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Comment

ROAD MAPS FOR THE 21ST-CENTURY RESEARCH IN SCIENCE COMMUNICATION

Is science communication its own field?

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ABSTRACT: The present comment examines to what extent science communication has attained the status of an academic discipline and a distinct research field, as opposed to the common view that science communication is merely a sub-discipline of media studies, sociology of science or history of science. Against this background, the authors of this comment chart the progress science communication has made as an emerging subject over the last 50 years in terms of a number of measures. Although discussions are still ongoing about the elements that must be present to constitute a legitimate disciplinary field, we show here that science communication meets four key elements that constitute an analytical framework to classify academic disciplines: the presence of a community; a history of inquiry; a mode of inquiry that defines how data is collected; and the existence of a communications network.

In his review *How to establish PCST. Two handbooks on science communication* (*JCOM* 7(4) December 2008), Alessandro Delfanti queries a claim in the book *Communicating science in social contexts* that science communication already '*is* a distinct research field'. He sees in both books 'an explicit effort to establish PCST as an independent academic field, different from both science and technology studies and communication and media theory'.

After pondering the question of whether we really need the creation of a new discipline such as public communication of science, Delfanti concludes that despite the growing strength and quality of the field, PCST still has some work to do if it is to distinguish itself as separate from fields such as science and technology studies, and media and communication studies.

JCOM has asked the editors of the books to respond:

"*Starting from the experience of your book, it would be interesting for us to have a contribution concerning what is "specific" of science communication research. What does distinguish it from something that could be considered a sub-discipline of media studies, sociology of science or history of science? In addition, which is the relation between research in science communication and the more general field of Science and Technology Studies? In other words, why does science communication deserve a special attention as an academic discipline?'*

We may not be able to demonstrate to everyone's satisfaction that science communication has attained the status of 'a discipline'. Apart from anything else, the definitions are varied and the ground is hotly contested. What we can do, though, is to chart the progress science communication has made as an emerging subject over the last 50 years in terms of a number of measures.

Science communication has established an identity over the last 50 years. In the aftermath of WW2, governments increasingly regarded science as important. At the same time they recognised their own lack of skills in the area, so appointed special advisors to lead presidents and politicians through science-based issues.

James Killian was appointed in 1957 as Special Assistant to the US President for Science and Technology, followed in 1965 by Sir Solly Zuckerman's appointment as Chief Scientific Adviser in the UK[1]. These were the first two advisers and others followed, all performing a classic communication role of translating the significance of research results for a lay audience. A little earlier, "science communication (or popularization)" had been enshrined in the constitutions of both India and China. So the subject had a political imperative.

With this convergence of science, the economy and policy, there was a corresponding convergence of questions related to science and society, science in the media, and the role of science journalists. These matters were initially addressed by university researchers who could be attached to a range of departments across the university:

- in media studies (mostly TV and newspapers) focusing on science in the media (how much science, what kind of science, who's speaking for whom…)
- in the field of sociology, dealing mostly with scientific careers ("how does one embark on a scientific career?", and so on…)
- questions of vulgarization (or popularization) – its role, functions, effects - were debated then in sociology, in discourse analysis (mostly linguistics), in media studies…)

By 1970, a new research area was emerging to address these questions. Multi-disciplinary in nature, science communication draws upon sociology, journalism, media studies; and those working in this emerging field felt the need to meet, exchange opinions, and share views. The 1970s marked the start of informal exchanges which grew into symposia, formal conferences, peer-reviewed journals and associations at a national and international level.

But does this demonstrable activity make 'science communication' a discipline? There are a number of analytical frameworks for classifying academic disciplines (Kuhn[2] et al). Others define disciplines by their characteristics: is the area taught in formal courses at universities? Is it defined and recognised in academic journals? Do practitioners belong to learned societies?

A third school considers the notion of a discipline from accreditation perspective. Does it have a name? What are its key concepts, and what models, paradigms and perspectives influence the field? What methods are taught, and what is the relationship between theory (academia) and practitioner? How did the history of the area evolve? [3]

'Debates are ongoing about the elements that must be present to constitute a legitimate disciplinary field. Among such elements are the presence of a community of scholars; a tradition or history of inquiry; a mode of inquiry that defines how data is collected and interpreted, as well as defining the requirements for what constitutes new knowledge; and the existence of a communications network.'[4]

So clearly different measures can be used to determine which fields of study can be considered "a discipline" in their own right. In this article we will first measure science communication against the four elements listed immediately above: the presence of a community; a history of inquiry; a mode of inquiry that defines how data is collected; and the existence of a communications network.

1. The presence of a community of scholars

International conferences and networks

The international PCST network was conceived in the decade of the 1980s, and held its first international conference in 1989. Since then it has held 10 formal international conferences and one symposium in cities from Madrid and Montreal, to Cape Town and Seoul. Recent conferences attracted 500-700 registrants from 50 different countries. Registrants are evenly balanced between those coming from a university background and involved in research and training, and those from a practical background working in science writing or editing or as 'communication managers' for research institutes,

The Network offers an opportunity for those conducting research in science communication to discuss their work with the practitioners. It has a web site, sponsors an electronic discussion list with 800 subscribers, and has inspired a range of publications and less formal meetings.

There are other meetings and conferences: the American Association for the Advancement of Science (AAAS) has a strong tradition of science communication in its deliberations. There are also networks for science museums, for science writers, for those involved in the teaching of science communication. One of the earliest was the Association of British Science Writers (founded in 1947). By contrast, the European Science Events Association (EUSCEA) was founded in 2001. With 89 member organisations from 34 countries, its major objective:

"… is to offer a meeting-place, a platform for the exchange of information, experiences and good practice among Science Communication Event organizations throughout Europe.[5]"

Depending on their teaching and research interests or their current employment, individuals will attend meetings organised by any of these different organisations. They all comfortably fit in the broad church that 'science communication' offers.

The community can be defined too by journals (JCOM, Science Communication, the new *International Journal of Science Education Part B: Science Communication and Informal Education,* Public Understanding of Science; and from China *Study on Science Popularisation* and *Public Communication of Science and Technology*) which are devoted to discussions on science communication issues,

Training and research at tertiary level

In parallel with the structuring of the research field, formal training at college and university levels began to take shape from 1980. Training has become very important, raising the standard for anyone embarking on a career in science communication in arenas ranging from communication manager for a research organisation, science writing or employment in a museum, to science journalism; and also raising the overall level of competency of the whole profession.

The Directory of Science Communication Courses and Programs[6] has since 1999 listed science communication courses and programs offered in the USA. Each course is categorised by criteria and orientation, and the Directory describes the content and lists the qualifications on offer. The current Directory lists 51 courses and programs at 44 separate universities. Most institutions offer undergraduate or postgraduate degrees, with a handful limited to short courses of certificates.

The European Guide to Science Journalism[7] lists the formal and informal training courses in 27 countries in the EU. Although labelled 'science journalism', the courses reach a far wider audience than simply those wishing to practice as science journalists. As the Guide itself notes, the courses prepare "students for careers in scientific and technological firms, public bodies, foundations, specialised research study centres, museums and science journalism."

Science communication courses at undergraduate and post-graduate levels are offered throughout the world, including Asia (China offered courses from 1989) and Australasia. Most offer undergraduate courses and postgraduate degrees; and conduct research in which science communication models are proposed and tested. Reflecting the origins of these departments, they may be attached to different areas of the university – the humanities faculties, media studies or journalism schools, or within the (natural) sciences. Mulder[8] et al have analysed the location of the courses and the intellectual foundation on which they are based, and have discovered:

'science communication programs at universities appear to combine aspects from the four key cognate areas of science, education studies, social studies of science, and communication studies'

What is clear from this list is that 'science communication' as a term and an object of study and research is well-understood and widespread throughout the world. The formal training strongly contributes to the formation of the discipline because it more or less determines who has the right and the legitimacy to speak on behalf of those in the domain (shared culture, shared jargon, shared ideas…).

2. A history of inquiry

As one reviewer remarked last year, "lately the science communication book market has become quite lively."[9]

A steady stream of books on science communication reaches the market every year. The PCST Network has inspired at least two: *At the Human Scale* and *Communicating Science in Social Contexts.* A Google search "books on 'science communication'" results in about 115,000 results; and indicates the topic has been well-explored.

A similar search on Google Scholar for journal articles also indicates a strong record of articles. The number of outlets may be limited but the range of topics and different approaches taken by authors is wide. It would be possible to list authors, books and journal articles but this does not seem necessary in the face of the obvious: that there is a weight of scholarly activity and a well-established history of inquiry.

The PCST conference in Seoul in 2006 attracted 320 Abstracts and 264 full papers from 38 countries. This indicates a strong international interest in research by people comfortable with presenting their work under the umbrella of 'science communication'. Similar numbers were involved in other conferences in the series.

3. A mode of inquiry that defines how data is collected

Science communication draws its tools and concepts from sociology, psychology, media studies, statistics and other areas, and has an interdisciplinary approach in common with modern social sciences. This characteristic of interdisciplinarity is increasingly (and legitimately) shared with the natural sciences: chemistry and biology, for instance in studies relating to genetically modified organisms.

There has been an increasing awareness of the power of collaborative activity involving several disciplines, summarised in an Australian report *Collaborating across the sectors*[10]:

"The world is turning to multi-disciplinary collaborations to deal with the big issues we face, critical problems such as water shortages, global climate change and threats to national security, human health and economic sustainability. No single discipline has all the answers: we need to provide the flexibility to ensure that the research and education community can pursue investigations across the whole landscape, regardless of discipline or approach."

Given this varied background, how then does the observer differentiate media studies (TV, radio, newspapers, museums…) from studies in science communication? The answer is that it is not a study of the media *per se*, but as a means to relate to scientific knowledge. Science communicators think of the media as another form of discourse. The same argument can be applied to verbal interactions with people which similarly can take many forms: face to face interaction, talking to an audience, debating in a scientific cafe, or engaged in a decision-making process (like the consensus conferences).

A distinction also needs to be made between science communication and science journalism. While some science communicators engage in journalism, they are then playing a different social role. Science communicators are not the mediators between scientists and the public, but instead examine the mediation function to understand how it works, to measure the effects, and to improve it.

In serving their function, science communicators debate models which posit the nature of communication: the deficit model first postulated in the 1980s, superseded to a large extent by the more democratic dialogue model. This provides a structure in which the meaningful discussions can take place, on issues such as:

- how do people relate to scientific knowledge?
- how is knowledge brought to people's attention, in what context?
- what are the interactions between those who are reputedly knowledgeable and those who are not?

In short: science communication deals with the diffusion, propagation and appropriation of scientific knowledge in different context, for different purpose, with different effects (intended or unintended), and the paradigms employed qualify these processes. Most of the time we deal with non-formal knowledge of scientific knowledge, which could be (depending on the theoretical frame of reference we use) representations, misinterpretations, misconceptions, preconceptions, everyday knowledge, or common sense knowledge.

4. The existence of a communication network

The first PCST (Public Communication of Science and Technology) conference was in Poitiers in 1989 and has persisted in biennial events ever since. The PCST network was born in this context. National associations using the term 'science communication' began to emerge in the southern hemisphere, beginning with Australian Science Communicators in 1994. A profession emerged, with jobs using the term 'science communication' growing in frequency through the decade of the 1990s.

Similar bodies exist at the national level. ASC (Australian Science Communicators), the Science Communicators Association of New Zealand (SCANZ) and SASCON *(*Southern African Science Communication Network) provide for a community of scholars and practitioners. The Indian Science Communication Society is "a voluntary and non-governmental organisation established in 1994 by a group of self motivated professionals. Science writers and Scientists driven by the visionary zeal and passions to popularise science and scientific temper among the Indian masses."[11]

Danish Science Communicators (DNF) "is an independent, non-profit organisation with the purpose of increasing public awareness and understanding of science and technology through new and innovative initiatives in science communication. The organisation is involved in non-commercial, commercial and European activities."[12]

These are examples of the communities which have emerged over the last 20 years in response to the growing number of people working, conducting research and undertaking training in this field.

Conclusion

The technical requirements for being able to claim that a field of research has achieved the status of a discipline are not clear, and in the absence of sharply defined targets we are reluctant to press hard on this claim for science communication.

What is clear is that, over the last 50 years there is an increasing recognition of this area. It began with academic discussions which emerged from a variety of departments and faculties in universities across the world. It swelled spontaneously into a loose international network which filled the need for the community dealing with these issues to meet and discuss approaches. It formalised into an international association, and a series of national associations which provided for this community of scholars, educators and practitioners. It became legitimised and defined at the professional level with the emergence of courses at undergraduate and post-graduate levels in universities across the world.

Satisfying the technical specifications of a discipline may require a more detailed analysis of the emergence of this field of study and the progress it has made, in order to define more sharply the factors which differentiate science communication from neighbouring fields and those from which it has borrowed.

We would contend science communication deserves 'special attention' because it is useful and contributes powerfully to pressing questions the modern world faces. In some ways *not* being a discipline may be more helpful, because it allows science communicators to plunder all disciplines and fields of study to conduct their work most effectively.

Notes and references

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