

Inclusion, reflection and co-creation: responsible science communication across the globe

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Abstract

Science communication is at the heart of many of the challenges our societies face today. At the same time, on-going changes in the relationship between science and society and the digitalisation of society can make science communication itself into a complex challenge. How can science communication adapt to an ever-changing landscape and take on new roles? In this issue we explore the potential of 'responsible science communication' to support and develop meaningful, open and trustworthy relationships between science and society. We present a selection of papers that review three crucial dimensions of 'responsible science communication: reflexivity, inclusivity and co-creation'. Integrating theory and practice, this issue advocates that researchers and practitioners should be mindful of these dimensions to create meaningful conversations about science and our future.

Keywords

Inclusion, reflection, co-creation, responsible science communication; Public engagement with science and technology

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Science communication is at the heart of many of the challenges our societies face today. As a field of research and practice, we are thoroughly aware that we should not take the merits of science communication for granted. The digitalization of society has further intensified on-going changes in the relationship between science and society, urging us to rethink science communication. Since 2018, the European Commission has invested €10 million across eight research projects entrusted with taking stock of how science communication can strengthen the relationship between science and society [Roche et al., 2021]. As one of the first of those projects funded, the RETHINK project has demonstrated the need for science communication to be better understood in the context of an ever-changing landscape [Kupper, Moreno-Castro and Fornetti, 2021]. A first special issue in JCOM, that was published in May 2021, invited the science communication community to explore this new landscape, the challenges it entailed, and potential ways forward. It is not surprising that the concerns about the relationship between science and society have only deepened. The mass of information, channels and

formats is overwhelming. Which has extended the range of actors involved as well as the issues that are — or should be — addressed. At the same time, it is argued, society is increasingly fragmented and polarised. Many scholars and practitioners in the field of science communication are concerned that science and public may be increasingly distanced and alienated due to a pattern of fragmentation, polarisation and misinformation.

An important question for the science communication community is how to respond to these challenges. It may be crucial to adapt to the changing landscape and take on new roles. For example, in what way can science communication help science and the rest of society to mutually understand each other and develop meaningful, trustworthy relationships? To answer this question we may benefit from insights developed within the Responsible Research and Innovation (RRI) framework, propagated in the European research area since 2011. Building on earlier work on anticipatory governance, ethical reflection and public engagement, RRI aims to redirect the science-society relationship and involve all actors in a process of collaboration and dialogue to align scientific developments with society's needs, values and interests [Klaassen et al., 2018; Stilgoe, Owen and Macnaghten, 2013; Von Schomberg, 2013]. The 'responsible turn' invited by RRI asks scientists (and scientific institutions) to take responsibility for an open and mutually aligned relationship between science and society. Next to researchers themselves, funders of science communication research and science communication practitioners have also been tasked with considering the tenets of RRI [Mejlgaard et al., 2018; Scholten et al., 2016]. Despite these efforts, there are many questions left about 'responsible science communication'. What is the role of science communicators in this pursuit? What does it mean to engage in 'responsible science communication'? To what extent is 'responsible science communication' an answer to the above mentioned challenges and does it help to redefine science communication in a complex and changing world?

In this special issue, we explore the concept of 'responsible science communication' in light of the complex challenges of the current science communication landscape. From an RRI perspective, these challenges require an active participation of research and innovation actors in communication processes around research and innovation, now and in the future. Furthermore, it requires these processes to be *reflexive*, in terms of the critical reflection of individuals and institutions, 'holding a mirror up to one's own activities, commitments and assumptions' [Stilgoe, Owen and Macnaghten, 2013], and *inclusive*, in terms of the early and active engagement of a wide range of actors and stakeholders to take their needs and concerns into account from start to finish. Increasingly, co-creation is recognized as a suitable approach to operationalize these dimensions of RRI. Five contributions to this special issue highlight these three aspects of 'responsible science communication': inclusivity, reflexivity and co-creation. We have invited the authors to explore these notions particularly by reflecting on science communication practices. For the commentary section of this special issue, we have invited authors to reflect on the notion of 'responsible science communication' from the perspective of different regions of the world.

Inclusivity

One important impetus for its recent ‘responsible turn’ is that science, and by extension, science communication, have historically been dominated by white, western and masculinised perspectives [Canfield et al., 2020; Finlay et al., 2021; Nicolaisen and Achiam, 2019; Orthia, 2020]. This has important implications for those who engage in science communication — both its practitioners and its intended participants. Accordingly, the first sub theme of this special issue of JCOM focuses on inclusive science communication, understood as an approach that acknowledges the gendered, raced, classed, ableist (etc.) properties of science, and attempts to redress these historical and present-day inequities [Canfield et al., 2020].

In their study, Wilkinson et al. [2022] focus on the practices and motivations of science communicators in seven European countries: Italy, the Netherlands, Poland, Portugal, Serbia, Sweden and the UK. Across these countries, the authors find that although women and men practice science communication with similar frequency, there are indications that women tend to be found in more supporting and assisting roles in science communication, whereas men tend to be found in more senior and high-status roles. Their study suggests that the seemingly straightforward gender divisions in science communication found in other studies [e.g. Johnson, Ecklund and Lincoln, 2014] may have underlying nuances that are yet to be discovered.

Keith and Kerr [2022] address the underlying rationales of science communication. They point out how public discourse in the UK often focuses on the need for a more diverse STEM workforce *for the benefit of science and society*. This discourse positions inclusive science communication as a means to recruit youth from across socioeconomic, ethnic and gender spectrums to scientific career pathways in order to strengthen the economy, rather than as a means to better the situations of these individuals. In response, Kerr and Keith propose a ‘re-think’ of science communication that reframes science engagement in terms of its benefit to the individual, e.g. by improving lifestyle or employability.

Both papers in this sub theme illustrate how research in inclusive science communication has moved beyond first-order (but necessary) studies of the inclusiveness of individual science communication events. Instead, the studies presented here critically question the societal and institutional structures that govern science communication practices in Europe.

Reflexivity

The second subtheme, reflexivity, has long been associated with science [Bourdieu, 2004]. In recent years, reflective practice has been highlighted for both researchers and practitioners in wide-ranging ways, such as encouraging sustainable development during a pandemic [Fuertes-Camacho, Dulsat-Ortiz and Álvarez-Cánovas, 2021], supporting museum facilitators in their professional responsibilities [Moore et al., 2020], and promoting more inclusive approaches to science communication [Finlay et al., 2021]. The subtheme of reflexivity is addressed by two research papers in this special issue highlighting how science communication researchers and practitioners need to critically reflect on their assumptions, perspectives, and roles, as well as developing new reflective practices that foster inclusion, adaption, and sensemaking.

Bailey, Salmon and Horst [2022] describe an example of how critical reflection in science communication can be facilitated. Through their creative and playful example of an engagement incubator in the form of a pop-up cardboard laundromat, the authors demonstrate how design can be a powerful means of stimulating reflection on public engagement with science.

Roedema et al. [2022] demonstrate the importance of supporting science communication practitioners in developing reflective practice approaches to adapt engagement activities to complex and contemporary environments. The authors show how reflective practice provides a means for science communication to become more responsible by opening up conversations about all aspects of how science is communicated, from surface-level facts and evidence to underlying values, emotions, and worldviews.

Co-creation

The third subtheme, co-creation, is increasingly recognized as an important approach and methodology to operationalize RRI [Deserti, Real and Schmittinger, 2022]. In fields like participatory design, co-creation has since long been propagated as a promising tool for the inclusive development of new and experimental solutions. Co-creation transforms passive into active actors by involving them actively in all stages of a development process in order to take the needs and interests of all actors into account. From an RRI perspective, co-creation is used to engage neglected actors and stakeholders and better include society in research and innovation processes [Deserti, Real and Schmittinger, 2022]. Also in the area of science communication, co-creation gains traction [Rock, McGuire and Rogers, 2018]. At the science-society interface, co-creative practices are not only used to co-create research and innovation trajectories, but also to co-create science communication itself. This development is elucidated by the contribution of Magalhães et al. [2022] to this special issue. Their *practice insight* tells the story of the citizen science scicomm labs initiated by the NEWSERA project. These labs use a co-creation methodology to improve the communication strategies and impact of citizen science projects.

Commentary section: responsible science communication around the globe

Insights into what responsible science communication can and should look like are provided by researchers and practitioners in different parts of the world.

Gajewski [2022] gives an overview of how science communication practice in Poland has grown and yet could still benefit from openness and reflexivity to better address the needs and perspectives of public audiences.

Leach [2022] shares a commentary on what rethinking science engagement could look like in Australia. She suggests issues and opportunities facing responsible science communication as well as the tensions present in current science engagement efforts that need to be investigated and unpacked to bolster responsible science communication on a global scale.

Rasekoala [2022] thinks profoundly about the outcomes of the EU-funded project RETHINK and what they might imply (or not) for science communication in an African context. In doing so, Rasekoala considers how the project's implications are

embedded in the cultural norms, practices, historicity of the European continent. In response, she interrogates and situates those implications with respect to science communication practices in Africa – effectively decolonising RETHINK’s outcomes.

Aguirre Rios and de Regules [2022] consider science communication in Latin America from a historical perspective. The authors provide compelling narratives of science communication from across centuries and regions, and use these narratives to contextualise present-day practices. Specifically, they focus on the ongoing challenge of science communication — namely constructively aligning the views of the heterogenous citizens in the ‘melting pot of melting pots’ that is Latin America.

Jensen [2022] outlines some key considerations for responsible science communication based on available evidence in science communication literature and practice. He outlines a set of questions for future science communication research to shape responsible science communication around the globe.

Taken together, these commentaries lend support to the reflection offered by Gascoigne and Schiele [2020, p. 2], namely that ‘although the movement to foster the development of science culture is universal, it can only develop in the historical, cultural and social contexts of a country’. We see in the commentaries the rich influence of national and regional conditions on the evolution of science communication. If science communication as a field of research and practice indeed wants to contribute to the challenges of today, researchers and practitioners should be mindful of these conditions to make their efforts truly inclusive and reflective and co-create meaningful conversations about science and our future.

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