Developing and Implementing hands-on training on Open Science and Open Innovation for Early Career Researchers

D 4. 4. – Training concepts on Open Science

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List of acronyms and abbreviations

DC	Doctoral Candidate
DIOSI	Developing and Implementing hands-on training on Open Science and Open Innovation for Early Career Researchers
ECR	Early Career Researcher
OS	Open Science
WP	Work Package

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Executive summary

Open Science (OS) including concepts on accessible research data is the key to the optimal exploitation of modern research's potentials and can result in a significant increase in scientific knowledge and the societal benefits of science.

WP4 was focused on actions related to strengthening the skills of OS and open data management of Doctoral Candidates (DC) and Early Career Researchers (ECRS), as such competences are an important part of the researchers' engagement with society.

Two train-the-trainer workshops (duration of three days each; table 1) to deliver hands-on training concepts on OS took place in November 2021 (Open Access Publishing) and April 2022 (FAIR Research Data Management). Two trainers per partner university for each workshop were selected by means of eligibility criteria by the respective universities.

Deliverable 4.4 provides a compilation of the training concepts conveyed by train-the-trainer workshop 1 and 2 to the participants. The workshop contents were coordinated among all partners beforehand. The overall concept of the workshop was developed by the FDMentor[1] project and is already published on Zenodo[2] and freely available. Each participant will give at least one workshop in their home institutions for DC and ECRs. This will enable the trainers to pass on their knowledge to approximately 800 DC and ECRs within the first year.

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[1] https://www.forschungsdaten.org/index.php/FDMentor
[2] https://doi.org/10.5281/zenodo.4071471.

1. Introduction

Data-driven research for society and economy as well as data-based decision making are becoming increasingly important in answering the pressing research questions of our time (addressing topics such as global warming, massive extinction of species, human health as well as socio-economic consequences of the COVID-19 pandemic) and are the engines of (scientific) progress. However, this is based on an open research culture (Nosek et al. 2015) and intelligent stewardship of data following the FAIR principles (Wilkinson 2016). **FAIR**, i.e., **f**indable, **a**ccessible, **i**nteroperable, and **r**eusable to enable a sustainable, cross-disciplinary, and loss-free usage of research data. Basic requirements are a) the detailed documentation of the research data itself as well as all processes of its collection (provenance), b) the assurance of data quality, and c) data storage according to the "FAIR principles". Consequently, Open Science (OS) including concepts on accessible research data is the key to the optimal exploitation of modern research's potentials and can result in a significant increase in scientific knowledge and the societal benefits of science. Additionally, OS fosters reproducibility as well as sustainability in science. Therefore, OS is an essential component within fields of work of the DIOSI-partners.

Open science and data skills are required and the demand on the labor market is high: By 2026, approximately 780.000 tech-specialists will be sought for instance in Germany and the need of such "future skills" is growing (Meyer-Guckel et al. 2017; press release by the Stifterverband, 2021). Thus, qualifications within these fields are beneficial and significant for new career perspectives and prospects.

WP4 was focused on actions related to strengthening the skills of OS and open data management of Doctoral Candidates (DC) and Early Career Researchers (ECRS), as such competences are an important part of the researchers' engagement with society.

Two train-the-trainer workshops (duration of three days each; table 1) to deliver hands-on training concepts on OS took place in November 2021 (Open Access Publishing) and April 2022 (FAIR Research Data Management). The workshop contents were coordinated among all partners beforehand. The overall concept of the workshop is already published on Zenodo and freely available (see chapter 2).

Two trainers per partner university for each workshop were selected by means of eligibility criteria (table 2) by the respective universities. Each participant will give at least one workshop in their home institutions for DC and ECRs. This will enable the trainers to pass on their knowledge to approximately 800 DC and ECRs within the first year.

After completing the train-the-trainer workshop all participants were asked to:

(1) CONDUCT A WORKSHOP for DC and/or ECR based on the gained OS/ FAIR Data Management skills, didactic skills and hands-on methods.

(2) COLLECT FEEDBACK after the workshop.

(3) BE PART OF THE EUROPEAN NETWORK OF TRAINERS for networking and cooperation between partner universities and within the OS community. In a virtual follow-up meeting (planned for November 2022) all new trainers of both train-the-trainer workshops have the opportunity to share training experiences, discuss collected feedback and training strategies. The idea is to benefit from the exchange within the network and to consolidate contacts.

Train-the-trainer workshop	OS & Open Access Publishing	FAIR Research Data
Date & time	2 – 4 Nov. 2021, 9:00 – 16:30 CET, on each day	25 – 27 April 2022, 9:00 – 15:00 CEST, on each day
Format	Online[a]	Online[a]
Trainer	Katarzyna Biernacka ([Discipline Workshops](#))	Katarzyna Biernacka ([Discipline Workshops](#))
Max. number of Participants:	2 per project partner; total number of participants: 20	2 per project partner; total number of participants: 17

Table 1 Generic information about the two train-the-trainer workshops. Feedback was collected after each workshop with a standardized questionnaire.

[a]Due to the COVID-19 pandemic both workshops were conducted in an online format.

Trainer *should* fulfill the following criteria. They should ideally	• Have a long-term perspective in the institution > (prospectively) a permanent position • commit to give at least one training course in 2021/2022 • Have time resources to give additional trainings in the following years • Have an interest in acting as a mentor in terms of OS • Have an interest in taking part in the trainer network • Have experiences in working interdisciplinary
Potential participants might be	*Infrastructure personnel*; advantages: • Mostly have permanent positions • Have time resources • Work independ from the scientific disciplines, know how the work interdisciplinary
	Senior scientists; advantages: • Familiar with workflows and the research context • "Open science"-, "open data"-champions (like at the University of Delft) > could also act as mentor • Chance to convey the cultural change to senior scientists
Further aspects to consider	• Plan long-term implementation of the workshops in existing programs in advance • Communicate plans and expectations to the potential lecturers to ensure a sustainable implementation • Aspects which should be clarified beforehand: • In which program(s) will the courses be implemented? • How often and when will/should the courses be offered in a year?

Table 2 Eligibility Criteria for the selection of participants

2. Training concepts

Our selected trainer, Katarzyna Biernacka, was part of the FDMentor Project which took place from 2017 to 2019. She has proven expertise in the field of Open science and FAIR Data Management.[3]

The overall aim of the FDMentor project was to develop Roadmaps, Recommendations for action and good practice examples for the strategic development and improvement of research data management at German-speaking universities. Train-the-trainer concepts on Open Access Publishing and FAIR Data Management were also developed and published. The comprehensive train-the-trainer concept, which includes many methods that were taught in both workshops, is already published. The concept, all checklists, guiding questions, posters, teaching scripts, worksheets and the corresponding solutions can be found in the comprehensive train-the-trainer concept on research data management (version 3.0): https://doi.org/10.5281/zenodo.4071471. A newer version (4.0) including methods for online workshops exists only in German: https://doi.org/10.5281/zenodo.1215376. From page 157 onwards (170 in the German version), the exact descriptions of the methods used based on the Schema-X model can be found.

The overall aim of the trainer-the-trainer workshops was to impart and teach content-related *and* didactic competencies in the following areas:

Open Science & Open Access Publishing

- Introductory skills on Open Science & Open Access Publishing
- Definition of Open Science
- Licensing Models
- Green Route
- Gold Route
- Predatory Publishing
- Open Access Initiatives and Policies

FAIR Research Data Management

- FAIR Principles
- Research Data Policies
- Data Management Plans
- Structure and Documentation
- Storage and Backup, Long-term Archiving, Access control
- Re-use and Legal Aspects
- 7 steps of concept development

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[3] More information about the trainer is available at https://www.discipline-workshops.com/en/startseite-english/

Elaborate on didactic skills (part of both workshops):

- Didactic Approaches (creating teaching methods, exercises, working materials; digital tools; dealing with disruptions)
- Giving and receiving feedback
- Seminar Conception
- Workshop Planning

2.1 WORKSHOP 1 OS & Open Access Publishing

Title	**Open Science & Open Access Publishing**
Icebreaker	Open Access Mystery Game (organized by the University of Essex) "This project was created in 2020 during the COVID-19 pandemic as a way of bringing colleagues, friends and strangers together in an online role-playing mystery game in a time where a lot of conferences and networking opportunities were postponed or canceled. This game is designed to be played virtually via Zoom, Skype, Microsoft Teams or any other online platform. The Open Access Mystery follows eight very different characters who meet at a conference. During the conference disaster will strike, and it's up to the players to figure out who's behind what turns out to be a global lockdown of all research. Will it be the Professor who relies on the h-index? The early career researcher with imposter syndrome? The problem solver who works in publishing? Or perhaps it's the paranoid researcher who thinks you've stolen her ideas? Pay attention, not all is as it seems…" Kathrine Sundsbø 2020, https://figshare.com/projects/Open_Access_Mystery/94466
Skills	- Definition of OS - Licensing Models - Green Route - Gold Route - Predatory Publishing - Open Access Initiatives and Policies
Tools	https://wheelofnames.com/ https://www.mentimeter.com/ https://padlet.com/ https://miro.com/ https://www.futureme.org/ https://kahoot.com/ https://quizizz.com/
Ressources	https://www.fosteropenscience.eu/content/open-science-cafe-card-deck

	https://miro.com/app/board/o9J_lnhZ3qo=/?invite_link_id=300392288691
	https://thinkchecksubmit.org/sample-page/check/
	https://orionopenscience.podbean.com/e/there-is-no-spoon-imagining-science-without-journals/

2.2 WORKSHOP 2 FAIR Research Data Management

Title	**FAIR Research Data Management**
Icebreaker	Data Horror Escape Room "The room we created consists of six tasks related to the following data management topics: FAIR data, personal data, data archiving, data transfer, persistent identifiers, and metadata. As the room was to become part of the Data Horror Week around Halloween, a theme with ghosts and vampires was chosen." Rodenburg, Elisa, Karvovskaya, Lena, Aarts, Anne, Aben, Bart, & Yeomans, Joanne. (2020). Finding a way out of data horrors: designing a Halloween themed Escape Room. Zenodo. https://doi.org/10.5281/zenodo.4263421
Skills	- FAIR principles - Research data policies - Data management plans - Data documentation - storage and backup - Long-term archiving - Access control - Data publication - Re-using data - Legal aspects - Institutional infrastructure
Tools	https://padlet.com/ https://wheelofnames.com/

	https://www.onlyoffice.com/de/ (integrated into the HU-Box/Seafile of the Humboldt University Berlin)

https://www.mentimeter.com/

Video of the Pandas:
https://www.youtube.com/watch?v=66oNv_DJuPc

Video about the lost Apollo 11 tapes:
https://www.youtube.com/watch?v=D2xCisd8ZWg

Data Horror Escape Room:
https://sites.google.com/vu.nl/datahorror/home?authuser=0

Train-the-Trainer Card Game by FOSTER OS:
https://www.fosteropenscience.eu/content/train-trainer-card-game-open-science-training |

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