

Online Trends from the First German Trend Study on Science Communication

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Communication both among scientists and between science and society is undergoing a paradigm shift that is fundamentally redefining the communicative requirements. This change is driven by the horizontalization of information, with the Internet as the enabling technology. However, technology only sets the framework, whereas the real challenges and solutions are deeply rooted in the culture and in the system of knowledge creation itself.

Introduction

If we divide the development of science communication into four phases, each with an approximately 15-year span, we are today witnessing the beginning of a fifth phase: After the Age of Utopia and Science Fiction in the 1950s and early 1960s, the Age of Enlightenment in the 1970s, the Era of Acceptance Building until the mid-1990s, and recently, the PUSH paradigm, policy-makers today advocate for a participatory and truly dialogic approach toward communication, seeking greater transparency and even the ideal of a “scientific citizenship.” The challenges emerging from this new paradigm were addressed in the first German trend study on science communication—a comprehensive survey conducted between September 2009 and October 2011 among 326 science journalists and Public Relations (PR) managers, scientists, and communication researchers, leading to an adjacent two-stage Delphi

study with 30 renowned experts, researchers, and practitioners who aimed to find answers to the challenges expressed by the community.

The findings (Gerber, 2011a) show trends in decreasing salaries, revenues, and media coverage on the one hand and increasing PR resources and direct online communication by scientists on the other. The four main trends identified and investigated within the study were as follows:

- 1) Influences of social media on science PR, science journalism, and scientific communication.
 - i) Science journalism is moving from classic storytelling and translating to moderating and investigating.
 - ii) The increasing demand in social media consulting and training in science PR is a clear sign of an upcoming second wave of professionalization among communicators.
 - iii) Scientists witness paradigmatic shifts both in expectations as well as in self-perception. Public science and open science will increasingly flatten scientific hierarchies (“sharing” vs. “status”).

- 2) Transparency through open science and citizen science create promising opportunities for renewed “cultures of communication,” which then could foster scientific citizenship.
 - i) If practitioners in science communication are serious about involving the entire spectrum of civil society in terms of a scientific citizenship, they will need to abandon their main focus on research results. New formats will switch more authentically between results- and process-oriented perspectives.
 - ii) Science PR / science media / science education have to make the relativity of the knowledge they create more transparent. New media can serve as an enabling technology for this approach.

- 3) Fundamental changes both in the self-perception of science communicators as well as the required qualification for professional science communicators in their new roles as “mediators.”
 - i) Sustainable science communication in the fifth development stage will exceed the previous approaches of the “packaging industry.”
 - ii) The communicator’s performance will increasingly be measured by whether he or she succeeds in assembling the pieces of the transdisciplinary puzzle within the institution instead of merely disseminating project results or cultivating a brand.

- iii) In lieu of squeezing news through narrowing information channels, PR will need to “agenda-surf” on socio-political waves. As a consequence of PR professionalization, it is becoming more and more important to communicate cooperatively.
- 4) Obstacles of a change-resistant scientific system that hardly incentivizes “real” outreach at all, leading to challenges such as measuring or norming communication impact.
 - i) Today’s criteria for research funding, evaluation, and the appointment of senior positions mostly disregard communication achievements. New systems of incentivizing outreach to the lay public will be considered. Such catalysts will foster a broad change in communication culture.
 - ii) Hereby, one of the major challenges and success factors lies in the ability to measure and compare communication performance, especially regarding social media activities. This will lead to a debate about norming and standardizing these new measurements. For the short term, specific communication audits will be sufficient.

By investigating these trends, the study could answer several of the challenges that were expressed beforehand by the community and were based on further statistical analyses, e.g., the decreasing sold circulation of popular science magazines in Germany by an average of 30 percent within the last 10 years (Gerber, 2011b).

Challenges in the Fifth Phase of Science Communication

As high as the change potential of Internet technologies might be in academia, the vast majority of both scientists and science communicators mostly react hesitantly, at best, to the new opportunities. In compliance with the findings of Bader et al. (2012), Dernbach and Schreiber (2009), Kleinmann et al. (2008), and Procter et al. (2010), the yet unpublished results of a comprehensive Web technology use and needs analysis conducted between February and June 2012 in nine German research institutes (Gerber, 2012) leave no doubt that the use of interactive and social media in academia is still a niche phenomenon. (The study combined an online survey among 617 participants with 30 in-depth interviews with decision-makers and standardized Web analyses of nine scientific institutions.)

Among the 14 most common online tools surveyed, ten were widely unknown (ranging from 35.8% publicity in the case of ResearchGate to 16.1% in the case of SlideShare). The best-known tools, however, were also those that were rejected by the majority of researchers, e.g., Twitter, which was rejected by 80.5% of the respondents.

In contrast to the assumptions of the aforementioned analysis, the willingness of researchers to use certain Web technologies does not automatically increase with the sheer publicity of these technologies. Whereas scientists are similarly familiar with ResearchGate und iTunes University (35.8% and 37.2%, respectively), the ratio between opponents and users of these platforms is more than twice as high in the case of the Apple platform (4.08) as in the case of ResearchGate (1.92); i.e., the degree of refusal is significantly more distinct. The only conclusion from this appears to be that sheer education or information about the new possibilities has not solved and will not solve the problem of slow adoption in academia. Nonetheless, the lack of orientation becomes obvious in the fact that 73.7% of the researchers interviewed explicitly expressed a demand for training in social media.

In compliance with these figures, the aforementioned Delphi study (Gerber, 2011a) showed clearly that a diffusion of Web 2.0 tools in the academic world is only partly a question of technology acceptance. For instance, online communication is still not taken into account in most cases of evaluations or allocations of research funding. The Delphi experts, therefore, demanded a critical discourse about possible incentives for scientists to reach out into the online world.

If online outreach, however, became a relevant criterion for academic careers, we would have to find more empirically sound ways to measure, compare, or even standardize and audit the impact of such outreach.

There is a widening gap between the masses of scientists communicating “ordinarily” on the one hand and the very few cutting-edge researchers and (mostly large and renowned) institutions experimenting extensively with the new online opportunities on the other. Therefore, it will be a major challenge for science communication scholars to provide appropriate advice and practical orientation.

Furthermore, the study investigated how an increase in transparency through open science could lead to a new culture of science and scientific communication. Such a dialogue would have to complement classic approaches of dissemination to engage with a much wider spectrum of societal groups than the dissatisfying spectrum that has been reached up to now. For instance, accordant studies over the last decade have unmistakably shown that civic scientific literacy within the European Union reaches no more than

an average of 13% (Miller, 2012). The obvious conclusion from this is that the supposed “social contract” between science and society has not been fulfilled through the PUSH paradigm.

Scientific institutions, more than ever, have difficulties in convincing lay people of the importance of their role in society. To avoid becoming easy prey for governments that might want to reduce state deficits, the aim of widespread scientific citizenship is far more than an academic endeavor.

One approach suggested by the Delphi experts is trying to distort the process of knowledge creation much less than has been done both in science PR and science journalism. Eighty percent of the experts see a major deficit in science being reduced to research results, whereas the process and mechanisms of innovation and scientific achievement remained unclear. This “science in the making” seems to be the hardest to convey by the media, even though scientists and science PR experts regard this aspect as the most important in inspiring young people to enter a career in research and development. Science blogging was mentioned by many of the experts as a possible solution due to its authenticity.

Taking all of this into account, the main challenges seem to be much less technological than they are cultural and systemic. Possible solutions, therefore, do not lie primarily in the tools or in the strategies but in the systemic frameworks of knowledge creation and dissemination as we have practiced them for decades, if not centuries. Permeating “open science” under closed paradigms can succeed only if the embedding communication frameworks are adapted. This will include just as many new forms of impact measurement, recognition, and qualification, as it will include obvious solutions from the archaic toolbox of the Enlightenment phase. The scientific community, however, still has a long way to go to properly understand the causes, effects, and solutions for this cultural change.

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