



FAIRSFair
Fostering Fair Data Practices in Europe

Professionalising Roles through Training, Mentoring, and Recognition

Key issue #3 in Assessing Capability Maturity and Engagement with FAIR-enabling Practices (ACME-FAIR)

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Professionalising Roles through Training, Mentoring, and Recognition

Introduction

Making and keeping data FAIR requires extensive and complex technical infrastructure, but it also requires systematic and sustained improvements in the human practices of managing research data. These improvements can be brought about through training, mentoring and recognition measures, which naturally also have implications for policymaking at the supra-national, sectoral, national, institutional, departmental and project levels.

The 2018 European Commission ‘Turning FAIR into Reality’ report and action plan (TFIR) is a key reference for, amongst other stakeholders, the communities of researchers and professional staff in research performing organisations (RPOs) who are looking for guidance on how to produce and manage FAIR data. TFIR recommends expansion of training in the skills for both data science and data stewardship as a key component of making and keeping data fair. TFIR is also clear that “metrics and indicators for research contributions need to be [...] enriched to ensure they act as compelling incentives for Open Science and FAIR [data]. Effective recognition and rewards are vital for culture change.” (TFIR, p. 8). These arguments are presented as priority (as opposed to ‘supporting’) recommendations as follows:

- Recommendation 6: Recognise and reward FAIR data and data stewardship;
- Recommendation 10: Professionalise data science and data stewardship roles and train researchers;
- Recommendation 11: Implement curriculum frameworks and training.

The messages from TFIR are echoed in FAIRsFAIR *D3.4 Recommendations on practice to support FAIR data principles*¹, a series of recommendations for practical actions to support the realisation of a FAIR ecosystem.

Earlier work by FAIRsFAIR Work Package 3 (Data Policy and Practice) identified areas in which contemporary research culture could benefit from further support or clarification to help make more research data and other digital research outputs ‘FAIR’, i.e. findable, accessible, interoperable and reusable. Deliverable 3.4 draws on these findings, and follows the structure and themes of TFIR to set out recommended, practical actions that meet those gaps in provision. Theme C, ‘Develop professional support for FAIR data’, recognises the contribution of emerging data professional roles such as the data steward and research software engineer, and advocates for the emergence of related training and qualification opportunities, career path development, and professional societies.

The FAIRsFAIR *Recommendations on practice* also include a commitment that the project would develop a self-assessment framework to help organisations “monitor and plan their actions to enable FAIR”. It said this “could be developed based on the TFIR [Turning FAIR Into Reality] action plans, focusing on the extent to which support on FAIR is offered to their data producer communities in delivering FAIR data, or put differently, to assess how FAIR-enabling they are” (p.27). This is the commitment that led to the present ACME-FAIR framework.

¹ <https://zenodo.org/record/3924132>

Introducing ACME-FAIR

The document sets out a draft FAIRsFAIR guide, whose main purpose is to help managers of Research Data Management and related professional services to self-assess how they are enabling researchers, and the professional staff who support them, to put the FAIR data principles into practice (for short we refer to this as ‘FAIR-enabling practice’). We welcome your comments on this draft, and responses to the specific consultation questions you can find below at the end of this Introduction.

ACME-FAIR can be used independently, or it can be used to complement Science Europe’s *Practical Guide to Sustainable Research Data*.² Both guides include ‘capability maturity’ matrices (or ‘rubrics’), for Research Performing Organisations e.g. universities, research institutes. While Science Europe’s guide is aimed at strategic-level management of the organisation, **ACME-FAIR targets the operational levels of the organisation**. It can optionally be used to follow up an assessment based on the Science Europe maturity matrices. ACME-FAIR is also strongly informed by *Turning FAIR into Reality*³ (henceforth TFIR), the recommendations of the European Commission’s Expert Group on FAIR data.

Covering key practical issues

ACME-FAIR covers 7 key issues. These address the FAIR-enabling practice themes highlighted in a number of FAIRsFAIR deliverables, together with recommendations from the *Turning FAIR into Reality* report. The table below shows the corresponding areas covered by the Science Europe *Guide to Sustainable Research Data*.

<ol style="list-style-type: none"> 1. Defining the policy environment 2. Developing sustainable business models 3. Professionalising roles through training, mentoring, and recognition 4. Supporting data management planning 5. Defining interoperability frameworks 6. Selecting data, services, and repositories for FAIR 7. Ensuring trusted curation 	<ul style="list-style-type: none"> - Policy environment - Financial aspects - Training <p style="text-align: center;">}</p> <p>Technical preparedness</p>
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Table 1. Mapping key issues addressed in ACME-FAIR (left) to Science Europe’s guidance (right)

Why use ACME-FAIR?

ACME-FAIR aims to be useful for services providing support to researchers on FAIR implementation in Research Performing Organisations (RPOs). It has 3 main use cases:

1. For the service to self-assess its readiness to support FAIR, by establishing current and desired levels of engagement with research community practices, and the organisational maturity of the support offered for FAIR data.
2. To aid colleagues’ in identifying areas of improvement in an organisation’s support for FAIR data management.
3. For national or international coordination initiatives to facilitate sharing of consistent information between peer organisations about their current levels of maturity, and to encourage community engagement around FAIR-enabling practices.

² Tommaso Boccali, Anne Elisabeth Sølvsnes, Mark Thorley, Stefan Winkler-Nees, & Marie Timmermann. (2021). Practical Guide to Sustainable Research Data. <https://doi.org/10.5281/zenodo.4769703>

³ Collins, S., Genova, F., Harrower, N., Hodson, S., Jones, S., Laaksonen, L., ... & Wittenburg, P. (2018). Turning FAIR into reality: Final report and action plan from the European Commission expert group on FAIR data.

The ultimate aim of ACME-FAIR is to improve availability of information on the implementation of support for FAIR data across disciplines and communities of practice. ACME-FAIR is partly based on the Digital Curation Centre's *RISE* self-evaluation framework for research data service development⁴ and partly on the guide '*Do I-PASS for FAIR*', which was produced in the context of the Dutch Coordination Point Research Data Management.⁵

How ACME-FAIR is structured

ACME FAIR uses a scale comprising, for each of the 7 issues, the following dimensions: -

- 3 levels of **maturity**
- 3 levels of **community engagement**

The maturity levels are a simplified version of the first 3 levels of the widely adopted *CMMI* (Capability Maturity Model Integration) which has been widely adopted as a tool to guide process improvement, especially in software development contexts.⁶

in ACME-FAIR the levels of community engagement are separated out from maturity for the following reasons: -

- Community engagement is essential for all of the practice areas covered;
- While the maturity goal of optimising alignment with *organisational* standards and practice is relevant to Research Performing Organisations, for research data support it is equally important to align with *community* standards, as defined by research domains and professional communities of practice;
- Identifying areas where maturity and engagement are at differing levels may be helpful to identify pockets of good practice in one or the other dimension, or areas to target for further action in your organisation.

The maturity and community engagement dimensions both indicate progression from ad-hoc project-level coverage of practice areas, through to organisation-wide coverage. These levels are:

Maturity

1. **Initial.** May be incomplete and falling short of the intent of the area of focus. Aware of and addressing performance issues.
2. **Managed.** Coverage delivering the full intent of the area of focus, minimally in some aspects, or lacking full alignment with overall organisational standards and practice. The approach identifies and monitors performance objectives. Includes and builds on level 1.
3. **Defined.** Complete coverage that delivers the full intent of the area of focus and aligns with overall organisational standards and practice. Identifies and monitors performance objectives that expand alignment to the whole organisation. Includes and builds on level 2.

⁴ Rans, J and Whyte, A. (2017). 'Using RISE, the Research Infrastructure Self-Evaluation Framework' v.1.1 Edinburgh: Digital Curation Centre: www.dcc.ac.uk/guidance/how-guides

⁵ Taco de Bruin, Sarah Coombs, Jutta de Jong, Irene Haslinger, Henk van den Hoogen, Frans Huigen, Mijke Jetten, Jacko Koster, Margriet Miedema, Sief Öllers, Inge Slouwerhof, Ingeborg Verheul, & Jacqueline Ringersma. (2020). Do I-PASS for FAIR. A self assessment tool to measure the FAIR-ness of an organization (Version 1). Zenodo. <https://doi.org/10.5281/zenodo.4080867>

⁶ See e.g. 'Capability Maturity Model Integration' Wikipedia article (accessed 24.11.2021) https://en.wikipedia.org/wiki/Capability_Maturity_Model_Integration

Community engagement: practice awareness, adoption, and collaboration

This dimension identifies the level of engagement the organisation (or the relevant services it offers) has with the communities it serves, about maintaining and updating data stewardship practices and identifying new areas for the development of policy and implementation standards. It includes actively communicating and promoting existing and emerging approaches to the immediately impacted communities and the wider data infrastructure landscape.

1. **Awareness:** the service monitors data stewardship practice in the community or communities it serves, and makes local practitioners aware of it.
2. **Adoption:** the service or its host organisation also supports practitioners to embed community practice locally.
3. **Collaboration:** the service also engages with the design, development, and review of community practice. Consults and collaborates widely, potentially also taking a community coordination and leadership role.

ACME covers the issues listed in Table 1, each with a two-dimensional rubric (maturity x community engagement).

Consultation questions

Please use [this form](#) to give your feedback. It asks how far you agree with 4 simple statements, and invites you to add any comments you wish. Please note that the form collects no personal information.

You are also welcome to add comments directly to this document (these may identify you by your Google ID). If you prefer, please email the FAIRsFAIR task lead Dr Angus Whyte (a.whyte@ed.ac.uk) or the Project Coordination Office (pco@fairsfair.eu).

ACME Checklist

The ACME-FAIR checklist identifies six main capability areas under this theme. Four capability areas are assessed on the *maturity* scale, measuring integration of the capability with organisation-level standards and practices. Another two capability areas are assessed on the *community engagement* scale, measuring adoption of broader community standards and practices.

The Science Europe *Practical Guide to Sustainable Research Data* includes a capability maturity matrix that complements ACME-FAIR at a high level. The relevant capabilities it describes include:

- Training: training and competency enhancement for both researchers and RDM support staff.
- Communication and awareness raising: researcher engagement as well as engaging with the broader stakeholder community (such as scientific communities, other RPOs) to seek alignment of approaches.

The scales used in the Science Europe guide are broadly consistent with ACME-FAIR. It may be helpful to use it prior to using ACME FAIR, but this is not necessary to use ACME-FAIR effectively.

As a first step, consider the capabilities in the checklist below that are relevant to your organisation. This may help you narrow down your goals in using ACME-FAIR, which might include assessing only those capabilities already under development, only those under consideration, or both.

Which capabilities is your organisation developing or considering doing in future?

Maturity	Current	Considering
1) Defining professional roles and profiles for enabling FAIR?	<input type="checkbox"/>	<input type="checkbox"/>
2) Training professional services staff and researchers about producing FAIR data?	<input type="checkbox"/>	<input type="checkbox"/>
3) Developing FAIR-enabling educational curricula for students?	<input type="checkbox"/>	<input type="checkbox"/>
4) Recognising FAIR skills acquisition through certification, accreditation, or HR processes?	<input type="checkbox"/>	<input type="checkbox"/>
Engagement		
5) Advocating and raising awareness of FAIR data policy and principles?	<input type="checkbox"/>	<input type="checkbox"/>
6) Mentoring in FAIR data skills through professional support networks?	<input type="checkbox"/>	<input type="checkbox"/>

These capabilities might be developed by a single unit within a Research Performing Organisation, for example by a Research Data Management Service. More likely, several areas of the organisation will also be involved, e.g. a Graduate School, Doctoral Training Centre, or Staff Development unit.

The next step in using ACME-FAIR is to discuss with the relevant colleagues what can realistically be achieved to meet needs of researchers, other stakeholders such as funders, and the organisation. To inform that, you may find the scope notes below helpful. They describe each capability for this theme covered in the framework..

Scope

We define capabilities as follows below, and then describe levels of maturity and engagement.

Defining professional roles and profiles for enabling FAIR

- Identifying and describing the roles in the organisation that are involved in enabling FAIR data, and the requirements for their expertise.
- Providing a framework that defines career pathways for the roles using appropriate terminologies.
- Monitoring recruitment and progression in these roles.

Training professional services staff and researchers in producing FAIR data

- Providing up-to-date guidance on the training opportunities and resources relevant to enabling FAIR and available from external sources
- Providing an ongoing, regularly updated programme of data stewardship training for staff at all levels of the organisation.
- Monitoring how well training materials and events deliver learning outcomes that meet individual professional development aims, and meet changing requirements for the competences expected of their roles, in line with sector expectations.

Developing FAIR-enabling educational curricula for students

- Providing training to students on data management and data-intensive research projects and are working to formalise learning outcomes and objectives for these using workshops and other training opportunities.
- Engaging with relevant departments and doctoral training centres to understand discipline-specific training needs, and identify or produce comprehensive, up-to-date and relevant training to be embedded in research and taught programmes.
- Providing both generic and domain-relevant training in digital skills for research data stewardship across disciplines, from undergraduate through to postgraduate level and life-long learning educational programmes.

Recognising FAIR skills acquisition through certification, accreditation, or HR processes

- Identifying skills development activities that lead to certification or accreditation, for research staff and emerging professional support roles
- Identifying measurable objectives for FAIR enabling activities in staff development frameworks, recognising skills acquisition and application in research contexts
- Encouraging membership of relevant professional bodies, and incentivising collaborations between researchers and professional support staff with metrics that recognise the contributions of all members of research teams

Advocating and raising awareness of FAIR data policy and principles

- Providing information across the organisation on FAIR data policy and principles, including promotion of the data policies of appropriate funders to relevant staff and students.
- Providing regular advocacy events to promote adoption of FAIR policy and practices, through organisational channels relevant to staff, student and research groups' specific interests.
- Engaging with relevant policy fora, professional groups, and research infrastructures about enabling FAIR in our organisation, seeking leadership roles and demonstrating influence on advocacy for FAIR principles in these contexts.

Mentoring in FAIR data skills through professional support networks

- Establishing support desks to help staff find guidance and training in FAIR data competences.
- Supporting the development of FAIR data skills through professional communities, including in emerging roles such as Data Stewards and Research Software Engineers, and for trainers and leaders of digital skills initiatives.
- Encouraging staff in relevant roles to participate in mentoring, and support their peers through established professional networks.

Professionalising roles through training, mentoring, and recognition - ACME Rubric

Professionalising roles through training, mentoring, and recognition	Maturity			
	1) Initial May be incomplete and falling short of the intent of the area of focus. Aware of and addressing performance issues	2) Managed Delivering the full intent of the area of focus, though minimally in some aspects. Lacking full alignment with overall organisational standards and practice, but identifies and monitors performance objectives. Includes and builds on level 1.	3) Defined Complete coverage that delivers the full intent of the area of focus and aligns with overall organisational standards and practice. Identifies and monitors performance objectives that expand alignment to the whole organisation. Includes and builds on level 2.	Maturity level (1-3)
Defining professional roles and profiles for enabling FAIR	We are identifying the different roles in the organisation involved in enabling FAIR; and the required competences, through liaison with departments and services.	We have a solid understanding of our requirements for enabling FAIR across the organisation and agreed role descriptions.	We have an agreed framework defining career pathways for roles that enable FAIR, using appropriate terminologies to describe the competences. We monitor recruitment and progression in these roles across the organisation.	
Training professional services staff and researchers	We provide up-to-date guidance on training opportunities and resources for enabling FAIR that are available from external sources. Appropriate links are made between FAIR principles, open science, reproducibility and research integrity. Online courses or materials are available to all professional staff and researchers.	We provide an ongoing, regularly updated programme of data stewardship training for staff at all levels. These are offered on an <i>ad hoc</i> basis and we have started to monitor uptake. Some resources are locally developed, to align with the organisation's needs and services. These target researchers and professional staff at different stages of their careers, also taking disciplinary differences into consideration. Training objectives are aligned with strategy towards FAIR data.	We monitor how well training materials and events deliver learning outcomes that meet individual professional development aims, and meet changing requirements for the competences expected of their roles, in line with sector expectations. Materials are described using an appropriate skills terminology, and are made reusable by others. Training is provided that facilitates successful skills acquisition towards agreed professional development aims.	

<p>Developing FAIR-enabling educational curricula for students</p>	<p>We do not yet have a curriculum on FAIR data stewardship specifically designed to connect with learning objectives of other taught curricula or research project aims. However, we provide training to students on data management and data-intensive research courses and are working to formalise learning outcomes and objectives for these using workshops and other training opportunities.</p>	<p>We engage with providers of training on FAIR-enabling skills in relevant departments and Doctoral Training Centres, to understand discipline-specific training needs. This allows comprehensive, relevant, and up-to-date training to be successfully identified and / or produced, and embedded in research and taught programmes.</p>	<p>We provide both generic foundational and domain-relevant digital skills training for research data stewardship across disciplines, from undergraduate through to postgraduate level and life-long learning educational programmes. We monitor changes in academic and societal needs and update the curricula to respond to these changes. Mentorship in relevant skills is included in the specified requirements for research supervision.</p>	
<p>Recognising skills acquisition through certification, accreditation, or other HR processes</p>	<p>We identify skills development activities that lead to certification or accreditation, for research staff and emerging professional support roles, such as Data Stewards and Research Software Engineers. We are considering how to change HR processes (e.g. recruitment, job appraisal, promotion) to recognise good practice in enabling FAIR data.</p>	<p>We identify measurable objectives for some FAIR enabling activities in our staff development frameworks. These enable staff to identify when FAIR enabling competences have been acquired, or applied in making data FAIR. We encourage membership of relevant professional bodies.</p>	<p>Staff development processes recognise skills acquisition and application in research contexts, and include FAIR-enabling activities within agreed professional development plans. We incentivise collaborations between researchers and professional staff with metrics that recognise the contributions of all members of research teams (e.g. using the CRediT taxonomy⁷).</p>	
<p>Community engagement: Practice awareness, adoption and collaboration</p>				

⁷ <https://credit.niso.org/>

	1) Awareness: the organisation monitors community practice and makes local practitioners aware of it.	2) Adoption: the organisation also supports practitioners to embed community practice locally. Includes and builds on level 1.	3) Collaboration: the organisation also engages with the design, development, and review of community practice. Consults and collaborates widely, potentially also taking a community coordination and leadership role. Includes and builds on level 2.	Engagement level (1-3)
Advocating and raising awareness of FAIR data policy and principles	We provide broad but limited information across the organisation on FAIR data policy and principles. Research data policies, e.g. of appropriate funders, are promoted to all relevant staff, and students.	We provide regular advocacy events, e.g. workshops, webinars to promote adoption of FAIR policy and practices, through organisational channels relevant to staff, student and researcher groups' specific interests. Guidance on how to apply relevant policies is provided and promoted Induction of new researchers includes information about data policies.	We engage with relevant policy fora, professional groups, and research infrastructures, about enabling FAIR data in our organisation. We seek leadership roles and can demonstrate we have some influence on advocacy in these contexts.	
Mentoring in FAIR data competences through professional support networks	We are establishing digital skills support desks to help staff find sources of guidance or training in FAIR data competences.	<p>We support the development of FAIR data skills through engagement with professional communities. These include communities for emerging roles such as Data Stewards and Research Software Engineers, and for trainers and leaders of digital skills initiatives.</p> <p>We offer support to research teams on sourcing or developing FAIR data skills, tailoring the support to their needs.</p> <p>We encourage mentorship in FAIR data skills as an integral part of research supervision.</p>	We proactively encourage staff in relevant roles to participate in mentoring, and support their peers through established professional networks e.g. for library, information and computing professionals, research managers and administrators.	