

The background of the entire page is an abstract, low-poly geometric pattern in various shades of blue, ranging from light sky blue to deep navy blue. The shapes are irregular polygons that create a sense of depth and movement.

DATA

STEWARDSHIP

IN THE MAKING

What Austrian Universities Look For?

Contribution

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This report was created as part of the FAIR Data Austria project, funded by the Federal Ministry of Education, Science and Research [1].



The FAIR Data Austria project is being implemented under the lead of TU Graz in cooperation with TU Wien, University of Vienna, Med Uni Graz, University of Innsbruck, and Academy of Fine Arts Vienna.





**A national strategy for the
development of
data stewardship solutions
for the Austrian context**

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1. INTRODUCTION

Universities are beginning to recognize the value inherent in the vast amounts of research data they hold. However, depending on their institutional trajectory, goals, and organizational structure, universities have different philosophies to tackle the challenges associated with making the most of these data. On the path to curating and managing those data, universities encounter a variety of problems in providing researchers with adequate resources (infrastructures and staff) to meet the requirements of data-driven science, which is at the core of current scientific activity. A much discussed solution involves professionalizing data stewardship at various levels of university organization.



A new way of data management for universities

A new initiative in Austria works towards streamlining data stewardship across Austrian research-performing institutions. Here, we present the results of a case study based on surveys, interviews, and workshops conducted in the Austrian context [2-7].

We find that while data governance is a challenge in any institution, the challenges universities face are particularly complex. The academic community expects universities to keep data secure, but at the same time respect privacy and academic freedom. In addition, universities find themselves in radically different places along the way of implementing adequate stewardship mechanisms.

Prospective data stewards face a variety of challenges, not the least of which is a significant range of expected competencies both within and across institutions, making it hard to develop a list of necessary and sufficient conditions related to tasks and required training that data stewards will have to fulfill.

This report, formalized as a toolbox, presents data steward models, respective competences, and available training. It allows universities to choose the appropriate implementation strategy based on their preconditions and needs.



2. DEFINITIONS

What is meant by research data management and data stewardship? What is the specific role of data stewards? Here we provide definitions of the key terms used in this report.

Research Data Management (RDM)

This term encompasses all measures, tools, and procedures required to handle research data throughout its entire lifecycle, with the goal of making data discoverable, accessible, interoperable, and reusable, i.e., in compliance with FAIR principles. It is important to keep in mind the differences between research disciplines, which usually require domain-specific tools. However, some issues, such as the preservation of data during and after a research project, are central to all research domains.

Data Stewardship

To ensure that the data policies formulated by the appropriate data governance bodies are followed, institutions need to establish a set of practices that guide research and support staff in making data FAIR. The process by which institutions steer this transformation along the whole research data lifecycle is referred to as “data stewardship”.



Data Steward

Data stewards are the staff who put data stewardship into practice at institutions by making connections and opening channels of communication between researchers, policy makers, software developers, and infrastructure providers (inside or outside the institution) so that the necessary elements that enable researchers to successfully implement RDM can be put in place. The role of data stewards as promoters of FAIR data principles is essential to help researchers and institutions transition to modern RDM practices.



3. DATA STEWARD MODELS

The positioning of data stewards at a university has far-reaching implications for the content of their work [9]. At the same time, positioning is a strategic decision which is implicated within organizational culture. Depending on the size of the university, the resources available, the profiles of the data stewards, and the training offered, there are different models that meet different needs [7].

Data Steward Contact Point



Data stewards of this type forward inquiries, network, offer general advice, but do not perform any operational activities (e.g., create data management plans or develop policies)

In the *data steward contact point* model, a data steward serves as the point of contact for all data-related inquiries. The holders of this role must therefore have excellent networking skills and know what expertise is needed in a particular case and who can provide that expertise.

In particular, data stewards are expected to be knowledgeable about Open Science and FAIR data principles, but have limited disciplinary expertise. This data steward model is closest to providing a service/consultation where researchers can turn to data stewards who do not proactively take initiative in providing advice.

Data Steward Office

Data stewards are positioned at a central organizational unit that bundles different competencies and offers appropriate services / advice. The competencies are broader because they are shared among several people



The *data steward office* model is a centralized structure of with a few data stewards who have a broader range of background knowledge and offer different services depending on their composition and resources. Compared to the contact point model, this model offers direct advice, although still with little operational support.

Overall, this model is already more in-depth, offering RDM training, support on data management plans (DMP) and advise on respective tools. Data Stewards bundle here rather on a general level knowledge about Open Science, FAIR principles,

and RDM. It remains to be noted that data stewards cannot answer discipline-specific questions due to low resources in this model. The transition from generalists to specialists (discipline-specific) depends not least on the respective organizational structure and the requirements that arise from it, as well as on the workload, the resources, and the training of the data stewards.

Data Steward Network



Data stewards are based at the faculties, main research areas or institutes. They have well-founded, discipline-specific knowledge / research experience and can therefore provide advice on a particularly discipline-specific basis. Data stewards are coordinated from a central point.

The *data steward network* model demands discipline-specific knowledge, tacit knowledge and embeddedness into the respective research culture, technical expertise, and basic RDM knowledge. These requirements entail that data

stewards in this model have a domain-specific background as well as experience in the domain. Being in close contact with researchers, data stewards develop workflows for data management and collaborate closely with faculty members. Data Stewards support, train and help develop concrete solutions, templates and RDM concepts. In addition, data stewards in this model coordinate the development of faculty-specific policies.

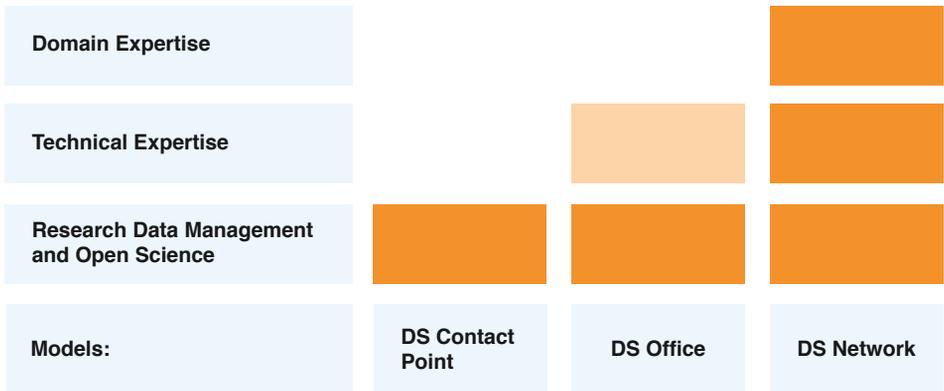
Data Stewards are coordinated centrally. Coordinators maintain an overview of networks and infrastructure, as well as changing RDM requirements from funders, consult with decision-makers, and are also responsible for budget planning.





4. COMPETENCIES & TRAINING

What you need



Roughly, three main areas of responsibility of data stewards can be distinguished: Research, Policy, and Infrastructure, even if they overlap [8]. Data stewards should have basic competencies in all areas. Even though the focus is often strongly on the technical competencies of a data steward, the methodological competencies (e.g., project and conflict management, facilitation techniques), the social competencies (e.g., communication and helpfulness), and the personal competencies (e.g., willingness to learn, adaptability) should not be neglected [3]. However, a key competency that all data stewards must possess is communication skills, which are critical to providing appropriate

support, collaborating with researchers, and raising awareness. Our results show that in models typical for the Austrian context it is very difficult to fulfill all competencies by one data steward, suggesting that a team of data stewards should work together to meet the requirements [3].

Training is a very important aspect of data stewards and extends to at least three subject areas: (i) research data management and Open Science, (ii) technical expertise, and (iii) domain expertise. Our models differ with respect to the significance of these areas [4].

The subject area of research data management and Open Science is typical of the contact point model, while the data stewards in the data stewardship office model extend this area with moderate technical expertise.

Domain expertise (both implicit and explicit) is paramount for embedded data stewards (data steward network model), as they should ideally be in a position to sensibly talk to and advise domain experts about their data management needs and develop workflows. Domain expertise requires hands-on experience with research practice. Given the diversity of research fields sometimes represented under the roof of a single faculty, meeting this requirement can be a challenge.

The available training courses cover the competencies required in the contact point model and (to some extent) the data stewardship office model, but not the data stewardship network model in its entirety.

In particular, the high demand for data science and programming skills should be met by combining courses from different training programs.



5. IMPLEMENTATION CHALLENGES

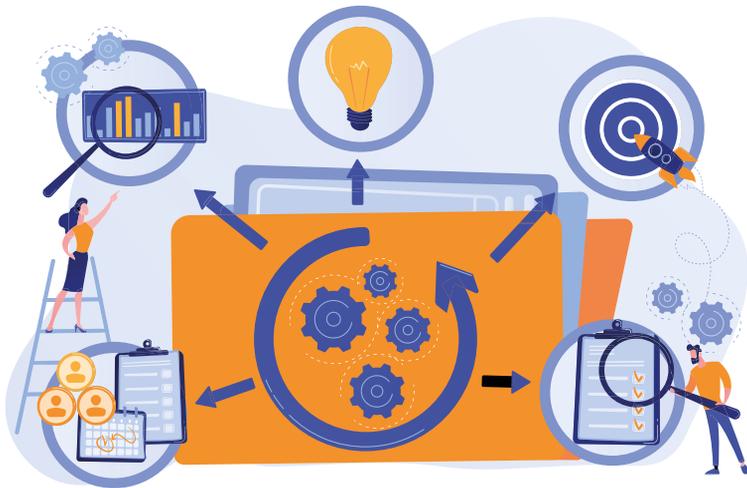
To meet the demands and challenges of data-driven scientific research, major efforts are being made to build the necessary infrastructures. Data stewardship is a comprehensive institutional response to the complexity of (academic) data management.

Austrian universities are at very different stages in the process of institutionalizing data stewards, models implemented, and priorities for data stewards (profile) and expectations. Individual implementation strategies include single data stewards (part or full-time) up to data steward teams coordinated by a team lead. These positions hold administrative or research profiles and are funded by ministries, project funds, and or faculties.

One of the implementation challenges is the lack of clearly defined skills, roles, and responsibilities. The roles universities look for in data stewards are diverse and differ across institutions, which suggests that universities subscribe to vastly different visions of data stewardship. The issue of philosophies also pertains to skills such as data analysis - to what extent do research institutions demand people with data-analytic skills or data science backgrounds? At present, this seems to be a salient yet unsolved problem, not least because research institutions differ with respect to the extent that data stewards would be involved in operational data management.

Funding data steward positions is a major challenge since considerations of resources are frequently absent from the literature.

The provision of funding is critical to how data stewards can/will be implemented. Depending on the funding available, data stewards will either be built on existing resources or newly hired. However, this still leaves open the funding sources in question. In terms of building a knowledge base, funding data stewards out of project money is detrimental because it is expected implicit knowledge acquired in the process to leave the university as soon as the project in question ends. On the other hand, there are valid reasons for implementing data stewardship at the project level. One important factor seems to be institution size, although this is contingent upon a multitude of other questions regarding funding. Thus, an important problem is to reconcile the conflicting demands of securing (continuous) funding while ensuring appropriate disciplinary (and therefore often project-specific) data management.



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