

ERAC 1207/21

NOTE

From: General Secretariat of the Council
To: Delegations
Subject: ERAC SWG OSI Guideline Report on Research Integrity and Open Science

Delegations will find in annex to this Note the ERAC Standing Working Group on Open Science and Innovation Guideline Report on Research Integrity and Open Science, as adopted by written procedure.

ERAC Standing Working Group on Open Science and Innovation (SWG OSI)

Guideline Report on Research Integrity and Open Science

1. Definition of Open Science and Research Integrity

- **Open Science**

Open Science represents a new approach to the scientific process that focuses on spreading knowledge as soon as it is available, using digital and collaborative technology¹.

- **Research Integrity**

Through dedicating attention to research integrity, research should aim at complying with the highest standards of ethics in the performance and governance of research and innovation, in regard to the following dimensions²:

- Reliability in ensuring the quality of research, reflected in the design, the methodology, the analysis and the use of resources;
- Honesty in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair, full and unbiased way;
- Respect for colleagues, research participants, society, ecosystems, cultural heritage and the environment;
- Accountability for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts.

2. Methodology

A taskforce on Open Science and Research Integrity has been established within the ERAC SWG OSI in 2021. The taskforce consisted of the Chair and Vice-Chair of SWG OSI, OSI delegates from Croatia, Estonia, Finland, France, Latvia and Romania, as well as colleagues from the European Commission. The aim of the taskforce was to focus on issues that are at the intersection of Open Science and Research Integrity, and to produce actionable guidelines that will allow their mutual cross-fertilization and reinforcement.

¹ https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/our-digital-future/open-science_en

² ALLEA code – European Code of Conduct for Research Integrity (2017). <https://allea.org/code-of-conduct/>

This guideline report is based on the one hand on desk research, and an examination of existing guidelines, codes of conduct and recommendations in the field of Open Science and Research Integrity (first semester 2021). On the other hand, webinars have been organized during the second semester 2021 with the French Office for research integrity (OFIS) (Carole Chapin), the Finnish National Board on Research Integrity (Sanna-Kaisa Spoof, who is also the current chair of the ENRIO network) and the Austrian ÖAWI (Österreichische Agentur für wissenschaftliche Integrität - Austrian Agency for Research Integrity) (Teodora Konach). Another webinar has been organized with Søren Holm, the project coordinator of ROSiE (Responsible Open Science in Europe) Horizon 2020 project. Finally, several members of the taskforce participated to the UNESCO global digital exchange of ideas and experiences on Scientific Integrity on 9 December 2021.

3. Crosscutting issues in Open Science and Research Integrity

- There is a strong connection between Open Science and Research Integrity, at each stage of the research cycle, from the research design to the participation of the researcher in the public debate. Therefore, in the Council Conclusion on Research integrity³, adopted on December 1st 2015, Member States recognised “the importance of open science as a mechanism for reinforcing research integrity, while, at the same time, research integrity contributes to open science”.
- The core difference between Open Science and Research Integrity is the pace of change. Open Science is more related to publicly available research outcomes, which vary depending on the stage of the research process (going as early as possible), media and formats. Therefore it is prone to frequent changes and improvements. On the other hand, Research Integrity is more related to the research processes, methods and practices themselves, and although they become more visible, they remain more or less constant, and changes are not so frequent. Furthermore, Research Integrity has been around for some time in research policies and practices, while Open Science has been introduced later.
- Open Science as well as Research Integrity concern all disciplines – including the social sciences, the arts and the humanities -, but there are disciplinary specificities in the uptake of Open Science and Research Integrity principles.

³ Council of the EU (2015). Council Conclusions on research integrity, 1 December 2015.
<https://data.consilium.europa.eu/doc/document/ST-14853-2015-INIT/en/pdf>

- Considered as an approach based on open cooperative work and systematic sharing of knowledge and tools as early and widely as possible in the research process, Open Science promotes transparency and openness throughout the entire research process. Open Science opens up research to external scrutiny and, therefore, weaknesses in methodology – from unintentional mistakes to true frauds - are more likely to be identified early on. Thus Open Science is more likely to produce results that are verifiable and reproducible. As research integrity aims at ensuring that the process and practice of research are as reliable as possible, open science contributes to high standards of integrity being met.
- Also, in citizen science – considered as an important dimension of Open Science -, non-professional scholars have developed in a bottom-up way standards of research integrity that are often both significant and inspiring.
- The positive interaction between Open Science and Research Integrity does not preclude that some aspects of this relation remain challenging, like particularly the reusability and reproducibility of research data – for example, it appears that in some very competitive fields researchers may make their data findable and accessible, but not provide the adequate context that would make the results really reproducible - and the wider public dissemination of non peer-reviewed preprints.
- Furthermore, systems that value perceived prestige and a narrow range of outputs over quality, rigour, openness and transparency risk incentivising practices that undermine research integrity. The race for publications – the so-called publish-or-perish culture – comes at the expense of quality, integrity and trust in research. This is the case in the current research assessment system which is often dominated by metrics, such as the number of publications and citations, and the quantity of publications in journals with high Journal Impact Factor (JIF).
- Another main challenge is the lack of sufficient training. Training on research integrity is often seen as voluntary, with the responsibility lying with the individual researcher⁴, while there is also the need to develop appropriate skills and training in Open Science, and to challenge the research environment as a whole, the infrastructures and the culture.
- Basic public information on national laws and regulations/policies relating to Open Science and Research Integrity is existing⁵, but still insufficient in English (on a national/federal level and on the big funders' and/or universities sites).

⁴ EU Open Science Policy Platform (OSPP) (2020). Progress on open science: Towards a shared research knowledge system: final report of the open science policy platform, p. 15. <https://op.europa.eu/en/publication-detail/-/publication/d36f8071-99bd-11ea-aac4-01aa75ed71a1>

⁵ Proudman, V., Sveinsdottir, T., & Davidson, J. (2020). An Analysis of Open Science Policies in Europe. <https://zenodo.org/record/4725817#.Ya6kObBKhaQ,%20https:%2F%2Fec.europa.eu%2Fresearch%2Fparticipants%2Fdocuments%2FdownloadPublic%3FdocumentIds=080166e5c9d07112&appId=PPGMS>

4. Recommendations

1. **Communicate about Open Science and Research Integrity in a positive way, as two fundamental and complementary pathways towards excellent science and greater social impact of research.** Indeed Open Science and Research Integrity both ultimately relate to the need to foster responsibility and trust in research and innovation.
2. **Commit to reforming the research assessment system to provide the right recognition, incentives and rewards for methodological rigour, for enabling the wider uptake of open science practices, and to move at the same time towards a system that supports integrity and that rewards the plural characteristics of high-quality research.**
 - Assessment should be based on qualitative judgement with (open) peer-review and openly available underlying data, supported by responsible use of quantitative indicators, taking into account the disciplinary specificities, as well as the stage of the researcher's career. It should reward the quality and (potential) impact of research and research that meets the highest standards of ethics and integrity. It should consider and value the diversity of research activities and outputs, as well as transparent research processes and methodologies, including preregistration of research (i.e. specification of research plan in advance of the study and submission to a registry). In particular, the publication of negative results fosters both Open Science and Research Integrity.
 - Metrics used in research evaluation should be based on transparent and accessible data and methodologies.
 - Additionally, recruitment and assessment processes need to include more narrative information on a diversity of achievements and their (potential) impacts, such as narrative *Curriculum Vitae* and prospective research narratives. It is needed to develop and test new indicators, while moving away from the use of the Journal Impact Factor.
 - Reforms of the research assessment must be driven by the research communities themselves.
3. **Journals and publishing platforms should be transparent about their editorial processes**, including peer reviewing, and promote reproducibility of research through support of FAIR data and, whenever possible, by facilitating open access to data, codes and methodologies.
 - Some private publishers make an unethical or fraudulent use of the APC business model, either delivering sub-standard peer reviewing and editorial practices, or even charging for services they don't deliver. **Such malevolent editorial practices and their negative impact on the quality of research, should be duly tackled, while not being confounded with Open Science practices.**

- Furthermore, publishers using the APC business model should transparently disclose their pricing models, as well as the services they include.
4. **Make sure that researchers (at every stage of their career), as well as other involved stakeholders (like university lawyers or funders), receive adequate training on research integrity and Open Science.**
- Such training should be optional in any graduate curriculum and mandatory in any PhD training programme.
 - Training and tools put at the disposal of trainers and researchers – and whenever possible, accessible in open access as open educational resources - should help in illustrating how Open Science practices contribute to research integrity, but also discuss challenges that researchers need to be aware of. They should also help researchers understanding Open Science practices and applying them to their daily work.
 - Furthermore teaching on integrity should not only limit itself to problems of research misconduct like falsification, fabrication and plagiarism, but include a much wider range of integrity issues such as, for example, authorship related concerns.
 - Trainings should be tailored according to research areas.
5. Open Science publishing systems make it possible to disseminate not (yet) peer-reviewed research as preprints. Although preprint publication allows that exploratory results and analysis are quickly shared by academic peers and foster the pace of science – which may be particularly useful in an emergency situation like the current COVID-19 pandemic -, **such preprints should only be used with extreme care in the public debate and policy making, since they relate to knowledge that has not yet been vetted.**
- The publication and use of preprint manuscripts should thus take place in a rigorous framework of responsible Open Science practices, as the potential misuse of preprint publications should not hamper the development of this otherwise useful procedure: preprint publication and the proper use of open peer-reviewing will indeed have a strong impact in terms of diffusion of research results and scientific discussions.
 - It is also needed to provide the public, and the journalists in particular, with the adequate knowledge regarding research processes and methodologies: research institutions and researchers should play a role in this need to better train the media professionals in the area of science.
 - In any case, adequate use of metadata is needed for distinguishing between peer-reviewed and non-peer-reviewed material that is openly available. Furthermore, the link to the published version of the preprint should be made available whenever relevant. This will also allow the reader to clearly distinguish which preprints have not (yet) been published in any journal.

6. **Regarding Open Research Data, data should not only be findable and accessible, but truly interoperable and reusable.**
 - Data availability statements should be present in every publication. Data must be stored in open data repository whenever possible. In the case of the possible security, confidentiality or commercial sensitivity breaches, explanations of the conditions for sharing research data should be provided.
 - Specific incentives should be provided for data and code sharing.
 - To this end, appropriate infrastructures and support services close to the researchers should be established. In particular, EOSC must become (more) easily accessible by every researcher and provide researchers with free of charge (basic) services and support.
7. **When Open Science and Research Integrity are led by the researchers within their own community, trust and ownership are created.** A community led self-regulation model supports this thinking. However, further studies need to be conducted on the effects of having legal actions as a last means to support and enforce Research Integrity.
8. **Whenever relevant, introduce consideration for Open Science and Research Integrity in the laws on research and higher education, so that the legal framework enables and fosters the ownership of research communities.**⁶
9. **Promote cooperation between Open Science and Research Integrity offices at a national and institutional levels.** This is essential to develop training and materials that contribute to supporting researchers in practicing open science and ensure that high standards of research integrity are complied with. It would also help ensuring that fast pace developments in the area of Open Science are taken into account and appropriately reflected in codes of conduct for Research Integrity.
10. **Publicize information and enhance visibility about main Open Science and Research Integrity policies/documents/guidelines at a national and institutional level,** notably through websites that could be considered as general knowledge hubs in this regard.

⁶ As an example of a recent development of interconnection of Open Science (OS) and Research Integrity (RI) within a national legal framework, the new French law on research adopted in 2020 includes an article regarding RI. This has been translated into the publication of a decree that specifies some elements regarding RI policies in French higher education and research organizations - in particular, it is mandatory to have an integrity officer in research organization which acts as an Ombudsman -, and that also includes elements related to OS (OS policy, data management plan, incentive to publish negative results...) The decree is available (in French) here: <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000044411360>

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<p>ERA related policy documents</p>	<p>ERAC Triangle Taskforce Guideline Paper on research evaluation in an Open Science and gender equality context (2021)</p> <p>ERAC SWG OSI Opinion on Open Science and Open Innovation in times of pandemic (2020)</p> <p>ALLEA code – European Code of Conduct for Research Integrity (2017). https://allea.org/code-of-conduct/</p> <p>Council of the EU (2015). Council Conclusions on research integrity, 1 December 2015. https://data.consilium.europa.eu/doc/document/ST-14853-2015-INIT/en/pdf</p>
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<p>Executive summary</p> <p>This guideline report presents the most striking issues that currently relate to the interactions between Research Integrity and Open Science in research policies and practice. While Research Integrity and Open Science are strongly and positively interconnected, there are also some emerging challenges that need to be properly tackled within the European Research Area, notably relating to the public dissemination of preprints and the actual levels of interoperability and reusability of research data. The report thus concludes with a set of ten actionable guidelines to promote further the mutual reinforcement of Research Integrity and Open Science, for the benefit of science and society.</p>	