

Report on the workshop

“Training in the EOSC”

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Abstract

This document is the output of a three-day workshop on Training in the EOSC, 26-28 February 2020, The Hague, The Netherlands. It provides recommendations regarding Rules of Participation for training as well as recommendations regarding practical guidance for training service providers.

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DOCUMENT LOG

Issue	Date	Comment	Author
V0.1	2020/03/19	ToC, first draft texts	Marjan Grootveld, Ellen Leenarts, Ilona von Stein
V0.2	2020/03/20	Draft for internal consultation EGI, EUDAT and OpenAIRE	Marjan Grootveld, Ellen Leenarts, Ilona von Stein, Iryna Kuchma, Giuseppe La Rocca, Pedro Príncipe
V0.3	2020/03/27	Draft for all workshop participants	all workshop participants
V0.4	2020/04/06	Draft with workshop participant's feedback addressed	Marjan Grootveld, Ellen Leenarts, Ilona von Stein
V0.5	2020/04/10	English language check and executive summary	Marjan Grootveld, Ellen Leenarts, Ilona von Stein, Gerard Coen
v.0.6	2020/04/24	RoPs for training included	Marjan Grootveld, Ellen Leenarts, Ilona von Stein
V1.0	2020/04/28		All workshop participants

² <https://www.eoscsecretariat.eu/funding-opportunities/co-creation-requests>



TERMINOLOGY

Abbreviations/Acronyms	Definition
EOSC	European Open Science Cloud
MVP	Minimum Viable Product
RIs	Research Infrastructures
RoP(s)	Rule(s) of Participation
CoP	Community of Practice for Training Coordinators, initiated by EUDAT and DANS, coordinated by OpenAIRE and EOSC-hub



EXECUTIVE SUMMARY

35 participants representing more than thirty EOSC-related projects and initiatives joined the workshop “Training in the European Open Science Cloud”. This three-day face-to-face workshop took place from 26-28 February 2020 in The Hague, The Netherlands. The workshop was organised by DANS in collaboration with EUDAT, EGI and OpenAIRE.

This report presents the results of the workshop:

1. Recommended Rules of Participation for training in the EOSC, and
2. Practical guidance for training service providers who want to participate in the EOSC.

The first part of this document is tended to support the EOSC Rules of Participation Working Group. The second part aims to be of particular benefit to the EOSC Skills and Training Working Group. The report may also provide a useful contribution for outlining the EOSC training elements to be included in the coming INFRAEOSC (03 & 07-2020) proposals.

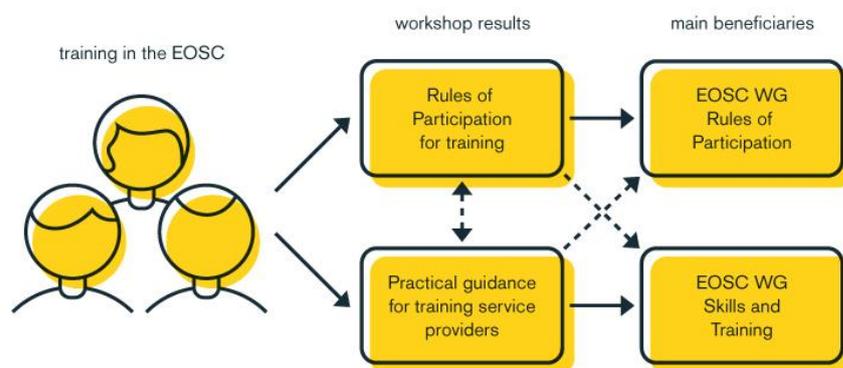


Figure: Workshop “Training in the EOSC”, workshop results and main beneficiaries

The main workshop result regarding Rules of Participation for training is the recommended adaptation of the EOSC Rules of Participation (v0.2)³ to include training services and training materials. Our training-related recommendations (Section 2) are integrated in the “Introduction” section of that document as well as in the sections on “Data” and “Services”. This illustrates how deeply training is entwined with the other services and with data. Also, we recommend three new terms for the glossary in the RoP: “training delivery”, “training materials”, and “training service provider”.

The workshop results regarding practical guidance can be found in Section 3. The guidance is targeted to training service providers. However, the implementation of recommendations would benefit from central specification and prioritisation. Therefore, we recommend the EOSC Working Group Skills and Training to initiate such centralised initiatives and collaborations among training providers. The main recommendations are clustered around three areas:

- **Stakeholders in EOSC Training:** Define stakeholders and their needs, define the Minimum Viable Product for the EOSC training provision and make sure to engage all stakeholders.

³ <https://repository.eoscsecretariat.eu/index.php/s/QWd7tZ7xSWJsesn#pdfviewer>



- Requirements for training providers, and trainers regarding EOOSC skills development and training: Focus on quality assurance by describing the organisation’s strategies and work processes regarding training , describing the training with respect to skill profiles needed in the EOOSC, and setting up trainer self-accreditation collaboratively.
- Recommendations for a federated EOOSC training catalogue and its training resources: Use standards for describing training materials, ensure harvestability and discoverability, describe policies to support quality control for training materials, and comply with FAIR principles.

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1. Introduction to the workshop and the report

This document is the output of a three-day workshop on Training in the EOSC, 26-28 February 2020, The Hague, The Netherlands.⁴ This workshop has been organised by [Data Archiving and Networked Services \(DANS\)](#) in collaboration with [EUDAT](#), [EGI](#) and [OpenAIRE](#). The workshop has been funded by the EOSC Secretariat under the Co-creation programme.

The objective of this workshop is to provide recommendations in two areas:

1. Rules of Participation (RoP) for training in the European Open Science Cloud (EOSC)
2. Practical Guidance for training service providers

First, this report provides recommendations for RoP for training in the EOSC. These rules should not act as a barrier for training providers, but rather improve the EOSC training provision by its quality, findability, accessibility and the easier reuse of learning resources. These are intended to support the work of EOSC Governance. The authors hope that especially the EOSC Working Group on RoP will benefit, as well as the EOSC Working Group on Skills and Training. Second, it provides practical guidance for training service providers on preparing training services and training materials for the EOSC.

The workshop was attended by 35 workshop participants (Appendix I) representing over 30 EOSC-related projects and initiatives (Appendix II). The participants were mainly experienced hands-on trainers, training coordinators and training service providers.

With this workshop we built on the significant volume of training activities in the EOSC which already exists. In various projects, research infrastructures and institutions relevant work has been done. Efforts have been made in the planning and execution of the workshop to respect and reuse existing work focusing on training in the EOSC (Appendix III). In this way the team involved considers the output of the workshop to benefit from ‘standing on the shoulders of giants’, and all efforts have been made to attribute credit when and where possible. For the workshop scope and methodology see Appendix IV, and for a detailed workshop programme Appendix V.

2. Recommendations regarding Rules of Participation for training

The workshop sessions on the [Rules of Participation \(version 0.2\)](#) of the [EOSC Working Group on RoP](#) strictly focused on their relevance for training in the EOSC. Therefore, intentionally, this report does not contain generic feedback on the RoPs. In this section we describe three larger discussion points, whereas section 2B is the adaptation of the RoP (version 0.2) that we recommend.

⁴ <https://dans.knaw.nl/en/current/workshop-on-training-in-eosc>



A. Main Rules of Participation discussion points during the workshop

Training is an EOSC resource like data and services, for each of which the EOSC WG has drafted a set of RoP(s). At the same time training is entwined with the other resources: training supports EOSC data providers and data users, service providers and service users, training can be about data and/or services, et cetera. A major part of the workshop was devoted to positioning training among the other resources, a dilemma which can be formulated as “should training have a section of its own, or should training be integrated in the sections of services and data of the RoP”? In the end, the organisers decided on the latter approach. The main arguments in favour of embedding training in the current sections in the RoP draft text are, first, that it demonstrates how deeply training is entwined with the other services and data, and second, that it rather naturally supports the distinction between providing training - which can be considered a service - and training materials, which have much in common with data.

A second topic discussed is openness of EOSC resources, as mentioned in Ground Rule 1, “EOSC is open to all”. There should be more clarification on the openness of the EOSC resources, e.g. the training catalogue or the resources in such a catalogue. There was a lot of discussion during the workshop on the feasibility of all training resources being open and free at the point of access (or rather the point of use). It was felt that the business model in relation to training could present challenges to implement. This issue is included in the recommended changes to the RoP below (see RoP Data 1 and Services 1).

A third topic that stood out in the workshop is that RoP should also provide information about what service providers can expect from EOSC - all service providers, not only training service providers. The current RoPs define obligations and accountability “governing all those in EOSC”, but not EOSC itself - whoever this may be. For instance, in addition to the ‘Rules on proper conduct’ (D2 and S2) it is recommended that EOSC monitors adherence to the rules.

B. The recommended Rules of Participation, training included

This section cites the following sections from the [Rules of Participation \(version 0.2\)](#): Introduction, B. Data, and C. Services. The recommendations regarding training are highlighted. Three new definitions for the Glossary conclude the current section.⁵

Here starts the citation from [Rules of Participation \(version 0.2\)](#):

Introduction

The Rules of Participation (RoP) for the European Open Science Cloud (EOSC) apply to all digital⁶ resources made accessible via EOSC, including data and services. They define a minimal set of rights, obligations and accountability governing the activities of all those participating in EOSC, such as data and service users, data and service providers, and the operators of EOSC itself.

⁵ For readability, RoP v0.2 sections without training-related recommendations are not copied into this report. Please note also 1) that the original in-text cross references don't work, and 2) that the numbering of footnotes is now part of the numbering of the current report.

⁶ In the context of training, the proposed Rules of Participation hold also for non-digital resources like books and human experts.



This version (v0.2) of the RoP is a draft for discussion. It assumes that the governance structure for EOSC will include a governance framework for EOSC involving the appropriate stakeholders that includes a legal entity that will assume ownership of the RoP and provide a decision and revision process for them. This document does not, therefore, address these matters, nor does it concern itself the legal basis for EOSC.

This document is being developed by the ROP Working Group at the same time as the FAIR, Architecture, ~~and~~ Sustainability **and Skills and Training** WGs are developing their recommendations. This version of the RoP, therefore, defers specific discussions on these topics to those groups and will later be revised to incorporate any elements arising from that work. Rather, this document provides a conceptual framework for policies and documents related to issues such as “Terms and Conditions” and “Acceptable Use Policies”. These will need to be further elaborated and reviewed with respect to legal regulations before the RoP are finalised. This will be done during 2020 through a study commissioned using EOSC-Secretariat co-creation funds.

For brevity, this document provides a simple exposition of the rules themselves and some brief notes expanding the discussion on a few of the key issues. The final version of the RoP will be accompanied by an explanatory document that elaborates further on the rationale behind the choices made.

Section A defines some ground rules for all EOSC resources, Section B relates to data provisioned through EOSC and section C relates to EOSC services. **Training materials and training delivery are included in sections B and C, respectively.** Section D relates to the “federating core”⁷.

B. Data

Unless indicated otherwise, Rules of Participation concerning data hold also for training materials. Training materials can be digital and analogue.

D1. Data resources exposed through EOSC are free of charge at the point of ~~access~~ use.

- General information about all registered EOSC resources (metadata) is universally available through EOSC.
- Data users in EOSC are entitled to find and access individual data resources ~~without payment~~ **free at the point of use**⁸.
- Access to certain data resources may require personal or organisational registration, authentication or authorization (see rule [S5](#)).
- Automated and bulk downloads of data resources or the use of data resources that require a related service to be accessible, constitute a case of service consumption (see rules [S1-S6](#)).

⁷ The “Federating Core” is the collection of internal services that make EOSC function (rather than those that are provided for researchers *through* EOSC). These services will be provided by the EOSC operators under contractual provisions such as Service Definitions and Service Level Agreements. (See also [Note 3 in Rules of Participation \(version 0.2\)](#))

⁸ The recommended change is in alignment with note 5 of “[Solutions for a Sustainable EOSC - A tinman report from the EOSC Sustainability Working Group](#)” (December 2019): “Free at the point of use does not imply Free of charge. Free at the point of use means the end-user does not pay directly for the service when it is delivered but their consumption will be paid for by other means.” That report’s use of the term “service” can easily be extended to include the notion of “data” as used in the Rules of Participation (see also rule S1).



D2. Data producers adhere to principles of proper research conduct⁹.

- Data producers agree to act in accordance with commonly agreed principles regarding the conduct of research¹⁰ and do not willfully misrepresent or provide false data.

D3. Data providers determine the terms of use of data resources.

- Data providers publish the terms of use for the data resource they are provisioning. This includes Licensing and Terms and Conditions of use and whether access requires authentication and/or authorisation.
- Data providers agree that EOSC operators may monitor and report on the level of usage of their data through EOSC.

D4. Data providers will respect principles of FAIR data.

- Data providers aim to implement the FAIR principles.¹¹
- The terms of use comply with the EOSC principles regarding FAIR data and any relevant licensing, legal and ethical constraints on how data can be accessed, processed, analysed, changed and redistributed by data users.
- **The scope of EOSC training provision should advance the use of EOSC Services and the knowledge and implementation of Open Science and the FAIR data principles.**

D5. Data users adhere to the terms of use of data resources.

- Data users agree to adhere to, and to not willfully violate, any terms of use associated with the data. (See [Note 3 in Rules of Participation \(version 0.2\)](#).)

D6. Data users reference the source.

- Data users agree to reference the source of the data, if required to do so, in every communication where they make use of, or refer to, the data resource.¹² (See [Note 2 in Rules of Participation \(version 0.2\)](#)).
- Where a persistent identifier is provided for the resource this will be used in the reference.
- If required to do so, data users will also acknowledge the intellectual work of the original creator(s) of the data.
- Where the resource stipulates a standard form for this reference or acknowledgment, this form will be used by the user.

⁹ D3, D4, and D5 attempt to distinguish the responsibilities and liabilities of the original data *producers* from those of *providers* that disseminate the data. There are legal ramifications here that need to be considered further. We propose to do this through a separate study.

¹⁰ For example, The European Code of Conduct for Research Integrity, https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020-ethics_code-of-conduct_en.pdf

¹¹ As defined by the FAIR data WG (such as “permissive” licensing to allow access and reuse, **comprehensive metadata, and the assignment of Persistent Identifiers**).

¹² If data is licensed as CC0 or is public domain, then this requirement is waived.



C. Services

Preamble: an organisation providing training is considered a service provider, more specifically, a training service provider. A service provider can provide training either solely or in conjunction with other services¹³. Any service provider who provides training on EOSC Services, Open Science and the FAIR data principles is subject to these Rules of Participation.

S1. Services exposed through EOSC are free of charge at the point of access~~use~~.

- Service users in EOSC are entitled to find and access individual EOSC services ~~without payment~~ free at the point of use (see also D1 and the associated footnote).
- In order for service providers to be compensated where appropriate, access to certain services may require personal or organisational registration, authentication or authorization (see Rule [Op4](#)).
- Where machine access to services implies high usage there may need to be additional means of compensation¹⁴.
- Where training requires significant human and/or technical resources there may need to be additional means of compensation.

S2. Service providers adhere to principles of proper ~~research~~¹⁵ conduct.

- Service providers agree to act in accordance with commonly agreed principles regarding the conduct of research¹⁶ that assure, for example, the quality of information provided through the service. For example, they will not willfully misrepresent or provide false information.
- Training service providers agree to adhere to community-agreed principles and best practices regarding training provision.

S3. Service providers determine and publish the conditions of use of their services.

- Service providers define and publish the terms of use for the service they are provisioning. This includes Licensing and Terms and Conditions of use and whether access requires authentication and/or authorisation.
- Service providers define and publish their own quality targets for their services and agree that EOSC operators may monitor and report on the service levels achieved for the usage of the service through EOSC.

S4. Services align with EOSC service architecture

- Services comply with EOSC architectural standards¹⁷ where applicable, for example regarding API access, **discoverability and aggregation**, so that composite services and workflows can be built that integrate service use.
- Training services comply with community-accepted standards and architecture to facilitate

¹³ For instance, an organisation providing an ICT service in EOSC may provide also training *about* this service.

¹⁴ The EOSC Sustainability Working Group is developing the business model for EOSC which will further define how compensation for service provision may work. These RoP may need to be refined in the light of the outcome of that work.

¹⁵ Providing a service is probably not research. Therefore this Rule is not limited to research conduct.

¹⁶ For example, The European Code of Conduct for Research Integrity, https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020-ethics_code-of-conduct_en.pdf and any National or Disciplinary or Ethical Codes. Service providers agree to apply for any forthcoming certification or accreditation that includes awareness and enforcement of such codes of conduct. Training service providers agree to adhere to any forthcoming code of conduct for trainers. Eg UK concordat.

¹⁷ These are currently being defined by the EOSC Architecture WG.



interoperability and reuse¹⁸.

- Services requiring authentication or authorization will support the use of relevant community recognised academic credentials for federated AAI¹⁹.

S5. Service users adhere to the terms of use of the services they consume.

- Service users agree to adhere to and to not willfully violate the terms of use determined by the service provider.

S6. Service users reference the source.

- Service users agree to reference the service they use, and if required, the intellectual work of its original creator(s), in every communication where they make use of, or refer to the service²⁰.
- Where the service stipulates a standard form for this acknowledgment this form will be used by the user.
- Where a persistent identifier is provided for the service this will be quoted in the reference.

S7. Service providers provide access to training to users on how to use their services.

- Service providers provide training on the services that they provide, e.g. on ICT services, or they enable other training service providers to do so.

Glossary (Partial - Work in Progress)

- <...>
- **Training delivery:** A situation in which a training service provider allows others to acquire knowledge and/or skills. Training delivery can be online, offline (“face-to-face”), or a combination of both (“blended”).
- **Training materials:** Any digital or non-digital material that has been used or can be used in training delivery. Like data, training materials can be in any format and should have metadata.
- **Training service provider:** Any organisation that provides training for external users. A training service provider can provide training either solely or in conjunction with other services, for instance when it offers onboarding training about an ICT service it provides. In the high-level context of Rules of Participation we don’t differentiate providers by e.g. ‘do they run a dedicated training infrastructure; do they only create or also curate training materials’.

<...>

Here ends the text that was cited from the [Rules of Participation \(version 0.2\)](#).

¹⁸ For example, the Sharable Content Object Reference Model (SCORM) and Learning Tools Interoperability (LTI). Discipline-independent standards around many aspects of training are still emerging, hence the importance of “community-accepted” standards.

¹⁹ As far as possible, services will provide community accepted methods for AAI and employ standard forms of wording in any AUP. The AARC project has provided a Blueprint Architecture and Policy Development Toolkit for Authentication and Authorisation.

²⁰ A training service, with related training materials, may have creator(s) and/or publisher(s); users agree to reference all of them.



3. Recommendations regarding practical guidance for training service providers

The EOSC training workshop focused on two areas: the RoPs for training as described in the previous chapter and practical guidance for training providers so that these training providers and trainers can actually participate in EOSC following the more formal RoPs. It was made sure that the practical guidance that is described in this section supports the RoPs implementation.

The ultimate goal of EOSC Training is to make sure there is sufficient expertise among the people who build, run and use the EOSC, as well as available - and findable - training for upskilling for Open Science and EOSC tools and services for all the relevant EOSC training stakeholders.

The current training landscape is large and heterogeneous, with many Research Infrastructures (RIs), e-infrastructures, service providers and EOSC projects having built or building their own training programme; on some occasions even with their own training portal. It is crucial that all these efforts of those training providers contribute in a coherent way, using a properly defined process, in order to enhance an EOSC skills and training provision. It is very important not to duplicate existing work, but to connect existing training outputs of infrastructures and projects, and to make it discoverable for the users.

In this workshop the attendees worked collaboratively on the practical guidance that is needed next to the RoPs for training. This section offers recommendations for practical guidance for training service providers in three areas:

- stakeholders in EOSC Training,
- requirements for training providers and trainers regarding EOSC training and skills development, and
- recommendations for a federated EOSC training catalogue and its training resources.

The guidance is intended for training service providers. However, the workshop participants are aware that in many cases an individual training provider can only implement the steps in collaboration with other training providers and after agreeing on specifics, for example, on a set of minimum requirements for the quality of learning resources. The implementation of the recommendations would also benefit from central specification and prioritisation. Therefore we recommend the EOSC Working Group Skills and Training and the CoP of training coordinators, to initiate such centralised initiatives and collaborations among training providers.

A. Stakeholders in EOSC Training

The different levels of participation of the stakeholders in an EOSC training provision need to be taken into account: a) researchers as the main end-user stakeholder, b) research support staff and librarians holding the role of intermediary, enabler, multiplier and trainer, and c) training service providers contributing with skills and services in building the EOSC training provision. Input from all different stakeholder types is critical in shaping a skills and training provision under EOSC. In the EOSC RoPs the



overall stakeholders in EOSC are mentioned. During the workshop the need for defining stakeholders in EOSC training became apparent:

Recommendation A-1	Guidance
<p><i>Define the stakeholders</i> involved in EOSC training and their <i>needs</i>. (Including potential users, training providers and other relevant stakeholders.)</p> <p>Ensure the main focus is on the <i>user</i> (researcher, research support staff and others) in the approach of the EOSC training provision.</p> <p>Define the <i>specification of the Minimum Viable Product (MVP) which is the EOSC training provision</i> in this case.</p>	<p>Conduct a <i>stakeholder analysis</i>, identify typical user-personas (across disciplines and infrastructures).</p> <p>Engage with stakeholders to establish their <i>requirements for the EOSC training provision</i> in order to develop the Minimum Viable Product (MVP).</p> <p>Define an <i>engagement strategy</i> for the MVP to ensure ongoing feedback by stakeholders (e.g. training providers and potential users) and enable reiteration.</p> <p>Involve the community from the start, ensure their voice is centre.</p>

B. Requirements for training providers and trainers regarding EOSC training and skills development

In the EOSC RoPs in Section 2 an organisation providing training is considered a service provider, more specifically, a training service provider. Training and skills development in the EOSC is supported by training service providers and trainers. In this section guidance is presented on defining EOSC training service providers as well as practical guidance on quality assurance for providers and trainers. With regard to accreditation and certification of training service providers, trainers (section B-1 and B-2) and training resources (section C) there was quite some discussion among the participants of the workshop. This followed from the overall goal that training - and the EOSC at large - should be as open and inclusive as possible. Clearly, any demand for accreditation and the like implies a threshold for participation. This trade-off should be considered when these recommendations are implemented.

Recommendation B-1	Guidance for Training Service Providers
<p>Describe the required and desirable characteristics of <i>providers of training and skills development to the EOSC</i>.</p> <p>These could include, for example, research performing organisations, research or e-infrastructures and their national or thematic nodes, training networks, coordination fora, industry bodies, SMEs, and others.</p>	<p>Adhere to the EOSC <i>RoPs</i> for service providers.</p> <p>Describe the organisation's <i>strategies</i> to adopt and implement FAIR and open principles.</p> <p>Identify the <i>scope</i> of the competences the organisation aims to enhance for its target audiences, including any themes it aims to provide leadership on.</p> <p>Provide training and guidance on the <i>skills profiles</i> that are needed for the relevant <i>roles</i> in conducting and supporting FAIR and Open Science, with regard to data, software development and services in the EOSC.</p>



	<p>Describe the provider's processes for <i>continuous improvement</i> of its training methods, tools and materials, including engaging with its target audiences, and responding to their feedback by regular reiteration.</p> <p>Define <i>quality assurance processes</i> and <i>sustainability plans</i> for the organisation, trainers and training materials and/or catalogue.</p> <p>Co-create a <i>checklist for accreditation</i> in line with relevant certification schemes (e.g. CoreTrustSeal, FitSM) that includes <i>minimum requirements</i>: materials review policies in place, prerequisites, continuous improvement based on feedback, who is responsible for what, etc.</p>
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Recommendation B-2	Guidance for Training Service Providers
<i>Accreditation procedures for trainers</i>	<p>Compile minimum requirements for <i>EOSC trainer accreditations</i></p> <p>Collaboratively set up a <i>workflow for self-accreditation</i></p>

C. Recommendations for a federated EOSC training catalogue and its training resources

After quite some discussions in previous workshops and again during this workshop, the following approach was agreed upon. The envisioned EOSC training catalogue is based on a multi-dimensional approach and the catalogue includes quality training resources, described according to an agreed common structure. The catalogue provides entry points highlighting the stakeholders who will benefit from specific resources, thus easing the navigation and discoverability of training resources.

Recommendation C-1	Guidance for Training Service Providers
<p>Create the <i>EOSC training catalogue as a hub</i> of training resources from the training service providers.</p> <ul style="list-style-type: none"> ● The training materials available via the catalogue (that might also be supplied by content providers from outside Europe) shall be <i>relevant</i> for the stakeholders. ● <i>User experience</i>. The EOSC training catalogue will enable specific navigation and browsing <i>entry points</i> to ease the discovery of useful 	<p>Define the <i>target audiences</i> (users and beneficiaries) of the EOSC training catalogue and the specific entry points, involving end-users in this process.</p> <p>Ensure the <i>training materials descriptions</i> are available for both humans and machines. Make sure these training descriptions describe the content of the training according to a <i>defined and</i></p>



<p>training resources for the different stakeholders.</p> <ul style="list-style-type: none"> • The <i>federated catalogue</i> should be built on existing training catalogues to create a catalogue of catalogues of training resources. • The objectives of a catalogue could be achieved in <i>three different ways</i> based on a multi-dimensional approach: <ul style="list-style-type: none"> a) via harvesting and aggregation processes of existing repositories; b) via registration of resources directly in the EOSC training catalogue (resources are hosted in the original service provider catalogue or repository, but can not be harvested); c) via a repository for all training materials that do not have a well-structured supporting infrastructure that hosts them. • The catalogue will have clear and well-defined <i>technical prerequisites</i> for content providers to join and follow the established quality requirements. 	<p><i>common set of metadata for training resources</i> (Tables 8 & 9 in the EOSCpilot D7.5 could be used as a guidance in addition to citation, duration of the course/training, learning objectives, language, etc.), using a simple Mandatory (M), Recommended (R), Optional (O) indication. (see also C-2)</p> <p>Ensure the machine <i>discoverability and harvestability</i> of the training resources, according to defined and established <i>standards</i> using endpoints for harvesting and standards like OAI-PMH, ResourceSync.</p>
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Recommendation C-2	Guidance for Training Service Providers
<p>The <i>training materials</i> registered and available via the EOSC training catalogue will be evaluated based on training community-agreed <i>quality criteria</i>.</p>	<p>The respective providers of training materials will describe <i>policies around the curation, maintenance and support</i> of the training materials. This may be a <i>self-assessment checklist</i> for quality control.</p> <p>The <i>process</i> of including new training materials implies three steps:</p> <ol style="list-style-type: none"> 1. <i>compliance</i> with a minimum mandatory requirements (adaptable for different types of resources), e.g. metadata, learning objectives and outcomes, prerequisites; 2. <i>review (and peer-review)</i> of the provided contents by the EOSC training catalogue editors; 3. <i>quality control</i> of the pedagogical approach presented in the training material and the consistency of the content by the curators. (The Open Science Training handbook provides guidance) <p>The quality criteria should also include <i>descriptive training materials metadata</i>, clear identification of the learning objectives, outcomes, and the prerequisites needed to use the training resources.</p> <p>The <i>descriptive training resources metadata</i> should cover:</p> <ul style="list-style-type: none"> • Classification of the training materials in a given catalogue according to a shared list of <i>learning resource</i>



	<p><i>types.</i></p> <ul style="list-style-type: none">● <i>Tag</i> the training resources to describe the relevant desired <i>competences</i> together with up-to-date technical information on any relevant <i>EOSC services</i>.● Use <i>controlled vocabularies and ontologies</i> to ensure standard descriptions of the training resources.● Describe the training materials in compliance with the <i>FAIR principles</i> (e.g. assigning persistent identifiers to make the materials accessible, harvestable and easily discoverable). <p>Require the training materials are <i>open access</i> (CC-BY or CC0) and reusable (in terms of <i>formats and licences</i>).</p>
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4.2 Next steps

The overall goal of the workshop “Training in the EOSC” was to bring trainers and training service providers together and collaboratively work on Rules of Participation for training as well as on practical guidance for training service providers. This workshop report is tended to support the EOSC Working Group Rules of Participation as well as the EOSC WG Skills and Training. However, our recommendations could easily (one might say naturally) be of interest to all actors participating in EOSC generally. This report is publicly available on Zenodo.²¹

²¹ <https://doi.org/10.5281/zenodo.3739055>



Appendix I. List of participants

The organisers thank all participants for their valuable contributions.

In particular we thank all session chairs (Iryna Kuchma, Marjan Grootveld, Ilona von Stein), speakers (Cees Hof, René Belsø, Pedro Principe, Gwen Franck) and all facilitators and rapporteurs as well: Giuseppe La Rocca, Ilaria Fava, Celia van Gelder, Cees Hof, Ellen Leenarts, Marjan Grootveld, Pedro Principe, Iryna Kuchma, Frans Huigen). A special thanks to Felix van Gelderen for workshop preparations and to Gerard Coen for English corrections.

First name	Last name	First name	Last name
Alexei	Belotserkovsky	Ellen	Leenarts
Rene	Belsø	Frances	Madden
Thibaud	Cayla	Ivan	Martin Hernandez
Helen	Clare	Irina	Mikhailava
Ingrid	Dillo	Marcin	Plociennik
Ilaria	Fava	Pedro	Príncipe
Vincent	Favre-Nicolin	Päivi	Rauste
Sonja	Filiposka	Eloy	Rodrigues
Gwen	Franck	Hugh	Shanahan
Marjan	Grootveld	Erzsébet	Tóth-Czifra
Lowri	Harris	Celia	van Gelder
Maggie	Hellström	Felix	van Gelderen
Cees	Hof	Irena	Vipavc Brvar
Frans	Huigen	Ilona	von Stein
Vasso	Kalaitzi	Angus	Whyte
Iryna	Kuchma	Tatsiana	Yankelevich
Mateusz	Kuzak	Katerina	Zourou
Giuseppe	La Rocca		



Appendix II. EOSC-initiatives representation

Carpentry Training
CODATA-RDA
DARIAH-EU
EaP-connect
ELIXIR
ENVRI-FAIR
EOSC Working Group Rules of Participation
EOSC Working Group Skills and Training
EOSC-hub
EOSC-Life
EOSC-Nordic
EOSC-Synergy
EOSCpilot
ExPaNDS
FAIR4Health
FAIRsFAIR
FIT4RRI
FoodCloud
FOSTER
FREYA
GÉANT
GN4-3
INOS
NI4OS-Europe
NPOS-F
OpenAIRE
OPERA-SP
PaNOSC
RDA-Europe 4.0
SSHOC
Terms4FAIRskills
TRIPLE



Appendix III. Previous and current work ‘Training in the EOSC’

This document includes a table with references to previous and existing project outputs regarding Training in the EOSC. Before and throughout the workshop, participants were continuously invited to add relevant information and references to the table. Note: this table is not meant to be exhaustive, but it acknowledges that the workshop built on existing work and outcomes.

Currently many projects, of which a few examples are FAIRsFAIR, EOSC Synergy, EOSC Pillar, and SSHOC, are active with regard to training, training provision, good practices. As a lot of these projects are members of the CoP, an overview of the activities is created by the CoP members [here](#).

Table 1: References to project output regarding Training in EOSC

What	Who
Draft RoP (version 0.2, January 2020)	EOSC RoP WG
Draft action plan WG Training and Skills	EOSC Training and Skills WG
workshop ‘Making EOSC Training more FAIR’ (Sept 2019) Open Science FAIR	CoP
Training and skills 1st session and 2nd session EOSC Symposium (November 2019)	CoP
Overview of training activities of projects	CoP
D7.5 Strategy for Sustainable Development of Skills and Capabilities	WP7 - training working group of the EOSCpilot project with the FAIR4S training and skills framework
Terms4FAIRskills working group; introductory ppt	two workshops, no report available yet. Builds on FAIR4S
D11.1 Training materials about common services and thematic services	WP11 - training working group of the EOSC-hub project
Matej Ďurčo, Klaus Illmayer, & Laure Barbot. (2019). SSHOC D6.7 Inventory of existing learning materials (Version v1.0). Zenodo.	The SSHOC project
Report on gap analyses of available training materials on FAIR and FAIRification vs RI self-assessment on their needs & requirements for such training - ENVRI-FAIR D6.1 (2019)	The ENVRI-FAIR cluster project (WP6: Training and skills building)



<p>ENVRI Community Learning Platform and underlying Training Resource Catalogue (built on IEEE LOM) - see beta version of catalogue (now holding resources identified in the gap analysis)</p>	<p>The ENVRI-FAIR cluster project (WP6: Training and skills building)</p>
<p>Zenodo community with all output, a.o:</p> <ol style="list-style-type: none"> 1. Data Steward landscape (picture) 2. Matrices with responsibilities, tasks, KSAs and learning objectives for each of the 3 Data Steward Roles 3. End report 	<p>ZonMw / ELIXIR-NL project “towards data steward as a profession”, 2019</p>
<p>D7.2: Interim report and catalogue of EOSC skills training and educational materials</p>	<p>EOSC pilot, 2017</p>
<p>EOSC Service Catalogue with a category Training & Education, see Service/Resource sheet, supercategory no. 5</p>	
<p>Regarding discussion around training material catalogue, we could agree on a common language/understanding of types of resources, e.g. Skills Common’s Learning Resources - Material Types</p>	
<p>(Related to elearning) Existing glossary of all kinds of terms (see end of this report)</p>	
<p>Regarding metadata for the catalogue, there is previous work in this area such as the Learning Resources Metadata Initiative</p>	<p>OER community</p>



Appendix IV. Workshop scope and methodology

This appendix provides more details regarding the scope of the workshop, the workshop participants and the workshop methodology.

Scope

The output of the workshop will be provided primarily to two of the EOSC Working Groups and to EOSC training service providers. To pave the way for easy adoption of the recommendations, these Working Groups form the scope of the workshop.

EOSC Working Group Rules of Participation

The Rules of Participation (RoP) for EOSC apply to all digital resources made accessible via EOSC, including data and services. They define a minimal set of rights, obligations and accountability governing the activities of all those participating in EOSC, such as: data and service users, data and service providers, and the operators of EOSC itself.

Currently, the EOSC Working Group on Rules of Participation limits its scope to data and services, but remarks that later versions of the RoP may include sections on other forms of EOSC resources, such as software, publications and training. With our workshop report we hope to accelerate the latter.

EOSC Working Group Skills and Training

The newly launched “Skills and Training” Working Group will work on building competence (skills) and capabilities (training) for EOSC. The goal is to provide a framework for a sustainable training infrastructure to support EOSC in all its phases and ensure its uptake. The Working Group will consult and converge with existing initiatives and H2020 EOSC-related projects to agree upon key components for skills development and training, determine how these can be embedded in different levels of EOSC (institutional, national, EU), and identify what structures are needed to make EOSC a viable success (sustainability).

Workshop participants

For this collaborative invitation-only workshop, (experienced) trainers of the major EOSC-related projects were invited, as well as the coordinators of training in EOSC. The invitation list was based on the input of trainers in EOSC and the CoP for training coordinators, and on information from the EOSC Secretariat project list.²² Ultimately, the workshop gathered 35 participants (Appendix I) that together represented 30+ EOSC-related projects and initiatives (Appendix II).

Collaborative workshop methodology

One week in advance, the workshop participants received a pre-read document that clearly framed the workshop and set out the objectives and scope. The agenda of the workshop was set out to facilitate discussions about how the EOSC training provision can be improved by its quality, findability, accessibility and the easier reuse of learning resources (Appendix III). The workshop consisted of four half day sessions spread over three days (26-28 February 2020). The format was designed to be interactive, and provided for a clear structure with breakout sessions, plenary feedback possibility and other opportunities for discussion in smaller groups. All break-out sessions were enabled by

²² <https://www.openaire.eu/cop-training> and <https://www.eoscsecretariat.eu/eosc-projects-list>



facilitators and rapporteurs. Shared collaborative templates were designed by the organisers to collect input. Following the workshop, this input was collected centrally and the organisers provided a first draft of this workshop report to workshop participants for a limited period of response and feedback. The final report and all presentations are publicly available.

The first half day session was designed to facilitate **introductions and landscaping** and was chaired by Ilona von Stein. Cees Hof opened the workshop and this was followed up by an interactive icebreaker game to get acquainted with one another. Subsequently, René Belsø represented the Working Group RoP and reported on the proposal of an initial set of RoP (v0.2) for EOSC.²³ A lively discussion followed on the basics of the European Open Science Cloud (Figure I). Pedro Príncipe synthesised the key needs and areas of improvement of training in EOSC based on prior findings (e.g. EOSC Symposium 2019²⁴) and the day was rounded off by a fishbowl discussion exercise led by Gwen Franck where participants were able to finetune their position on several statements around training in EOSC.

During the second half day session, chaired by Iryna Kuchma, participants collaboratively worked on **Recommendations for Practical Guidance for training service providers**. It started off with Iryna Kuchma as a representative of the EOSC Working Group Skills and Training who provided an overview of the current state of work and future directions of the just established Working Group.²⁵ This was followed by the first parallel breakout session in three groups centered around the topics of:

1. training metadata and catalogue,
2. training cross-infrastructure, and
3. training quality and certification.

Participants were challenged to formulate ambitions and practical steps toward these ambitions. These discussions were succeeded by plenary reporting, after which participants were invited to discuss a new topic to facilitate sharing experience and knowledge across the topics and participants (Figure II). This was facilitated by flip charts with key findings in each corner of the conference room, so participants were able to walk along to their flip chart/topic of interest to contribute to the discussion. The outcomes of these discussions resulted in a restructuring of the Practical Guidance texts (see Section 3).

In the third half day session the focus was on gathering **Recommendations for RoP for training**; it was chaired by Marjan Grootveld. The draft version of RoP introduced the day before concerns: Ground rules, Data, Services and EOSC Operators. During the afternoon, workshop participants set out in three parallel breakout groups to extract RoPs from this draft that - after rewriting - were relevant to training. One group was asked to rewrite relevant RoPs for Data and Services (D1-D3, S1-S3) *for training*, another group to rewrite D4-D6 and S4-S6 *for training*. The third group got the instructions to consider and comment on the Ground rules in relation to training and on general text and Operators. Two rounds of discussion were organised where each group moved to the next group after a given time. After the break outs followed concise plenary feedback by the rapporteurs. Each participant was then asked to provide constructive feedback in the provided templates upon the topic he/she did not participate in, and to have a look again at the notes from the RoP session where they

²³ <https://www.eoscsecretariat.eu/working-groups/rules-participation-working-group>

²⁴ See: <https://eosc-hub.eu/events/eosc-symposium-2019>

²⁵ <https://www.eoscsecretariat.eu/working-groups/skills-training-working-group>



started. In this way, ideas of different groups of people were mixed to produce a better result in the end.

On the last day, chaired by Ilona von Stein, a half day session was organised to start **editing the texts for Recommendations for both RoP for training and for Practical Guidance for training service providers**. The focus of this session was on merging results of the previous sessions, and to merge, select, rewrite and edit texts so that they would be useful for the final aggregation of this final report. To this end, workshop organisers in advance merged the collaborative documents from the day before (practical guidance) and well as the collaborative documents created the previous afternoon (RoPs for training) as a starting point for pooling the collective knowledge of the participants. Participants who did not work on RoPs nor on practical guidance were encouraged to consider possibilities for the mapping of practical guidance elements and RoPs for training.



Appendix V. Workshop agenda

Wednesday February 26th afternoon

12:30 - 14:30	Registration desk open The registration desk is located at the ground floor of the NWO building. Felix van Gelderen (DANS) is managing the registration. Street address: Laan van Nieuw Oost-Indië 300, 2593 CE Den Haag	
13:00 - 14:00	Lunch Lunch is being served at the third floor of the NWO building, in the atrium next to the main meeting room (room no. 300)	
14:00 - 17:00	Topics: Introductions & landscaping	Afternoon chair: Ilona von Stein
14:00 - 14:10	Opening	Cees Hof
14:10 - 14:50	Introductions of the participants Interactive game / ice-breaker Group photo afterwards	Ilona von Stein Felix van Gelderen (photo)
14:50 - 15:00	Programme and objectives of the workshop Training provision in the EOSC	Ilona von Stein
15:00 - 15:30	EOSC WG Rules of Participation 15 min. presentation / 15 min. interactive	René Belsø (EOSC WG RoP)
15:30 - 15:45	Tea & coffee break	
15:45 - 16:00	Key needs and areas of improvement in training Main findings EOSC Symposium (November 2019)	Pedro Principe
16:00 - 16:15	Lookout Thursday and Friday	Ilona von Stein
16:15 - 17:00	Interactive discussion session Fishbowl exercise 'deluxe' to discuss statements around training in the EOSC	Gwen Franck
(17:00 - 17:30)	Internal session organising parties Finalise "main topics", preparations for Thursday	-
19:00 - 22:00	Social / working dinner Indonesian restaurant GAROEDA Street address: Kneuterdijk 18a, 2514 EN Den Haag	



Thursday February 27th whole day

08:45 - 09:00	Walk-in / coffee & tea	
09:00 - 13:15	Topic: Practical guidance for training service providers in the EOSC on training resources and associated metadata	Morning chair: Iryna Kuchma
09:00 - 09:15	Introduction morning programme , i.e. training good practices & refreshing of the key needs	Iryna Kuchma
09:15 - 09:45	EOSC WG Skills & Training 15 min. presentation / 15 min. interactive	Iryna Kuchma (representing EOSC WG S&T)
09:45 - 10:45	Parallel Breakout session in three topic groups:	
	<ul style="list-style-type: none"> Break out group Metadata 	Room no. 300
	Facilitator: Giuseppe La Rocca Note taker / Rapporteur: Ilaria Fava	
	<ul style="list-style-type: none"> Break out group Cross-infrastructure 	Room no. 307
	Facilitator: Cees Hof Note taker / Rapporteur: Celia van Gelder	
	<ul style="list-style-type: none"> Break out group Quality 	Room no. 308
	Facilitator: Pedro Príncipe Note taker / Rapporteur: Iryna Kuchma	
10:45 - 11:15	Tea & coffee break	
11:15 - 11:30	Plenary presentation by the topic groups (no discussion yet)	Room no. 300 Iryna Kuchma
11:30 - 12:00	Interactive walk-along	Iryna Kuchma
12:00 - 12:15	Wrap-up morning programme	Iryna Kuchma
12:15 - 13:15	Lunch	



Thursday February 27th whole day

13:15 - 17:00	Topic: Recommendations on the Rules of Participation for training in the EOSC	Afternoon chair: Marjan Grootveld
13:15 - 13:30	Objectives of the workshop Training provision in EOSC (recap)	Marjan Grootveld
13:30 - 13:45	Introduction to the proposed draft recommendations on Rules of Participation for training	Marjan Grootveld
13:45 - 15:15	Parallel Breakout session in three groups, working on the draft RoPs for training:	
	<ul style="list-style-type: none"> • Break out group 1 	Room no. 300
	Facilitator: Marjan Grootveld Note taker / Rapporteur: Pedro Principe	
	<ul style="list-style-type: none"> • Break out group 2 	Room no. 307
	Facilitator: Iryna Kuchma Note taker / Rapporteur: Frans Huigen	
	<ul style="list-style-type: none"> • Break out group 3 	Room no. 308
	Facilitator: Giuseppe La Rocca Note taker / Rapporteur: Cees Hof	
15:15 - 15:45	Tea & coffee break	
15:45 - 16:45	Concise plenary feedback on breakout session	Room no. 300 Marjan Grootveld
16:45 - 17:00	Wrap-up + planning Friday morning	Marjan Grootveld
(17:00 - 17:30)	Internal session organisation, preparations for Friday morning	-



Friday February 28th morning

08:45 - 09:00	Walk-in / coffee & tea	
09:00 - 13:30	Topic: Editing draft RoPs for training and draft practical guidance text	Morning chair: Ilona von Stein
09:00 - 09:30	Plenary start, Articulate game, before breaking out into groups	Ilona von Stein
09:30 - 10:45	Parallel Breakout session in three groups:	
	<ul style="list-style-type: none"> Break out group 1, continue with the Rules of Participation 	Room no. 300
	Facilitator: Marjan Grootveld Notetaker / Rapporteur: Frans Huigen	
	<ul style="list-style-type: none"> Break out group 2, continue with the practical guidance per topic 	Room no. 307
	Facilitator: Pedro Principe Notetaker / Rapporteur: Giuseppe La Rocca	
	<ul style="list-style-type: none"> Break out group 3, how to match practical guidance topics and RoPs for training 	Room no. 308
	Facilitator: Iryna Kuchma Notetaker / Rapporteur: Ellen Leenarts and Cees Hof	
10:45 - 11:15	Tea & coffee break	
11:15 - 12:30	Continuation Parallel Breakout sessions	Room no. 300
12:30 - 13:00	Next steps / goodbye / lunch (take away)	Ilona von Stein



Figures

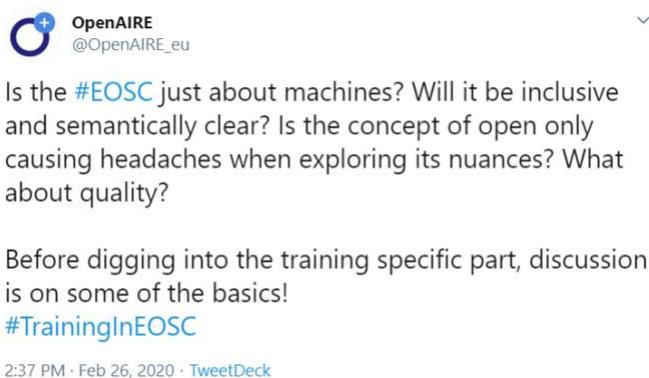


Figure I. Tweet on workshop Day 1



Figure II. Group discussions on practical guidance for training service providers