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Presentation of the theme “Production and dissemination of scientific knowledge: achievements, opportunities and challenges”

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EDITORIAL

Contemporary science is undergoing a period of rapid transformation, driven by technological advances, the globalization of knowledge, and unprecedented ethical challenges. This scenario calls for a critical reflection on the modes of production and dissemination of scientific knowledge. Motivated by this dynamic context and in celebration of the 25th anniversary of Revista Biblios, we present the thematic edition titled *"**Production and Dissemination of Scientific Knowledge: Achievements, Opportunities, and Challenges**."* Our goal with this edition is to provoke reflections and foster debates on the main milestones, emerging opportunities, and ongoing challenges that shape the present and future of science.

In the paragraphs that follow, we highlight some significant achievements, emerging opportunities, and ongoing challenges faced by global science. From iconic transnational collaborations, such as the Human Genome Project, to contemporary initiatives in Open Science and the impact of Artificial Intelligence, these examples illustrate the dynamism and complexity of the current scientific landscape.

This thematic edition is not limited to these points but offers contributions that engage with these and other crucial topics. We believe that the diversity of perspectives presented will deepen interdisciplinary discussions, promoting a broader and more integrated understanding of the challenges and opportunities in the production and dissemination of scientific knowledge.

In recent years, transnational scientific collaborations have gained even more relevance, especially with iconic examples like the Human Genome Project and global efforts in response to the COVID-19 pandemic. The COVID-19 Data Portal, launched by the European Bioinformatics Institute (EBI), facilitated the rapid exchange of scientific data and accelerated the development of vaccines and treatments in record time, exemplifying the impact of collaboration networks (EBI, 2020). This infrastructure not only enabled the swift dissemination of data among scientists from different countries but also fostered the creation of interconnected ecosystems. One example is the integration between the COVID-19 Data Portal and the Global Health Data Exchange (GHDx), which centralized public health information on a global scale, allowing scientists to share real-time data on virus variants and treatment effectiveness (IHME, 2021).

Additionally, the Open Science movement has advanced substantially with initiatives like Coalition S, which aims to ensure that all publicly funded knowledge is accessible by 2025. Coalition S, formed by European and global research funders, is at the forefront of this movement, seeking to make science more inclusive and accessible (Coalition S, 2021). This progress has been complemented by platforms such as OpenAIRE, which serves as a pan-European repository, enabling the integration of publications, data, and software related to publicly funded research. The combined impact of these initiatives goes beyond providing open access to articles: it promotes data standardization and interconnection among global scientific records, such as Zenodo (OpenAIRE, 2020), where scientists can deposit anything from software codes to raw data sets, creating a dynamic ecosystem of open science.

The spread of scientific misinformation is a major challenge in the digital era. A report by the National Science Foundation (NSF) revealed that 79% of Americans express little trust in scientific information disseminated

through social media, highlighting the need for effective strategies for responsible scientific communication (NSF, 2020). This data points to the urgency of stronger public communication efforts, which have been the focus of initiatives like FactCheck and the Poynter Institute, both of which work on verifying and validating scientific information circulating on social networks. In Brazil, the National Institute of Science and Technology in Public Communication of Science and Technology (INCT-CPCT) has played an essential role, promoting interactions between scientists and the public through partnerships with media outlets and science communication networks. The impact of these networks is evident in the expansion of a culture of open scientific communication, which is being replicated in other Latin American countries, as seen with the SciELO network (Packer, 2020), which integrates open-access scientific journals.

Artificial Intelligence (AI) is revolutionizing the scientific field, offering new opportunities in areas such as biomedicine, where AI is already used to discover new drugs and analyze large data volumes (MIT Technology Review, 2021). However, the growing use of AI raises ethical concerns. A report by the Association for Computing Machinery (ACM) emphasized the need for clear guidelines to ensure integrity and transparency in scientific results generated by AI, pointing out that automation cannot replace human rigor in scientific research (ACM, 2021). Projects like AI4Science are exploring the limits and opportunities of AI in science, allowing intelligent systems to perform complex molecular simulations that would have taken decades with traditional techniques (AI4Science, 2020). However, the emergence of increasingly autonomous systems demands clear regulations, especially regarding authorship and accountability, with initiatives like the UK's Data Ethics Framework already outlining ethical boundaries for the use of AI in science (UK Government, 2021).

This theme covers interdisciplinary approaches that reflect the diversity of perspectives in the field of scientific knowledge production and dissemination. The interactions between Open Science, AI, scientific communication, and global collaboration networks demonstrate how the current scientific landscape is interconnected and how these platforms are shaping a more inclusive and transparent future for knowledge production. We hope this special issue fosters constructive dialogue among researchers and professionals, generating reflections on the opportunities and challenges shaping the future of science.

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