

Research data management and ethics

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RESEARCH DATA

Factual records (numerical scores, textual records, images and sounds) used as primary sources for scientific research, and that are commonly accepted in the scientific community as necessary to validate research findings.

DATA – THE FOUNDATION OF RESEARCH RESULTS



“Research data are the evidence that underpins the answer to the research question, and can be used to validate findings regardless of its form (e.g. print, digital, or physical).”

Concordat on Open Research Data, published on 28 July 2016

<https://www.ukri.org/files/legacy/documents/concordatonopenresearchdata-pdf/>

MANAGING RESEARCH DATA = DATA MANAGEMENT

DATA
MANAGEMENT
MEANS THAT

- Data and related metadata are created, preserved, documented and organised systematically
- Data lifecycle and terms of use have been planned and agreed upon

DATA
MANAGEMENT
MAKES SURE
THAT

- Responsible conduct of research has been followed in managing data
- Data is not compromised at any level
- It is possible to reuse the data

RESEARCH DATA MANAGEMENT AS A REQUIREMENT

ORGANISATION

Tampere higher education community's Open Science and Research Policy

- Research data related to research results is by default open and meant for cooperative use
- Well-managed research data is regarded as a merit
- Every researcher is responsible for good data management
- DMP should be made at the beginning of research

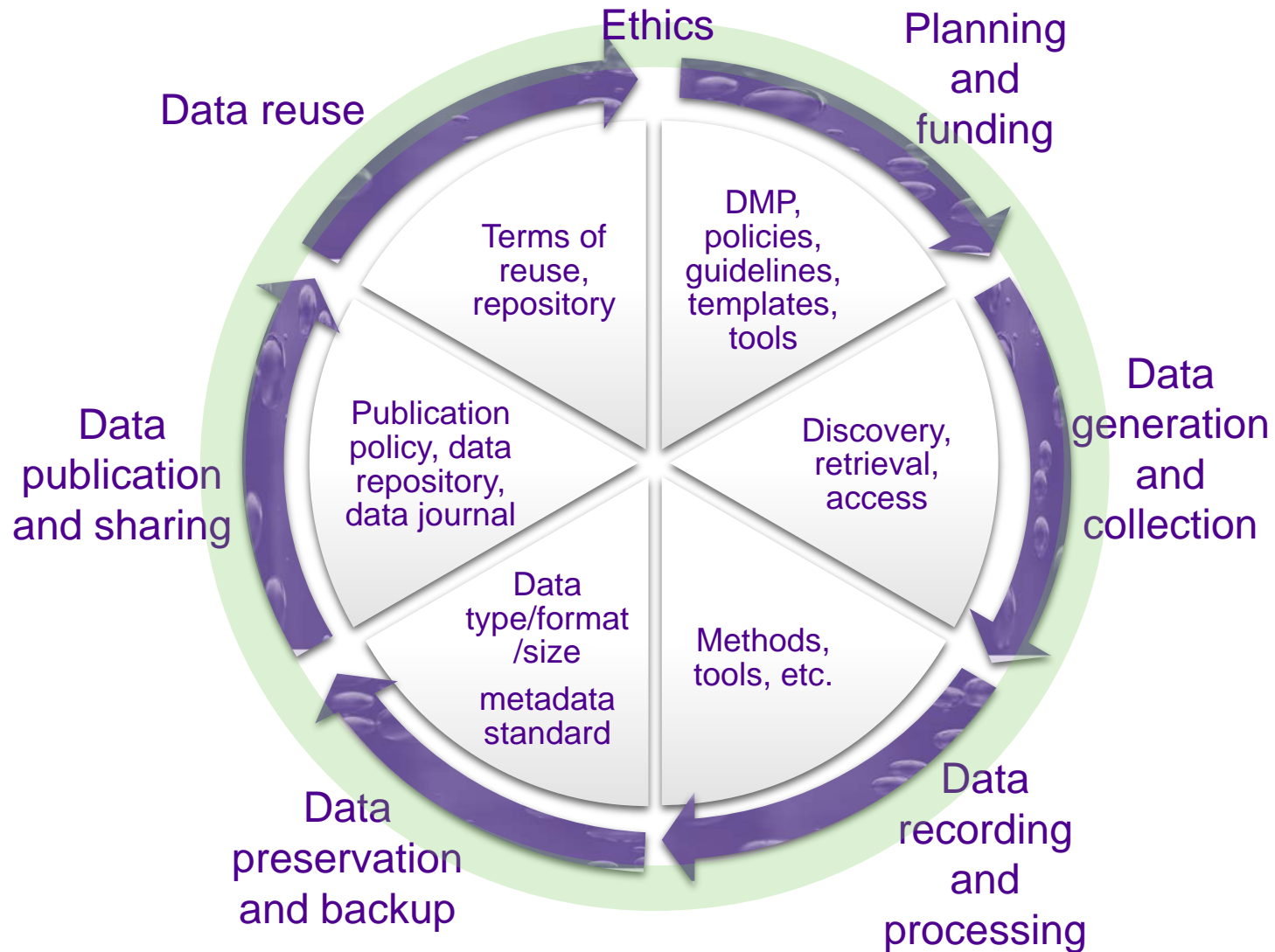
RESEARCH FUNDERS

- **Academy of Finland** requires a data management plan, data must be made freely available as soon as possible after the research results have been published
- **EU's Horizon2020**: Open access as a default
- **Business Finland**: Data should be utilised in the future as effectively as possible

REASONS TO MANAGE YOUR DATA

- Part of the researcher skills: good data management as a default
- Shows you are well-planned, systematic and ethical
- Saves time
- Reduces risks (loss of data, inability to prove research findings, etc.)
- Enables that data can be used after the research project
- Helps you do better research
- Shows that you understand that your data has value

RESEARCH DATA LIFECYCLE



DATA MANAGEMENT PLAN

- Part of the research plan
- Begin writing one at the beginning of your research
- A document describing what type of data you have, how you will manage your research data during the project and how you will make them available after the research project has been completed
- Describe data, not methods or analysis in the DMP
- Remember to be concrete
- A living document to be updated regularly
- Use DMPTuuli tool: <https://www.dmptuuli.fi/>



RESEARCH ETHICS AND DATA MANAGEMENT - THINGS TO DO BEFORE PROJECT

GOOD SCIENTIFIC PRACTISE

- The methods applied for **data acquisition** as well as for research and evaluation, conform to scientific criteria and are ethically sustainable.
- When publishing the research results, the results are communicated in **an open and responsible fashion** that is intrinsic to the dissemination of scientific knowledge.
- The researcher complies with the standards set for scientific knowledge in planning and conducting the research, in reporting the research results and in **recording the data obtained during the research**.
- The necessary research permits have been acquired and the preliminary ethical review that is required for certain fields of research has been conducted.
- Before beginning the research or recruiting the researchers, all parties within the research project or team agree on the researchers' rights, responsibilities, and obligations, principles concerning authorship, and questions concerning archiving and accessing the data.

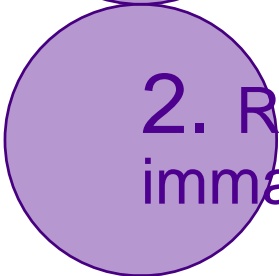
Ethical principles for research with human participants (Finnish National Board on Research Integrity TENK guidelines 2019)

- Openness of research data:
 - Preserving the data gathered in research to make it available to other researchers is one way of ensuring open science.
 - The degree of openness is determined on the basis of the data in question, taking into account both freedom of science and freedom of expression, and the protection of personal data and privacy
 - Opening the research data must be considered already at the planning stage of the research

ETHICAL PRINCIPLES IN SCIENTIFIC RESEARCH



1. Respecting the autonomy and dignity of research subjects



2. Respecting cultural heritage (material and immaterial) and biodiversity



3. Avoiding significant risks, damage or harm

ETHICAL REVIEW

MEDICAL SCIENCES

Ethical review as a default

The ethics committees of hospital districts are responsible for ethical pre-evaluation of medical research

IN HUMAN SCIENCES
WHEN

- The research deviates from the principle of informed consent,
- the research involves intervening in the physical integrity of research participants,
- The focus of the research is on minors under the age of 15, without separate consent from a parent or carer
- Research that exposes participants to exceptionally strong stimuli
- Research that involves a risk of causing mental harm that exceeds the limits of normal daily life
- Conducting the research could involve a threat to the safety of participants or researchers or their family members or others closest to them



AGREEMENTS AND RESEARCH DATA

- To determine the tasks, responsibilities and rights of all project participants
- To create mutual understanding in a project
- To demonstrate responsibility and respect (for research subjects)
- To clarify administrative roles within the project
- To clarify rights to the data (authorship)
- To avoid disputes and conflict of interest
- To show responsible conduct of research and good data management skills

RESEARCH ETHICS AND DATA MANAGEMENT - THINGS TO DO DURING PROJECT



REMEMBER WHEN PROCESSING AND HANDLING DATA

- Always process and handle your data in an ethical manner!
- Follow relevant legislation
- Don't forget data security when processing and transferring data
- If you collect and process personal data, remember to follow EU's general data protection legislation and Tampere higher education community's Data Protection Policy

DOCUMENTING DATA

- Data documentation means the description of the content, data collection, variables and other necessary information about the data
- Remember to document the content and structure of the data, not results or publications
- It is possible to produce different kinds of descriptive information (text files, README-files, technical metadata, and so on)
- Document too much rather than too little
- Well-documented research data is more easily findable, accessible and reusable
- Aim:
 - Secondary users of your data can understand why, how and for what purpose the data was originally collected and how it can be used
 - You can understand and reuse your own data later on
 - You can use national data documentation tool Qvain:
<https://qvain.fairdata.fi/>

STORING RESEARCH DATA

When choosing a storage for the research data, you have to consider several things:

- what kind of research data you will produce and how it will be processed? (the type and amount of research data may prevent usage of some storage services)
 - how are you going to save, store, use, backup and transfer your data?
 - to whom are you going to share the data?
 - what kind of access control you need?
 - are you going to actively modify your data?
 - is your data sensitive?
-
- Remember data protection at every step!

RESEARCH ETHICS AND DATA MANAGEMENT - THINGS TO DO AFTER PROJECT



OPENING AND SHARING DATA

- Open access to research data (Open Science)
- Research data are considered as a valuable research output
- The act of publicly disclosing the research data you've collected, making them findable, accessible and reusable = Other people can find, access and reuse your data
- Opening, archiving and publishing your data properly will enable both your future self as well as future others to get the most out of your data
- Increases impact
 - Data as a merit in a cv
 - After the data has been opened, other people can use and cite the data
 - Increased citation increases the impact of research (Drachen et al. 2016; Piwowar, Vision 2013; Piwowar, Day & Fridsma 2007)
- The importance of metadata → enables data to be used and understood by others

FAIR DATA

FINDABLE

ACCESSIBLE

INTEROPERABLE

RE-USABLE

REMEMBER THESE WHEN OPENING DATA

- Open and share your data in a data archive or data journal
- Get a Persistent Identifier to your data
- Use formats that are open and suitable for long-term preservation
- Check that copyright or ownership does not prevent sharing data
- Define terms of reuse by a license
- Create and publish metadata

- Sharing personal data:
 - Can only be shared anonymised
 - Basis for processing of personal data might limit reuse (for example no consent)
 - Choose a certified data archive
 - If you cannot publish the data, publish metadata

LINKS

Data management

Research Data Management online guide: <https://libguides.tuni.fi/friendly.php?s=researchdatamanagement>

Finnish Social Science Data Archive: Data Management Guidelines: <http://www.fsd.uta.fi/aineistonhallinta/fi/>

Michener, William K. (2015): Ten simple rules for creating a good data management plan / PLOS Computational Biology: <http://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1004525>

Sharing data and code

Drachen, T.M. et al., (2016). Sharing data increases citations. *LIBER Quarterly*. 26(2), pp.67–82. DOI: <http://doi.org/10.18352/lq.10149>

Piwowar, H. A., Day, R. S., & Fridsma, D. B. (2007). Sharing Detailed Research Data Is Associated with Increased Citation Rate. *PLoS ONE*, 2(3), e308. <http://doi.org/10.1371/journal.pone.0000308>

Piwowar, H.A., & Vision, T.J. (2013). Data reuse and the open data citation advantage. *PeerJ*, 1, e175; <http://dx.doi.org/10.7717/peerj.175>.

Vandewalle, P. (2012). Code sharing is associated with research impact in image processing. *Computing in Science and Engineering*, 14(4), 42–47. <http://dx.doi.org/10.1109/MCSE.2012.63>

Open science

Finnish Advisory Board on Research Ethics (2012). *Responsible conduct of research and procedures for handling allegations of misconduct in Finland*, http://www.tenk.fi/sites/tenk.fi/files/HTK_ohje_2012.pdf

European Commission Recommendation on access to and preservation of scientific information: <https://ec.europa.eu/digital-single-market/en/news/recommendation-access-and-preservation-scientific-information>

FAIR data: Wilkinson, M. D. et al. The FAIR Guiding Principles for scientific data management and stewardship. *Sci. Data* 3:160018, doi: 10.1038/sdata.2016.18, (2016).

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