

# Advice: online applications for data management plans (DMP's)

[translated]

Landelijk Coördinatiepunt Research Data Management (LCRDM) (National Coordination Point Research Data Management)

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## Introduction

As a consequence of national and international developments, ever more research institutes in the Netherlands have adopted policy that requires researchers to write a data management plan (DMP) as part of their research project. To support researchers in writing a DMP, many institutes and research funding organizations have developed [templates](#) with relevant information and directions.

When it comes to planning data management and matching support, we can distinguish: (1) the contents of the DMP, contained in a template or questionnaire (possibly with clarification) that serves as a basis for a researcher to plan his/her data management; (2) the infrastructure, tool or application used to record the DMP. Although these aspects of data management planning cannot be seen as entirely separate from each other, this advice focuses on the infrastructure, or the *tooling*.

Current infrastructure used to draw up DMPs varies considerably and at many institutes does not function optimally. A researcher may have different 'clients' for which he/she is expected to draw up a DMP, for example his/her own research institute or an external research funding organization. Mostly a separate DMP needs to be made for each 'client'.

Once a researcher has started with data management, he/she must decide which *template* is required, download it from a website, fill it in and save it locally. If a research group works collectively on a DMP or needs support advice, the concept DMP is usually mailed to all those concerned. There is no central registration of DMPs. Researchers do not have DMPs of other researchers that could serve as an example. Research support staff lack insight in what kind of assistance is needed for working with DMPs, varying from storage capacity to legal advice.

An online application that offers DMP *templates* that are oriented towards a research funding organization, institute or a certain kind of research, helps prevent unnecessary administrative pressure (a researcher doesn't have to answer irrelevant questions), guarantees that the DMP of the researcher complies with set demands and allows for central storage and sharing of DMPs. The future development of *machine-actionable DMPs* can further support this process and offer even more practical applications for a DMP.

The goal of this advice is to give insight in possible DMP applications and the criteria a DMP application must comply with. This can help institutes and support staff to determine which application they want to use or give advice to facilitate the writing of a DMP. Such advice also offers a vision of the future and serves as input for the Landelijk Coördinatiepunt Research Data Management (LCRDM) with regard to which steps are necessary at a national level. Already during a survey of this advice, a number of institutes opted to use online DMP applications and to exchange experiences with each other.

For the benefit of this advice, a comparison was made between the following three online DMP applications on the basis of criteria that seemed relevant for circumstances in the Netherlands during mid 2017:

- DMPonline (Digital Curation Centre (DCC)),
- RDMP Webtool (Rijksuniversiteit Groningen (RuG))
- ELIXIR Data Stewardship Wizard.

This advisory report has been structured in the following way:

- recommendations by the work group based on comparing the three applications and the individual expertise of the work group members.
- survey report: which applications were selected for comparison and why; which criteria were used to assess the applications and how did each application score?
- preview of developments regarding *machine-actionable DMPs*.

## Recommendations

On the basis of a comparison of the three applications and the individual expertise of the work group members, the sub work group DMP of the LCRDM has formulated a number of recommendations. In first instance these recommendations are directed at the staff of universities, hogescholen and university medical centres who offer DMP advice to researchers and their own institute.

1. *Initiate a roadmap for the introduction of an online DMP application at your institute.*

Offering researchers an online DMP application is preferable to a template in Word.

Advantages of an online application are:

- a. the DMP is easier to manage
- b. use by researchers can be monitored
- c. central storage of DMPs
- d. in the future, automatic links with other systems are expected, for example a link to a CRIS-system

2. *DMPonline by DCC seems to be the most suitable online DMP-application.*

The comparison shows that currently both DMPonline and RDMP Webtool, function adequately for the creation of online DMPs. Compared to the RDMP Webtool of the RuG however, DMPonline is better developed, has a broader user's basis and plays a leading role in developments concerning machine actionable DMP's. The ELIXIR Data Stewardship Wizard is still in a development phase and as yet not fully functional.

3. *Make use of the DCC hosted version (<https://dmponline.dcc.ac.uk/>).*

For the moment it seems that in the Netherlands there is no demand or necessity to host and maintain a separate national version of DMPonline as happens in [Belgium](#). Of the four Dutch institutes that have already begun to implement DMPonline, the majority embed the institute's template in the DCC environment and use a link with SURFconext. There is one institute that has opted to host its own in-house version.

4. *Share experiences at a national level.*

The LCRDM can play a coordinating role in the exchange of experiences regarding the implementation of online DMP applications at institutes.

5. *Monitor the developments concerning licensing conditions.*

Currently use of DMPonline is free. However, in the future DCC is expected to charge for its services. Brexit developments could also influence matters. These events could be monitored at a national level via the LCRDM.

## Approach

The survey started with the formulation of assessment criteria and deciding on a shortlist of online DMP applications. Both are clarified below. The concept assessment criteria were submitted to the Ondersteuning & Advies work group of the LCRDM for approval and amended where necessary. Subsequently, a sub work group, DMPtooling, carried out an 'assessment' of the chosen applications according to the listed criteria.

Our primary goal is to give an insightful survey of the current state of play. We have not attempted to make a product comparison that is 'suitable for a tender' The results were scored in a qualitative way and a qualitative final verdict was given because it gives a clear picture of the three tools. We have not worked with marks, weighing criteria or end scores – that could result in pseudo accuracy for the three candidates .

### ***Which online DMP-applications were compared ?***

During an initial survey the work group examined if a certain tool complied with a number of essential criteria: as writing aid for researchers, storage of DMPs within Europe and possible up-scaling for use at a national level. This resulted in the following comparison of three online DMP applications:

1. DMPonline<sup>1</sup> of the Digital Curation Centre (DCC). For this study the original, English version of DMPonline was reviewed. This tool is available for Dutch users with immediate effect.
2. RDMP Webtool<sup>2</sup> of the Groningen University (RuG). At the time of writing, this tool was only available to RuG staff, but the RuG is amenable to cooperating at a national level.
3. ELIXIR Data Stewardship Wizard<sup>3</sup> of the Dutch Tech Centre for Life Sciences (DTL). At the moment this wizard is more a *proof of concept* than an operational application.

The work group has disregarded a number of tools, for example those that are part of an institute-specific Digital Research Environment, like that of the Radboud UMC, which can therefore probably not be up-scaled for national use (not -functional criterion 3). At an international level, only DMPonline has been included. DMPtool<sup>4</sup> of the University of California was not considered because in time it will merge with DMPonline and because it currently stores data in the US and therefore falls under non-functional criterion 8.

### ***Which criteria have been used and why?***

The work group has formulated functional and non-functional criteria for assessing applications. These criteria stem from three user's scenarios (see figure 1):

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1 <https://dmponline.dcc.ac.uk>  
2 <https://rdmp.webhosting.rug.nl>  
3 <http://dmp.fairdata.solutions/>  
4 <https://dmp.cdlib.org/>

1. a researcher uses the application to fill in a DMP template of the institute and/or research funding organization;
2. a support staff member/institute uses the application to a) make his/her/its own DMP template with accompanying explanation, b) to add an own explanation to the DMP template of a research funding organization, c) support own researchers to compile their own DMP, and/or d) generate management information;
3. a research funding organization uses the application to a) make an own DMP template with related explanation, b) to generate management information/core data.

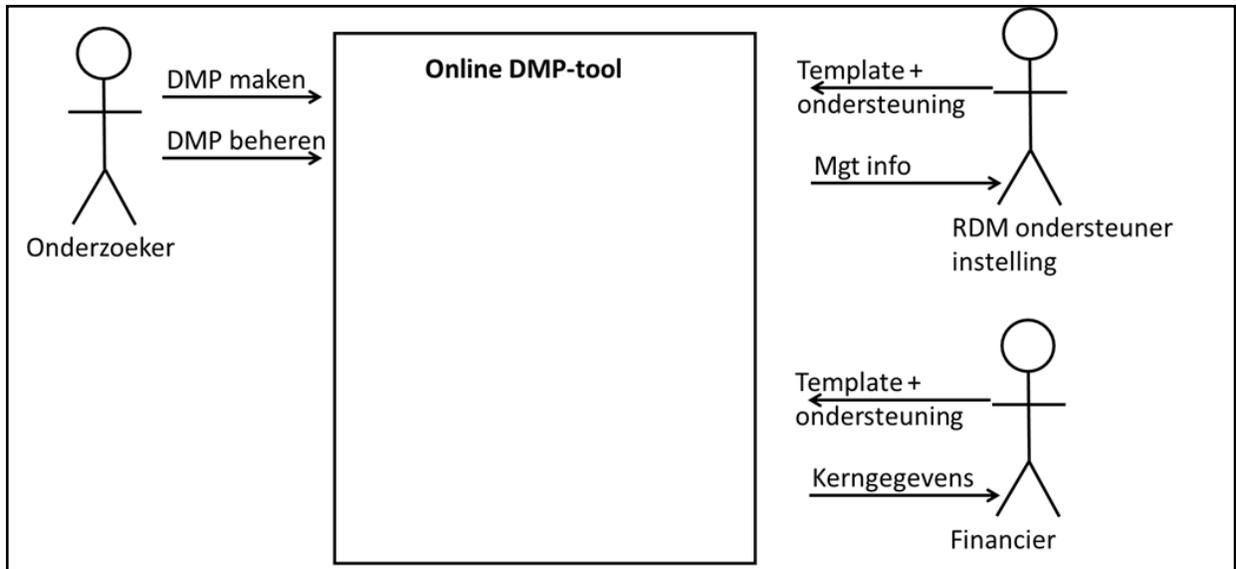


Figure 1: applied user scenarios

In addition to the user scenarios in figure 1, there are currently developments under way under the heading, *active DMPs* and *machine-actionable DMPs*. Tools are not yet geared to these advancements but we have considered in how far tools can follow future progress.

#### Functional criteria

Templates & explanation:

1. Researchers can draw up a DMP on the basis of a *template* with accompanying explanation (*guidance*). [scenario researcher, institute, research funding organization]
2. Saving a new version does not lead to overwriting the previous version. [scenario researcher]
3. A DMP can be exported and saved outside the application in pdf, Word and /or a structured data format. [scenario researcher]
4. Institutes and organizations can introduce their own template and/or explanation, including links to information or services of their own organization or third parties. [scenario institute, research funding organization]
5. Institutes can make different templates for different faculties/research institutes

thereby re-using questions. [scenario institute]

6. A template may contain different types of questions (open, multiple choice, yes /no). [scenario institute, research funding organization]
7. A clarification (institute-specific) can be added to existing templates of other parties. [scenario institute, research funding organization]

#### Rights

8. Multiple authors may write one DMP. [scenario researcher]
9. The author will be informed of each amendment made. [scenario researcher]
10. There is a distinction between reading- and writing rights. [scenario researcher]

#### Registration and administration

11. Support staff can examine a survey of filled-in DMP's. [scenario institute]
12. Support staff can generate management information. [scenario institute]
13. Support staff have access to the contents of DMPs, for *review*. [scenario researcher, institute]
14. Support staff can offer feedback/remarks with regard to a filled-in DMP. [scenario institute]

#### Other

15. Institutes and organisations can alter the *look and feel* of the application to suit their own house style. [scenario institute, research funding organization]

#### Non- functional criteria

1. Speed: loading time of pages should not be a disruptive factor ( $\leq 2$  seconds). [scenario researcher]
2. User-friendliness: the *user interface* of the application should be clear to users without further explanation. [scenario researcher]
3. Capacity: it should be possible to up-scale the application for national use. [scenario institute?]
4. Inter-operability: It should be possible for other systems (e.g. CRIS) to read relevant fields of DMPs via open standards (machine-readability). [scenario institute, research funding organization]
5. Support: is user support available for both researchers as well as research support staff, for example via a manual, forum or mailing list. [scenario researcher, institute, research funding organization]
6. Security: the application is sufficiently secure. [scenario researcher, institute, research funding organization / "common good"]
7. Logging-in: logging-in via SURFconext is possible. [scenario researcher, institute, research funding organization / "common good"]
8. Storage: DMPs and user information is stored in Europe; flexibility regarding choice of data storage location. [scenario researcher, institute, research funding organization / "common good"]
9. Maintenance and development: active upkeep of the application; stays in tune with international developments. [scenario researcher, institute, research funding organization / "common good"]

- 10. Continuity: the supplier of the application offers continuity. [scenario researcher, institute, research funding organization / “common good”]
- 11. Stages of development: the application is mature and has sufficient user’s basis to be viable. [scenario researcher, institute, research funding organization / “common good”]
- 12. Costs: the costs of the application are feasible . [scenario institute, researchfundingorganization]

**Analysis per application**

***DMPonline***

DMPonline is a product of the British Digital Curation Centre (DCC) that has grown to become the de facto international standard for writing data management plans. In the meanwhile, the tool is used all over the world by both universities and research funding organizations. It has an active, international group of users, is inter-active, easy to use and still evolving.

Table 1: Criteria applied to DMPonline

Criterion	Satisfactory?	Explanation
Functionalities		
Templates and explanation		
1. Drafting a DMP	+	
2. Version control	-	As yet no version control - expected in 2018. This is the latest adaptation.

Criterion	Satisfactory?	Explanation
3. Export	+	PDF, csv, html, txt, docx
4. Template for institute possible	+	With regard to administrative interface.
5. Faculty template, re-use questions	+	See the Customising guideline on <a href="http://www.dcc.ac.uk/dmponline">http://www.dcc.ac.uk/dmponline</a>
6. Different types of questions	+	Open questions and multiple choice. Per question you can add a sample answer.
7. Own <i>guidance</i> for other <i>templates</i>	+	
Rights		
8. Multiple authors on DMP	+	
9. Track author changes	+	
10. Distinguish between reading and writing permission	+	<p>DMPonline has 3 permission levels</p> <ul style="list-style-type: none"> <li>• Read only. This permission allows users to only read the plan.</li> <li>• Editor: With this permission users can alter and add text.</li> <li>• Co-owner. Users with this permission have the same rights as editors but with expanded authority (altering details of the actual plan and regulating access).</li> </ul>
Registration and administration		
11. Access survey list for support staff	+	Administrative component – being expanded (roadmap).

Criterion	Satisfactory?	Explanation
12. Report regarding management information	+	Administrative component – being expanded (roadmap)
13. Access for DMP reviewers	+	Person who formulates plan can decide to nominate a “collaborator” & authorize him/her to read or alter the plan (see: 3 permission levels)
14. Register feedback	+	Use the comments field to post feedback
Other		
15. Adjust <i>Look and feel</i>	+/-	Add your own branding – still quite basic. To be further elaborated, see: <a href="https://github.com/DMPRoadmap/roadmap/wiki/Development-roadmap">https://github.com/DMPRoadmap/roadmap/wiki/Development-roadmap</a>
Non-functional		
1.Speed	+/-	Adequate during test situation, but sometimes problematic in the past during peak moments. <i>Performance</i> –improvement is a priority of the DMPonline roadmap. Extra precautions will be taken in the event of national acquisition.
2. User-friendliness	+	
3. Capacity	+	Up-scaling for national use is possible, i.e. a national set-up can be realized (as occurs in Finland)
4. Interoperability via open standards	+/-	Work in progress (roadmap)
5. User’s support	+	DCC offers support. Guidelines /instructions are available on the website ( <a href="http://www.dcc.ac.uk/dmponline">http://www.dcc.ac.uk/dmponline</a> )

Criterion	Satisfactory?	Explanation
		You can also send an email to the helpdesk ( <a href="mailto:dmponline@dcc.ac.uk">dmponline@dcc.ac.uk</a> )
6. Security	+	See <a href="#">Terms of use</a> .
7. SURFconext link	+/-	Not yet realized in the Netherlands (has been achieved in the UK). Technical preparations are complete but SURF must still finalize local production.
8. Data storage location	Edinburgh in principle	When using the UK system (e.g. as ZonMW does), data is stored on the servers of the University of Edinburgh. If you have your own system, you can save your own data.
9. Active maintenance follows international developments	+	
10. Continuity	+	DCC regards the maintenance of DMPonline as a core service. DMPonline has an active user's group whose members contribute new code, etc.
11. Costs	+	Currently DCC does not charge costs, but is considering asking a fee for customising DMPonline, e.g. an annual contribution per institute.
12. Mature user's base	+	Many institutes and large research funding organizations already use DMPonline.

### ***RDMP Webtool***

The RDMP Webtool is an application developed and hosted by the Centre for Information Technology at the Rijksuniversiteit Groningen. The application was developed by the Science and Engineering Faculty and is now being tested by multiple other faculties. The RuG is amenable to working together at a national level to advance this tool.

On the whole the web tool provides a basis for user scenarios that include both researcher and support staff as indicated in figure 1. The tool was planned for internal use, that's why a user scenario for an external research funding organization is not yet possible. The system is functional and is being further developed to include troubleshooting and process suggested amendments.

Table 2: Criteria applied to the RDMP Webtool

Criterion	Satisfactory?	Explanation
Functionalities		
Templates and explanation		
1. Drafting a DMP	+	
2. Version control	+/-	In part. Versions are saved but not shown as yet.
3. Exporting	+/-	In part. From print-out to PDF, no Word or structured format.
4. Institute template possible	+	
5. Faculty template, re-use queries	+	
6. Different types of questions	+	
7. Own <i>guidance</i> for templates of others	-	Requires tool modification
Rights		
8. Multiple authors on DMP	+	Add via participant
9. Monitor author amendments	-	Requires tool modification
10. Distinguish between reading and writing permission	+	Reviewer only has reading permission
Registration and administration		

11. Access survey list for support staff	+	
12. Report for the benefit of management information	-	Requires tool modification
13. Access for DMP reviewers	+/-	Is possible, but occurs outside RDMP via email or pdf.
14. Register feedback	-	Requires tool modification
Other		
15. Adapt <i>Look and feel</i>	-	Requires tool modification

Non-functional		
1.Speed	+	Adequate in demo set-up. The system is scalable.
2. User-friendliness	+	UI is self-evident
3. Capacity	+	Has not been tested but the system has been installed to allow scalability.
4. Inter-operability via open standards	-	
5. User support	+	Films and support via helpdesk
6. Security	+	Satisfies RuG safety requirements
7. SURFconext link	-	Can be realized in the future.
8. Data storage location	+	RuG data centre. If desired, institutes can dispose over their own system
9. Active maintenance follows international developments	+/-	Is actively maintained; version 2 is under construction. Focus is on topical wishes of RuG users and less on international developments.
10. Continuity	+/-	Depends on internal and external user numbers.
11. Costs	+/-	The system has no peculiarities with regard to technical or functional control. Development costs could be shared but are not specified in detail.
12. Mature, user's basis	+/-	The system is used by various faculties but needs to be further developed.

### ***ELIXIR Data Stewardship Wizard***

In the case of the Data Stewardship wizard conceived by ELIXIR / DTL, the two aspects of data management planning (template and tooling) are combined. The wizard comprises a questionnaire in

which all aspects of data management and data stewardship are addressed. It can add important subject matter for projects to random DMPs. The software of the wizard has been developed in such a way that by answering the questions, the researcher can make a DMP. The wizard has been made in the context of biomedical research but is suitable for all research disciplines.

The wizard as a tool for DMPs has not been included in the assessment because it is still very much in the development phase. Nonetheless, it is briefly described in this report because it is a Dutch tool that in the near future could prove to be a practical option for data management and stewardship<sup>5</sup>

Specialities being developed for this tool are:

- An extensive questionnaire is generated on the basis of a 'Data Stewardship Knowledge Model' whereby answers given to questions, prompt follow-up questions. In this way the wizard can be used in a customized way.
- The wizard is linked to a platform which hosts service providers and research infra-structures. Researchers can then choose the facilities they need. A customized version made by a particular institute will allow researchers to see which services are offered locally.
- The developers of DTL/ELIXIR are consulting with DCC to make the wizard suitable for machine-actionable DMP's.

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<sup>5</sup> For more information about current circumstances, see: <https://www.dtls.nl/data-stewardship-wizard-enhance-quality-data-management-plan/>

## Future developments: *machine-actionable* DMP

With the development of *machine-actionable* DMP (maDMP), online DMP applications gain new practical possibilities. Online DMP applications make the DMP a living document that can exchange information with different parties (see figure 1). In first instance these applications focus on facilitating the writing of DMPs via questions and support. With online storage, the DMP can be controlled in real time, thereby becoming an integral part of research. Reasoning from the idea that DMPs are stored in the data bases of online DMP applications and that from DMPs the exchange of information with different parties is possible, even more applications are conceivable. Think of the possibility of searching in other maDMPs. It can help a researcher who wants to re-use a data set, because he/she can find information about projects that worked with the same data set or other data sets used in that connection and the quality and applicable standards, etc. Of course this requires standardization of data formats, APIs (application programming interfaces) and PIDs (persistent identifiers). Figure 5 gives several examples. Arrows suggest how the researcher extracts information from DMPs, but information can also be extracted for planning goals of the ICT department or feeding a Current Research Information System (CRIS).

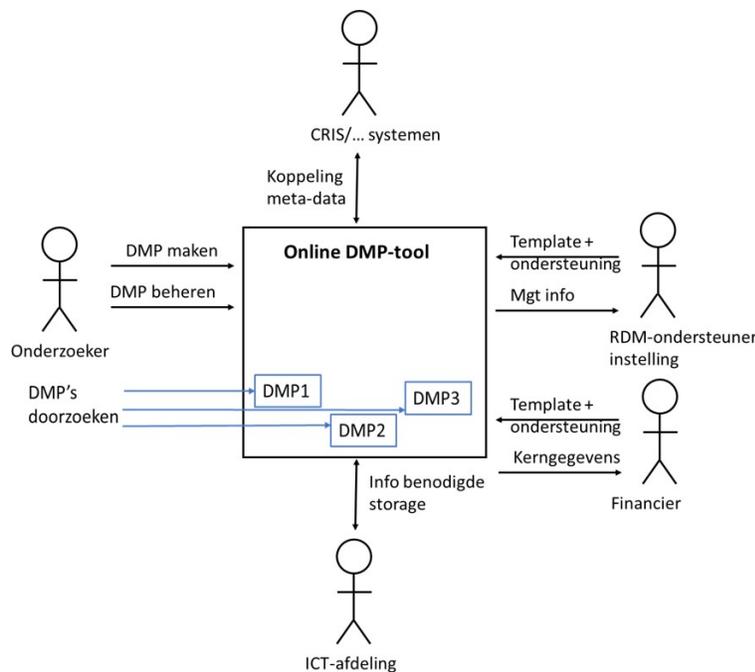


Figure 5: An expansion of the applications for information exchange from a DMP

This development is called maDMP. The Research Data Alliance (RDA) working group DMP Common Standards describes the concept *machine-actionable* in a Case Statement<sup>6</sup> as: “information that is structured in a consistent way so that machines, or computers, can be programmed against the structure”. maDMP is not yet available to research practice. The RDA working group DMP Common Standards is now working with the British Digital Curation Centre (DCC) and the University of California Curation Center (UC3) to develop a concept of maDMP and the tooling it requires.

<sup>6</sup> <https://www.rd-alliance.org/group/dmp-common-standards-wg/case-statement/rda-wg-dmp-common-standards-case-statement>