



FAIR-by-Design Methodology Implementation Success Story

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Abstract

The FAIR-by-Design Methodology aims to promote the development of FAIR learning materials by incorporating the FAIR principles in the design process. Developed in a general, agnostic way, it can be applied to a wide set of organisations and environments using various tools and techniques for learning resource design. This text showcases a success story of adopting the FAIR-by-Design methodology to improve the development of learning materials that are part of the French online training platform DoRANum. It highlights the experiences, challenges and lessons learned and paves the way for others that would like to incorporate the methodology in their instructional design.



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TERMINOLOGY

<https://eossc-portal.eu/glossary>

<i>Terminology/Acronym</i>	<i>Definition</i>
APA Style	American Psychological Association citing style
CC	Creative Commons
CMS	Content Management System
DOI	Digital Object Identifier
DoRANum	Données de la Recherche, Apprentissage Numérique
FAIR	Findable, Accessible, Interoperable, Reusable
OS	Open Science
ToT	Training-of-Trainers

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Executive summary

The Skills4EOSC project addresses the critical need for developing FAIR (Findable, Accessible, Interoperable, Reusable) learning materials and training resources with the development of the FAIR-by-Design Methodology, which guides instructional designers through each stage of the development process to ensure adherence to the FAIR principles.

The FAIR-by-Design Methodology integrates FAIR principles into the backward instructional design process, covering six stages: Prepare, Discover, Design, Produce, Publish, and Verify. This approach ensures the incorporation of essential elements such as metadata schemas, reusable resources, appropriate licensing, accessibility, and quality control.

This approach is being adopted beyond the project, including the French online training platform DoRANum, which provides training on managing and sharing research data according to FAIR principles. This document describes their success story of the FAIR-by-Design Methodology implementation.

DoRANum's pilot initiative applied the FAIR-by-Design Methodology to a course on finding data papers, adapting the methodology to fit its specific context and platform constraints. This included overcoming challenges related to platform and tools limitations, while leveraging existing practices aligned with FAIR principles.

The key outcomes of this effort include the successful integration of FAIR principles in instructional design, improved awareness and application of these principles, and enhanced workflows for creating educational resources. The success story highlights the importance of adaptability and continuous improvement in implementing FAIR principles, with future plans focusing on certifications, translations, metadata schema development, and creating a repository for open science resources.

1 Introduction

The Skills4EOSC project has fully recognised the need for development of FAIR learning materials and training resources that will be not just easily findable and accessible by users, but also truly reusable and interoperable so that other instructional designers and trainers can reuse them and adapt them for their own purposes.

For these purposes, the project has attempted to address the problem of development of FAIR learning materials by developing the [FAIR-by-Design Methodology](#), that helps instructional designers in each stage of the development process by ensuring that the FAIR principles are going to be followed and incorporated in the final product.



Fig.1 – The FAIR-by-Design Methodology

As depicted in Fig. 1, the FAIR-by-Design Methodology empowers the popular backward instructional design process with the elements needed to implement the FAIR principles. In this way, the process of development of learning resources is divided into six stages that guide the instructional designers on how to ensure that elements such as metadata schema, reusing existing resources with permissible licenses and appropriate attribution, structuring the learning resources to improve reusability, ensuring accessibility for a wide audience, deciding on a compatible license, implementing quality control and versioning, etc. are taken into account and addressed when necessary. Finally, the whole process is embedded in the

continuous improvement philosophy which incurs gathering feedback via different communication channels, deciding on improvement items and developing new, enhanced versions of the learning resource.

In addition to the definition of the FAIR-by-Design methodology, Skills4EOSC has also conducted a [Training of Trainers \(ToT\)](#) on how to practically implement the methodology, and has also provided a [microlearning unit](#) with best practices and guidelines on the implementation.

While all learning resources that are developed within the Skills4EOSC project follow the FAIR-by-Design Methodology, its adoption has been expanded outside the project activities with many different stakeholders implementing the methodology steps and guidelines while developing their own learning materials.

This text describes one of these success stories about the adoption of the FAIR-by-Design Methodology for the development of learning resources for the French online training platform DoRANum. The rest of this document describes the use case and adopters and their journey of implementing the FAIR-by-Design Methodology. They are sharing their insights, challenges, and lessons learned so that they can help others in their attempts of producing FAIR-by-Design learning materials.

2 About the Platform and Pilot Initiative

[DoRANum](#), which stands for 'Données de la Recherche, Apprentissage Numérique' (Research Data, Digital Learning), is an online training platform designed to provide self-paced and short training courses for researchers, PhD and research support staff from the French research landscape on managing and sharing research data according to the FAIR principles. The platform and its developments are part of the national and institutional open science policy. DoRANum currently offers more than 130 digital training resources. The pilot training to which the FAIR-by-Design methodology was applied is 'Finding data papers'.

2.1 Organisation

DoRANum is produced and managed by the [Inist-CNRS](#): the 'Institut de l'information scientifique et technique' (Institute For Scientific and Technical Information), which is part of the [French National Centre for Scientific Research](#); and the 'GIS: Réseau Urfist': 'Groupement d'intérêt scientifique: Unité Régionale de Formation à l'Information Scientifique et Technique' (Scientific Interest Group: Regional Training Unit in Scientific and Technical Information).



Fig. 2 – The organisation and groups involved in the DoRANum initiative

DoRANum is a 'Centre de ressources' (resource centre) in the Recherche Data Gouv ecosystem for sharing and opening research data. Recherche Data Gouv has been designated as the French Skills4EOSC Competence Centre.

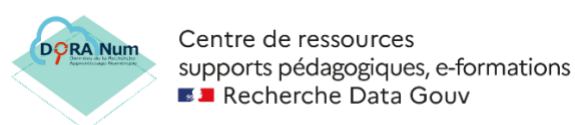


Fig. 2 – The DoRANum initiative logo

2.2 Participants

The department works with six instructional designers. The process of creating a pedagogical resource usually involves only one educational engineer, and the others intervene for an internal quality check before publishing. For the creation of this specific resource, two were involved with one having studied instructional design as an initial training at university.

3 Success Story Details

3.1 Learning Resource Description

The chosen pilot learning resource for the implementation was about how to find data papers. DoRANum's FAIRness is a long-standing objective. As FAIR is an integral part of DoRANum in terms of the content of the resources and the platform itself, the current limits and objectives are known to the department. The methodology was presented by a Skills4EOSC trainer who followed the [training of the trainers \(ToT\) class](#) in October 2023. It was adapted to the DoRANum context which:

- Limited the application of certain parts because of its own framework,
- Echoed longer-term projects already undertaken by the department.

For example, a large part of the adaptation is due to the fact that DoRANum is a Wordpress platform (CMS), rather than the Moodle LMS context proposed by the methodology. This limiting factor prevented, for instance, the use of a Github / Moodle workflow for publication, and the creation of certifications (open badges) on a Moodle platform. Moreover, when Github was briefly introduced to the instructional designers its usage met with some resistance. The arguments were the following: not instinctive enough, too complicated to learn, and does not allow as much flexibility and creativity as the software already used by the team members.

3.2 Incorporating the FAIR-by-Design Methodology

The methodology allowed the instructional designers involved and the service to be fully aware of what is already implemented on their side.

They have a really good knowledge of what FAIR is, including regarding training resources. Part of the training the DoRANum team provides is on making data FAIR and they apply the principles to their own work as much as possible (still undergoing). The first phase ('Prepare') was really not a problem for them. Most of the elements included in the methodology are already used and implemented in DoRANum (open licence, accessibility, PIDs, read me, citation and attribution, feedback, continuous improvement).

It also led to conversations about the pedagogical workflow: one of the instructional designers studied instructional design at university and already follows a backward instructional design when creating a resource. This was not necessarily the case for her colleague who noticed that using Bloom's taxonomy was helpful and interesting to build the resource.

Reuse existing materials is not always possible: most of the resources produced on/by DoRANum are produced on demand to fill existing gaps. In this case, reusing materials is hard, if not impossible.

DoRANum also already partly uses a syllabus, but some fields are not considered required on each page. Two relevant examples of this are the target audience (DoRANum's target audience is always researchers, PhD students and research support staff) and the language (French). Some of the other fields already appear on each page in one way or another: the title, the description, the training objectives, keywords, the authors (Inist-CNRS), the licence (Etalab, the French equivalent to the CC-BY licence), the DOI...

3.3 Key Outcomes

The methodology was already partly applied to the DoRANum workflow even if the team did not necessarily realise it:

- **Permanent identifier** for the resource (DOI) manually generated with DataCite. The team does not use PIDs for authors: the team always signs as 'Inist-CNRS';
- **Licensing**: we used Etalab, French open licence, equivalent to CC-BY;
- **Accessibility**: already implemented in DoRANum in February 2023 and as part of the resource design process. The DoRANum website complies (with a few exceptions) with the RGAA version 4, 'référentiel général d'amélioration de l'accessibilité' (the general French Accessibility guidelines based on WCAG2);
- **Internal quality control**: proofreading and testing by all the other team members. Their own checklist for the production of educational resources was used along with a checklist from the methodology. Both were followed as close as possible considering our limitations;

- The **read me file** containing: the name of the software used to produce the resource, the URL, the dates (first online, last version), the DOI, information on reusability, the licence, the APA citation, the authors, and links to DoRANum's website. This file contains all the above information;
- **Continuous improvement** with regular updates on our resources and the date of our latest update. (This will obviously be the case for this update too);
- **Citation and attribution**: the APA style is used.

The resource was created with the methodology in mind with its use analysed afterwards. Using a backward instructional process and describing learning objectives with the Bloom's taxonomy was already part of one of the two instructional designers' routine. Using the methodology together with someone who was not working the same way enabled sharing of experiences.

3.4 Challenges and Solutions

Some challenges are related to the tools available to the team:

- Since the main platform is a CMS, the possibilities for setting up open badges, for example, are limited. A Moodle platform (Callisto) is available to the team, but the vast majority of teaching resources are available on the Wordpress platform. The current focus is on tools that can be used to assess and issue certifications, and one of the avenues currently being explored is the use of Callisto to issue open badges.
- Also, no versioning control is used because of the tools used by the team. Regardless, instructional designers work alone or at most by pairs, as was the case for this resource, so no versioning control is actually needed.
- For this specific resource, Articulate Storyline was used. Even if it does not allow versioning per se, the instructional designers left comments on the slides while creating and modifying them and working together.

Some other challenges (adaptations) are related to the principles of DoRANum and how the team usually works:

- The reuse of already existing materials is not always possible, since most resources are made on demand to fill gaps;

- The training resources made available on DoRANum are self-paced and short. They can be considered as learning objects themselves and the granularity ends there. Moreover, because the resources are self-paced, the use of an instructor kit is not needed.
- The resources are not available on any registry – just on the DoRANum website. This particular resource is catalogued under the theme 'Data papers and Data journals' and category 'L'essentiel' ('the essentials'). Keywords were also allocated to help finding the resource on the website.
- The tool used for this resource is Articulate Storyline because it allows branching and interactivity. It is not an open tool and users have to pay a subscription fee to use it. The exported file was an open file (HTML), but a reuser would also need to have Articulate Storyline to modify it. The tool was chosen because:
 - it is well known to the instructional designers
 - it allows branching, interactivity, and to produce a resource that is both synthetic and playful.

Future plans are taking shape and the team is starting to implement solutions to some of these problems.

3.5 Lessons Learned

What mainly emerges from this use of the methodology is the need and possibility to adapt it to the context it is to be applied to. Not everything is directly applicable to a given context, but the FAIR principles can be applied to teaching resources by following this methodology as close as possible to structure thoughts and priorities, and leave room for adaptation.

The use of a backward instructional design is also very valuable in many ways. The possibilities for external feedback are very limited. DoRANum includes star ratings on each page with a Wordpress widget but this is not widely used and does not work well. Users can however send the DoRANum team a message via a contact form available on the 'contact' page. An email address is also provided on the same page to contact the team. There is room for improvement here.

4 Next Steps

The methodology also highlighted the importance of certain initiatives already underway within DoRANum to improve its FAIRness:

1. This is the case with certifications (ideally open badges): the subject is being studied and tests are underway to compare the possibilities given the available tools. The need for certifications was also highlighted in conversations with members of the Research Data Gouv ecosystem, which is the French Skills4EOSC Competence Centre. The use of measurable learning objectives with Bloom's taxonomy will also be appreciated when creating certifications.
2. The translation of the resources and the platform has also been requested by French partners, mostly for PhD students whose native language is not French. English resources will help achieve a better level of FAIRness. The first translated resources were officially launched at the beginning of June 2024 with the publishing of the translated 'fiches synthétiques' (summary sheets). This is still an ongoing project, with now the upcoming translation of short videos with English subtitles.
3. The creation of a metadata schema: metadata has not properly been used for now on DoRANum. Tags are used which are like metadata to an extent but no proper schema has been chosen yet. DoRANum does not use a repository yet so there is no use for it now. The RDA schema might not be well-suited to the case of DoRANum.
4. The creation and use of a repository – registry: this project is underway and will be launched in the following months. It will be a repository (and a registry) for all French open science resources, and a DoRANum collection will be created. It will also serve as a registry (DoRANum resources are currently not on any catalogue).

5 References

No	Description/Link
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R2	DoRANum website/training platform: https://dorum.fr/
R3	CNRS-Inist website: https://www.inist.fr/
R4	DoRANum Twitter: https://twitter.com/DoRANum

6 Contact Information

Contact the CNRS Skills4EOSC team at skills4eos-cnrs-request@groupe.renater.fr

And the DoRANum team using contact@dorum.fr