Exploring regional differences in Open Science adoption using Open Science Indicators

INTRODUCTION

Despite growing interest in Open Science policies and monitoring, until recently there have been no comprehensive data on if and how Open Science practices are being adopted by researchers. Funders and institutions need better information on researchers’ Open Science practices and information on the effectiveness of policies1,2. The publisher PLOS also needs reliable data on the adoption of Open Science practices by researchers to support improvements in research practices. In 2022 PLOS developed ‘Open Science Indicators’, (OSI) an initiative that tracks adoption of multiple Open Science practices – such as sharing data, code, protocols and preprints – over time in the scholarly literature.

METHODS

PLOS developed requirements for an OSI measurement framework underpinned by six guiding principles3 and which were informed by previous work, such as Serghiou et al. (2021)4. PLOS selected DataSeer as a partner to deliver OSI, following a competitive Request for Proposals process. OSI are calculated using a natural language processing (NLP) and artificial intelligence-supported method to analyze published journal articles’ XML. Detailed methods information and accuracy rates are available in Figshare with the OSI dataset5. These results analyse adoption levels across ~74,000 PLOS articles published between the start of 2019 and the end of March 2023 segmented by the geographical region of the corresponding author.

RESULTS

Overall the results show increasing rates of data sharing, code sharing and preprint posting over time. There are differences in adoption between geographical regions. Whilst levels of repository use for data sharing over time have increased steadily in the Americas, Europe and Australasia, only small increases have been noted for Asia, MENA (Middle East and North Africa) and Africa (Figure). Similarly, the greatest increases in preprint posting have been seen in the Americas and Europe (Figure). Rates of preprint posting by authors from Australasia and Africa have fluctuated over time but generally increased, whereas Asia and MENA have shown little to no increase. Code sharing has seen impressive growth in nearly all regions, although due to fluctuations in the data it is unclear whether this trend will bear out in Africa (Figure).

DISCUSSION

The broad trends presented here can help us build a picture of the publishing practices of PLOS authors. This type of information is crucial for developing Open Science solutions that fit community needs and existing strengths. The metadata fields collected enable further segmentation, for example, by research discipline or by the types of infrastructure used to share outputs, which will further strengthen our understanding of regional norms and practices. The OSI dataset also enables exploration of correlations between different Open Science behaviors within the dataset, and potential correlations with other metrics, such as article usage and citations.

New versions of the OSI dataset will be published quarterly in 2023-4 and additional indicators will be developed, such as indicators for protocol sharing, and preregistration. The dataset also contains data from articles from other publishers to provide a comparison to the PLOS articles. The data and methods are shared openly to support reuse and enable stakeholder discussion about how we can use quantitative, longitudinal evidence on Open Science practices to support increased adoption of Open Science.

REFERENCES


Lauren Cadwallader* and Iain Hrynaszkiewicz
PLOS, 1265 Battery Street, Suite 200, San Francisco, CA 94111, USA
*lcadwallader@plos.org