science communication by a single author, or by two or more working seamlessly together. Some edited collections aim for a composite view of the state of knowledge in the field, some to

provide an introductory review of the field and current issues, and others to present a distinct perspective on its development. These three publications represent, approximately, one each of these options.

As new cohorts enter the science communication field, there is renewed demand for updated summaries of the dominant ideas and issues. In editing such a volume, there is a difficult balance to be struck between being concise and accessible, and being true to the complexities and uncertainties of the field. Van Dam et al's volume covers key topics in science communication and some closely related fields (environmental, health and risk communication) in convenient scope and in accessible form. The editors have given priority to being concise and the book might be described as offering a common-sense view of field. But it does not shy away from divergent opinions and challenging subjects; the first substantive chapter is devoted to philosophies of science, introducing Popper, Kuhn and Latour.

This chapter also treats briefly research integrity, post-normal science and Responsible Research and Innovation (RRI) but the actual workings of science, including publishing, peer review and professional paths, get little or no attention here or in other chapters. Karl Popper is prominent in the philosophy chapter, but his view of science as defined by falsification is let stand despite its critiques. By contrast, the equivalent chapter in Leßmöllmann et al asks provocatively, Is Karl Popper rightly the philosophical hero of practising scientists?, and answers is that Popper's falsificationism has itself been "falsified by a normative reconstruction of the history of science".

The Introduction book retains a distinctly Dutch flavour from its previous form, but with added international elements. A chapter on communication processes ranges widely over the history and theories of mass communication, contrasting a 70-year-old canonical model from Lasswell with a more complex and up-to-date one from Dutch scholar Frank Oomkes. However, the long-running discussion about models of science communication is only lightly touched on.

A chapter on science journalism covers news values in general but not their adaptation by Badenschier and Wormer (2012) to science journalism. The chapter's three-part typology of forms of science journalism appears very basic in comparison with the more sophisticated framework from Fahy and Nisbet (2011); this work is cited several times, though not its presentation of science journalism's current and emerging roles.

There is a lot of 'should' in this book, as the contributors advocate for their preferred approaches and practices. This affects strongly the concluding chapter on research in science communication, which highlights "tensions" and "the divide" between research and practice in the field, though without evidence that the relationship between the two is significantly different from, or worse than, in any comparable field.

Much of this chapter is devoted to general descriptions of social research methods and ethics; an extended case study of pseudoscience in South Africa is an awkward fit. There are various proposals about directions for and gaps in science communication research but not much guidance on the topics, strengths and main contributors of such research or on its present patterns.

Felt and Davies have each contributed valuably to science communication research over many years and here they make a detailed case for an approach to science communication that draws inspiration and conceptual tools from science and technology studies (STS). The editors' jointly written opening chapters set out a selective view of STS as it pertains to science communication, largely leaving out what STS says about, for example, science governance, innovation systems and technology assessment.

The STS they present owes much to the neighbouring fields of communication and cultural studies, with much talk here and in the case studies of tropes, narratives, discourses,

framings and performativity. The repertoire of such concepts is large and diverse, and reading the first part of the book is made more challenging by the well-known STS indulgence of neologisms and of newly minted plural forms. So, we have references to processuality, actant and projective (p55), also to becomings, presents (not gifts) and atmospheres, to add to the longer-established knowledges, assemblages and imaginaries. The idiom may be difficult but a core idea is clear and restated in the case studies: science communication generates or produces science (in society) more than it represents or translates science. Hence there are many references to generative, productive and constructive activities, where, for example, the last term refers to 'of construction', rather than the colloquial meaning of helfpul.

The editors propose a conversation between science communication research and STS and insist they are not being normative in bringing awareness of STS "sensitivities" to such a conversation. The case studies certainly help make their case; in their application to particular objects of study some of the analytical terms become clearer. These case studies cover types of topics not frequently found in science communication studies, and, indeed, might not be easily amenable to the modes of research more common in this field. The objects include an exhibit in a medical museum; interpretive centres in parks; visualisation of climate change in National Geographic; personal anecdotes within newspaper coverage of obesity. The case study authors pick and mix from the wider repertoire of approaches set out in the opening chapters, and, in various ways and to varying degrees, enrich the observation and analysis of the phenomena under scrutiny.

Leßmöllmann and over 40 colleagues make an analogous proposition in many of their chapters, drawing attention to linguistics-derived approaches to science communication research. As a corollary of this novelty, the well-established authors and authorities in this research field are under-represented among the contributors and even among the citations. This is true for the German-speaking world as much as for the international community, though Mike Schäfer, who spans both of these, is here and, alone from the United States, Sharon Dunwoody.

Science Communication is volume 17 in the publisher's series on communication science and reflecting the project's mainly German origins, the 'science' in 'science communication' and in 'communication science' spans the humanities and social sciences. So, when the science of science communication is invoked, as it is by Leßmöllmann, it refers to something more inclusive than the US version, which is heavily skewed towards quantitative analysis and more restrictive conditions of being scientific. In the version of communication science represented here, there is no reception analysis, no impacts studies or audience segmentation. There are, however, densely presented arguments for applying semiotics, rhetorics, speech communication, visual communication, discourse and terminological analysis to science communication. Some of this will be new and challenging to those specialising in the field but, as with the case made by Felt and Davies for STS-based approaches, they merit consideration.

The contribution of STS to understanding science communication is examined here by Hungarian researcher Gábor Zemplén who in appropriately reflexive mode draws attention to the plurality of approaches within STS and the "surprising speed of the conceptual and terminological innovations in the field". Zemplén also cites a view (from Ibarra & Mormann 2003) that "many STS writings have lost any sense for a well-controlled use of language. The half-lives of STS jargon and proposed reconceptualisations become shorter and shorter".

Also provocative is a chapter on philosophy of science which poses 22 questions, such as How reliable is scientific observation? What does "scientifically proven" really mean?, and answering each in a few hundred words.

Historical or "evolutionary" perspectives are strongly represented in this collection, in some chapters as the stated topic, but in many others as a preferred means of situating the

particular topic in the wider context. This is the case notably in a chapter on media studies, where the concept of medialisation is analysed critically, a chapter on communication models, which tracks how the succession of emergence and critique has produced increasingly complex models of science communication, and a chapter on the empirical evidence from analyses of science communication "through the lens of communication science".

The last-named of these chapters, by Schäfer and colleagues, is confidently presented and extensively referenced and is a potentially very valuable aid to those researching in the field. So too is the concluding chapter by Leßmöllmann on the present and future of science communication research. She somehow pulls together the disparate strands of the previous 30 chapters and presents a synthesised view of the research field. This includes an answer to the question raised earlier in this review about closing the gap between science communication practice and research. Leßmöllmann notes that this is the "the same gap between science and its transfer to laypeople or practitioners that other fields grapple with … Not every practical problem is examinable with scientific methods, and not every scientific outcome from science of science communication research can be translated into practical advice".

It may have seemed plausible a decade ago to think of science communication as an emerging discipline. But the field has grown in promiscuous manner and from these three books we have a picture of science communication intersecting with many other fields: science communication and its neighbours remain willingly inter- and multi-disciplinary.

References

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[i] As Reviews Editor for this journal, I realised that many of the possible candidates to review these books were potentially compromised by association with similar publications. Taking this on myself, I acknowledge my possible conflict of interest as co-editor of the *Routledge Handbook of Public Communication of Science and Technology* (Bucchi & Trench, 3rd edition, 2020), and a contributor to this and other such volumes. For full disclosure, this journal's editor, Hans Peter Peters, is also a contributor to such collections and is the editor of the World Scientific Series on Science Communication, in which the book edited by van Dam et al, and reviewed here, is the first in series.