DEFINITION OF OPEN SCIENCE POLICIES
IN THE UNIVERSITY OF ZARAGOZA

1. *Introduction*

Research represents an outstanding activity at the University of Zaragoza, since the generation, transfer and dissemination of knowledge is at the heart of our mission. In recent years, it has become clear that this knowledge, generated by our researchers and financed largely by public funds, does not remain within laboratories, but favors the enrichment of our Society through its unlimited dissemination. Thus, on April 29, 2013, the Governing Council of the University of Zaragoza agreed to express its agreement with the principles of the Open Access movement and to develop an institutional policy of open access to knowledge. Subsequently, and during the last years, what we have come to call **Open Science policies have been developed in research environments around the world with**   a shared objective of dissemination of knowledge, which would encompass open access policies, but also aiming at objectives related to transparency, the reproducibility of research, its transfer and impact on innovation, the promotion of collaboration between groups of researchers and interdisciplinarity in the development of Science, understood in its broadest sense. Therefore, the University of Zaragoza, through its Vice-Rectorate for Scientific Policy, considers it necessary to have a document that defines Open Science policies clearly and with a holistic approach so that they can be known and developed in our research environment.

2. *Definition of Open Science*

Open Science is a movement that promotes free and unrestricted access to scientific production and research data so that the results of it are available to anyone interested in accessing them, without economic, technical or legal barriers.

The objective of Open Science is to promote the democratization of knowledge to increase the efficiency and quality of scientific and technical research, while serving as an important tool to boost innovation. In addition, Open Science promotes accountability and transparency in research, which contributes to improving public trust in science and facilitating society's access to the benefits of scientific research.

Open Science involves the use of open technologies and practices for research, including open access publishing, the use of open infrastructures and licenses that allow the reuse of information and the exchange of data and research materials, and open and transparent collaboration between researchers, institutions and communities, as well as the development of open source tools and platforms.

Areas of Open Science

Open Science can be applied to different areas of scientific and technical research, as well as the social sciences, humanities and health sciences. Some of the most relevant areas are:

- Open access to scientific publications: allows research results to be freely accessible to anyone, without payment or subscription restrictions.
- Open research data: It consists of making the data generated by scientific research findable, accessible, interoperable and reusable (FAIR).
- Open educational resources: that allows them to be used by educators and students, without the need to pay royalties or license fees
- Open Repositories: infrastructures allowing unhindered economic, technological or legal access to research publications and data.
- Open source: refers to the use of free software and open source tools for research development.
- Open Science Assessment: seeking transparent research evaluation that enhances collaboration and multi-disciplinarity.
- Citizen science

The development of these areas in the framework of Open Science will allow to obtain a series of benefits for researchers, institutions and society in general:

- Increasing the impact and visibility of research
- Ensure access to research results in the short and long term.
- Improving the quality and transparency of research
- Promoting innovation and scientific progress
- Contribution to economic and social development through an orientation of research towards major global challenges.
- Promoting collaboration and citizen participation in research

3. *Institutional commitments*
   UNESCO

   UNESCO has actively promoted Open Science as a tool for **achieving global sustainable development goals.** In 2019, UNESCO published the Open Science Recommendation, which is a guide for member states and other stakeholders interested in implementing Open Science policies and practices.

   UNESCO's recommendation states that Open Science can improve the quality and impact of research, strengthen transparency and accountability in research and evidence-based decision-making, and foster innovation

and collaboration. It also highlights that Open Science can contribute to equal access to education and knowledge, and to diversity and inclusion in research and innovation.

In the recommendation, UNESCO urges member states to develop national Open Science policies (in Spain, both the LOSU and the Science Law have developed policies along these lines), as well as to promote international cooperation and the exchange of knowledge and resources. UNESCO also calls for the creation of Open Science infrastructures and platforms and the promotion of skills and capacities for Open Science.

European Commission

The European Commission has been one of the main drivers of Open Science in Europe, with specific policies and programmes aimed at encouraging and supporting the uptake of Open Science practices in research and innovation that are specifically reflected in the Political Agenda of the European Research Area (ERA) for the years 2022-2024. Some of the key actions of the European Commission in relation to Open Science are:

- Horizon Europe Programme: The Horizon Europe Programme is the main EU funding programme for research and innovation, and is designed to support Open Science through various actions. For example, the European Commission requires all Horizon Europe-funded projects to make their publications and data accessible in open, and also promotes the adoption of Open Science practices in project planning, implementation and evaluation.

- Open Science Action Plan: In 2018, the European Commission presented its Open Science Action Plan, which sets out a number of objectives and concrete measures to boost the uptake of Open Science practices in Europe. The plan includes actions to promote the openness of scientific publications and data, encourage the use of quality standards and practices, support training and skills in Open Science, and strengthen international cooperation.

- Open Data Policy: The European Commission has adopted an open data policy, which states that all data produced with EU funds must be available in open, unless there are legitimate reasons to restrict their access. The open data policy applies to research data as well as data generated by EU institutions and agencies.

- Data Infrastructure Initiatives: The European Commission has launched several initiatives to support research data infrastructure, including the European Open Science Cloud (EOSC) and the European Data Infrastructure (EDI). These initiatives are designed to facilitate access to and exchange of research data across Europe, and to support the development of Open Science services and tools.

Crue

The Conference of Rectors of Spanish Universities (CRUE) has taken several actions to promote Open Science in the Spanish university system. Thus, in 2015, CRUE launched the initiative "Commitment of Spanish Universities to Open Science", which sought to promote Open Science practices in Spanish universities and commit institutions to develop Open Science policies and practices. In 2016, CRUE published a report entitled "Open Science in Spanish Universities", which collected good practices and recommendations to promote Open Science in the Spanish university system.

CRUE has been actively involved in the implementation of Open Science policies at the national level, such as the 2011 Science Act and its update in 2022, and has collaborated with other organizations to develop Open Science policies and practices. In the same way, CRUE has established working groups and networks of experts to promote Open Science in different areas, such as open access publishing, research data management and training in Open Science skills and capabilities.

4. *Open Science Policy Framework*

European level: ERA Policy Agenda

The Political Agenda of the ERA for the years 2022-2024 has a series of elements and actions for the development of Open Science within the framework of the European Research Area. In particular, within the priority area "Deepening*a truly functioning internal market for knowledge",*actions 1 and 3 are specifically related to the development of Open Science, with a particular focus on the development of the European Open Science Cloud (EOSC), and the advancement of the reform for research evaluation. These policies are in addition to those developed in previous years in other aspects such as Open Access through platforms such as Open Research Europe.

European level: Horizon Europe

Horizon Europe is the European Union's research and innovation programme for the period 2021-2027, and Open Science is one of the fundamental principles of the programme. In this regard, the Horizon Europe programme sets out a number of provisions to promote Open Science in EU-funded research, including:
- The obligation to deposit scientific publications resulting from projects funded by the Horizon Europe programme in open access in a reliable repository. This obligation extends to research data, which must also be accessible and reusable under open access conditions.
- Promoting the re-use of research data and its interoperability, to foster collaboration and data sharing between different disciplines and sectors.
- The promotion of research data management practices, including the development of data management plans for all projects funded by the Horizon Europe programme.

- Promoting Open Science training for researchers, and supporting the creation of networks and communities of practice in Open Science.

National level: Science Act 2022

Spain's new Science, Technology and Innovation Act 2022 (LCTI) recognises the importance of Open Science and sets out a number of provisions to promote its implementation. Among the provisions related to Open Science, the following stand out:
- The Law establishes that publicly funded research must have an open dimension, and establishes the obligation to deposit in institutional repositories a copy of the accepted final version, in the event that the researcher chooses to disseminate his research results in scientific publications, simultaneously to the date of publication.
- The Act establishes the obligation of public research bodies and universities to develop and implement research data management policies, and to ensure the availability, accessibility and re-use of research data in an open manner.
- Access to open access repositories and their interconnection with similar national and

international initiatives will be facilitated, promoting the development of systems that facilitate it.
- The Act recognizes the importance of training in Open Science and establishes the need to include this training in the curricula of universities and in the continuing training programmes of researchers.

National level: LOSU

The Organic Law of the University System (LOSU) of 2023 includes provisions in its article 12 that detail and specify actions and procedures to promote Open Science and Citizen Science. Thus, the actions that the various actors of the Research and Development (R&D) system must follow are established.

Specifically, researchers are required to deposit a copy of the accepted final version, i.e. the post-print, together with the corresponding data, in the open access institutional or thematic repository, indicating the date of publication. Academic publications in digital format must be deposited in institutional repositories, without ruling out the possibility of using other specialized or general repositories. The data generated must comply with FAIR principles (Ease of Finding, Accessibility, Interoperability and Reuse) and, whenever feasible, must be disseminated in open access.

In addition, universities should actively promote and contribute to Open Science, facilitating open access to scientific publications, data, codes and methodologies that ensure the communication of research.

Finally, it is established that universities must promote transparency in subscription agreements with scientific publishers, allowing citizens access to both digital and non-digital information resources, and offering the necessary training to promote the dissemination of Open Science in the university community and in society in general.

National level: State Research Agency

The State Research Agency (AEI) is the Spanish agency in charge of the management and promotion of scientific and technical research, and has several funding programs for research. The EIP has established a number of recommendations and provisions to promote Open Science in research funded by its programmes, including:
- The EIP recommends the publication in open access of scientific publications resulting from projects funded by its programmes, and establishes a maximum embargo period of 6 months for the publication of scientific articles.
- The EIP makes it mandatory to develop a research data management plan for projects funded by its programmes, and recommends the adoption of good practices in data management to ensure its accessibility, availability and reuse.
- The EIP recommends promoting the re-use of research data and their interoperability, and encourages collaboration and data sharing between different disciplines and sectors.
- The AEI promotes Open Science training for researchers, and recommends the inclusion of this training in university curricula and continuing education programmes for researchers.

National level: National Open Science Strategy

The Council of Ministers approved on Wednesday 3 May 2023 the first **National Open**

Science Strategy for the period 2023-2027. It has been prepared by the Ministry of Science and Innovation and the Ministry of Universities. The ENCA has 4 strategic objectives:

- Ensure that interoperable digital infrastructures are sufficiently robust and well-articulated to absorb the impact of the implementation of a national open science policy and facilitate their integration into the international ecosystem and their integration, where appropriate, into the *European Open Science Cloud* (EOSC).
- Promote the proper management of open research data generated by the national R&D&I system through the FAIR principles (Findable,*Accessible, Interoperable, Reusable*)   to increase its location, accessibility,
  interoperability and reusability.
- Implement open and free access by default to publications and scientific results financed directly or indirectly with public funds, for all citizens.
- Establish new mechanisms for evaluating research and a system of incentives and recognition aimed at promoting open science practices, as well as training all staff (researcher, manager, funder, evaluator) to align their professional performance with the principles of open science.

5. *Open Science Policies at the University of Zaragoza*

The University of Zaragoza adheres to the principles of Open Science, as marked by the National Strategy indicated above, with clear objectives of accelerating scientific progress, increasing collaboration between researchers and multidisciplinarity, improving the transparency and reproducibility of research results, as well as increasing as much as possible the impact of our research through innovation and the valorization of these results while complying with the requirements that are being imposed by the funding agencies, and aligning with national and European policies. Thus, measures that facilitate the achievement of the objectives pursued by open science and that have been indicated in the introductory part of this document will be actively promoted.

a. Responsibilities

The ultimate responsibility for Open Science policies lies with the Vice-Rectorate that assumes the competences of Scientific Policy and/or Research. The Open Science policies of the University of Zaragoza will cover open access and publication policy, open data policy, storage infrastructures in repositories, open source policies, open science dissemination policies and research evaluation policies. Within this Vice-Rectorate, the University Library, with the support of SICUZ, will be responsible for transmitting and hosting information regarding open access and open publication, as well as open data and information and, where appropriate, management of institutional or external repositories. At the same time, it is the responsibility of the research staff to incorporate practices in the design, development and dissemination of research that facilitate the achievement of the objectives of open science defined in this policy.

b. Open access policy to scientific publications

The University of Zaragoza approved, on June 25, 2015, the ***Regulation on the open publication of research results,*** which governs the rules of publication and open access of our University. In this Regulation, the University expresses its support for both the open access greenway (deposit in the Zaguán repository) and the golden pathway (open publication), establishes the responsibilities and commitments of the University and the researchers involved, as well as the procedures to be followed. In any case, the University of Zaragoza will update this Regulation so that it complies with the legislation and recommendations related to this issue.

The University of Zaragoza recommends that its researchers publish their academic output in open access. Posts are considered open access if they are "digital online, free and free of most copyright and licensing restrictions." The publication must be available immediately, without restriction, under an open license, preferably in the published version and not subject to embargo. Hybrid open access is not recommended.

c. Open data policy

The University of Zaragoza recommends that, whenever possible, open research data be made available without restrictions. The University of Zaragoza expects its researchers to share research data in high quality where possible following the maxim of 'as open as possible, as closed as necessary'.

How research data is managed and shared depends on the type of data and the culture of different disciplines and domains. Thus, data and metadata must be machine-readable and in unprotected file formats. Specifically, this means that:

- the data (at least metadata) on which a publication is based must be freely accessible;

- the data should be shared as soon as possible, at the latest at the time of the first publication;

- the data must comply with the FAIR principles (Findable, i.e. that such data can be found, that they are Accessible, Interoperable and Reusable) and comply with good scientific and legal practices (anonymisation, etc.)

In any case, open data is subject to data protection legislation and must comply with legal requirements (e.g. in the case of sensitive data).

The University of Zaragoza recommends using high-quality digital repositories such as Zenodo. The University of Zaragoza will work to develop a sustainable and adequate infrastructure for data management.

d. Infrastructures and repositories to support Open Science

The infrastructures and repositories to support Open Science are a fundamental element of the different Open Science strategies of the institutions. These would include data spaces as defined in the European Data Strategy, open access institutional, regional and thematic repositories for scientific publications and research data, institutional research management systems and publishing platform services of public institutions responsible for publishing, reproducing and disseminating scientific journals, books and other publications. The University of Zaragoza will have a high quality and interoperable institutional repository for the development of Open Science policies. The Zaguán repository (https://zaguan.unizar.es)is currently available as a repository of documents, as well as other initiatives related to Open Science such as the Open Journal System OJS Papiro (https://papiro.unizar.es/ojs/), thanks to which our University publishes electronic journals on the diamond route.

The University of Zaragoza will have the means, to the extent that its budget allows, to update and improve its own infrastructures in a way that serves the commitments of Open Science.

e. Evaluation of research

The University of Zaragoza has signed the Agreement for the Reform of Research Evaluation and participates in the CoARA coalition. Therefore, in the coming years we will work on the development of the evaluation of research in all its areas (researchers, organizations, calls) that is not only based on journal-based metrics and that, therefore, reinforces the areas of Open Science. In this sense, the University of Zaragoza will pursue the commitments of the aforementioned Agreement and commit resources for its development.

f. Other areas

The Library of the University of Zaragoza will also be responsible for the policies of dissemination of Open Science, collaborating with the Vice-Rectorate that has the competences of Scientific Policy and the Scientific Culture Unit in the dissemination of these policies among the researchers of the University and the Society in general.

The University of Zaragoza will promote training in all areas of Open Science to its researchers.

Free and open source software fosters user contributions and ease of collaboration through its use or development. In cases where code or software is part of the research process, it may be important to share it so that the research is verifiable, but also to stimulate its reuse and collaboration with other researchers.

The University of Zaragoza encourages its researchers to use free and open source software when there are high quality, interoperable and secure options. He also hopes that the code and software created by the researchers at the University of Zaragoza, and that it does not have a commercial return that the researchers or the University itself wishes to exploit, will be shared with an appropriate open source license.