



Data Matters – and Data Matter



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The world is changing

Modern research has undergone significant changes in recent years, driven by technological, cultural, and policy shifts

- Interdisciplinary collaboration
- Transparent and reproducible research → open science
- Data-intensive research
- New skills are necessary!
 - European Competence Framework for Researchers (<u>ResearchComp</u>)





Advancing data skills

Why now?

- Data are central to modern research across disciplines
- Improving research quality and reproducibility
- Research funders and journals require data transparency
- We have the means
 - New technologies
 - Financial investment



Advancing data skills

Challenges

- Increasing use of big data and complex datasets
- Effective use of new tools and technologies

What do researchers need?

- New skills
- Institutional support



Identifying new skills



Basic skills

- Relevant across research disciplines
- Required skill level might differ individually
- European Competence Framework for Researchers (ResearchComp)
 - Research data management
 - FAIR data
 - Intellectual property rights
 - Research ethics and integrity principles
 - Artificial Intelligence



Individual needs

- Depending on individual researcher's needs
- Covering different aspects of data life-cycle
 - Survey design
 - Electronic laboratory notebooks (ELN)
 - Statistics, data visualisation
 - Programming, machine learning
 - High performance computing
 - Ethics, anonymisation





What could an institution do?

Provide training opportunities

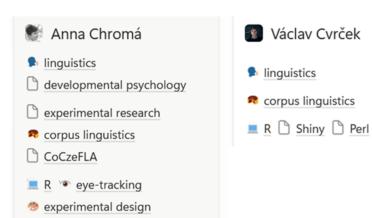
- Utilise existing competence frameworks
- Identify individual needs
- Support the creation of new courses
- Provide trainings

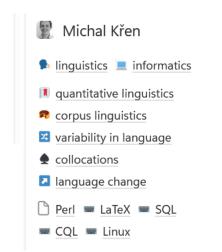
Foster peer communities

- Peer support
- Knowledge exchange











Targetting training

Students

- BA, MA courses
- Research integrity training

Early career researchers

- PhD hub, Postdoc hub
- Central support for basic skills

Senior researchers

- New methods and tools in their field
- Lack of long-term structured courses

Doctoral Study Hub





Managing research



Making an impact



Self-management



Cognitive abilities



Working with others



Managing research tools



Doing research



Institutional support



Supporting researchers

- Researchers are busy x there is a lot to take in at once
- They are experts in their respective fields
- Need for trained support staff x researchers know their data best
- Central point of contact for help
- Facilitate access to tools and infrastructure
- Clear policies and guidelines



Open science support centre

- Central contact point
- Providing generic support to researchers on the central level
- Supporting the support at faculties
- Website easily findable source of relevant information
- Ensuring researchers get access to infrastructure and support



Data stewards

Administrative role

- Generic advisory role
- Developing institutional policies
- Ensuring infrastructure and support are in place
- Building bridges between researchers and support services
- Designing and providing generic training

Research role

- Part of a research team
- Direct support to researchers
- Field specific knowledge
- Tailored advice and training
- Setting up workflows in the lab
- Developing a DMP



Data stewards

Institution Faculty Department Research team

Generic and advisory role

Field specific knowledge and hands-on support





...and where to find them

Czech community of data stewards

- 250+ members across institutions in Czechia
- Institutional DS, research team DS, people interested in RDM

Map of data stewards in the Czech Republic



Research software engineering

Researchers are experts in their field, they don't need to be expert programmers too

RSE support

- Accessing high performance computing, optimizing code
- Developing software for research
- Creating automated pipelines
- Training for researchers
- Help researchers articulate technical requirements for grant proposals



Ethics & legal issues

Ethics

- Research Ethics Committee
- Consulting and reviewing ethical aspects of research proposals
- Promoting research integrity

Legal support

- GDPR and legal compliance
- Intellectual property rights, copyright
- Data sharing agreements



Guidelines and policies

Institutional research data policy

- Sets clear expectations of both researchers and the institution
- Provides guidelines for researchers
- Helps the institution plan further development
- Basic principles x NOT prescribing particular tools





1. Preamble

Charles University is convented to ensuring that its research is transparent, replicable and its research results are widely accessible and ensable, in line with the principle as open as possible, as closed on necessary. The University strongly believes that such practice improves the quality of research and benefits not only the wider research community but individual researchers as well by fostering collaboration and increasing their impact. Making research results widely available will further highlight the excellence of the University's research and enable public engagement.

The University recognizes that research data are an integral part of the research process and that research data management is a key component of research quality and integrity. The aim is for the University researchers to produce research data that are managed in accordance with the FARI principles.

2. Definitions

Research date: Research date can be characterised as any information that has been collected, observed, generated, or created to validate or reproduce research findings. Research data can take various forms, including but not limited to documents, spreadsheets, images, audio and video recordings, code, software, laboratory notebooks or samples, and may be digital as well as non-digital.

Metadata: Metadata provide information about other data. They may include, for example, information about who the author of the data is, or when and where the data were created.

FAIR principles: The FAIR principles describe how research data should be organised so they conbe more Findable, Accessible, Interoperable and Bausable.

Date management plan (DMP): Date management plan (DMP) is a document that specifies what data will be created and how, and outlines the plans for sharing and preservation of the data, both during and after the research project. DMP should be updated regularly to reflect what octually happened with the data.

Repository: Repository is a digital online storage for storing and sharing the results of creative activities (e.g., publications or data).

Persistent identifier: Persistent identifier is a long-losting reference to a unique entity. Persistent identifiers may be used, for example, for digital objects (e.g., DG), handley researchers (e.g., OBCD, ResearcherD), organizations (e.g., OBCD) or other existins.



Summary

Data skills are crucial for modern research

Researchers need both skills and institutional support





Thank you



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