

## **NEW DOMAINS OF THE SCIENCE-SOCIETY BINOMIAL: OPEN SCIENCE, CITIZEN SCIENCE AND INFORMAL CONTEXTS OF PUBLIC ENGAGEMENT**

**NOVOS DOMÍNIOS DO BINÓMIO CIÊNCIA-SOCIEDADE: CIÊNCIA ABERTA,  
CIÊNCIA CIDADÃ E CONTEXTOS INFORMAIS DE ENVOLVIMENTO DO PÚBLICO**

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Science impacts various dimensions of human life. Social and economic development is closely intertwined with the capacity to incorporate scientific advances. In some cases, the affirmation of a political decision-making process based on scientific evidence, for example, during the pandemic in European democracies, has shown the growing relevance of experts in driving the destinies of society. Even leisure moments are increasingly enjoyed in technological contexts facilitated by science. Societies today are richer, more comfortable, safer and more diverse due to science.

While the role that science plays today in the daily lives of citizens and social order is unquestionable, its image and place in society face continuous challenges that may undermine public confidence in the scientific system. In some cases, such challenges stem from legitimate positions and real concerns about the risks and possible misuse of science motivated by vested interests. However, the profuse proliferation of fake news, pseudoscience and disinformation strategies has kept researchers, scientific organisations, policymakers, and other social stakeholders continuously alert. This apparent paradox, the growing mistrust toward science at a time when it is part of nearly all areas of human life, challenges everyone, especially researchers working on science communication issues and its relationship with society.

Promoting initiatives for a scientific culture among citizens and a greater dialogue between scientists, science institutions, and society has increasingly been the path to strengthening the recognition of and public trust in science. In this respect, a long way has been walked. It started with the “public understanding of science” paradigm and the “deficit” model (where citizens are seen as mere receptors of scientific information) up to the “public engagement with science” paradigm and the “dialogue” model (where citizens are seen as a constituent part of the scientific construction process). However,

we must further deepen the reflection on the reasoning, the evidence and experiences that have contributed to the enhancement of this bilateral relationship. Such is the case of citizen science and open science, and the new practices emerging in these contexts as important initiatives enabling this dialogue with citizens.

This issue of the *Lusophone Journal of Cultural Studies* (LJCS) should be read in this context as it seeks to motivate reflection and deepen the knowledge about the new practices that strengthen the relationship between science and society, opening the vast field of knowledge to the wider participation of citizens. The authors' responses to this call have been mainly translated into contributions addressing the topics of citizen science and, to a lesser extent, related to open science. Proposals of historical and conceptual approaches and experiences in these two domains are also paired with papers tackling the public perception of science and the possibilities of dialogues between society and the scientific enterprise.

This edition highlights the consolidation of the “citizen science” movement, which stems from different forms of direct participation of citizens in scientific projects. The concept of “citizen science”, coined in the 1990s by Alan Irwin (1995), has evolved to include the participatory perspectives that have gained ground in recent decades. Although initially, the concept referred mainly to the idea of scientific citizenship, based on the need to open science and scientific policies to the public, some developments were already anticipated but little explored in the definition of the English sociologist. Thus, besides arguing that science should respond to the concerns and needs of citizens, Irwin (1995) also anticipated the possibility of citizens producing reliable scientific knowledge.

The concept of “citizen science” has added new dimensions, namely the possibility for citizens to participate in collecting scientific data, co-create research agendas, and discuss results and their social implications. The democratisation of science, in this context, involves opening science to a greater engagement from the public in the research process itself and not only learning about it after its conclusion. In essence, it means inviting citizens to join the scientific enterprise and not just letting them observe it through a window.

Naturally, this process does not apply to all contexts, nor does it always and only bring unquestionable benefits. Citizen science is a movement under construction, which still seeks affirmation and recognition in a wide range of fields of scientific knowledge production. The projects developed under this framework are mostly local, and their results are not easily applicable to other contexts. Although there is greater acceptance of this practice, some doubts persist about validating the knowledge produced in these circumstances, namely on the part of editors and reviewers of scientific publications (Bonney et al., 2014). The contributions to the debate opened by this issue of LJCS provide clues about the conditions of effective participation of citizens in the production of scientific knowledge. There will still be much to explore on citizen science — its potentials and limitations — but this issue shows that this concept is moving towards consolidation.

This issue also features contributions to the debate on the “open science” movement. This movement designates the various efforts to put scientific research (including publications, data and physical samples) and its access within reach of all groups of society, laymen or experts. In one of the first considerations on the topic, Chubin (1985) describes the participation process, in this context, as an opportunity for stakeholders, including scientists in the field, but also other researchers and non-scientists, to appropriate and evaluate new knowledge.

The movement has received support in several parts of the world. At various levels, scientific and political, translated, for example, in the increase of open access scientific journals, the availability of databases and the growth of institutional repositories with knowledge open to society. Reinforced open science policies at the international level emerged recently at the hand of the United Nations Educational, Scientific and Cultural Organization General Assembly, which, in November 2021, approved a recommendation on open science (United Nations Educational, Scientific and Cultural Organization, 2020), calling on member states to develop policies and incentives in this area.

These two movements seek to further, at different levels, the relationship of non-specialised publics with science as a social enterprise of knowledge production with its opportunities and limitations. It is important to reflect on these new contexts of public engagement and their potential for the development of scientific culture. In contrast, more consolidated themes, such as the public perception of science and the contexts that promote dialogue between society and scientists, are still worthy of our attention. The articles in this issue of LJCS delve deeper into these issues by reflecting on outreach communication and its role in public engagement.

This issue of LJCS introduces an article by Toss Gascoigne, Jenni Metcalfe and Michelle Riedlinger, in which the authors propose an analytical model for citizens' exercise of power in citizen science contexts based on the ladder of participation model proposed by Arnstein (1969). By analysing the different possible forms of citizen participation in citizen science projects, the authors note that there is room for different types of science communication depending on their suitability for different social contexts.

Cristina Luís' contribution also focuses on the different expressions of citizen science, proposing a journey through time and the different projects that implemented it in Portugal. This historical revisitation provides a better understanding of the space and role of citizen science in the last few centuries while mapping experiences identifies the scientific areas where the movement is more consolidated.

The work of Elaine Santana, Rosa Silva, Ana Filipa Cardoso, Filipa Ventura, Joana Bernardo and João Apóstolo explores concrete practices of open science. It analyses how the main international scientific institutions in the health field involve citizens in their digital platforms for science communication. This article highlights some innovations in the field by identifying the various strategies developed.

Focusing on the city of Rio de Janeiro and its publics, the article by lone Maria Mendes, Luisa Massarani and Yuri Castelfranchi addresses the issues of social appropriation and the use of techno-scientific knowledge by young adults. By showing that these presented a positive view of science and technology, recognising its benefits and risks, the study points to the existing possibilities for establishing dialogues and communicational processes between science and this community which grew up with the internet.

Also seeking to understand the field of dialogue between science and society, based on the identification of the publics, Claudia Irene Quadros, Regiane Regina Ribeiro, Chirlei Diana Kohls and Patricia Goedert Melo present the experience of an agency of the Federal University of Paraná. Within the scope of the project *Pergunte aos Cientistas* (Ask the Scientists), citizens were invited to ask questions to the scientific community, mediated by the agency's services, which allowed for a deeper approximation between society and scientists.

Back to the realm of citizen science, Rafael Vitame Kauano and Alessandra Fernandes Bizerra propose a bridge between the conceptualisation of citizen science and the theories of situated learning proposed by Lave and Wenger (1991), based on the experience of a local community. Addressing biodiversity issues from the problem of biological invasions, the authors evaluate the activity of picking as a social-scientific practice that amplifies the learning processes on issues related to biological invasions, thus bringing the community closer to science.

This issue closes with the article by Evelin Gabriella Hargitai, Attila Sik, Alexandra Samoczi and Milan Hathazi, which describes a new experience in citizen science based on the assumption that it is possible to establish more reciprocal relations between citizens and scientific institutions. The study outlines the methodological challenges in mentoring citizen science projects while highlighting this process's possible advantages to the scientific community.

**Translation: Anabela Delgado**

#### **ACKNOWLEDGEMENTS**

This work is supported by national funds through FCT – Fundação para a Ciência e Tecnologia, I.P., under the project UIDB/00736/2020 (base funding) and UIDP/00736/2020 (programme funding).

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