Lessons learned from teaching FAIR RDM for students

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Questions

• How can a RDM course for students be started?
• How can the course be integrated into a degree programme?
• What topics should be included in the curriculum?
• How is the topic of FAIR data covered in the curriculum?
Principles of research data at Bielefeld University (19 July 2011)

“In order to establish and develop high-quality research data management in a sustainable manner, the specific methods and principles of good scientific practice in teaching and further education should be appropriately addressed.”

https://uni-bielefeld.de/(de)/forschungsdaten/fdm-bi/grundsaetze/
CITEC Open Science Manifesto (8 March 2013)

“CITEC recognizes the need to extend the educational curriculum for young scientists towards topics of research data management and offers training and personal consulting for advanced researchers, thus contributing to awareness among young researchers of good practice in scientific research.”

https://www.cit-ec.de/en/open-science/manifesto
Seminar “Research Data Management“

- started in Oct. 2013, repeated every winter semester
- interdisciplinary
- 14 sessions (1.5 h each)
- 5 CP in elective module
- taught in English (since 2015)
- implemented as a module (in 2016)
Number of Participants

- Switched to English included in degree programmes

<table>
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<tr>
<th>Year</th>
<th>Number of Participants</th>
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<tbody>
<tr>
<td>2013</td>
<td>9</td>
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<td>2014</td>
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<td>2015</td>
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<td>2018</td>
<td>91</td>
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<td>2019</td>
<td>91</td>
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Participants by Programme
Participants by Degree Programme

- Master: 214
- Bachelor: 75
- PhD: 18
- Staatsexamen: 1
Participants by Discipline

- Social Sciences; 27
- Natural Sciences; 43
- Humanities; 7
- Computer Science (other); 57
- Informatics in the Natural Sciences (Master); 32
- Data Science Master; 7
- Intelligent Systems (Master); 135
Obectives of the Seminar

Students shall

• understand the **motivation**, challenges and solutions of managing research data

• learn the principles of research data management and its importance for **good scientific practice**

• acquire **knowledge** of the organizational, technical and legal aspects of managing research data

• **apply** the acquired knowledge to their own disciplines’ research

• develop **competence** to make up their own mind about the questions of Open Science
Seminar Plan (WiSe 2019/20)

1 Introduction
2 Good Scientific Practice FAIR
3 Data, Information, Knowledge
4 Data Backup
5 Data Archiving
6 Documentation, Metadata + Linked Data FAIR
7 Sharing and Publishing Data, FAIR Principles, Copyright Law FAIR
8 Finding and Re-Using Data FAIR
9 Tools: GitLab + Git
10 Data Protection and Safety
11 RDM Services at Bielefeld University
12 Data Management Plans FAIR
13 Open Science FAIR
Hands-on Sessions

1. CMS + Wikis, Project Management Software
2. Cloud storage (sciebo/Owncloud)
3. Version Control Systems (Git)
4. Electronic Lab Notebooks
Competence-Based Approach: Mix of methods

- start with a current topic or example
- alternate presentation of knowledge with student assignments (whole-class, group, individual)
- use real-life examples from disciples of students
- include presentations by the participants
- group discussions
Group discussion „Open Science“

- Topic „Open Science – How open can and should science be?“
- Moderated discussion
- Participants assume roles e.g.
  - Progressive researcher
  - Conservative researcher
  - Rector of a university
  - Science politician
  - ...
Final Assignment: Data Management Plan

students will create their own data management plan to organize one of their own research project.
Survey: Participants

- Computer Science: 12
- Informatics in the Natural Sciences: 3
- Intelligent Systems: 8
- Physics: 1
- Biophysics: 3
- Biology: 1
- Psychology: 1
- Computer science, physics: 1
How did you learn about the seminar?

- eKVV, 27
- Word-of-mouth, 2
- Friends, 1
- E-Mail, 1
- Poster, 0
- Website, 0
"The seminar was useful for my studies/research."
- Strongly agree: 5
- Agree: 19
- Undecided: 6
- Disagree: 1
- Strongly Disagree: 1

"I would recommend the seminar to other students."
- Strongly agree: 12
- Agree: 18
- Undecided: 0
- Disagree: 1
- Strongly Disagree: 1

"Learning about research data management should be mandatory for students."
- Strongly agree: 6
- Agree: 14
- Undecided: 10
- Disagree: 1
- Strongly Disagree: 1

"I would be interested in an advanced course about research data management."
- Strongly agree: 8
- Agree: 10
- Undecided: 8
- Disagree: 4
- Strongly Disagree: 1

"I would have liked more practical exercises."
- Strongly agree: 7
- Agree: 9
- Undecided: 9
- Disagree: 6
- Strongly Disagree: 1

"I would have liked more theory and background information."
- Strongly agree: 2
- Agree: 10
- Undecided: 14
- Disagree: 5
- Strongly Disagree: 1
Which topics would you like to learn more about?

- Good Scientific Practice
- Data Backup
- Documentation and Metadata
- Software Tools
- Finding and Re-Using Data
- Data Archiving
- Copyright Law
- Open Science
- Publishing Data
- Privacy Protection Law
- Date Management Plans
- Electronic Lab Journals
- Version Control Systems
- Research Data Management for big data
- Third Party Funding
Comment by Student

“What I found most interesting about the seminar was the part about good scientific practice, which helped me in finding a better understanding of how to properly work on my Bachelor thesis.”
RDM Courses for Researchers

- PEP-Seminars
  - „Introduction to RDM“ (4 h, each semester)
  - „Writing a DMP“ (2h, each semester)
  - „Manage Research Data and Software with GitLab“ (4 h, each semester)

- Roadshow: On-demand presentation in group meetings
RDM for Students

• Seminar „Research Data Management“
• Data Literacy courses (1.5h ea, each semester)
  • “Introduction to good scientific practice”
  • “Data protection for personal data in research projects”
  • “Avoid data loss with backups”
  • “Finding and using research data”
Next Steps: Co-operation

• develop a shared curriculum
• exchange teaching materials using open licenses
• exchange experiences with different teaching methods
More info in

Thank You!
Contact

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