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COMMUNICATION AT THE INTERSECTION OF SCIENCE AND POLITICS

The conflation of motives of science communication — causes, consequences, remedies

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Abstract

We explore and discuss the diverse motives that drive science communication, pointing out that political motives are the major driving force behind most science communication programmes including so-called public engagement with science with the result that educational and promotional objectives are blurred and science communication activities are rarely evaluated meaningfully. Since this conflation of motives of science communication and the gap between political rhetoric and science communication practice could threaten the credibility of science, we argue for the restoration of a crucial distinction between two types of science communication: educational/dialogic vs promotional/persuasive.

Keywords

Participation and science governance; Public engagement with science and technology; Science and policy-making; Science communication: theory and models

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The diverse motives of science communication

Science communication has become a standard item on science policy agendas in most countries with a modern science system. Governments around the world spend considerable sums of money on national programmes. These programmes serve several explicit functions [Burns, O'Connor and Stocklmayer, 2003; Weingart and Guenther, 2016]. Thus, science communication aims to enhance the public's understanding of science. It makes new advances in science visible and accessible to the public in order to allow people to make informed decisions about scientific issues concerning their own lives. It is supposed to secure ongoing political support for science, as well as to account for public expenditure on science, thus fulfilling a democratic obligation. Finally, science communication promotes science in general, and science organisations, such as universities, in particular.

Over the years, these programmes have become more ambitious. Partly because of a failure to reach the public's attention and consent, partly because of a well-meaning (not to say 'correct') political discourse propagating the

democratisation of science the previous paradigms of 'public understanding of science' was criticised as a 'deficit' model and replaced by the 'engagement' paradigm, i.e. the commitment to 'engage' citizens with science, to take the public's input into science (policy) seriously.

Based on the emergent perception that top-down information dissemination may not be the most effective way to communicate science [Bauer, Allum and Miller, 2007; Brossard and Lewenstein, 2010; Besley and Nisbet, 2013], the concept of 'science engagement' emphasises meaningful dialogue and reciprocal learning. Scientists and members of the public are supposed to engage in conversation as a way to improve mutual understanding, reduce conflict and build trust [McCallie et al., 2009; Fischhoff, 2013]. [1] But the popularity of 'engaging' the public to 'participate' in science cannot be explained by the democratic enthusiasm of scientists and communicators alone. Figuring prominently in government programmes, it is also politically motivated: policymakers and science administrators are united in their desire to avoid public resistance to new scientific and technological developments, as has happened, for example, with GM crops in Europe. Accordingly, the political nature and context of public science communication are increasingly recognised [Scheufele, 2014].

In reaction to the engagement hype, science communication scholars have reflected critically on some of the inherent shortcomings (or limitations) of public engagement, how it is actually practiced and how its effectiveness is evaluated [Stilgoe, Lock and Wilsdon, 2014; Smallman, 2016]. In most cases, the nature of activities that take place under the banner of public science communication and/or engagement, with its focus on exhibitions, shows, public talks and other formats of information dissemination, suggests that the reality of science communication practice is largely still that of the 'deficit model' approach. The numbers of people involved in engagement exercises are typically low and are mainly constituted by already-converted or socially privileged audiences [Dawson, 2018; Kennedy, Jensen and Verbeke, 2017]. The ambitious aim to 'engage' the public with science is only the latest stage in the development of a primarily politically motivated rhetoric, of a widening gap between talk and action, between 'motives espoused' by science policy and 'motives enacted' by the respective organisations commissioned to develop and implement science communication formats. The reality on the ground is one of mostly standard exhibition and event type communication formats.

Two observations support this diagnosis: 1) There is a striking similarity of science communication formats internationally. Regardless of economic, cultural and demographic differences between countries, their governments, research councils and academic bodies have adopted more or less identical programmes [Drori et al., 2003, p. 112]. This underscores the political motivation driving the science communication and science engagement programmes. 2) The broad variety of functions attributed to science communication reveals a conflation of different motives, with the result that the effectiveness of the various communication formats is not and cannot be properly evaluated. Evaluation is not a priority for political rhetoric. Instead, the grand programmes have the effect of attracting and mobilising various actors following the funds attached to them.

[1] 'Public engagement in science' has become a buzz phrase [Bensaude Vincent, 2014]. Increasingly, it is also included in the guidelines of research funders around the world [Palmer and Schibeci, 2012].

Our claim is that the conflation of motives of science communication and the gap between political rhetoric and actual practice of science communication is a problem because it ultimately threatens the credibility of science as an institution, of scientific organisations and the mission of science communication.

Diverse functions of science communication

A look at how science policymakers articulate the goals of public science communication, including engagement, shows that they often combine (or conflate) promotional, persuasive motives on the one hand with educational, dialogic motives on the other. Already in 2002, the U.K. Research Councils promoted the following reasons for scientists to enter into dialogue with society [People, Science and Policy, 2002, quoted in Stocklmayer, 2013, p. 21]:

- to promote an awareness of science as 'part of the fabric of society';
- to promote an individual organisation;
- to demonstrate public accountability;
- to recruit the next generation of scientists and engineers;
- to gain acceptance of science and new technologies;
- to support sound and effective decision-making.

Similarly, in a proposed agenda for future science communication research, the U.S. National Academies of Sciences, Engineering and Medicine [2017] list the following blend of persuasive, reflective as well as promotional goals:

- sharing the findings and excitement of science;
- increasing appreciation for science as a useful way of understanding and navigating the modern world;
- increasing knowledge and understanding of the science related to a specific issue;
- influencing people's opinions, behaviour and policy preferences;
- engaging with diverse groups so that their perspectives about science related to important social issues can be considered in seeking solutions to societal problems that affect everyone.

A third example is Germany, a latecomer in science communication. A recent strategy paper of the official organisation 'Science in Dialogue' ("*Wissenschaft im Dialog*" — WiD),[2] published in 2017, [Wissenschaft im Dialog, 2017] states that WiD increasingly offers formats for the direct participation (i.e. engagement) of citizens. It defines its 'strategic goals' among others with reference to the citizens:

- strengthen the awareness of citizens for the importance of science in a democratic society;

[2]WID was founded by the Federal government and the main science organizations in 2000.

- promote, measurably and sustainably, the societal dialogue about science and its central themes;
- promote the encounter and exchange with scientists and strengthen the awareness for the methods and the processes of knowledge production of science;
- reach people that a single science organisation with its own communication activities would hardly reach.

These goals are remarkably similar to those in the U.S. and the U.K., especially if one considers that the German science system differs institutionally from the Anglo-Saxon one, while acknowledging that with respect to educational level and economic well-being it is comparable to these countries.

A fourth example is South Africa, a threshold country. The South African Agency for Science and Technology Advancement [SAASTA] was established in 2002 to coordinate science engagement activities nationally. The Department of Science and Technology (DST) adopted a new science engagement framework in 2015, in order to encourage and coordinate an ambitious portfolio of activities across all government departments, higher education institutions, science councils, museums and private sector partners [Department of Science and Technology, 2015]. From the start, science policy in the 'new' South Africa emphasised the need for a society which understands and values science as a precondition of socio-economic progress [Department of Arts, Culture, Science and Technology, 1996]. The democratic government wanted its citizens to be able to monitor policy, learn, collaborate, campaign and react to proposed legislation. Current policies highlight public understanding of science as a prerequisite for South Africa to become a more innovative society with a more democratic and participatory mode of science governance than before [Department of Science and Technology, 2007]. The science engagement strategy [Department of Science and Technology, 2015] promotes the idea of "… engaging to enrich and improve our lives …" and seeks "… to develop a society that is knowledgeable about science, scientifically literate and capable of forming opinions about science issues". Thus, the SA government's policy on science communication proclaims 'engagement' to serve three objectives at the same time:

- educating and enlightening citizens in order to strengthen democratic processes;
- promoting economic growth and innovation and improving the standard of living;
- increasing international visibility of South African science to attract investments.

South Africa has embraced the 'engagement' paradigm even more vigorously than the other three countries which can perhaps be explained by the democratic renaissance of the 'rainbow nation'. However, it, too, conflates educational and promotional objectives. Even more surprisingly, in the formulation of the objectives there is no hint at the vast diversity of the country's population in terms of

educational level, levels of income and cultural backgrounds the latter of which are manifested in eleven official languages, a multitude of religious sects with growing membership and a strong adherence to indigenous knowledge as a source of national identity. Nonetheless, South Africa's science communication strategies are, again, very similar to those of the three countries mentioned above.

It may be hypothesised that science communication strategies which are primarily motivated politically, i.e. to promote science for public acceptance, to legitimate science policies, will not be impacted by cultural, economic and political differences, whereas strategies that are supposed to educate and engage citizens, will be sensitive to these differences. They have to address different levels of education or prior exposure to science, and they also have to be sensitive to the different attitudes toward science that a host of research has uncovered in different segments of each society [Schäfer et al., 2018]. It is simply not conceivable that all of the different objectives stated in science communication and engagement programmes will be served equally well by the same formats.

Evaluation criteria

Evaluations of different science communication formats are, as Jensen states, routinely of "poor quality" [Jensen, 2014]. They are rare and inaccessible although the respective organisations stress their importance. WiD documents give an impression. An unpublished evaluation of the "MS Wissenschaft"[3] for the years 2012–2016/17, focuses on the number of cities visited, the number of visitors (school classes in particular) and their demographic data, level of education, and the effect of the exhibitions on people's interest in science.[4]

This can be extended to virtually all other evaluations: the most important indicator of 'success' is the number of participants/visitors reached. The second most important is satisfaction with the respective format (either asked directly or indicated by 'interest' generated). These are followed by varying questions regarding motivations to attend a particular format and to come again or not, satisfaction with individual presenters, suggestions for other topics, improvement of the format, critique of the organisation, etc. Incidentally, in an evaluation project of the German 'Science Year 2015'[5] some of the same indicators were applied except, one of the concerns is the assessment of the format as a brand of the ministry, another one is the long-term effects on the partner organisations of the ministry.[6] Thus, the political motivation of the format becomes explicit which, given the origin of the 'science years', is not surprising.

[3] A ship travelling since 2003 on interior canals and rivers, stopping in various cities during the months of May to September with changing exhibitions, now one of the flagship communication formats of WiD. https://de.wikipedia.org/wiki/MS_Wissenschaft.

[4] An evaluation of the MS Wissenschaft, although announced in (deplorable) English by the Blog Scicomlab June 10, 2016 is nowhere to be found on the internet.
http://www.scicom-lab.com/evaluation-at-ms-wissenschaft/ (visited April 24, 2018).

[5] The German science ministry's 'Science Years' (*Wissenschaftsjahre*), which is now an umbrella organisation for communication initiatives of science organisations, universities, museums, communities and others. https://www.bmbf.de/de/die-wissenschaftsjahre-229.html.

[6] com.X — Institut für Kommunikations-Analyse und Evaluation. *Zukunftstadt. Ergebnisse der Begleitforschung.* No year.
https://www.zukunft-verstehen.de/service/publikationen/Evaluation-WJ15 (visited April 28, 2018).

The strategic goals of science communication and engagement are too general anyway to be evaluated in ways that allow to reliably assess their success or failure. A meaningful evaluation would have to be applied to specific formats which are supposed to implement these goals. But even on this level of generality it is already apparent that the evaluations are using indicators that are easy to gauge in polls. To estimate interest in science or attitudes towards it is a beginning. But objectives such as 'strengthening the awareness for the importance of science in a democratic society' would require the design of much more sophisticated and complex measures. The strategy paper of WiD reflects some realisation of the need for such measures, but there is no indication that they have been developed, let alone implemented.

The same arguments hold for the South African case. Over the years, the 'number of people reached' remained the only indicator of success for the large public engagement initiatives. Recently, two more indicators were added, the 'actual investments made in science communication' and the 'number of interactions (or events) created' [National Research Foundation, 2016/17] i.e. input indicators, rather than indicators of effectiveness (impact).

In its science engagement framework [Department of Science and Technology, 2015], the government recognises the need for more meaningful evaluation and impact measurement of its science engagement programmes. This is set to be achieved by a comprehensive monitoring and evaluation framework [Department of Science and Technology, 2018] in which a wide-ranging set of baseline measures and a complex set of success indicators are proposed, along with the structures, processes and tools required for effective monitoring and evaluation. This new strategy signals at least a more nuanced approach towards evaluating the effectiveness of science engagement. Whether it will be realised remains to be seen.

Restoring crucial distinctions

Science communication owes its present configuration to several interlocked developments: universities and research organisations have been subjected to market-oriented competition for public funds and students. Thus, they (have to) compete for public attention. A similar development has taken hold of government departments responsible for science, technology and innovation policy: with growing budgets and (sometimes) contested policies the pressure to secure public approval increases. Both developments have had a profound effect on how these organisations communicate about science. While it does not come as a surprise that political actors vie for attention and employ promotional techniques to obtain it the same cannot (or rather could not) be expected of scientific organisations whose public esteem rests on intellectual achievement and/or quality of education. However, both political and scientific organisations have referred the task of communication to the profession of public relations experts. Finally, the advent of social media, and its devastating effect on the classical mass media resulting in the migration of science journalists to the expanding PR departments of universities and research labs have added momentum to this development: the old intermediaries are eroding, the new ones (i.e. the internet companies) operate on a different (commercial) logic which is oriented to the capturing of attention, thus favouring promotional communication. So dominant has the quest for attention become that scientific organisations, universities, big science labs, research councils and academies alike, routinely and unabashedly communicate in the PR mode rather than the mode of education, or popularisation. In fact, the scientific

community itself mostly fails to differentiate between the understanding of science on the one hand, and building appreciation for research organisations on the other, often touting reputation-enhancing communication efforts as programmes aiming to advance public understanding [Borchelt, 2001]. The quest for attention, supported by publishers and internet companies pushing attention-focused so called 'altmetrics', has even begun to erode the norms governing the communication within science, as is evidenced in the growing number of premature publications.

As far back as 1992, Lewenstein [1992] pointed out that when science communicators say that they are working towards public understanding of science, they often really mean improving the public's appreciation of the benefits that science brings to society. Consequently, their actions focus on promoting science, and hardly ever on questioning science. A key problem today is that this perception of science communication, even its intentional identification as synonymous with propagating and marketing of science, common to many scientific institutions, has become dominant [Meyer-Guckel, 2012; Marcinkowski and Kohring, 2014].

In view of this it is time to restore the distinction between the different functions of science communication. The motives and functions of science communication can be divided into two categories (see Table 1):

Type 1: activities designed to educate and inform, as well as to engage the public via meaningful dialogue.

Type 2: activities designed to promote and persuade, in order to build the image and reputation of science organisations (and scientists), and to legitimise political institutions and/or their representatives.

Of course, this dichotomy is a simplification and one can think of other functions or their further differentiation. However, here the objective is to focus on the distinction as defined which we consider crucial.[7]

Table 1 provides examples based on the U.K. and U.S. objectives of science communication cited above. It is an exemplary attempt to classify these objectives with respect to their different functions, the common initiators and beneficiaries.

There are those — like Davies and Horst [2016] — who contend that it is virtually inevitable for institutional science communication to encompass different strategic agendas, as well as to comprise a complex blend of motives. As such, a specific communication event may present a mix of academic content, social obligations, and branding opportunities, which may include a genuine effort to engage people in science. The authors point out that even PR campaigns frequently have educational objectives. However, it is hardly credible that a communicator does not know what he/she wants to communicate to whom and why. It is one thing to claim that certain formats *can be used* for different objectives (i.e. have different functions), but another to distinguish between different motives to design these formats with the goals in mind they are intended to serve. While it may be that

[7] Similarly, Dawson [2018] distinguishes between activities that are politically motivated and those that have cultural or educational motives. Cf. also footnote 10.

Table 1. Motives of science communication.

Motives of science communication	Functions	Initiators/ beneficiaries
Science communication type 1		
To support sound and effective decision-making	PUS; reduce cognitive deficit	Government/ individuals
Sharing the findings and excitement of science	PUS; reduce cognitive + attitude deficit	Government/ individuals
Increasing appreciation of science as a useful way of understanding and navigating the modern world	PUS; reduce attitude deficit	Government/ Individuals
Increasing knowledge and understanding of the science related to a specific issue	PUS; reduce attitude deficit	Government/ Individuals
Engaging with diverse groups so that their perspectives about science related to important issues can be considered in seeking solutions to societal problems that affect everyone	Engagement; reduce cognitive deficit on both sides	Government/ individuals
Science communication type 2		
To promote an awareness of science as 'part of the fabric of society'	Science promotion	Government and science organisations
To promote an individual organisation	Institutional profiling and marketing	Government and science organisations
To demonstrate public accountability	Legitimisation;	Government
To recruit the next generation of scientists and engineers	Stimulating economic growth	Government
To gain public acceptance of new technologies	Legitimisation	Government
To influence people's opinions, behaviours and policy preferences	Legitimisation	Government

science communication type 2 also contains components of science communication type 1 (see Table 1), in the final analysis communication in the public relations (PR) mode (i.e. promotional, persuasive communication) is bound to make things 'look good', and to serve the interests of the client [Gioia and Corley, 2002]. Thus, although these functions may in some cases overlap, a closer look reveals one criterion which allows a clear distinction of the motives. Science communication type 1, which is driven almost exclusively by educational objectives, is executed *without an institutional interest influencing its contents*, serving only the interests of the target audience. But, in the case of science communication type 2, the communicator (typically a political agency, a university or an academic organisation) does entertain an interest: in self-promotion, in augmenting institutional prominence, and in attracting attention.[8] Most importantly, science communication type 1 has to be sensitive to the particular profiles (cultural, educational), needs and interests of target audiences and thus has to develop different formats, while science communication type 2 mostly remains focused on attracting general attention.

[8]It is an ongoing debate whether the term 'science communication' should be used for all these functions or if one should distinguish between science communication and science PR. The extreme position is to equate science communication with science PR (https://de.wikipedia.org/wiki/Wissenschaftskommunikation#cite_note-5). This indicates that usage of the term is not without vested interests.

It is important to maintain a distinction between these two types of science communication for at least four reasons:

Analytically, the distinction is *necessary* because without it one could not argue that science communication entails different motives and is directed at different audiences.[9] Even to claim an unavoidable overlap or blurring of motives *presupposes* the distinction and is not an analytical insight per se.

Practically the distinction has *important implications:* various surveys show that institutional communication (i.e. interested communication with a PR slant) has less credibility with the public than disinterested communication [Peters, 2015; Hoffjann and Seidenglanz, 2018]. Therefore, given the credibility gap between science communication type 1 *vs*. type 2, it is recommended to identify instances where the two are compounded, either intentionally or unintentionally, both for the sake of the integrity of communication, for the sake of science as an institution, and also for the sake of scientific organisations like universities, which have a good reputation to defend. This is all the more important as it may well be the case that organisational and professional interests are purposefully blurring communications type 1 and 2 in order to advance their respective interests.[10] Science communication is, after all, a prestigious exercise. The good reputation of science as an institution is based on its identification with the common good [Critchley, 2008; Peters, 2015]. Being associated with science conveys trustworthiness. This is supported by government policies that merge the democratic obligation of accountability to the public imposed on science organisations with the equally noble cause of educating and enlightening the public. By not distinguishing between the two types of communication, universities and scientific organisations run the risk of being perceived as 'just another advertiser', whose messages meet with the same kind of disdain as the ubiquitously mounting flood of commercials.

Legally/ethically, for good reason, the separation of editorial and advertising is an established (ethical) principle of quality media journalism: it serves to protect the reader/viewer/listener and to ensure fair competition. While this principle has always been endangered, social media platforms have actively contributed to its erosion by rejecting editorial responsibilities and at the same time distributing news and advertising content [Cornia, Sehl and Nielsen, 2018]. [11] Advertisers have an interest in camouflaging their PR as editorial content because it adds credibility. In spite of the difficulties in distinguishing between promotion and information in the concrete case the traditional media have not given up the demarcation and paid

[9] Luhmann [1993].

[10] Marcinkowski and Kohring [2014] provide a more finely-grained conceptualisation of the different types of science communication. In essence, they come to the same conclusions, albeit focused on the communication of universities.

[11] Cf. "The litany of transgressions in both traditional and social media seems endless, and I'm afraid that many people today, especially young people, are either unaware of what's happening or don't care. While the fusion of editorial content and advertising is disturbing, I'm afraid the trend is irreversible. Which means readers, listeners and viewers must be on the lookout, and must learn how to separate the wheat from the chaff, so to speak." (https://davidmrosen.wordpress.com/2010/05/25/the-separation-between-advertising-and-editorial-content-have-the-boundaries-shifted/ (accessed Jan 25, 2019)). Also: https://www.cision.com/us/2013/01/the-separation-of-editorial-and-advertising/ (accessed Jan 25, 2019); https://www.theguardian.com/media/media-blog/2015/apr/19/advertising-editorial-buzzfeed-telegraph-dilemma (accessed Jan 25, 2019).The separation of editorial content and advertising is contained in press (Germany) or editors' codes (U.S./U.K.).

content is identified as such. Scientific institutions should beware of becoming complicit in the business model of social media.

Technically, the distinction is called for because the logic of PR (which is coincident to the logic of politics) has the *attraction of attention* as the main criterion of success. The shift 'from substance to image', the logic underlying PR communication, is in line with communication being directed to a general public rather than to specific audiences [Gioia and Corley, 2002], to their uptake of information or to an elevated level of understanding the scientific method.[12] When it comes to measuring the success of their efforts, science communication practitioners (e.g. government campaigns or the PR departments of universities and science organisations) typically are content with counting visitors (or recipients of promotional materials and mentions in the media), rather than investigating whether these visitors have become more competent citizens who are more reflexive in their daily lives. Commonly, little effort is made to find out whether scientists entered into dialogue with the public, and actually listened to what the public wanted to know or say.

It is to be hoped, therefore, that governments and science organisations alike will take the distinction between their promotional objectives and their educational and engagement intentions more seriously and develop effective formats of science communication and science engagement that will fulfil their promises.

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[12] The need for more in-depth research into the impact of events such as science festivals has been highlighted, along with an acknowledgement of the challenges and complexities of such evaluations [Bultitude, 2014; Riise and Alfonsi, 2014].

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