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FOSTER's Open Science Training Tools and Best Practices

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FOSTER's Open Science Training Tools and Best Practices

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Abstract. FOSTER is an EU project aiming at identifying, enriching and providing training content on relevant Open Science topics in support of implementing EC's Open Science Agenda in the European Research Area. During the previous two years a wealth of training resources have been collected, which are now presented in a dedicated training portal. The paper describes how to use the FOSTER training platform and the tools available to identify suitable training materials and create modular e-learning courses.

Keywords. Open Science, e-Learning, Training Materials, European Research.

1. Introduction

Recently we have witnessed significant debate and activity surrounding the movement to make research papers, data, and scientific information available, free of cost and with limited rights restrictions, to all readers online. Open Access as well as Open Data policies have been championed across the European Research Area (ERA), and feature prominently in the recommendations of Horizon 2020, the European Commission's research and innovation programme (EC, 2014). Moreover, since the launch of the FOSTER Project, Open Science has seen both grass-roots demand by young researchers (McDowell et al., 2015), as well as becoming a centerpiece of new agenda on Open Innovation (EC, 2015). In this environment, FOSTER[2] , a two-and-a-half year EU project, is designed to facilitate Open Science adoption by early career researchers, established scholars, librarians, library managers, research administrators, funders and other research stakeholders. Particular focus is placed on key skills necessary to adopt Open Science in the daily research routines. Open Science, as defined by the project, is the practice of research in a transparent, sharable and collaborative manner, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproducibility of methods and/or results (FOSTER, 2015).

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[2] FOSTER - Facilitating Open Science Training for European Research - is funded through the European Union's Seventh Framework Programme for research, technological development and demonstration under Grant Agreement No 612425. See http://fosteropenscience.eu.

The project therefore focuses on identifying, enriching and providing training contenttent on all relevant topics in the area of Open Science for the European research community. It started in February 2014 with the following objectives:

• Support different stakeholders, especially young researchers, in complying with the open access policies and rules of participation set out for Horizon 2020;

• Integrate open access principles and practice in the current research workflow by targeting the young researcher training environment;

• Strengthen the institutional training capacity (beyond the FOSTER project);

• Facilitate the adoption, reinforcement and implementation of open access policies from other European funders in partnership with the PASTEUR4OA project.

These objectives were realized through the combination of 3 main activities:

1. Identify existing re-usable training content, repackage and reformat them to be used within FOSTER, and develop/enhance content if/where needed;

2. Create a portal to support e-learning and dissemination of training materials and a help desk;

3. Deliver face-to-face training, especially training multipliers, to carry on further training and dissemination activities within their institutions, countries or disciplinary communities.

Materials and tools developed by project partners and collected with the help and support of relevant communities of researchers, librarians and other stakeholders, are now available on the FOSTER portal and will be introduced in detail below.

2. FOSTER Open Science Training Portal

Our dedicated platform, the FOSTER Open Science Training Portal, serves as a single hub of information for collecting, storing and disseminating training content on Open Science to a variety of stakeholders at different knowledge levels, in various formats and for different usage scenarios. Launched as an early preview version in September 2014, it has now developed into a mature system. Functions that support the project's objectives can be grouped into the two areas introduced below.

2.1. Training Content: Upload, Categorisation and Navigation

Materials suitable for training targeted stakeholders were collected using two methods:

• Project partners identified and reviewed existing but widely scattered materials in a joint exercise. An open Call for Content was launched engaging interested stakeholders in the search for and contribution of re-usable training content.

• Training organisers of all FOSTER-funded training events (cf. activity 3 above) provided their training materials for re-use.

Training content collected by the means described above was analysed to identify a suitable classification system. Based on previous efforts to classify open science, and in particular research data management training outputs, the classification of the
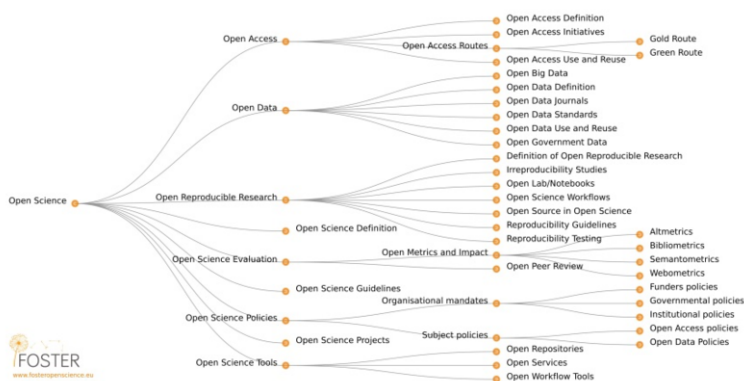

Figure 1. FOSTER Open Science Taxonomy.

DaMSSI-ABC project[3] was chosen as a starting point. DaMSSI-ABC aimed to classify course offerings to ensure that participants are able to select the training that best meets their particular learning objectives. The following is the list of metadata fields adapted for use within the FOSTER project: Title, General description of the resource, Author/creator, Date, URL of the resource, Language, Target audience, Scientific discipline, Level of knowledge, Main topic, Secondary topic, Resource licence, Media type, File type, and Size.

For the 'Topic' part of the classification scheme the FOSTER Open Science Taxonomy was developed. As explained by Pontika et al. (2015) this taxonomy was not only created to enable navigation and searching of the portal content. It has also been used to link and recommend related content items; to provide a structure to which users can subscribe to receive content updates; and for content experts to be notified of items that need review or raise questions that should be answered. Furthermore the map of topics provides an overview to inform learners of the existence and relationships of areas that comprise Open Science (cf. Figure 1). Finally it serves as a means to check whether the FOSTER training content covers all relevant areas in the field and whether there are any gaps in the topics explored in the Open Science agenda.

Collecting Open Science training resources in one place under a common classification scheme helps individuals identify their training needs and contribute to satisfying them. Readers may search for topics (e.g. by using the taxonomy), map their own interests by comparing indicated audience and learning levels, and use the provided material for self-study. Any individuals and contributors in the Open Science

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[3] DaMSSI: Data Management Skills Support Initiative - Assessment, Benchmarking, Classification. See http://www.dcc.ac.uk/training/damssi-abc.

community are permitted and invited to add content, by creating an account to the portal, to store their materials for greater distribution and re-use.

2.2. e-learning Courses: self-learning and course creation

In this paper so far we have discussed, how the content of the FOSTER training portal is being collected and how learners can identify resources that help them fulfil their learn training activities. In today's distributed and networked environments it might be useful for trainers to think also about e-learning and blended learning formats. The advantages of self-learning (at students' own pace, location-independent and asynchronously with self-assessment) can be combined with benefits of teacher-led training (synchronous interaction with teacher and classmates, higher engagement and motivation).

The FOSTER training portal offers tools for creating online training courses, including definition of learning objectives, multimedia course content, quizzes for self-assessment and discussion forums for supporting learners. Several courses on different areas of Open Science, such as the 'Introduction to Open Science', 'Open Access to publications' and the 'Horizon2020 Open Data Pilot', are already available. Several of these were run as blended learning courses combining self-learning with interactive webinars. Similar to the content on the FOSTER portal, the e-learning courses can be proposed and created by any individuals, again registration to the portal is necessary. This functionality is critical in order to allow various recombinations of the content into modules that best fit local learning needs, and train all stakeholders in the academic ecosystem.

3. FOSTER Training Programme

By means of funding training events throughout Europe a large number of participants was educated on different aspects of Open Science on various knowledge levels. Two open Calls for Training were conducted: for 2014 45 proposals from 19 countries were submitted and 80 proposals from 28 countries for 2015. Consortium partners additionally held training sessions and were invited to give presentations through the Speaker Directory available from the project website[4].

Preliminary results of the FOSTER training programme indicate that in total more than 100 training events with over 4600 participants were co-organised and/or funded by FOSTER. A great diversity of approaches (institutional, national, and discipline-specific), geographies and languages could be observed. Most prominent themes of the training courses were Research Data Management/Open Data as well as Open Access and Open Science. Subjects covered included policies, legal and ethical issues as well as evaluations. Training events aimed at all stakeholder groups (researchers, students, project managers, research administrators, librarians and policy makers; cf. Figure 2).

Materials from training events were added to the FOSTER training portal and are available for individual learning or for the creation of new training activities. Two tools

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[4] FOSTER Speaker Directory: see https://www.fosteropenscience.eu/project/index.php?option=com_speaker&view=speakers&Itemid=192

developed by project partners to help in re-using these training materials are described below.

3.1. Training Toolkit

The FOSTER training toolkit[5] explains how an instructor can organize a successful Open Science training course. The purpose of its creation was to maintain a consistent quality of the FOSTER funded training activities.
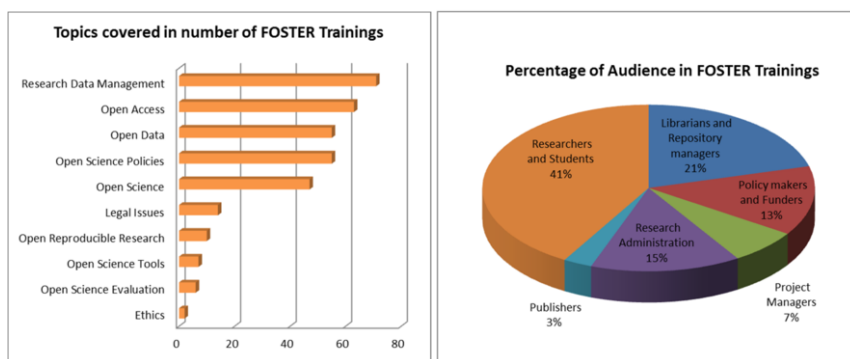

Figure 2. FOSTER Training Topics and Audiences.

Additionally, it ensured that resulting training materials are re-usable, for instance by giving tips and best practices on video recording of training sessions and licensing of contributions. It contains many training examples, which can serve as templates and best practices.

3.2. Learning Objectives

When selecting training materials either for self-learning or inclusion in new training contexts, learning objectives are core elements for mapping the learners' needs to available training resources. As detailed by Grigorov et al., (2015) FOSTER learning objectives are structured by Open Science Topics according to a functional Open Science Taxonomy (Pontika et al., 2015), reflecting the main responsibilities of each stakeholder along the Research Lifecycle. Specific Learning Objectives are structured in increasing levels of competence, frequently ending with successful integration of Open Science best practices in the daily research routine, facilitating self-assessment of personal workflow. The FOSTER learning objectives assist trainers with identifying related core learning elements and resources. These are additionally mapped to audiences and divided into three knowledge levels (introductory, intermediate, and advanced).

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[5] FOSTER Training Toolkit: https://www.dropbox.com/s/ccrgkd0d6cizj4u/D4.2%20-%20Toolkit%20for%20Training.pdf?dl=0

4. Experiences and Recommendations

First numbers and feedback on the FOSTER training events demonstrate the successful approach of funding community-driven training courses. By means of engaging the targeted stakeholder groups their different perspectives and necessities could be integrated in design and content of the training sessions. The resulting training programme had a wider reach, clearer focus on the needs of the respective participants, and could also be held in many more languages than the consortium would have been able to provide on its own. Training organisers valued not only the financial support, but also consulting and recommendations on formats, topics and speakers for events. Participants ranked the quality of the trainings between 'good' and 'excellent'. According to the evaluation forms, attendants highly valued the quality of speakers and training materials provided, and appreciated the wide range of topics that were discussed during the majority of trainings. (Schmidt et al., 2016) The training programme is currently being evaluated in more detail. Case studies on training experiences and recommendations will be published.

5. Conclusions

FOSTER aims to identify and enrich training content in Open Science and assist researchers in searching and locating it in one central point for self-learning purposes. In addition, its goal is to provide a collection of resources that will help trainers during the planning of their training activities, which can also be used as primary resources of information in these sessions. For this purpose a wealth of high quality training materials has been collected in the FOSTER Open Science Training Portal. The tools that help with identifying and re-using the training resources described in this paper are the: Open Science Taxonomy, Training Toolkit, Learning Objectives and e-learning courses. Case studies with best training practices will complete the offering.

6. Acknowledgements

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