



COMMENT

Reshaping science communication in a critical period of disinformation and distrust

Commentary on

Science communication in changing political winds

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Abstract

I was invited by my colleagues, Leßmöllmann and Medvecky, to participate in a set of commentaries on the role of science communication in the post-truth era, which will be published in the *Journal of Science Communication*. My reflection will focus on how reshaping and promoting official or governmental science communication could help minimise the impact of misinformation on science-related issues, such as climate change, vaccines and artificial intelligence, among others, in the public sphere.

Although European and Western governments have increasingly embraced the integration of science communication as a structural and ethical component of their public information strategies, these efforts have mainly centred on fostering dissemination practices led by individual researchers or research teams. However, this approach often overlooks the equally critical role of institutional communication systems, which are incapable of translating scientific knowledge into clear, accessible and actionable information for the broader public. This omission becomes particularly salient during crises when citizens actively seek guidance grounded in scientific evidence and are frequently met with institutional silence, ambiguity or poorly coordinated messaging.

Keywords

Policy-making, communication and governance of science; Public engagement with science and technology; Risk communication

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Citizens navigating overlapping information. The growing politicisation of scientific issues in public discourse has made it more difficult for citizens to distinguish between evidence-based knowledge and partisan messaging (beyond the use of *green*, *blue*, *pink* and *social washing* in corporate campaigns and political parties). For instance, in countries such as Spain and the United Kingdom, politicians have frequently presented alternative interpretations of data or employed disinformation for political gain [Armstrong-Taylor, 2012; D. G. Lilleker, 2018; D. Lilleker & Pérez-Escolar, 2023]. Such practices raise concerns about the potential erosion of public trust in both science and democratic institutions, although the specific effects may vary depending on political, cultural, and communicative contexts (for example, fact-checking agencies like *Newtral* (Spain) and *Full Fact* (U.K.) regularly debunk science-related hoaxes that are politically driven or exploited for partisan gain). Concurrently, however, governments are attempting to integrate science communication as a structural and ethical component of their public information strategies. The frameworks from the European Union and other consolidated democracies offer examples of how embedding science communication into research policy and funding requirements can promote transparency, civic trust and accountability [Claessens, 2012; Davies et al., 2021; Campillo-Alhama et al., 2024].

The review of European scientific policies over the two past decades, such as the implementation of initiatives like the Horizon 2020 programmes (2014–2020) funded by the European Commission, has produced a pivotal shift in how governments, research communities and the public at large integrate science communication and outreach into their social systems and daily lives [Young, 2015]. Activities that were once considered optional for scholars and scientists have been increasingly recognised as fundamental components of the research process [Entradas et al., 2020; Rose et al., 2020; Elliott, 2023]. Consequently, knowledge transfer to society — previously not regarded as a core scientific duty — has now become an essential aspect of academic culture. According to Lewenstein [2022], science communication has evolved from being seen as an optional or secondary task to being understood as a central, even requisite, responsibility of modern scientists due to the historical shift in norms within academia and science policymaking, placing greater emphasis on engagement with the public and knowledge transfer as formal duties of scientists.

Furthermore, knowledge transfer and public communication are now central to the structure and evaluation of scientific work [Driscoll & Lynton, 1999; Young, 2015]. This means that research is no longer deemed complete until its findings have been effectively communicated to the broader public. Indeed, in countries with consolidated democratic systems and well-established science governance structures — such as those in the European Union, the United States, and Canada — national quality assurance and academic evaluation bodies (e.g., AqC in Portugal, ANECA in Spain, QAA in the U.K., and WES and ECE in the U.S.A.) have increasingly incorporated science communication and public engagement as assessment criteria in researcher evaluations. This shift has contributed to the broader production and dissemination of evidence-based information to the general public. It is one of the main reasons why more evidence-based information is now available to citizens than in the past (in addition to advances in policy, governance, and open access).

The entropic death of scientific and science information. Just as this transformation was gaining momentum, however, the emergence of the post-truth era in 2016 raised new and complex challenges for the role of science within and for society [Lewandowsky et al., 2017; Sismondo, 2017; Vernon, 2017; Kopf et al., 2019]. Beyond the post-truth era concept, the

world is currently immersed in a saturated environment of alternative facts, fake news, disinformation, misinformation, truthiness, gaslighting, information disorder, echo chambers, cognitive bias, spin and so forth. This hyperabundance of conflicting and emotionally charged content has led to what Markham [2015] and Han [2018] have described as information overload and saturation. I prefer to talk about the entropic death of (science and general) information, a state in which meaning dissolves into noise, namely, a sort of information collapse. In other words, as citizens are bombarded by an overwhelming amount of information (news, opinions, memes, facts, misinformation, etc.), it is difficult for them to separate the grain from the chaff, with the distinction between truth, relevance and falsehood often becoming increasingly blurred.

Eventually, the system, the media and public discourse reach a point of saturation when they can no longer process or prioritise information meaningfully, a situation that leads to cognitive overload and possibly to confusion and even political apathy and media avoidance – a sort of ‘death’ of the original role of information, namely, to keep people well-informed. Scholars such as Grignolio et al. [2022], Monsees [2021] and Pothos et al. [2021] have stressed this idea of how systemic misinformation and cognitive biases create a reality in which factual consensus becomes almost impossible. This pervasive condition fosters an environment in which mis- and disinformation flourish not only due to malice or manipulation but also because of the sheer volume and pace of competing narratives. As a result, the cognitive burden of citizens intensifies, thus diminishing their ability to distinguish between scientifically grounded evidence and ideologically motivated distortions.

Over time, this erosion of epistemic clarity not only challenges the authority of science but also undermines the credibility of scientific findings. Moreover, it gradually chips away at the legitimacy of democratic institutions themselves, as public trust becomes increasingly decoupled from empirical reality and redirected toward partisan, religious or conspiratorial belief systems, among others [Lee et al., 2023; Masrek et al., 2024]. In relation to climate change, for instance, the arguments underpinning denialism have led to a *new form of denialism*. While accepting the increase in global temperatures, new arguments have been deployed to break the scientific consensus (such as minimising human responsibility, emphasising economic trade-offs, or promoting the idea that warming is manageable or beneficial), resulting in an epistemic crisis in which political, social and scientific truths are persistently contested or ignored by the citizenry [Achiam et al., 2024; Cobb, 2024].

In democratic societies, the integrity of institutional communication is not merely an operational requirement but also a moral and political obligation [Elliott, 2023]. Public trust, civic cohesion and democratic legitimacy all rest on the expectation that governments and public institutions will act transparently, especially during periods of uncertainty or crisis. Yet, in recent years, this foundational trust has been steadily eroded by repeated failures in official communication. When institutions withhold critical information, delay essential alerts or – more seriously – disseminate falsehoods, the consequences for citizens extend far beyond the moment of crisis [Moreno-Castro et al., 2025].

The high risk of disinformation when there is a lack of official information. Two recent emergencies in Spain illustrate the high stakes of institutional communication failure and, consequently, the emergence of disinformation. The first is related to the flash floods affecting the southern part of the city of Valencia (on the Mediterranean coast) in October 2024, which not only revealed the lack of readiness of emergency response systems but also

the government's failure to inform and protect the citizenry. Warnings were issued too late and lacked actionable instructions. Citizens in affected areas, many of whom were already isolated without electricity or a mobile signal, were left in a state of confusion and fear. In the absence of reliable information, disinformation spread rapidly, with false stories of dam demolitions, fabricated warnings from national meteorological agencies and conspiracy theories about engineered weather events flooding social media, according to a fact-checking report released by Maldita.es [2024]. These often emotionally charged narratives exacerbated public anxiety and created a parallel reality in which rumours superseded verified facts. The institutional silence during the initial hours of the crisis was not simply a missed opportunity but a profound betrayal of the public.

Citizens depend on institutions to mediate their understanding of emergencies, interpret risks and guide their behaviour. When governments fail in this duty, the result is not only disorientation but a loss of belief in the state's role as a protective actor. In such scenarios, disinformation is not merely a digital nuisance but becomes a coping mechanism for communities left to their own devices to interpret chaos. The psychological toll is considerable: fear, distrust and a sense of abandonment become the defining features of the citizenry's experience [Moreno-Castro, 2025].

In the second example, this pattern repeated itself during the massive blackout that affected most of the Iberian Peninsula (Portugal and Spain) in April 2025. Millions were left without electricity, Internet and mobile connectivity. Yet for hours, no official information was issued, and the Spanish Prime Minister did not release a public statement until late in the day. The silence was filled with viral narratives about sabotage, foreign cyberattacks and fantastical explanations involving extraterrestrial interference. These were not fringe conversations but formed the dominant discourse in the absence of state intervention. For citizens, particularly those who were isolated or vulnerable, this void of credible information created emotional distress, disorientation and a perceived collapse in institutional authority.

The effects of such communication failures are cumulative and corrosive. Research in political science and public policy [e.g. Norris, 2011; Marks, 2023] has shown that inconsistent or weak institutional communication contributes to a decline in public trust and reduced participation in democratic processes. Weak institutional communication does not simply affect trust in a single agency or leader but alters the citizenry's relationship with the state itself. Over time, the absence of truth in official sources leads to civic disengagement, increased polarisation and greater receptivity to extremist narratives. A public that feels systematically misled or neglected becomes more likely to withdraw from democratic processes, more sceptical of institutional intentions, and more inclined to seek alternative sources of authority, often outside the democratic framework [Denemark & Niemi, 2012].

Moreover, the manipulation of language by political actors compounds the problem. When elected officials use emotionally resonant terms like 'freedom', 'truth' or 'security' not to inform but to muddy the waters or deflect responsibility, they degrade the very concepts on which democratic accountability rests. This rhetorical erosion blurs the distinction between governance and propaganda. Citizens are left with no reliable semantic reference point, no clear sense of whether official language is factual, strategic or ideological posturing.

Strong governmental or public information. Restoring the credibility of institutional communication must, therefore, be recognised as a priority, not only for emergency management but also for democratic renewal [Elliott, 2023]. More than technical

improvements or media strategies, it requires a cultural and ethical shift within institutions — a renewed commitment to factual integrity, timely disclosure and communication transparency as essential pillars of public service. Pre-established communication protocols must be institutionalised, with multilingual, multimedia and analogue dissemination capabilities ready to be activated immediately. Public officials must undergo regular training in risk and crisis communication [Reynolds & Quinn, 2008], while independent oversight mechanisms should monitor the truthfulness and timeliness of institutional messaging.

Crucially, citizens should not be treated as passive recipients of institutional narratives but as democratic participants entitled to the truth. Communication in a crisis is not a favour extended to the members of the public by the powers that be, but a fundamental right. When this right is violated, the social contract itself is jeopardised.

The examples of the 2024 Valencia flash floods and the 2025 Iberian Peninsula blackout offer more than cautionary tales. They reflect a broader tension between technological acceleration and institutional inertia, between the speed of disinformation and the slowness of official and governmental response. There is often a lack of visibility and accessibility of data and science information from public institutions, particularly during emergencies. Rather than being always intentional, this opacity is usually the result of limited internal and external communication capacities, under-resourced departments and insufficiently integrated crisis protocols. For instance, international cases of flash floods have repeatedly shown that citizens actively seek and demand science and institutional information in real-time, but these demands frequently go unmet, not necessarily because of unwillingness but due to fragmented communication infrastructures and resource constraints.

Addressing these structural limitations is as critical as countering disinformation if the aim is to strengthen democratic trust and institutional legitimacy. To close this gap, public institutions must reclaim their communicative authority, control the narrative and commit to the values of transparency, humility and truth. In this way, they could begin to repair the fragile trust underpinning all democratic legitimacy. Trust in institutions is a critical yet brittle asset. Its erosion — particularly through poor crisis communication — has profound psychological, social and political consequences. Scholars, journalists and communicators worldwide are calling for urgent cultural shifts towards transparency, empathy, ethics and accountability in public institutions to restore this foundational trust. Medvecky and Leach [2019] called for science communication to initiate a reflective ethical conversation to define its unique identity and values, enabling practitioners to do the *right moral thing* in diverse contexts.

Reshaping science communication. Against the current backdrop of complex societal challenges, ranging from climate change to public health crises, there is an urgent need to reinforce the interface between scientific knowledge and policymaking. One promising step forward in science communication could be the institutionalisation of science advisory offices that report directly to heads of government, as exemplified by the Anglo-American model of chief scientific advisors. These structures, established in countries such as the United Kingdom, Canada, New Zealand and, at least historically, the United States, serve as conduits of scientific evidence and mechanisms to strengthen public trust in governmental decisions. By embedding scientific advisors in the highest levels of governance, these models would help to ensure that policy is informed by robust, timely and context-sensitive expertise.

The recent establishment of Spain's Oficina Nacional de Asesoramiento Científico (National Scientific Advice Office, ONAC) further underscores the growing international recognition of the strategic value of scientific advice in democratic systems. Acknowledging the diverse scientific advisors working across ministries and agencies worldwide, it becomes increasingly clear that science communication must evolve beyond dissemination to become a structural element in the architecture of public decision-making. Institutionalising scientific advice at an executive level would elevate the role of evidence in policymaking, while also repositioning science communication as an essential embedded function of democratic governance. In an ideal world, scientific advisors should be a public body, like civil servants, for the purpose of establishing a global information system (apps, warning systems, citizen meeting points, local news channels, etc.). As we face many emergencies stemming from global warming and other crises, it is necessary to consider recommendations from experts in different areas so as to inform the public at large and advise governments. This is essential for organising emergency preparation needs such as evacuation and meeting and information points, to mention but two.

In conclusion, although European and Western governments have increasingly embraced the integration of science communication as a structural and ethical component of their public information strategies, these efforts have mainly centred on fostering dissemination practices led by individual researchers or research teams. However, this approach often overlooks the equally critical role of institutional communication systems, which are incapable of translating scientific knowledge into clear, accessible and actionable information for the broader public. This omission becomes particularly salient during crises when citizens actively seek guidance grounded in scientific evidence and are frequently met with institutional silence, ambiguity or poorly coordinated messaging.

Against this backdrop, my recent research has focused on how institutional communication protocols grounded in the science of science communication are being implemented. The aim is not merely to enhance the visibility of international scientific production but also to ensure the systematic transfer of evidence-based information to the public at large, thus enabling informed decision-making and reinforcing the democratic function of science in, with and for society.

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