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DATA MANAGEMENT PLANS IN OPEN SCIENCE: WHAT, WHY, & HOW

Increasingly, research funding agencies and institutions require researchers to submit a Data Management Plan (hereinafter DMP). In an Open Science ecosystem, DMPs play a crucial role in fostering transparency, accessibility, and reproducibility. Good data management is also essential for ensuring the trustworthiness and integrity of research outputs.

WHAT IS A DMP?

A DMP is a living document that outlines what research data will be generated during a project and provides a structured strategy for organising, documenting, storing, sharing, and preserving this data throughout and beyond the project's lifecycle.

WHY PREPARE A DMP?

- Ensures data are complete, accurate, and reliable.
- Reduces the risk of data loss, duplication, or security breaches.
- Facilitates data reuse and increases visibility of research.
- Anticipates potential issues, such as lack of storage space, incompatible data formats, missing consent forms, early on.
- Saves time during data retrieval, publication, and sharing.

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WHAT IS RESEARCH DATA AND WHAT IS METADATA?

The **OECD** defines research data as factual records (numerical data, textual records, experimental results, measurements, field observations, images, etc.) used as primary sources in scientific research that are “commonly accepted in the scientific community as necessary to validate research findings”. In turn, the OECD defines metadata as “detailed descriptions of the data sets and documentation of the workflow needed to access these resources”.

Sensitive data, such as personal or confidential information, must be addressed in the DMP with attention to ethical concerns, privacy, data protection, and security. The guiding principle here is: **"as open as possible, as closed as necessary"** — meaning data should be openly accessible unless there are valid reasons for restrictions.

MAIN COMPONENTS OF A DATA MANAGEMENT PLAN

While funder requirements and research fields may differ, a comprehensive DMP typically includes the following elements:

- **Data description:** What data will be generated (types, formats, volume)?
- **Standards and metadata:** What standards will be used to describe and document the data?
- **Data storage and backup:** Where and how will data be stored and protected?
- **Data sharing:** How and when will data be shared? Which repositories will be used?
- **Access and reusability:** Who can use the data? Under what license?
- **Preservation:** How will the data be archived for long-term access?
- **Roles and responsibilities:** Who is responsible for different aspects of data management?
- **Legal and ethical issues:** How will you address confidentiality, consent, and IP rights?

PRACTICAL STEPS TO CREATE A DMP

Describe Project Data

- List data types (surveys, code, images…) and formats (CSV, JPEG…)
- Estimate data volume
- Identify any reused data

Define Storage, Backup, and Security

- Use secure, redundant storage (cloud, institutional servers)
- Apply file naming conventions and version control

Assign Roles and Responsibilities

- Define who manages each aspect of data handling

Address Legal, Ethical, and Privacy Issues

- Ensure compliance with relevant laws
- Describe anonymization or encryption methods for sensitive data

Set Standards and Metadata Practices

- Use accepted metadata standards (e.g., DataCite)
- Include documentation like README files or codebooks

Outline Data Sharing Strategies

- Indicate when data will be shared
- Use trusted repositories (e.g., OSF, Zenodo, national or institutional)
- Justify any embargo periods

Ensure Accessibility, Reusability, and Preservation

- Choose open, non-proprietary formats when possible
- Apply open licenses
- Archive data in repositories with long-term preservation policies

FINAL CONSIDERATIONS

- Keep the DMP updated as the project evolves.
- Discuss data management early with your team.
- Promote FAIR (findable, accessible, interoperable, reusable) principles.
- Plan for challenges in documentation, licensing, and data standards.

TOOLS TO SUPPORT DMP DEVELOPMENT

- **DMP Tool**: Free tool to create DMPs aligned with funder requirements.
- **ARGOS (OpenAIRE)**: EU-supported platform to create actionable DMPs.
- **DMPonline**: UK-based platform offering templates and public DMP examples.
- **FAIR Wizard**: An online tool that guides researchers through the creation of a FAIR-aligned DMP in a structured and intuitive way.

RESOURCES

For examples and templates of DMPs, please check out the following:

Public DMPs

Horizon Europe Template

NIH Sample Plans

Further resources on DMPs are linked below:

Science Europe Guide

Center for Open Science Guide

FAIR-Aware Rubric

Utrecht University Guides

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