

Editorial

# When Science Communication Becomes Parascience: Blurred Boundaries, Diffuse Roles

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The communication of science goes hand in hand with technological development and, in general, with the need to apply scientific advancements to the improvement of human wellbeing. The publication of scientific journal articles became a milestone for modern science, as academics shared an interest in research output being available to all other scholars [1], with the scientific community as the privileged audience with access to new knowledge. However, since the second half of the twentieth century, researchers have increasingly been required to go beyond the publication of their results in high-impact journals, usually English medium, only accessible to their peers both in terms of knowledge availability and understanding, and to communicate and disseminate their findings in varied contexts among different agents and audiences in an attempt to democratise access to science. Science communication to various types of non-specialist publics has been understood as a “crucial responsibility of research scientists” [2] to facilitate citizens’ understanding of complex knowledge and their participation in decision-making processes. Moreover, communicating scientific knowledge and engaging the public is currently of paramount importance for funding and accountability reasons. The use of the digital medium has fostered such dissemination and access to knowledge, rendering digital discursive practices increasingly complex for scholars and scientists, who need to embrace multimodal and multimedia means of communication. Research findings and implications must reach not only multiple stakeholders, but also an audience of laypeople.

As such, dissemination is undertaken in new ways, modes and discourses that seek to bring science closer to society and to promote citizens’ participation. The affordances of existing and emergent platforms are fostering a change in audience roles, and with it, the erosion of boundaries between scientific communities and the general public, which entails disseminating scientific information and knowledge [3].

Within this context, we are witnessing the development of a type of discursive practices, which can be referred to as instances of “parascientific communication”. These practices go beyond the dichotomy between internal or expert (members of the scientific community) and external or non-expert (diverse publics) and transcend previously well-delimited communities and spheres of communication. Parascientific genres are evolving based on authoritative or expert knowledge (communicated through conventional, sanctioned scientific genres) but not subjected to the filters of internal, formal scientific communication [4]. In these genres, discourse “borrows scientific authority and knowledge structures from the realm of science but operates without the gatekeeping and traditional reporting forms of internal science communication. In other words, it borrows some features from the internal discourse of science without the whole complex of features upon which the epistemic authority of science depends” [4] (p. 231). In our view, parascientific communication contributes to the broad dissemination of science, empowering citizens, making them participants in advancements, offering them accessible answers to problems that may be complex for non-specialised audiences, and fostering their agency and participation [5]. This is largely achieved thanks to the affordances of the medium.



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The articles in this Special Issue contribute, in various ways and from different angles, to our understanding of how science is communicated and disseminated digitally. The studies include analyses of scientific and parascientific discursive practices across varied domains, such as Business [6], Chemistry [7], Physics and Astronomy, Medicine and Health, Biology and Life Sciences, as well as Earth and Environmental sciences [8]. They concern various topics of current impact and social interest, such as the press and social media coverage of the popular French scientist Didier Raoult [9], the communication of knowledge in the Harvard Business Review [6], COVID vaccines [10] and COVID-19 news [11]. They cover a myriad of scientific and parascientific genres: online readers' comments as user-generated text [10,11], press articles and tweets [9], video genres (Quick Study, Explainer, Tips and Ideas) [6], institutional and personal blogs [8] as well as a strategic proposal (Total SciComm) to broadly and diversely communicate science, from preprints to social and new media [12].

Promoting and easing participation from diverse audiences, including laypeople, can also pose risks and challenges, some of which are touched upon in the articles in this Special Issue. These include disinformation, or difficulty in disentangling speculation from reliable and contrasted information [10]; polemics and conflicts confronting legitimacy and authority [9]; trivialisation; entertainment, which does not necessarily come with ease of interpretation [7]); or the creation and spread of pseudoscientific information [11].

In our call for papers, we launched three sets of questions which are now answered by the results reported within this Special Issue, allowing us a better overall understanding of current scientific and parascientific communication.

*To What Extent Does Parascientific Communication Differ from Scientific Communication? Which Features Characterise It/Them?*

Parascientific communication takes greater advantage of the medium and platform affordances to foster readers' participation by means of commentaries and reactions, but seems at times to fail in possible opportunities to co-construct knowledge. On the one hand, such affordances seem to be effectively employed by users in media contexts, especially newspapers [10,11] and social media [9], in which readers make their contributions to the creation of knowledge. On the other hand, the corresponding affordances are not so commonly embraced by users in other contexts, such as the Harvard Business Review journal [6]. Moreover, whereas scientific communication through specialised discourse between experts tends to be linear and monosemic, expert–non-expert discourse tends to be non-linear and polysemic and takes advantage of a combination of different modes, which suits different levels of knowledge or expertise.

At a discursive level, parascientific communication seems to be characterised by a greater versatility and a wider range of resources aimed at explaining scientific matters in an accessible manner, as well as at promoting credibility, on the one hand, and dialogicity and closeness with the audience, on the other [6–8].

*Which New Discoursal Practices Are Emerging in Response to Boundary Erosion in Scientific Communication? What Do They Entail? Who Undertakes These? What Functions do They Fulfil?*

In an attempt to democratise science through its dissemination, new practices are emerging. Among the more innovative examples discussed in this Special Issue are videos shared on Facebook [6], graphical abstracts [7] and users' online comments [10,11]. Nevertheless, many other practices can and should be undertaken to communicate scientific ideas and engage all scientists as part of the Total SciCommon strategy proposed by [12], which encompasses scientific film and video, scientific games, scientific art and the scientific novel. These practices are undertaken by experts, journalists and citizens, who can easily respond to scientific topics and controversies. Whereas scientific communication constitutes legitimised, sanctioned knowledge, this needs to be brought closer to the audience and to diverse stakeholders through parascientific communication responses to which can become pseudoscience [11].

*Can Well Established Methodological Approaches Be Useful and Valid to Explore Digital Communication, Either in a Scientific or Parascientific Context? What New Perspectives Might Contribute to the Exploration of New Practices?*

A well established perspective such as Genre Theory, which approaches textual instances as social action, seems to be useful and valid to explore digital scientific and parascientific communication, although it has to be necessarily combined with other frameworks, among which multimodality seems most pertinent [6,7]. Of particular interest is the analysis of knowledge communication from a multimodal perspective, which encompasses knowledge expansion and knowledge enhancement processes proposed and applied by [6] to the study of the semiotic modes which contribute to making meaning in the interplay between texts and different types of video in the context of the Harvard Business Review. The study of genres has been further combined with other concepts and approaches, such as dialogicity [8], credibility [10] and distance and closeness [11]. New concepts within digital humanities such as textometry [9], which allows us to understand the themes of a corpus through the lexical words used in texts, has also proven highly insightful for the analysis of scientific digital discourse. Most studies have combined quantitative and qualitative analyses to address their object of study, to reveal discursive and social tendencies, but most importantly, to interpret them in the context of global scientific communication in general and, in particular, scientific or parascientific communication through the selected digital practice, genre or platform.

Overall, the contributions included in this Special Issue identify new digital practices of scientific communication, signal unexplored conceptual paths and propose innovative ways of applying existing methods for their study. Taken together, we believe that the seven papers that form this Special Issue will inspire future research and shed light on the diffuse landscape of digital science communication and dissemination.

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