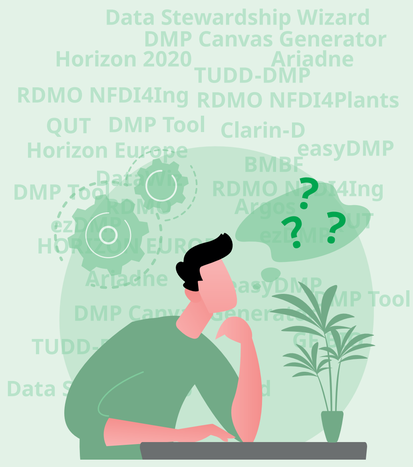
Analysis and Evaluation of Data Management Planning Tools

Carina Becker[1]*, Carolin Hundt[2] , Claudia Engelhardt[1] , Johannes Sperling[2] , Moritz Kurzweil[2] , Ralph Müller-Pfefferkorn[1]

[1] Center for Information Services and High Performance Computing (ZIH), TU Dresden, Germany
[2] Directorate – Library and Digital Services, Leibniz Institute for the History and Culture of Eastern Europe (GWZO), Germany
*Corresponding author: carina.becker@tu-dresden.de

Introduction



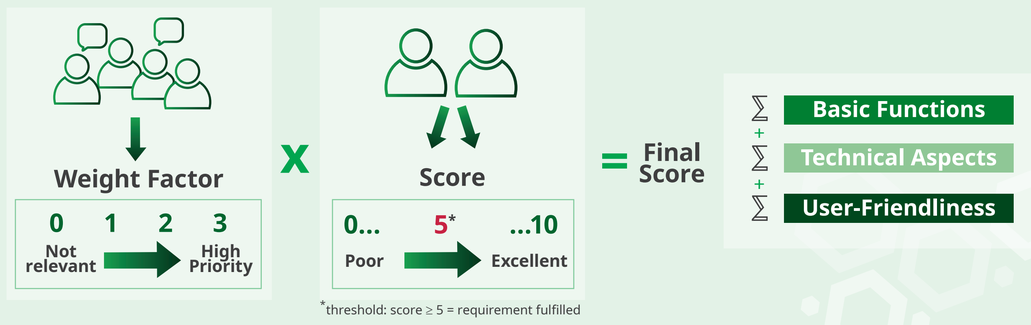
Data Management Plans (DMPs) are crucial for a structured research data management throughout the data lifecycle [1] and often a mandatory part of research proposals [2], [3]. The manual creation of DMPs is very time-consuming, since researchers have to start from scratch. Furthermore, they run the risk of not meeting the funders requirements. By using tools, DMPs can be effectively developed and managed. There are a variety of tools to support the development of DMPs: discipline-agnostic DMP tools, which are used to write a generic DMP, and discipline-specific DMP tools, which support the drafting of a DMP in specific research fields. In view of the large number of offers, the selection of a suitable tool poses a great challenge for researchers. To support the decision of institutions planning to host a DMP tool, this evaluation can also be helpful. Therefore, it is crucial to analyze these tools [4]. The objectives of this work are as follows:

A. Identify requirement parameters to evaluate existing DMP tools

B. Evaluate DMP tools based on the identified parameters

Evaluation of DMP Tools

- **18 DMP tools** (table 1)
  ⇨ Which of them are easy to host/maintain and adaptable to specific needs of researchers/institutions/funders?
- 19 expert interviews and a discussion among project partners
  ⇨ **32 requirement parameters** (table 2)



*threshold: score ≥ 5 = requirement fulfilled

Table 1: Evaluated DMP tools. Discipline-specific tools are marked in bold.

DMP tool	Discipline	Hosting/Developers
ARGOS	Interdisciplinary	OpenAIRE AMKE, EUDAT CDI, Europe
ARIADNE	Archeology	Vast-Lab, Italy
Clarin-d DMP	Humanities/social sciences	Eberhard Karls Universität Tübingen, Germany
Data Stewardship Wizard	Interdisciplinary	Czech Technical University, Dutch Techcentre for Life Sciences, Czech Republic, Netherlands
DataWiz	Psychology	Leibniz Institute for Psychology Information, Germany
DMP Canvas Generator	Life sciences	Swiss Institute of Bioinformatics, Switzerland
DMPonline	Interdisciplinary	Digital Curation Centre, University of Edinburgh, United Kingdom
DMPTool	Interdisciplinary	California Digital Library, University of California, USA
easyDMP	Interdisciplinary	EUDAT, Finland, Norway
ezDMP	Interdisciplinary	Columbia University, Rutgers University, University of Illinois, USA
GFBio	Biodiversity	GFBio, Germany
NFDI4Plants DataPLAN	Plant science	Eberhard Karls Universität Tübingen, Germany
QUT	Interdisciplinary	Queensland University of Technology, Australia
RDMO	Interdisciplinary	Leibniz Institute for Astrophysics Potsdam, University of Applied Sciences Potsdam, Germany
RDMO NFDI4Ing	Engineering	University and State Library Darmstadt, Germany
TUDD DMP	Interdisciplinary	TU Dresden, Germany
TUM Workbench	Interdisciplinary	TU München, Germany
UWA-DMP	Interdisciplinary	University of Western Australia, Australia

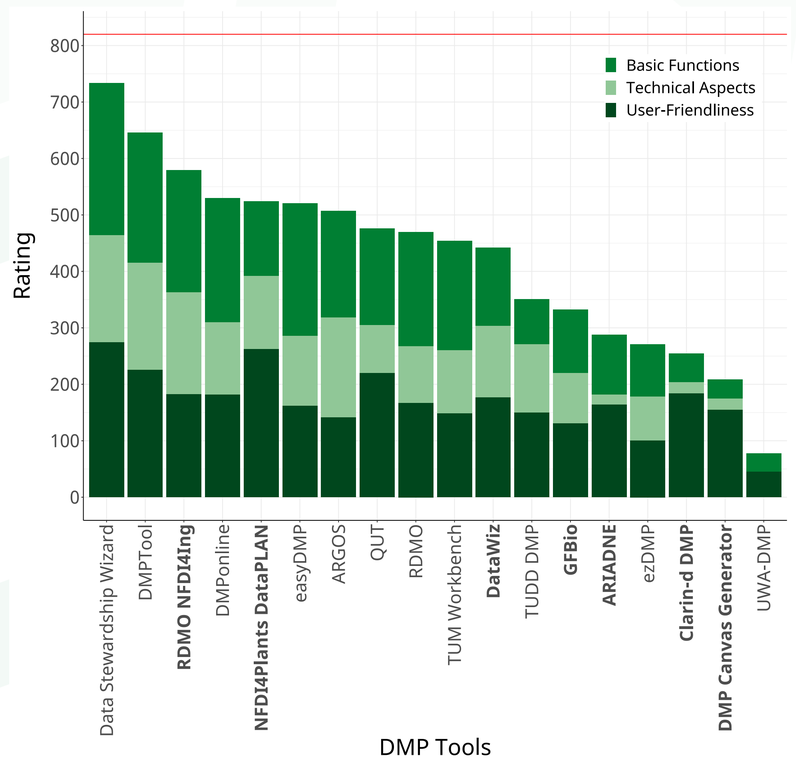


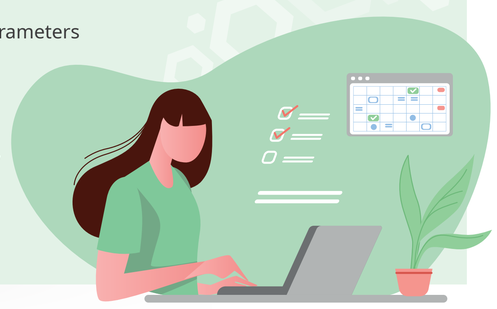
Figure 1: Evaluation results of the discipline-specific (bold) and generic DMP tools with each bar constructed from the stacked main categories (basic functions, technical aspects, user-friendliness). The maximum achievable total score was 820 (red line).

Table 2: Requirement parameters are grouped into main categories (dark green) and subcategories (light green). Priority 3 = high, priority 0 = not relevant. DSGVO - General Data Protection Regulation.

Parameter	Priority
1 BASIC FUNCTIONS	
1.1 Access	
1.1.1 Open access with login	3
1.1.2 Open access without login	3
1.1.3 Encryption	2
1.1.4 DSGVO compatibility	3
1.2 Storage and Export	
1.2.1 Saving	3
1.2.2 Export/import of DMP in tool format	3
1.2.3 Various export formats	3
1.2.4 Machine-actionability	3
1.3 Collaboration	
1.3.1 Share DMP with collaborators	3
1.3.2 Track changes	1
1.3.3 Commenting function	2
1.3.4 Control levels	2
2 TECHNICAL ASPECTS	
2.1 Editing	
2.1.1 Editor access (CMS with roles)	3
2.1.2 Modularity (‘generic’ and ‘institution specific’)	3
2.1.3 Frontend/backend access	2
2.1.4 Easy maintenance of content	3
2.1.5 Sustainability of the software (updates and development)	3
2.2 Transparency	
2.2.1 Open source	3
2.2.2 FAIRness	2
3 USER-FRIENDLINESS	
3.1 Assistance	
3.1.1 User-friendly guidance	3
3.1.2 Pre-formulated filterable answer options	3
3.1.3 Text modules	3
3.1.4 Text sections (short DMP)	3
3.1.5 Preview of text modules (what you see is what you get)	2
3.1.6 User guide	3
3.1.7 User feedback	2
3.2 Design/Structure	
3.2.1 Layout/usability	3
3.2.2 Progress	2
3.2.3 Breadcrumbs (navigation)	2
3.2.4 Highlighting unanswered questions	3
3.2.5 Skipping questions	3
3.2.6 Open text fields	3

Results and Discussion

- Evaluated tools satisfied 10 % to 90 % of the requirement parameters
- Covered at least half of the parameters: 11 tools
- Pre-fabricated text modules: 5 tools
- Machine-actionable [5]–[7] and open source: 7 tools
- Highest total rating scores: Data Stewardship Wizard (733.5), DMPTool (645.5), RDMO NFDI4Ing (579.5)



Conclusion

Data Stewardship Wizard, DMPTool and RDMO NFDI4Ing can be recommended for researchers and institutions as flexible tools for hosting.

- This study provides an up-to-date evaluation of 18 DMP tools
- Results can support:
  - Tool developers to identify potential improvements
  - Hosting institutions to select a tool suited to their specific needs

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SACHSEN

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