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Innovation und Technologie

## **Open Science Policy Austria**

Austrian Policy on Open Science and the European Open Science Cloud

Vienna, 2022

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## 1. BACKGROUND

According to Directive (EU) 2019/1024 of 20 June 2019 on open data and the re-use of public sector information (Open Data and Public Sector Information Directive, PSI), EU Member States shall support the availability of research data through the adoption of national policies and relevant measures with the aim of making publicly funded research data openly available by default and in line with FAIR principles (Art. 10 of EU Directive 2019/1024).

On 21 October 2020, OANA <sup>1</sup>(Open Science Network Austria - formerly Open Access Network Austria) published its recommendations for an open science strategy in Austria, with a focus on different stakeholders. The aim was to produce a document modelled on the Vienna Principles<sup>2</sup>, a vision paper from 2016. OANA was founded in 2012 as a joint initiative under the organisational umbrella of the Austrian Science Fund (FWF) and the Austrian University Conference (UNIKO). In the period 06.03.-19.04.2020, the recommendation for an Open Science Strategy was subject to public consultation. Together with the EU's objectives in the area of research and data policy, the Recommendation for an Open Science Strategy forms the basis for Austria's contribution to Open Science and the European Open Science Cloud (EOSC).

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<sup>1</sup> [Open Science Network Austria: OANA](#)

<sup>2</sup> [Vienna Principles a vision for scholarly communication](#)

## 2. PREAMBLE

### 2.1. Open Science, the FAIR Principles and the European Open Science Cloud

The term *Open Science*<sup>3</sup> describes a range of strategies and approaches that aim to make a broad range of aspects of scientific research and its dissemination as accessible as possible to the scientific community, students and the interested public as well as economic actors. The concept is therefore based on the principles of transparency, inclusion, correctness, fairness and sharing. *As open as possible, as closed as necessary*, taking into account all relevant legal framework conditions such as security, data<sup>4</sup> protection and privacy; this credo describes the efforts towards an open way of knowledge production and dissemination.

The umbrella term Open Science<sup>5</sup> commonly includes sub-concepts such as *Open Access*, *Open Research Data*, *Open Methods*, *Open Evaluation*, *Open Infrastructure*, *Open educational resources (OER)* and *Citizen Science*. There are also overlaps with the term *Open Innovation*<sup>6</sup>, for which a national strategy has already existed<sup>7</sup> in Austria since 2016. Open Science and Open Innovation are also defined as important cross-cutting issues in the Federal Government's current Strategy for Research, Technology and Innovation 2030. Increasing digitisation in particular opens up unimagined possibilities for opening up scientific research - which is still often not very transparent today - to make it available to a broader target audience.

Open access<sup>8</sup> policy aims to provide researchers and the general public with access to research data as early as possible in the dissemination process and to facilitate its use and re-use. "Open access" is to be understood as the practice of making research results available online to the end user free of charge and without restriction on use and re-use, apart from the possibility of requiring attribution of the author. Open access helps to improve quality, reduce the need for unnecessary duplication of research, accelerate scientific progress and combat scientific fraud. It also boosts the economy and innovation as a whole.

Open Science opens up new, collaborative and innovative ways of generating knowledge. It promotes the active involvement of the interested public and new innovation potentials. Open

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<sup>3</sup> [Open Science Definition | FOSTER](#)

<sup>4</sup> [GDPR](#)

<sup>5</sup> [Open Science | European Commission](#)

<sup>6</sup> [Open Innovation 2.0 | Shaping Europe's digital future](#)

<sup>7</sup> [Open Innovation Strategy for Austria - Goals, Measures and Methods](#)

<sup>8</sup> [Open access | European Commission](#)

Science practices also contribute to reducing scepticism towards scientific research and to gain more transparency and profitability for the general public.

Effectively, Open Science encompasses both research data and research publications. This inclusive process is about the involvement of the public and a wide range of societal actors, the sharing of final results but also of all intermediate stages leading to them, and all forms of dissemination, including publication in multiple languages, as well as the impact of science on society.

The Open Science Roadmap is recognised<sup>9</sup> internationally and has been one of the EU<sup>10</sup>'s strategic goals since 2015. With the Amsterdam call for Action on Open Science, an official roadmap was presented<sup>11</sup> by the European Council in 2016. The G7 countries also expressed great interest back in 2016 with their memorandum on the development of infrastructures for open research and the creation of a working group on Open Science, specifically also for the collaborative fight against the COVID-19 virus<sup>12</sup>. UNESCO also recently presented<sup>13</sup> a recommendation on Open Science practices. Open science efforts also contribute to the United Nations Sustainable Development Goals<sup>14</sup> (SDGs). Article 27 of the Universal Declaration of Human Rights provides for the right of all to share in scientific progress and its benefits. This is a big step towards breaking down old divides and towards justice and equal opportunities, both at the European level and in the global context.

The current discussion on the future of the European Research Area (ERA<sup>15</sup>) - especially in the RTI field - underlines the need for joint action to exploit this potential with a clear focus on creating significant European added value. The European regulatory approach is to create appropriate framework conditions to form a favourable environment for the development of vibrant, dynamic and thriving ecosystems. To be able to address societal challenges efficiently and holistically, it is essential and urgent to make data from different sources across sectors and disciplines accessible, merged and reusable.

The European Union explicitly promotes and advocates the open science culture and the reusability of data, as well as open access to publications. In the course of the major research and innovation programmes such as *Horizon2020* - or its direct successor *HorizonEurope* - practices of the Open Science movement such as Open Access Publications and Open Research Data that comply with the FAIR principles - Findable, Accessible, Interoperable, Reusable - are already explicitly cited as a prerequisite for receiving funding.

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<sup>9</sup> [Open access to scientific information](#)

<sup>10</sup> [Open Innovation Open Science Open to the World](#)

<sup>11</sup> [Amsterdam Call for Action on Open Science | Report](#)

<sup>12</sup> [G7 Science and Technology Ministers' Declaration on COVID-19 - United States Department of State](#)

<sup>13</sup> [UNESCO Recommendation on Open Science](#)

<sup>14</sup> [Open Science as a cornerstone of the sustainable development goals-openaire](#)

<sup>15</sup> [ERA Portal Austria - A new ERA for Research and Innovation](#)

Furthermore, under the name *Plan S*, a strategy <sup>16</sup>already exists to promote free access to scientific knowledge that has been developed with public funds. This strategy, developed by the association *cOAlition S*, is supported by 18 national and international research funding agencies, as well as the European Commission and the European Research Council. The Austrian Federal Government actively supports the projects of Plan S. The principles are to be implemented step by step by all universities and universities of applied sciences.

Opening up scientific practice requires close cooperation and joint efforts on the part of several levels of scientific research. This includes the research institutions and their libraries as well as the funding agencies, politics and, last but not least, the researchers themselves. For this reason, Austria relies on a policy that should take place on several levels with constant exchange.

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<sup>16</sup> ['Plan S' and 'cOAlition S' - Accelerating the transition to full and immediate Open Access to scientific publications](#)

### 3. PRINCIPLES OF THE AUSTRIAN OPEN SCIENCE POLICY

The Austrian Open Science Policy is based on the international principles of Open Science. These are based on eight pillars, as <sup>17</sup>recommended by the *Open Science Policy Platform*. The *Open Science Policy Platform* is a group of experts that supports and advises the European Commission in the development of strategies and the practical implementation of the European Agenda for Open Science. The eight core tasks of Open Science can thus be listed as follows:

1. Rewards and incentives (Rewards and incentives)
2. Research indicators and next-generation metrics (research evaluation, evaluation metrics)
3. Future of scholarly communication
4. European Open Science Cloud EOSC
5. FAIR data (Findable, Accessible, Interoperable, Re-usable)
6. Research integrity
7. Skills and education (skills creation and open teaching)
8. Citizen science

The principles listed above are discussed in detail below.

#### 3.1. Rewards and Incentives

Scientific work must be carried out in accordance with the Open Science principles and must be promoted through appropriate recognition and rewards. Incentive systems should be established to encourage scientists and citizens to practice open science in their daily work. Open Science practices should be reflected in scientific careers and made more desirable for researchers.

#### 3.2. Research Indicators (New Generation Metrics)

New ways of evaluating research will be explored, especially to accommodate open science practices. *Publish-or-perish* environments will be broken up and avoided. Open peer review practices are to be implemented in order to make the evaluation of scientific output more transparent. Despite years of intense criticism of so-called journal-based metrics, the impact factor of prominent journals still plays a significant role in the scientific community - especially when it comes to career planning. Increased transparency of evaluation processes of researchers and their applications should be ensured. Austria respects the goals of the San Francisco Declaration on

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<sup>17</sup> [Open Science | European Commission](#)

Research Assessment (DORA)<sup>18</sup>, an international initiative that aims to establish metrics for evaluating scientific work. At the European level, the Leiden Manifesto should be mentioned in this context, which formulates similar intentions in the European context.

### **3.3. The Future of Research Communication**

All publicly funded research should be freely accessible to all, regardless of institutional affiliation. In particular, access to the data and publications resulting from research should be given value. In future, data and metadata, software and other methods should be made available to a broad public without barriers. The opening and federation of existing data and digital objects also enables links that can lead to new insights. Here, institutional libraries in particular are encouraged to negotiate new open access contracts and to rework old contracts. The Vienna Principles<sup>19</sup>, a vision paper from 2016, developed by the OANA network (Open Access Network Austria), represents an internationally acclaimed framework for the future of scholarly communication. These principles are based on the 12 cornerstones for a system of the future in science communication. The cornerstones are accessibility, findability, reusability, reproducibility, transparency, understandability, collaboration, quality assurance, evaluation, validated progress, innovation and public good.

### **3.4. European Open Science Cloud (EOSC)**

The European Open Science Cloud (EOSC)<sup>20</sup> is a trusted, virtual, federated environment that transcends borders and scientific disciplines to store, share, process and reuse digital research objects (such as publications, data and software) that are discoverable, accessible, interoperable and reusable (FAIR). EOSC brings together institutional, national and European stakeholders, initiatives and infrastructures from science and research. The European Open Science Cloud creates an open and secure virtual environment (World Wide Web of FAIR Data and Services) where scientific data can be stored, managed and analysed for free.

EOSC creates the federation of existing European data infrastructures, as well as the integration of high-capacity cloud solutions and expansion of the scope of these services, ultimately including users from the public sector and industry. Efforts will be made in particular in the areas of data culture, research data services, federated architecture and co-funding.

The official starting signal for the governance structure of EOSC was given in 2018 during a launch event at the University of Vienna, where an important milestone for the implementation process of

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<sup>18</sup> [DORA: Home](#)

<sup>19</sup> [Vienna Principles a vision for scholarly communication](#)

<sup>20</sup> [Architectures of Knowledge: The European Open Science Cloud](#)

EOSC was set by the acclamation of the "Vienna Declaration"<sup>21</sup> by European representatives from politics, administration and science.

EOSC is a process (not a project) of making research data in Europe available to all researchers under the same conditions of use. EOSC gives a strong push in Europe towards a culture of open research data following the FAIR principles.

### 3.5. FAIR Data

Research data generated in the course of a publicly funded project and relevant to the understanding or reproducibility of the results should be freely accessible. Research data includes statistics, experimental results, measurements, fieldwork observations, survey results, interview records and images. Metadata, specifications and other digital objects also count as research data.

Research data and related metadata shall be made discoverable and available online with the highest possible precision and granularity and, where possible, in open formats that are machine-readable. This shall ensure the interoperability, reusability and accessibility of research data. Publication must take place via institutional repositories or thematic archives, which will subsequently be integrated into the European Open Science Cloud. The data made public must comply with the FAIR principles. This means that they must be created and made accessible according to the FAIR principles <sup>22</sup> (Findable, Accessible, Interoperable and Reusable).

In this context, <sup>23</sup>reference is made to the international Open Definition<sup>24</sup> and the requirements of the Open Data Directive (EU) 2019/1024 and the Information Reuse Act (IWG). The re-use of research data should, as far as possible, be subject to no, or only minimal, legal restrictions. Restrictions on use should only be permitted in order to safeguard the origin and openness of the knowledge, for example by naming the authors. If public bodies grant licences for the re-use of documents, the licence conditions should be objective, proportionate and non-discriminatory. Therefore open, international standard licences should be used as far as reasonably possible. An optimal balance between IP protection and publication in the scientific and educational sectors is essential<sup>25</sup>. For the area of universities and research institutions, the focus should be on largely unrestricted publication ("as open as possible, as closed as necessary"), for those scientific activities

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<sup>21</sup> [EOSC Vienna Declaration](#)

<sup>22</sup> [FAIR Principles](#)

<sup>23</sup> [Information Reuse Act - Federal Law Consolidated, version of 17.03.2021](#)

<sup>24</sup> Cf. international open definition ([Open Definition](#)). The Information Reuse Act (IWG) represents the implementation of the EU's Open Data Directive 2019/1024.

<sup>25</sup> [ERA Portal Austria - Intellectual Property Rights](#)

that were predominantly financed with public funds, taking into account the respective strategic handling of intellectual property<sup>26</sup> and its exploitation.

### 3.6. Research Integrity

The EU's Open Science Policy Platform states that all publicly funded research should meet common, pan-European standards of research integrity and reproducibility. In this regard, a report on the framework conditions of reproducibility of research within the EU was published<sup>27</sup> by the EU in December 2020. In October 2020, the Austrian Higher Education Conference adopted "Guidelines for Standards of Good Scientific Practice and Principles of Scientific Ethics<sup>28</sup>".

### 3.7. Skills and Education

All researchers in Europe should develop the skills necessary to apply Open Science practices and, where appropriate, receive support to do so. In this regard, an EC working group produced a report in 2017 which, among other things, identifies<sup>29</sup> the following competences that are central to Open Science practices:

- Publish Open Access
- Production, management and curation of open research data
- Interdisciplinarity and understanding of ethical and legal frameworks
- Conception of Citizen Science projects

The aim of several international training measures - e.g. FosterOS, OS MOOC or OS Handbook - is to promote Open Science competences at an early stage of scientific careers. In the future, this promotion should also manifest itself in curricular design at the institutional level. Keywords such as data management skills and the understanding of ethical and legal aspects of research should be considered here.

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<sup>26</sup> [Intellectual property | Internal Market, Industry, Entrepreneurship and SMEs](#)

<sup>27</sup> [Reproducibility of scientific results in the EU : scoping report.](#)

<sup>28</sup> [Practical Guide to Integrity and Ethics in Science](#)

<sup>29</sup> [Providing researchers with the skills and competencies they need to practise Open Science.](#)

### 3.8. Citizen Science

The aim of Citizen Science<sup>30</sup> is to actively involve laypeople and non-scientists from the interested public in research processes (e.g. pupils, journalists, app developers, etc.). Of course, this must be done in compliance with all scientific criteria and be conducted by trained personnel. Here, among other things, the relationship between science and society is at the forefront of the efforts. Citizen Scientists can, for example, collect data, formulate research questions or even write publications. One aspect of successful implementation of Citizen Science is also free access to infrastructures as well as software and hardware for scientific research. These are possibilities that are still mostly accessible only to selected personnel at the research institutions. Citizen Science projects were funded with about 60 million € in the last EU Framework Programme on R&I - Horizon2020 - and will receive<sup>31</sup> even more attention in HorizonEurope.

At the Austrian level, the Sparkling Science project<sup>32</sup> and the OeAD Centre for Citizen Science have, for example<sup>33</sup> already set accents in the field of Citizen Science and continue to receive support.

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<sup>30</sup> [What is Citizen Science - Austria does research](#)

<sup>31</sup> [Citizen Science - Publications Office of the EU](#)

<sup>32</sup> [Sparkling Science](#)

<sup>33</sup> [Centre for Citizen Science](#)

## 4. AUSTRIAN DECLARATION ON OPEN SCIENCE [AND ON THE EUROPEAN OPEN SCIENCE CLOUD]

Austria is involved in the development of open, transparent and inclusive science and promotes fair treatment of research processes and their results<sup>34</sup>. Open Science was included<sup>35</sup> in the research policy strategy, which takes<sup>36</sup> into account open access to research publications and data, through Austria's clear commitment to Horizon Europe and its active participation in the European Research Area (ERA).

### 4.1. Publication of Scientific and Research Data Based on the FAIR Principles

The aim is to ensure that data generated by publicly funded research in Austria are progressively structured to comply with FAIR data principles (findable, accessible, interoperable and reusable), that they are preserved and, whenever possible, open to<sup>37</sup> all without barriers. The aim is also to implement a mandatory open access dissemination mandate for all data that has already been made available as part of publicly funded projects. Certain exceptions to this obligation will be allowed in accordance with the legal provisions, e.g. if the data in question are professional secrets, statistical secrets, industrial and commercial secrets, personal data or copyrighted content<sup>38</sup>, as well as if the data are considered<sup>39</sup> sensitive due to national security, defence or public safety and health.

Considering the European Data Strategy<sup>40</sup>, several European legal provisions regulate the reuse of research data, in particular the European Commission Recommendation on Access to and Preservation of Scientific Information<sup>13</sup> (revised 2018), the revised Directive on Open Data and Reuse of Public Sector<sup>41</sup> Information (Open Data and PSI RL 1024/2019) and the EU Copyright<sup>14</sup> Directive, which applies to publicly funded research data and to which Austria is committed. The aim is that research data can be re-used for commercial and non-commercial purposes if it has been publicly funded and if it has been<sup>42</sup> made publicly available by researchers, research institutions or research funding bodies via an institutional or thematic archive.

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<sup>34</sup> [Commission: Recommendation on access to and preservation of scientific information](#)

<sup>35</sup> [RTI strategy of the Federal Government](#)

<sup>36</sup> [A new ERA for Research and Innovation](#)

<sup>37</sup> [Accessibility: Directive \(EU\) 2016/2102 and Web Accessibility Act Implementation](#)

<sup>38</sup> [EU Copyright Directive](#)

<sup>39</sup> cf. [Directive \(EU\) 2019/1024](#) Art. 1 (2d)

<sup>40</sup> [European Data Strategy | EU Commission](#)

<sup>41</sup> [PSI Directive](#)

<sup>42</sup> cf. [Directive \(EU\) 2019/1024](#) Art. 10 (2)

Furthermore, the European Data Strategy<sup>43</sup>, published in 2020, aims to drive forward the creation of a single market for data. The aim is to increase the exchange and use of data within the EU and across sectors for the benefit of researchers, businesses and public administrations. This approach also forms the basis of the new European Research Area (ERA) to build a common science and technology space for the EU<sup>44</sup>. Open Science and Open Data are essential instruments for improved cooperation between researchers and innovators to increase the attractiveness of Austria as a location for the world's best talents.

#### Measures

- Austria is working to accelerate the structuring of the scientific community to promote the FAIR data principles and open up data. In general, the inclusion of data processing costs in calls for projects will be allowed. Researchers will be encouraged to deposit data in certified data repositories. Priority will be given to national and European research infrastructures, in particular subject-based and subject-specific repositories. Data management plans, a key instrument for defining rules for structuring, storing and disseminating data, will thus become standard. Austria supports the Research Data Alliance (**RDA**), an international network that establishes best practices for research data. It also supports the development and preservation of software, an essential component of mankind's technical and scientific knowledge.
- Austria supports the creation of synergies between Open Science and Open Data initiatives, for example through regular exchanges between actors of the European Open Science Cloud with Cooperation Open Government Data (OGD) Austria. This is intended to promote the exchange of experience, particularly with regard to data governance and technical standards, and to identify future potential for data preparation and reuse.
- Interdisciplinarity: Austria supports projects to improve the interdisciplinary availability of research data (avoidance of data silos). This is intended to facilitate more interdisciplinary research projects.
- Austria promotes scientific research on the handling of personal data, the appropriate anonymisation of data and the adequate processing of aggregated data.
- Austria is committed to ensuring that science and research have access to statistical microdata.
- Austria supports the development of repositories (e.g. AUSSDA, GAMS, ARCHE, PHAIDRA, Visual Library, etc.) for research data and digital objects, for example in the context of participation in European Research Infrastructures or in the course of performance agreements with universities.

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[European Data Strategy | EU Commission](#)

<sup>44</sup> [New European Research Area: Council adopts conclusions](#)

## 4.2. Participation in European and International Open Science Processes - the European Open Science Cloud - EOSC

The success of open science implies the development of new basic practices for researchers. This requires the definition of new skills, the development of new training programmes and the creation of new services. The aim is to broaden the scope of this Austrian policy and to use it. All research agencies are encouraged to develop or implement Open Science policies within their institutions.

Without transparency, it will not be possible to change the scientific ecosystem. It is therefore important to open up access to data sets concerning the funding of calls for projects and winning proposals, as well as institutions' acquisition costs for journals and books. Although Open Science has certain regional characteristics, it is a global movement that can only be further developed through comprehensive international coordination. Austria wants to play its part in promoting the idea of an efficient, regulated, transparent and resilient ecosystem that benefits the scientific community and society.

### Measures

- Austria will help shape this international landscape in terms of services, standards and best practices by strengthening participation in European and international open <sup>45</sup>science initiatives (European Open Science Cloud - EOSC; GO FAIR, Research Data Alliance - RDA; OpenAIRE; Directory of Open Access Journals).
- Austria will contribute to defining and regulating the building blocks of the open science ecosystem. For example, by founding AUSSDA<sup>46</sup> (The Austrian Social Science Data Archive), Austria has created a data infrastructure that offers a variety of research-supporting services, especially data archiving and assistance with data re-use. This will make scientific data accessible and reusable for science and society. Similarly, it will help to share information and coordinate international negotiations with publishers, facilitated by efforts to ensure cost transparency.

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<sup>45</sup> [Landscape of EOSC-related infrastructures and initiatives : report from the EOSC executive board working group \(WG\) landscape.](#)

<sup>46</sup> [AUSSDA - The Austrian Social Science Data Archive](#)

### 4.3. Open Access - Access to Publicly Funded Publications

Open scholarly publishing must become the standard approach as soon as possible. To drive this momentum, research publications resulting from calls for projects that are publicly funded must be disseminated via open access platforms, be it in journals, books or via an open public repository. Austrian universities are encouraged to ensure that the publications of researchers working there are also published under open licences. To maintain these practices over time, the evaluation system for researchers and research institutions needs to be updated to reflect the principles and practices of open science. Changes in the way researchers are evaluated aim to give more weight to quality over quantity, as <sup>47</sup>outlined in the proposals of the San Francisco Declaration on Research Assessment (DORA) <sup>48</sup>and the principles of the Leiden Manifesto.

The scientific community needs to regain control over the publishing process in general, in line with the principles required for open science and bibliodiversity<sup>49</sup>. It must direct its efforts towards those stakeholders who are working to develop a less focused publishing environment that is consistent with the principles of open and ethical access.

#### Measures

- Austria will benefit from this by developing innovative publishing approaches enabled by digital technologies such as preprints, short-format manuscripts, data articles, open peer review, etc. Austria will continue to support increased open access publishing by researchers through the "Cooperation E-Media Austria<sup>50</sup>". Archives will have improved working conditions and functions to facilitate use by researchers and institutions. Finally, Austria will recommend the introduction of an open licence for publications and data that is compatible with national law as well as international scientific practices.
- "Austria aims to promote and support the process of Open Science and Open Access in organisational terms and via appropriate thematic or institutional archives, including the establishment of common metadata standards in the field of research; Open Access publishing and FAIR research data management are essential factors<sup>51</sup> in this."
- Austria actively supports Plan S. Universities and universities of applied sciences should therefore implement the principles of Plan S step by step.

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<sup>47</sup> [Leiden manifesto for research Metrics - Home](#)

<sup>48</sup> [DORA: Home](#)

<sup>49</sup> [Jussieu Appeal for Open Science and Bibliodiversity](#)

<sup>50</sup> [KEMÖ: Welcome to the Austrian Library Consortia](#)

<sup>51</sup> [Open Science Network Austria: OANA](#)

#### 4.4. Open Educational Resources (OER)

The aspect of how knowledge is communicated is also inseparably linked to an open society and an open science. The dissemination of knowledge is closely linked to the concept of Open Data. With reference to the statements made under "Skills and Education" and in the light of the recent Sars Cov 2 pandemic, the opening of learning resources is of increased importance.

##### Measures

- Austria would like to make its contribution to making the learning materials created in Austria in whatever form publicly accessible and in open formats, for example using established open data standards. In a first step, the relevant repositories will be linked and thus made publicly accessible. In this way, Austria wants to make learning content available to the scientific community on the one hand and make learning more flexible and adapt it to individual needs on the other.
- The Forum New Media Austria (FNMA) has already prepared "Recommendations for the Integration of Open Educational Resources at Universities in Austria". The currently running project "Open Education Austria Advanced", in which several universities are involved, is concerned with the implementation of a corresponding infrastructure.
- Universities and universities of applied sciences are therefore called upon both to create infrastructures for storing OER and to share them with others. Staff working at universities and universities of applied sciences should be encouraged to post their content and share it in open formats where possible and appropriate.