

Five Thoughts About Improving Science Communication as an Organizational Activity

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Discussions about science communication often focus on how individual scientists can become more effective by improving their ability to speak or write clearly, foster dialogue, and tell stories (Besley & Dudo, 2017). Such tactical skills are useful but being a strategic science communicator requires more than individual skills. This essay describes five specific problems that highlight the need for enhancing the role of organization-based teams in developing and implementing strategic communication within the scientific community.

The ideas contained are the result of a decade of research on North American scientists' views about public engagement (e.g., Bennett, Dudo, Yuan, & Besley, 2019; Besley, Dudo, & Storksdieck, 2015; Besley, Dudo, & Yuan, 2018; Besley, Dudo, Yuan, & AbiGhannam, 2016; Besley, Oh, & Nisbet, 2013; Besley & Tanner, 2011) and an ongoing dialogue with scientists, communication professionals, and fellow researchers. It also builds on strategic communication arguments about the importance of differentiating communication tactics, communication objectives, and behavioral goals (Hon, 1998). Providing this type of commentary involves a need to make broad generalizations and I therefore try to describe the rationale behind the claims while recognizing the fragmented and incomplete evidence base. The arguments are also based largely on an American context. Although some of the arguments could be interpreted as critical of existing science communicators, I make these arguments out of a desire to build on current efforts and with deep admiration for the science communication community. The first three problems focus on communication strategy and foreground the challenges of thinking about communication in evidence-based ways. These challenges lead to the fourth and fifth arguments, which highlight the potential value of greater reliance on organization-based teams to allow the scientific community to better draw on the expertise of well-trained communication experts, especially communication strategists.

Problem 1: Inadequate identification of communication goals

First and foremost, too few science communicators identify clear behavioral goals before devoting time and resources to communication. In this paper, I define goals as the audience-specific behaviors that a communicator would like to see occur because of their communication efforts. These could be individual or personal (e.g., the target audience doing more or less of some activity, consuming or purchasing more or less of some good or service, etc.) or civic (e.g., the target audience voting for, donating to, or otherwise supporting a policy, person, or group). In some cases, the desired behavior might involve somewhat ephemeral outcomes, such as a willingness to accept a decision (i.e., a target audience engaging in behavioral trust by making itself vulnerable, or accepting the legitimacy of a controversial decision) (Besley, 2010; Schoorman, Mayer, & Davis, 2007). For example, those studying nuclear energy and genetic modification of food do not necessarily need explicit support from consumers; they often just need non-opposition. A final—and vital—type of potential goal involves changes to the communicators' behavior. In this regard, ethical and strategic communicators should plan for the possibility that their communication could change the research they do, how they do their research, or something else.

One way that communication experts can help identify goals is by asking science communicators to describe what they hope to achieve through communication and then pushing back until they get an answer that identifies a distinct, measurable behavior. In my experience, when first asked about goals, scientists often say something like they want to correct misinformation or get people excited about some topic. The task then becomes to work with the science communicator to identify a specific behavior (within a specific audience) that the scientist thinks might change as a result of correcting beliefs or stoking an audiences' emotions.

Doing so can then enable a discussion about whether trying to correct misinformation or garner excitement is the most efficient or ethical way to increase the likelihood of achieving their goal behavior. In this regard, another key element of behavioral goals is that they must typically be achieved indirectly and over time by targeting a range of beliefs, feelings, and frames within a specific audience (Montano & Kasprzyk, 2015). Unpublished research with my colleagues suggests that scientists' most common goals involve advancing the place of science in policy and society (Besley, Dudo, & Newman, 2019). This raises the second issue I see with many science communication efforts.

Problem 2: Inadequate identification of communication objectives

Science communicators' frequent failure to identify behavioral goals often seems accompanied by inadequate identification of intentional, intermediate communication outcomes—communication objectives—that might lead to desired behaviors (i.e. the cognitive or affective mediators that precede behavior). Researchers often note that the common objective of filling deficits in audiences' scientific knowledge rarely results in substantial impacts on behaviors (National Academies of Sciences, Engineering, and Medicine, 2016). However, the research community has done less well articulating alternative objectives (beyond scientific knowledge) that communicators could seek to achieve. Trainers will sometimes emphasize the importance of communicating the benefits of science or fostering emotions such as excitement, or anger (Bennett et al., 2019; Besley & Dudo, 2017). They will also sometimes speak vaguely of building trust, but it is rare to hear substantive discussions on making tactical choices aimed at fostering specific trust-related beliefs about scientists (e.g., beliefs about motivations, integrity, ability, willingness to listen, and shared identities). It is especially rare to hear substantial discussion of how to achieve objectives related to common communication research topics such

as normative beliefs, efficacy beliefs, and specific framing choices (Bennett et al., 2019; Besley et al., 2018; Besley et al., 2016; Dudo & Besley, 2016).

One reason science communicators may rarely discuss a broad menu of potential objectives is that many communicators seem to have backgrounds in the natural sciences and journalism, rather than the social sciences. Just as social scientists may not have the background to deeply understand how the chemistry of how mitochondria work, few science communicators have had the opportunity to learn the nuances of the language that social scientists have developed to discuss the workings of social psychological constructs such as beliefs, attitudes, values, emotions, and framing. This does not mean science communicators without a social science background lack knowledge about effective communication; it simply means that conversations about the social science of science communication need to be done with respect for different types of expertise.

At the same time, there seem to be few incentives or resources for social scientists studying science communication to do (or share) applied research that could provide practitioners with clear guidance on clarifying goals, identifying communication objectives to help achieve those goals, and deploying tactics to achieve those objectives. A lack of applied research also means that those wishing to practice evidence-based communication must often extrapolate from disparate and hard-to-penetrate literatures. Communication researchers need to work with practitioners to identify potential research needs and use our role as peer reviewers to ensure that such research gets published.

Problem 3: Inadequate identification of communication tactics

A third potential problem is that science communicators sometimes talking about tactics when trying to discuss communication effectiveness. Tactics include choices about messages,

communicative behaviors (e.g., how much time devoted to discussion at a public meeting), the tone or style of communication (e.g., humorous, or serious), the channels used, and the communicator. Thus, the use of plain language and storytelling constitute tactical choices, whereas the content of such tactics represent message choices. Similarly, creating opportunities for dialogue also represents a tactical choice rather than a communication objective. Tactics are primarily valuable in conversations about communication effectiveness when they are discussed as tools to achieve specific communication objectives.

A commonly discussed tactical choice involves admonitions about the value of public engagement. While some communicators suggest that public engagement should be understood as two-way communication, I prefer to understand public engagement as communication activities where there is a focus on trying to ensure that all participants—including participating scientists—have the motivation and opportunity to cognitively engage (Chaiken & Maheswaran, 1994; Petty & Cacioppo, 1986) such that there is an increased likelihood of new, long-term beliefs. These beliefs might be about scientific facts, but they could also be about people (e.g., trust-related beliefs related perceived motivation, integrity, etc.), risks and benefits, social norms, or self-efficacy. Dialogue is powerful tactic for promoting cognitive engagement, but other tactics might also prove helpful in certain circumstances.

In this regard, public engagement can be understood as communication that seeks to improve the quality of public opinion (Price & Neijens, 1997) inasmuch as it seeks to build the types of long-term cognitive structures that accumulate over time as people try to make sense of the world (i.e., the results of system 2 thinking, central route processing, or systematic processing). Similarly, the decision to focus on engagement might be understood as an ethical commitment to communication that does not seek to take advantage of humanity's tendency to rely on cognitive

shortcuts (i.e., system 1 thinking, peripheral processing, or heuristic processing), including affect-related heuristics (e.g., emotion).

Understanding the use of public engagement activities as a type of tactical choice also means it does not make sense to talk about public engagement as a stand-alone goal or objective. This becomes especially clear when we consider that talking about the effectiveness of public engagement activities suggests the need to discuss the degree to which activities may have changed participants' beliefs, feelings, or frames and the degree to which such changes might, in turn, impact participants' behaviors.

Problem 4: Scientists' inadequate use of strategic science communication expertise

A fourth problem I see with current science communication discussions is that they seem to focus too heavily on improving scientists' individual communication skills (Besley & Dudo, 2017) and too little on helping scientists collaborate with communication experts. This problem is where the need for organizations seems especially apparent. The multi-billion-dollar strategic communication industry and profession has expanded over the last century for a reason: communicating effectively and efficiently is hard. The conceptual and technical skills needed to develop, implement, and evaluate goal-focused communication activities are different from those needed to succeed in other organizational functions. People without communication training can often communicate well in some circumstances, but even the most charismatic leaders typically employ teams of communication strategists, writers, and logistics experts once they have the resources to do so. It seems too much to expect working scientists to have the skills or time needed to identify specific behavioral goals (problem 1), and the intermediate communication objectives (i.e., beliefs, feelings, and frames) that might help achieve those goals (problem 2). Choosing, deploying, and evaluating communication tactics' impact on objectives also requires

specialized skills (problem 3). One potential reason that too few scientists make use of science communication expertise is likely limited access to communication experts in their organizations.

Problem 5: Scientists' inadequate access to communication expertise

The fifth and final problem I want to highlight is that we have too few organizations (or dedicated groups within organizations) focused *primarily* on helping the scientific community ensure the health and welfare of science. Most communication experts within the scientific community work for organizations where the primary goals are about helping the organization rather than advancing the overall scientific enterprise. Such organizations—including universities, scientific societies, or companies—may sometimes do things that strengthen the overall place of science in society. However, advancing science may not always be a priority in the face of the organization's need to attract donors, ensure taxpayer funding or revenue, recruit students, and deal with periodic crises. Many countries have stand-alone organizations such as the American Association for the Advancement of Science (AAAS), or the National Academies of Science, Engineering, and Medicine (NASEM), the Royal Society, the Academy of Science Leopoldina, or the Chinese Association of Science and Technology that sometimes seek to speak on behalf of science but these organizations seem small relative to the overall scientific endeavor. Similarly, many museums and science centers may also have missions that focus on enhancing the place of science in society, but these organizations are also often constrained by the need to generate the revenue needed to pay the bills.

Ultimately, it seems that much of the public face of science often comes in the form of self-selected, self-directed, and poorly resourced scientists who find ways to develop a public profile. Many of these science communicators likely have positive effects on how people see

science and scientists, but the scientific community needs to ask itself if it wants to entrust its overall reputation and impact largely to *ad hoc* communicators. It is not hard to think of examples of problematic behavior such as aggressive science communicators who do things that may generate clicks but hurt the broader scientific community (Hardy, Tallapragada, Besley, & Yuan, 2019; Yuan, Ma, & Besley, 2019). We can do better.

The path forward

In light of the problems outlined above, my working conclusion is that the science communication community should put more priority on getting decisionmakers within science organizations (i.e., public and private funders, university leadership teams, scientific societies, principal investigators of research teams) to pool resources to enable more high-quality communication efforts focused on advancing the scientific enterprise. If the scientific community collectively thinks getting policymakers and citizens to use and fund science is important (Besley et al., 2019), then we need to organize ourselves in ways that help make such goals possible. This likely means decreasing the use of individual and organizational resources on *ad hoc*, non-strategic communication and convincing those who allocate and distribute the budgets for science organizations to provide the resources needed to communicate professionally. An initial indicator of commitment to improved communication would be stable budgets to both employ communication experts and sustain goal-directed, organization-led communication campaigns. Grassroots efforts (e.g., individual scientists working on their own) could still occur, but the hope would be that those involved in such efforts would try to find ways to build on community goals and enhance the collective impact.

One immediate way that organizations could show that they care about quality over quantity is through the credit they give during hiring, annual review, and promotion decisions to

scientists who communicate. Funding organizations could also give credit to principal investigators who make substantive commitments to communication quality. I have frequently heard American scientists ask for more professional credit for their science communication activities but seldom hear a discussion of evidence-based quality metrics we could use to assess communication quality. Scientists must show the impact of their research, teaching, and service to receive credit and we should expect similar efforts from scientists who want credit for the time and resources they devote to science communication. Asking scientists to show impact to receive credit for communication could lead to the development of organizational mechanisms—including teams that include both scientists and communication strategists and tacticians (Grunig, Grunig, & Dozier, 2006)—aimed at ensuring communication quality.

It also worth thinking about what organizations are best placed to advance science. It may be that the higher-level units within universities (i.e., communication shops linked to presidents' or deans' offices) have enough responsibility with raising funds and attracting students that they will have a difficult time focusing on the type of communication we need to help ensure a robust role for science in society. Organizations such as scientific societies and individual research centers might therefore be better places to pool resources and build the organizational capacity needed to best communicate on behalf of science. Such organizations are also well positioned to come up with field-specific or location-specific goals around which to develop communication strategy and build stakeholder relationships. At this point, however, the key is recognizing that we could enhance the quality of our communication efforts by moving away from individualistic, *ad hoc* communication and moving towards developing organizational capacity for strategic science communication.

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