Science Communication: a "Down Under" Perspective

Lloyd Spencer Davis

In 1981, the Australian band *Men at Work* released a song called "Down Under," which topped the British, American and Australian charts. Since then it has become the anthem for an alternative worldview that is distinctly Australasian (New Zealanders, by extension, are included in that worldview because we share much in common with our near-neighbours, including a love of yeast-extract sandwich spreads). One of the song's signature lines is:

> *I said, "Do you speak-a my language?"*
> *He just smiled and gave me a vegemite sandwich*

There are two aspects of this that are relevant to the view of science communication that I wish to promote here. The first is the underlying assumption in the question that to truly understand something there needs to be a common language; the second is the peculiarly austral aspect, as represented by the vegemite sandwich.

1. Science Communication: a definition

Science communication may be defined in broad terms as: *the popularization of science*. In practical terms this means distilling the results of scientific enquiry (which are usually published in papers or books conforming to the conventions and practices of scientific writing) into a form that is readily understood by the public. There are several aspects of this that are crucial to the process:

- Distillation necessarily involves condensation; a reduction in complexity to present the essential information.
- If the goal is actually to get that information across to the public (as opposed to simply putting it in the public domain and letting interested parties find it if they so wish), then the information must be made, in some way, engaging.
- Almost invariably in popular communication there will be some sort of value put on the information, either explicitly or implicitly. Science communication is very seldom neutral.

While the scientific writing that scientists use to communicate their results with each other has its merits, to the non-specialist it comes across as tedious, incomprehensible and, mostly, too focused to put the results into a bigger picture (Davis 2007). Just like the communication between scientists, the currency of science communication is facts, but it is the way they are presented that is the distinguishing feature of popularizing science. Popularizing science is like

Centre for Science Communication, University of Otago, New Zealand
Contact: lloyd.davis@otago.ac.nz

art: hard to define, but we recognize it when we see it. And perhaps that is for the very same reasons: both art and popularizing science appeal to our aesthetic sides. Science communication, then, is not just about facts; it is "facts in a bun"; it is making facts appealing.

All this presupposes that science communication, while somewhat intangible, is a distinct entity. But one of the problems with defining science communication according to the way I have above – which is essentially about the *process* of popularization – is that science communication occurs under so many different guises that getting agreement on an all-encompassing definition has proved nigh-on impossible. Burns et al (2003) attempted to define science communication and all its sub-genres (public awareness of science, public understanding of science, scientific literacy, scientific culture) but their resulting "vowel analogy" definition is so patently unwieldy and vague in its attempt to be all-inclusive that it is of little heuristic value.

The problem, in my view, stems from trying to make science communication into something other than what it should be. The Burns et al (2003) definition equates science communication with outcomes (the changes that are effected in the public's knowledge and attitude towards science) rather than just the processes, which are the basis of my definition above and also that of Bryant (2003): "the processes by which the culture and knowledge of science are absorbed into the culture of the wider community."

According to Burns et al (2003 p191) science communication "is not *just* a process. It should never be done for its own sake, in an ad hoc or inappropriate manner. For science communication to be effective—*in fact, to allow any valid assessment of its effectiveness*—it must always have predetermined and appropriate aims."[1)]

In such a worldview of science communication, predetermined outcomes are mandatory not because they necessarily aid communication in any way but because they allow the assessment of effectiveness. In other words, the research and theories associated with communication studies are tied to the practice of science communication because the former provides a means of measuring the effectiveness of the latter. Hence, according to the Burns et al (2003) definition, these two "parts" of science communication are both related and necessary.

The practice of science communication, then, provides the necessary fodder for its analysis by those doing research into the effectiveness of science communication. The data can be used to both develop and test theories of communication. However – and this is where science communication suffers – the opposite is not true. Communication theories and research from studying science communication are unlikely to be particularly helpful when trying to improve the practice of science communication. Studying the "phenomenon" of science communication does not, by necessity, provide a theoretical basis for conducting science communication. The practice of science communication, in my view, should to be located within other theoretical constructs that are more useful to the *processes* that deliver outcomes rather than the *measurement* of outcomes. These are those areas associated with storytelling, creating impact and development of techniques of communication. To communicate science effectively, it helps me little to know about deficit models of communication and the like (Gregory and Miler 1998); it is much more important that I know about the theoretical areas that affect the *way* I communicate: the way I express myself, the tools I use, the techniques for engaging an audience.

2. Science Communication as a Discipline

Science communication has emerged as a formal discipline at universities particularly over the last two to three decades. It is, however, a mass of contradictions. The term science communication is used variously to include those who are practitioners of popularizing science, those who conduct research on science communication, those who organize events such as science fairs and the like, and those who explain public policy with respect to science (Miller 2008). Miller (2008 p285) maintains that there "is something of a gulf between the practical science communication community and the body of researchers." He takes a none too subtle dig at Richard Dawkins, in particular, and professors of science communication, in general, who, like myself, often come from a background in science, when he states, "At the 'top' of the academic tree there are even professors of 'public understanding of science' or something similar who have carried out no research in the area…Instead, they may have written some popular science books (or several versions of the same book)[2] or run a science festival" (Miller 2008 p276).

Miller makes an excellent point: one would not expect professors in virtually any other discipline, from Anthropology to Zoology, to be appointed without a research or teaching record in the area, let alone any formal training.

As a consequence of the rather loose criteria for defining the discipline of science communication, the field exists as a collection of disparate entities that come at their subjects from completely different perspectives. On the one hand, according to Miller (2008 p276), there are the practitioners of science communication, often with a background in natural sciences, medicine or engineering, who organize and take part in public engagement with science activities; on the other are researchers, usually with a background in the social sciences or humanities, writing articles for journals but "aloof from the blood and sawdust of the science communication arena."

While I agree with Miller's assessment, I maintain that it does not go far enough. The real problem with the discipline of science communication is not that the researchers and practitioners "just do not talk to one another" (Miller 2008 p 276), it is that they are not speaking the same language. In fact, I would go even further than that and suggest that *the research and theory that has been developed under the guise of science communication is inappropriate as a theoretical basis for underpinning science communication as it is practised.*

3. The GeoPolitics of Science Communication: do you speak-a my language?

I attended my first PCST (Public Communication of Science and Technology) conference in Malmo, Sweden, in 2008. The experience was akin to being confined in various rooms with a range of individuals all speaking different languages (language, as used in this context, bore no relation to their particular mother tongue – whether English, Japanese, Spanish or whatever – but to the "language" they used to talk about science communication). It was as if much of what was being said at any one time was incomprehensible to much of the audience. The irony that this was occurring at a conference about communication did not escape me.

As Mulder et al (2008) showed, part of the issue is that the "discipline" of science communication, as it is currently taught at universities, is not a natural and discrete area of academic enquiry but a grouping of distinct areas that have arisen from disparate origins.

They recognized four key cognate areas as (i) science, (ii) education studies, (iii) social studies of science, and (iv) communication studies (Mulder et al 2008). General regional trends were apparent in the teaching and approaches to science communication that followed essentially geopolitical boundaries.

In North America, science communication is largely the province of the humanities and is heavily weighted towards the social sciences, where the focus is often on communication theory and assessing communication efficacy. In Europe, science communication programmes often attempt to cover all four cognate areas but with a higher weighting in areas like social studies of science (or science and technology studies, STS) than elsewhere.

By contrast, in Australasia, science communication programmes are typically located within science divisions and weighted towards the *practice* of science communication, with an emphasis on *how* to communicate science more effectively (Mulder et al 2008).

4. Developing an Appropriate Framework for the Practice of Science Communication: the vegemite sandwich

Going back to the beginning, if the role of science communication is to promote understanding of science in the public, then science communicators must distill information, make it engaging and deliver that information via means that allow the public to determine its value. Hence, the theory that will best inform such practice is that which will enhance the way in which the information is packaged and delivered. The following are three critical areas that I identify as providing the essential framework for any course teaching science communication.

(i) Storytelling

The most effective communication is that which involves storytelling. Story, or narrative, can be thought of as "a mode of thinking, a structure for organizing our knowledge, and a process for the vehicle of education" (Bruner 1986, p119). The power of story lies in its "narrative effect," whereby it creates interest and enhances understanding and memory of the information being conveyed in the story. When it comes to science communication specifically, this effect manifests itself by increasing attention and eliciting faster and fuller comprehension of information (Norris et al 2005). Storytelling, then, should be at the core of any programme that purports to produce better communicators rather than just conduct research on communication.

For the Master of Science Communication (MSciComm) degree at the University of Otago's Centre for Science Communication in New Zealand (www.sciencecommunication.info), storytelling forms the core paper (SCOM 402) and is compulsory for all students irrespective of what area of science communication they are specializing in (e.g. filmmaking, writing, or popularizing science).

(ii) Engaging

In a world of dross and abundance, it is essential to attract attention to the information being conveyed. Design of the way the information is packaged will affect whether the public engages or not. There is an ample literature from the discipline of design studies that demonstrates how people are impacted by different designs (Crilley et al 2008). This can be through any of the senses, from visual, auditory, tactile, olfactory to taste stimuli. For a poster it might involve the way colours are used, the

fonts, the spaces, the graphic images and a host of other possibilities. For a film it might depend upon the way the story is set up in the first 30 seconds, the type of narration, the pacing, the music or a score of other things. For a book or magazine article, again it may depend upon the beginning, the use of graphics, the layout, the title or whatever. Exhibitions may engage by stimulating the senses and being interactive. Same for websites. The point being that elements of design influence whether members of the public engage with information in the first place and continue to give it their attention. It is one thing to conduct research into how effective a particular piece of science communication has been, but far better from the practitioner's point of view to conduct research into what forms of packaging help engage the audience. And for that, the theory and research lies not in departments of communication studies but in departments of design studies.

(iii) Enhancing creativity

What skills are best for communicating will depend upon the method of delivery of the information. Nevertheless, it is a fact that not all forms of communication are equal even if they contain the same information and tell the same story. The creativity of the communicator in the way he or she delivers the story will affect its reception.

For enhanced writing about factual information there has, over the last little while, been the development of a genre of writing called, for want of a better term, creative nonfiction writing (Gutkind 1997). In essence, it involves the application of techniques of writing usually associated with fiction to the presentation of nonfiction, with the one stipulation that the information presented must be true and factual. Analyses of the effectiveness of creative nonfiction and the theory behind techniques for enhancing such writing are to be found in English departments (or other language departments) and not those devoted to communication studies.

Students specializing in writing as part of the MSciComm degree at the University of Otago must take two papers that analyse techniques for creative nonfiction and examine examples of such writing. One paper is taught within the Centre for Science Communication (SCOM 403), but the other is taught by the Department of English (SCOM 427).

For enhanced filmmaking the story is the same. Like fashion, art, architecture and writing, much can be learnt about the process of communicating by film from an examination of the history of what has been done before (Reeves 1999), and this is particularly so for science and natural history filmmaking (Mitman 1999). Creativity is often about re-inventing something by putting a new take or perspective on what has been done before. There is an evolution of ideas and, again, the appropriate academic place to study them is in film and media studies departments and not communication departments *per se*.

Students taking the science and natural history filmmaking stream of the MSciComm degree at the University of Otago, in addition to learning about filmmaking techniques (SCOM 401), are encouraged to take SCOM 415, which is a course about the history of documentary and is taught by the Department of Film and Media Studies.

As we move further into the 21st Century there is a convergence of technologies occurring that is based around the internet. Effective communication in this sphere, while still fundamentally revolving around storytelling, can have specific requirements depending upon the medium: websites, blogs, YouTube videos, podcasts, Twitter, Facebook and other social networking sites. Science communicators must learn to use such tools to best effect (Davis 2007) and to do that

they need to be basing what they do on research coming out of computer and digital design studies and not the esoteric writings of a bunch of academics "aloof from the blood and sawdust of the science communication arena."

The MSciComm degree at the University of Otago can be taken in an area that is called, rather broadly, popularizing science, but which, in essence, concentrates on communication of science in the digital realm and exhibitions. Students taking this stream are advised to take SCOM 407, which is a course that looks at the application of digital design to communication. It is taught from within the Department of Design Studies.

5. Where to from Here?

All this is by way of saying that I do not think the discipline of science communication is well served by the current division into what is supposedly its two wings: theory and practice. It is a construct that has emerged as a consequence of the chaotic and multi-facetted way science communication has developed historically. The theory and practice of science communication did not develop together as is the case for other academic disciplines. There is no common language. As a result of this disjuncture, while theoreticians and researchers of science communication may depend to some extent upon observing the practice of science being communicated, it is not at all clear that the practice of science communication receives much direct benefit from those areas of study.

Hence, I am arguing, that as we go forward, rather than lumping everything together under the umbrella of science communication, we should be treating the *practice of science communication* as a separate and recognizable academic entity that draws its theoretical and research wing from those studying narrative, writing, filmmaking, design and digital communication.

I emphasize that this is not to denigrate that area of research and theory that currently falls under the auspices of science communication. It is a perfectly valid and valuable area of study but, for the sake of clarity, we should be distinguishing it as a separate academic area from those aspects of science communication to do with its practice.

6. Implications of such a "Down Under" Perspective for Science Communication in Asia

For anything from cars to cameras, coal mining to clothing manufacture, there is little doubt that science and technology powers the economies of Asia such as those of Japan, China, Korea, Malaysia, Singapore, Indonesia and India. Yet, surveys of science communication programmes at universities worldwide by Mulder et al (2008) and my own separate research (Davis and Hendry, unpubl. data), reveals that disarmingly little is being done within Asia with respect to science communication. There are, of course, exceptions and the science communication programme at the University of Hokkaido in Sapporo, Japan, is one of them.

In my view, the late arrival of science communication at Asian universities can be viewed as an advantage. With some of the largest and most populated countries in the world, it is undeniably important that their citizens have an opportunity to learn about and understand the science that so impinges upon their lives. It is practitioners of science communication that are needed and better techniques for enhancing that practice: all of which requires research into those areas associated with narrative, design and creativity.

If the structure of science communication courses and associated academic research at Asian universities were to follow the guidelines I have set out here, whereby the practice and an appropriate theory of science communication are allowed to develop side by side, speaking the one language, I believe it would have major downstream benefits for the science literacy of the Asian population. Of course, we will still need researchers in communication to measure the degree of science literacy, but let's not confuse that with research into the practice of science communication; let's call that something else befitting of a separate but related discipline while recognizing the valid and separate aims of each field.

If that were to happen, what I am proposing would be seen as less of a "Down Under" perspective and more of a mainstream approach to science communication. And I'd like that very much – as much as any vegemite sandwich.

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Notes

1) The italics used for emphasis are part of the original quote
2) This dig is presumably aimed at Dawkins alone

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