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Data Stewardship – Austrian National Strategy and Alignment

Abstract

Within the FAIR Data Austria project, supported by the Federal Ministry for Education, Science, and Research (BMBWF), a national strategy has been established to advance the creation of tailored Data Stewardship solutions for the Austrian context. The strategy, formalized as a toolbox, delineates various Data Steward models, corresponding competencies, and accessible training resources. Despite the crucial role of Data Stewardship in supporting data-driven scientific research, Austrian universities encounter challenges in its implementation. Issues include lack of consensus on the skills, roles, and responsibilities of Data Stewards, coupled with insufficient funding for these positions. This article explores these challenges and emphasizes the importance of addressing them to promote effective Data Stewardship within the Austrian academic landscape.

Keywords

Data Stewardship, Data Stewards, FAIR Data Austria, Research Data Management, Scientific Research

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1 Background

The handling and management of research data vary across disciplines and even within individual research groups. However, there are commonalities that are universally recognized as challenges by researchers in their daily activities. A few illustrative examples: loss of data after departure of PhD and master students (the whereabouts of their data and associated documentation become uncertain), illegible handwriting (colleagues face difficulties when dealing with illegible handwriting in laboratory records) or incomplete data availability (e.g., the intrigue surrounding a graphic in a presentation/publication raises the question of whether the raw file/raw data with metadata is readily accessible). These scenarios underscore the need for effective Data Stewardship and Research Data Management (RDM) practices to address issues related to data preservation, accessibility, and usability in academic and research settings. To address these challenges related to research data, institutions employ various strategies that require both personnel and infrastructure (HASANI-MAVRIQI et al., 2022). Practices for handling and preserving research data are collectively referred to as Data Stewardship and are inherently linked to the broader realm of RDM and Data Stewards.

Data Stewardship

Data Stewardship encompasses a set of practices aimed at facilitating the transformation of researchers and RDM supporters towards FAIR (Findable, Accessible, Interoperable and Reusable) research data. Simultaneously, Data Stewardship acts as a bridge between stakeholders in research, infrastructure, and management, defining their roles and responsibilities in the transformation. The underlying processes can be projected onto the lifecycle of research data, covering the entire cycle (SCHOLTENS et al., 2019).

Data Stewards

Data Stewards are the experts in RDM responsible for implementing Data Stewardship in practice. These dedicated individuals empower researchers, considering the unique cultural context and available resources. To fulfil this role, Data Stewards must possess a range of professional, methodological, social, and personal competencies. (GRUBER et al., 2021; GRUBER et al., 2022; HASANI-MAVRIQI et al., 2022).

Research Data Management

Research Data Management encompasses all practices and tools involved in the life-cycle of research data. RDM includes both generic aspects, such as data publication, and discipline-specific requirements, like specific data formats or relevant tools. Legal and contractual considerations, such as those arising from industry collaborations, also fall within the scope of RDM tasks (HASANI-MAVRIQI et al., 2022).

This article offers a thorough overview of national efforts to define and implement Data Stewardship programmes. It then delves into specific case studies from four prominent Austrian Research Performing Organizations (RPOs), providing valuable insights into their individual approaches. The inclusion of testimonials from a personal perspective adds a human touch, shedding light on the experiences of those directly involved in Data Stewardship. Additionally, the article concludes with a reflective section, sharing lessons learned and offering practical recommendations, enhancing the overall understanding and applicability of Data Stewardship practices.

2 Professionalisation of Data Stewardship in Austria

National initiative within the framework of FAIR Data Austria

One of the key objectives of FAIR Data Austria project (BLUMESBERGER et al., 2021) was the establishment of a national strategy to advance the creation of Data Stewardship solutions tailored to the Austrian context. This strategy, formalized as a versatile toolbox, outlines various Data Steward models, the corresponding competencies, and accessible training resources. Its aim is to empower universities to select and adopt an implementation strategy that aligns with their specific conditions and requirements (HASANI-MAVRIQI et al., 2022).

To achieve this objective, project partners organized various workshops aimed at defining concepts, models, competences, and training opportunities for Data Stewards at the national level. These workshops addressed both the required and desired competences of Data Stewards and facilitated discussions on the content of current and future training programs for these professionals. Notably, the communication skills

of Data Stewards and their adaptability in the realms of change and problem-solving thinking stand out as crucial attributes (GRUBER et al., 2021; GRUBER et al., 2022; HASANI-MAVRIQI et al., 2022).

FAIR Data Austria not only dealt with the role of a Data Steward or their required competencies, but also recognized that their establishment at an institution always depends on the existing organizational culture, available resources and expectations (REICHMANN et al., 2021; HASANI-MAVRIQI et al., 2022).

Specifically, three models currently used at Austrian Research Performing Organizations (RPOs) were identified that take these requirements into account. The Data Steward Service Point is the first model. Here, a single Data Steward provides information on FAIR and open science issues and is excellently networked at the institution in order to forward inquiries to the most suitable office. The Data Steward Office model is fit for universities that want to create a central facility that bundles different competencies and can provide services, advice and support for generic inquiries as a team. The last model describes a Data Steward Network in which the Data Stewards are located at the faculties organized by a coordination office. In this model, the Data Stewards provide discipline-specific support and advice and can also be directly involved in research projects in some cases (HASANI-MAVRIQI et al., 2022). However, the models are not rigid constructs with hard boundaries, but merge seamlessly into one another.

3 Institutional Approaches

In order to advance Research Data Management (RDM), Austrian Research Performing Organisation (RPOs) have taken proactive steps to establish Data Stewardship programs. The initiatives developed involve in all cases the appointment of Data Stewards who play a pivotal role in advocating, guiding, and fostering awareness of RDM. As we delve into examples from four Austrian RPOs in implementing Data Stewardship programs under FAIR Data Austria, their proactive approaches serve as notable benchmarks. The presence of Data Stewards, strategically positioned within faculties and coordinated by central units, not only ensures the integration of researchers into the faculties but also underscores directed and coordinated initiatives in support of FAIR data practices. This section will explore the endeavours of

these institutions, shedding light on the diverse strategies employed in implementing effective Data Stewardship programs.

3.1 Graz University of Technology (TU Graz)

To establish a comprehensive and communicable strategy serving as the foundational framework for all subsequent initiatives, TU Graz embraced a Framework Policy for Research Data Management (RDM) in late 2019². Crafted by representatives from pertinent stakeholders in the realm of RDM, this policy delineates roles and responsibilities. Building upon this foundational Framework Policy, the RDM Team was established at TU Graz. This team assists the research groups in the university in finding the best approach to address questions related to RDM. The RDM Team, an interdisciplinary team of experts with complementary technical, domain-specific, methodological, and social competencies, consistently provides high-quality RDM tools and services³ (e.g., machine-actionable data management plans (maDMPs) – for a semi-automatic creation and management of DMPs, CyVerse Austria – a collaborative platform for RDM and data analysis, electronic lab notebooks (eLabFTW) – as an innovative lab documentation tool, and TU Graz Repository (InvenioRDM) – as a repository for long-term storage of reusable and citable data research results).

The Framework Policy also includes the role of Data Stewards and, with the help of faculty-specific implementation strategies, lays the foundation for the establishment of Data Stewards at the faculties. Three Data Stewards have since been appointed at TU Graz, tasked with addressing both generic and domain-specific issues and requests, formulating strategies to tackle them. A key focus lies in enhancing awareness and visibility within the research community at TU Graz, facilitated by the Data Champions Initiative. This initiative aims to form a community of researchers and Data Stewards who, adopting a “bottom-up” approach, align with RDM principles, serving as a complementary aspect to the Framework Policy. A challenge faced by them is to secure long-term acceptance from diverse stakeholders of each faculty.

2 <https://www.tugraz.at/sites/rdm/policies/tu-graz-framework-policy-for-rdm>

3 <https://www.tugraz.at/sites/rdm/tools/>

Concurrently, an array of consulting and training services is under development to empower researchers, either independently or in collaboration with Data Stewards, to infuse modern perspectives into their workflows and overcome emerging challenges. The services encompass assistance with data management plans, guidance for research consortia, and the formulation of RDM optimization strategies for working groups or institutes. Workshops on newly developed RDM tools, accompanied by the creation of pertinent support materials, complete the service offerings.

When emphasizing the role of the Data Steward, it is imperative to recognize that their function is advisory and supportive, never prescriptive. Researchers remain the ultimate authorities on their data, and any concerns or criticisms arising from these changes and challenges must be addressed with empathy and solution-oriented approaches. The primary duty of Data Stewards is to “empower” researchers in their RDM pursuits, striving to minimize additional burdens whenever feasible.

3.2 University of Vienna

The University of Vienna has offered RDM services for the past fifteen years. Based on the results of the FAIR Data Austria project, the University developed a concept for a new Data Stewardship Program in 2021. The pilot phase began in the summer of 2022 with the goal of further developing the existing RDM services by offering domain-specific support to researchers and students. The program consists of two pillars: a network of embedded Data Stewards and the “Data Steward” certificate course – the first certified professional development program for Data Stewards in Austria. For the three-year pilot phase, the University hired three Data Stewards (see section 4) based at the Faculty of Philological and Cultural Studies (June 2022), the Center for Microbiology and Environmental Systems Science (October 2022) as well as the Faculty of Life Sciences (March 2023). The Data Stewards provide individual consultations and training on various topics such as data management plans, repositories, and persistent identifiers to support students and staff at the university in the handling of research data. Additionally, they assist in developing sustainable RDM workflows and are involved in national and international initiatives such as the DARIAH, DINI/nestor, OpenAIRE or RDA. Overall, the Data Stewardship Program contributes to promoting an open and responsible research culture and strengthens

the University of Vienna’s position as a pioneer in the field of Research Data Management.

“Data Steward” Certificate Course of the University of Vienna

Due to a lack of formal training available for Data Stewards in Austria at the time, Vienna University Library developed a new further education program – the “Data Steward” certificate course⁴. The goal of the course is to help participants from Austria and other countries acquire knowledge and key competences to perform tasks as Data Stewards at their research institutions.

Certificate Course “Data Steward”: The Basics

- Academic degree: Certificate of the University of Vienna
- Language: English
- Duration and scope: 2 semesters part-time, 15 ECTS credits
- Target groups: People with research experience and research support staff that want to work as Data Stewards at research institutions
- Costs: 2950 € (as of June 2023)
- Part of the continuing education program of the Postgraduate Center of the University of Vienna⁵

The course has three **main objectives**:

- Competency acquisition
- Peer-to-peer learning
- Community building

4 <https://www.postgraduatecenter.at/en/programs/communication-media/data-steward/>

5 <https://www.postgraduatecenter.at/en/>

The curriculum of the “Data Steward” certificate course is based in part on the certificate course “Data Librarian”, which was offered by four Austrian research libraries from 2018 to 2020. Further, the course also incorporates the results of the FAIR Data Austria project, specifically the Data Stewardship Models and Competences. The course was developed in close collaboration with similar further education programs in other countries, most notably DataTrain⁶ of the U Bremen Research Alliance and the certificate course RDM⁷ (Zertifikatskurs FDM) of the TH Köln and the State Initiative for RDM in North-Rhein Westphalia (Landesinitiative für Forschungsdatenmanagement [fdm.nrw](https://fdm-nrw.coscine.de/)⁸). The course consists of five obligatory modules covering a range of RDM topics.

The first round of the course began in October 2022 with 25 participants from 10 countries, and is set to finish in the summer of 2023, with the second round starting in October 2023.

3.3 Technische Universität Wien (TU Wien)

At TU Wien, Data Stewardship services are provided by the Center for Research Data Management. The Center is the first contact point for all questions regarding research data management. It was founded in 2018, shortly after the release of TU Wien’s RDM policy, and is a service unit of the service department RTI Support (Research, Technology, Innovation) within the Vice Rectorate for Research and Innovation.

The four pillars of the Center for RDM at TU Wien are:

- the development of technical tools and services (TU Wien DMP Tool/DAMAP, TU Wien Research Data repository/invenioRDM),
- the provision of RDM information and guidance on our website (e.g., RDM basics, DMP handbook, RDM policy, funders’ guidelines),

6 <https://www.bremen-research.de/data-train/>

7 https://www.th-koeln.de/weiterbildung/zertifikatskurs-forschungsdatenmanagement_82048.php

8 <https://fdm-nrw.coscine.de/#/>

- the integration of RDM topics in education (e.g., new course “Introduction into RDM” with 3 ECTS in TU Wien’s transferable skills lecture catalogue starting in the winter semester of 2023/2024)
- as well as training, consulting, and networking (internal and external).

The internal training courses focus on the topics of how to write a DMP (3 hours), how to upload data into our repository (2 hours), and how to use Git and TU Wien’s Git lab service (3 hours). They are held regularly, twice a year.

Consultation is mainly on request and on a personal basis, but discussions on specific needs on a faculty level have started as well. The aim of the Center is to get in contact with all eight faculties at TU Wien in the near future.

3.4 Medical University of Graz (Med Uni Graz)

The development of central Data Stewardship at Med Uni Graz

Research data management (RDM) is an intrinsic part of “Good Science” and is a central duty of each scientist. Basic RDM-principles and practices are thus an integral part of our internal “Standards for Good Scientific Practice”.

A more comprehensive picture of RDM is set out in the RDM-policy, which became effective in early 2021. This policy focuses on e.g., the collection, documentation, processing, utilization, storage and further use of research data, refers to the correct handling of personal data, introduces the FAIR-Principles, recommends the use of data management plans (DMPs) for each research project at Med Uni Graz and outlines the responsibilities of researchers as well as the institutional responsibilities of Med Uni Graz.

In order to fulfil some of these institutional responsibilities, the Division of Research Documentation and -Evaluation (D-RE; located within the Organizational Unit of Research Management and under the auspices of the Vice Rector for Research and International Affairs) was commissioned to start working on core-RDM-tasks.

To be able to fulfil these tasks, a new position dedicated to RDM (“Data Steward”) was created at the D-RE and filled towards the end of 2020. A second RDM-position followed in the summer of 2023. Both employees were admitted to the first round of

the Certificate course “Data Steward” at the University of Vienna (as described in chapter 3.2) and are supposed to graduate in autumn 2023.

Starting in 2021, the main tasks of the “RDM-Team” of D-RE consist of:

- Collection and internal dissemination of information/information sources/materials on RDM and open science
- Conducting internal surveys on RDM-related infrastructure in use, as well as on current RDM practices and RDM-needs
- Providing internal guidelines (e.g., on writing DMP, various RDM-topics along the research data life cycle)
- Providing internal courses (e.g., on writing DMPs)
- Hands-on RDM-support upon request (e.g., DMP-review)
- Evaluation and testing of RDM-tools
- Accreditation of Med Uni Graz for the Austrian Microdata Center (AMDC) and managing the interaction with AMDC
- Networking with other internal RDM-relevant positions/organizations (e.g. Digital Officer, Data Protection Officer, Dean of Doctoral Studies, Information Technology, Legal Matters and Risk Management, Institute for Medical Informatics, Statistics and Documentation, Research Services and Technology Transfer, Center for Medical Research, ...)
- Collaboration on the development of internal guidelines and processes for legally compliant transfer of research data
- Tracking data availability statements and data accessibility on publications
- Preparation of RDM-related decision making bases for the rectorate
- Providing a central contact point for RDM
- Participation in the FAIR Data Austria (FDA) project and networking

Along this process, the FDA-project (Med Uni Graz was a project-member) provided a highly valuable source of RDM-tools as well as information, support and exchange on various RDM-topics.

In summary, FAIR RDM along the research data life cycle is a complex process for the individual scientist and may often require support from and interaction with various central services. Among these services, Data Stewards at D-RE are a substantial pillar for sustainable RDM at Med Uni Graz.

4 Navigating the Evolution: Personal Journeys of Data Stewards in Research Data Management

This section delves into individual success stories from the personal perspective of Data Stewards. It highlights the transformative journey these individuals undergo, transitioning from researchers to Data Stewards and showcasing the structured evolution.

1. Biochemist Advocating for Effective Research Data Management Through Personal Experience

Not every Data Steward currently active at our institution was part of the FAIR Data Austria project, but based on individual experiences, came to know of the project and to be part of the team for research data management. The story started with the first experiences in regard to research: Besides at school, I already came to handle data from experiments during my laboratory exercises in the first semester of my studies. No one introduced me to proper data management. I went on, doing experiments and laboratory protocols, without any focus on suitable practices in regard to data handling throughout the subsequent courses until my second diploma thesis. By then I still had no clue about data management and continued this way of working throughout my PhD-thesis. At the time of its end, I had to collect all produced results from the past 4 years and summarize them appropriately for a handover to a postdoctoral colleague. By that time, I realized that I could have done much better from the beginning. That would have saved me a lot of time. Still, I had not become aware of the dimensions for reasonable data management apart from lacking the knowledge of best practices. As a postdoctoral researcher, I had the luck to cooperate with many computer scientists and got to know their

examples of documentation to version control. Later, as part of a new research group focusing on FAIR data management, I got to know projects primarily concerned with that matter. That is how I became aware of suitable methods and tools, also developed and introduced along the FAIR Data Austria project fostering the substantive exchange in the course of Cluster Forschungsdaten. At the end of the FAIR data Austria project, new roles had been implemented at the institution, and my responsibilities changed from being part of the research community to supporting it. In my current work, my team organizes institutional training, and as part of the newly established Data Stewards I took over several sessions and topics to be introduced to all interested researchers at the institution. Besides training, we support requests about research data management, and we continue to raise awareness for research data management to all researchers, including students, young scientists, as well as experienced working group members.

2. Chemist Aiming to Elevate Research Data Management Practices in the Field

During my master's and Ph.D. in chemistry, I had my first encounter with managing large amounts of data. Unfortunately, there was no clear guidance or lab-wide system for data organization. In addition, the research community in which I worked lacked established data sharing habits. This created significant challenges when researchers requested access to the data associated with my publications, resulting in time-consuming efforts to gather the requested data. Moreover, the work of a former postdoc contained important data that could have advanced my research, but the lack of documentation made it impossible for me to reuse the already existing data for my dissertation. In retrospect, I would say that proper research data management could have saved me from a lot of headaches and extra work. My journey to becoming an RDM professional began when I took on the role of Data Steward at the Center for Microbiology and Environmental Systems Science. In this role, I primarily support research teams working with multi-omics data, which has great potential for implementing standard workflows to promote data integration and reuse. I attended workshops, took the Data Steward certificate course, and engaged in continuous self-education to acquire the skills necessary for this position. This

newfound knowledge gave me the confidence to optimize practices that facilitate the seamless transfer of data between team members and strengthen collaborative efforts. I also began to raise awareness of the importance of data management by conducting workshops and training sessions in collaboration with other members of our Data Steward team. In summary, the embedded Data Stewardship model at the research center enables me to be a driving force in the professionalization of RDM and to provide demand-driven RDM solutions.

3. Web Content Archiving Enthusiast Serving as a Data Steward

Prompted to write this text, I remembered a real-life example of where I would organise my data much better in hindsight: For a very long time, I have planned to write an analysis on how women* are represented in the *Centralblatt für Bibliothekswesen* (CfB), an important German library journal published since 1884. So far, I have only managed a work-in-progress report at a conference – after all, this is a personal quest and not something I do in my work-time.

I had access to the digitised version through *Digizeitschriften*, but still preferred to browse through the printed volumes in the library, as it is faster and better for the eyes to scan the printed pages quickly than to click through the pages. Searching for “Frau” or “Fräulein” or “Bibliothekarin” would miss a lot of hits, so is not a viable option: Women* are also mentioned as bibliographers, as authors, as readers and library users, as wives/widows of male librarians, etc. To go only through the table of contents would not be enough as many hits are hidden in the smaller categories such as “Mitteilungen” or “Personalnachrichten” that are not indexed in detail. Long story short, I spent hours and hours over the volumes and managed to go through 30 years so far.

My research data mainly consists of hand-written excerpts of CfB. I transcribed only a part of it. In the meantime, I changed my jobs twice. I also moved, and I still have boxes needing to be unpacked. I also have a new laptop, and not everything has been transferred from the old one (which is still working). I found some pages recently, but in fact I don’t know the current whereabouts of my data. At least, I am quite sure that they are not lost, only misplaced. So I understand completely well that knowing how to do something does not always mean actually doing it, and I like supporting researchers and students to manage the

important steps from being in the dark to knowing and from knowing to doing. Having these experiences myself helps tremendously.

My career path to the role as a Data Steward differs from the other personal experience reports: My professional identity is librarian, not researcher, although I participated in several research projects in different roles, love publishing about library science, and am active as an editor for an open access repository and an open access journal.

Before joining the University of Vienna's Faculty of Philological and Cultural Studies as a Data Steward, I worked as a journalist, librarian, data manager, and IT project manager.

My LIS studies in Eisenstadt and Stuttgart provide a solid basis for this role – think of metadata, selective dissemination of information, data organisation, database systems, reference services, and preservation, just to name a few examples. In addition, I trained as a data protection officer, took several RDM online courses, completed the “Data Librarian” certificate course, and am near completing the “Data Steward” certificate course. I also benefit from having a wide network in the library and data management scenes. My degree in German studies gives me some authority and understanding when talking to humanities researchers.

The topic I have immersed myself into is the long-term archiving of websites and web applications. This is one of the most common requests at my faculty, which is not surprising considering the increase of new publication formats, such as digital editions, wikis, and enhanced e-books. Computer centre, library, and Data Stewards working together, we currently design guidelines for researchers and have started a pilot for preserving dynamic websites.

Why I enjoy being a Data Steward: I love bringing people and information together, I am fascinated by all the research projects I support, I am committed to helping people, I thrive when working in a supportive and fun team setting, I work in an innovative environment and learn something new every day.

4. Cross-disciplinary Challenge Tackled by Computer Scientist Developing RDM Solutions

Whenever I consulted researchers who needed advice in RDM, they always asked at some point for specific solutions they could include in their work environment. Sometimes these are specific recommendations on things they should

or should not do with their data, but very often they wanted practical tools that help them achieve some goal, for example, organise and version data, publish data for reuse, or simply comply with guidelines and formal requirements. Very often such tools do not yet exist, or existing tools need to be customised. This is not a task for the researchers, but Data Stewards can act as their representatives.

For this reason, I see Data Stewardship as a first step of the larger process of service and software engineering, namely requirements engineering. By working closely with researchers from different domains, I have a unique chance to get a good understanding of the challenges they face with respect to RDM. Furthermore, having to deal with different domains allows me to identify patterns and generalise better the problems, i.e. we do not have to build systems that are fit for only one purpose, e.g. to serve only one specific group at the university. By learning about problems of one domain, we are able to design systems in such a way that similar problems are also addressed in other domains. A typical example is the repository for the publication of research data. By following a common set of minimal metadata and providing persistent identifiers for all data, independent of its format and domain it originates from, researchers are able to share their work openly and can comply better with FAIR principles. Being able to build such solutions based on the common challenges identified is one of the most rewarding aspects of being a Data Steward.

5. Experienced Scientist Advocating the Essential Role of Proper Data Management for All Researchers

I started my research career in the field of symbolic computation, which, in lay terms, can be thought of as “doing maths with symbols”. In more concrete terms, I was designing algorithms that would find and process logical proofs of mathematical statements (propositions or theorems)⁹. Availability of prior knowledge in automated proving is paramount, and one of my research topics was to collect, formalize, organize, and maintain a body of mathematical knowledge that an automated theorem prover could efficiently use. Which means that I was confronted with describing knowledge (i.e., data) in some

9 The current version of the system I was working on is at <http://www3.risc.jku.at/research/theorema/software/>

standardized way, making sure it is up to date and consistent. My way of working with data, though, was based on intuition, and included nothing from the principles of proper data management. After defending my PhD and after my first child-care leave, my research shifted towards Information Retrieval and Data Science for specific domains (patents, medical data, scientific articles), my experience in data management increasing with each and every research project. I have often had to grapple with large amounts of data that needed to be organized, described, and made available to the research community in a meaningful way. Principles of data management started to be more prominent in my data-handling related tasks, starting with finding a proper and public storage place for the released data sets. With time, as reproducibility of research results and availability of the data research is built on gain significance in the research evaluation, I have included more and more of the FAIR principles in my work. Examples are the publication of a widely used dataset of patent documents, the CLEF-IP data set¹⁰, and, latest, a data set for (web-)search evaluation, LongEval Test Collection¹¹, both following the FAIR paradigm. Having worked with so many different types of data, in different domains, with stakeholders from very different research domains, each with its own methods of processing and handling data, I see the importance of proper data management from the very beginning of any research project. Coming from “the trenches”, I understand well the pain points of researchers when asked to do “proper management of their data”. In my teaching and advisory activities, I guide students to carefully design their experiments, correctly describe and make use of data, store results, etc. Therefore, I see my role not limited to a *Data Steward*, but as an advocate of good RDM practices, of including them in the day-to-day research, as I have seen first-hand how this can help with one’s own work. Towards this end, at TU Wien, we are in the process of developing a set of lectures as an extension degree that gives a formal education on Research Data Management.

10 <https://doi.org/10.48436/s7jbf-nzp35>

11 <http://hdl.handle.net/11234/1-5139>

6. Life Sciences Data Steward with Hands-On Experience

Before I was hired as the first Data Steward at Med Uni Graz, I worked for several years as a research technician in various research groups with different expertise (cell biology, animal models, bioanalytics (NMR)). During my time as research technician, I completed a part-time master's degree in "Biochemistry and Molecular Biomedicine" at Graz University of Technology, in the hope of new career opportunities. Working in several research groups, I got to know various ways of group-internal data management strategies and organizing the laboratory. Over the years, I recognized that a loss of knowledge can quickly arise when long-time staff members leave the group without proper documentation of laboratory protocols or data, or when the recording/documentation was not done according to established standards (e.g., FAIR Data principles). It could be time-consuming and costly to train new staff or to continue working seamlessly on projects when already established knowledge and/or data, can no longer be accessed. These experiences raised my personal awareness of the importance of complete and traceable documentation of knowledge and its long-lasting accessibility. My professional focus shifted more and more towards quality management, for example, when I started writing laboratory protocols for established methods to ensure the reproducibility of experiments and research results. Due to ongoing collaboration with researchers, my communication skills and understanding of researchers and their needs also grew. From my point of view, this range of experience laid an important foundation for my current work in RDM support.

In 2020, I successfully applied for the first permanent job position in RDM support at Med Uni Graz. Since then, I help to build up RDM services, training and infrastructure at our university. While the focus in the first years was mainly on DMP consulting, creating and providing guidelines as well as development of internal RDM training, the focus in the upcoming years will probably be more on the implementation of RDM infrastructure such as an institutional repository, electronic lab notebooks and machine-actionable Data Management Plans (maDMPs). I think there is still a lot of work that cannot be done by a single person and therefore I am glad that I recently got a new Data Steward colleague at Med Uni Graz.

Looking back, it was the greatest challenge for me to acquire discipline-specific RDM knowledge as well as finding best practice examples and information

sources in the life science sector. Here I had to acquire most of my current knowledge on my own. For a general introduction into RDM it helped me quite a lot that we were partners in the FAIR Data Austria (FDA) project. Thus, I was able to get in touch with other Data Stewards easily whom I could ask for help and from whose experience and knowledge I could learn. Most recently, the certificate course “Data Steward” at the University of Vienna further helped me to professionalize my RDM knowledge, competencies and skills as well as to even expand my Data Steward network.

5 Lessons Learned and Recommendations

The establishment and long-term assurance of professional Data Stewardship are essential when it comes to making institutions future-proof in the realm of FAIR Research Data Management (RDM) practices. Austrian Research Performing Organisations aim to develop and provide services and infrastructures across universities by using the BMBWF funding from different projects (BMBWF, 2023). This collaborative effort is intended to maintain Austria’s research landscape as an attractive destination for researchers in the future.

However, Austrian universities face challenges in implementing Data Stewardship due to a lack of consensus regarding the skills, roles, and responsibilities of Data Stewards. At present, this essential role is not supported by validated curricula that produce individuals with the competencies, skills and capabilities the research community desperately needs to manage data. In addition, the necessary resources and funding pose significant constraints for all institutions.

The article puts forth a set of recommendations aimed at addressing and resolving the identified challenges.

- **Fund Permanent Data Stewardship Positions:** FAIR Data Austria has effectively adapted Data Stewardship organizational models from other countries (SCHOLTENS et al., 2019) to the Austrian context and motivated the creation of several full-time Data Stewardship positions at Austrian universities. However, there is currently a significant shortage of dedicated Data Stewardship positions at most Austrian RPOs and many of the currently active Data

Stewards are funded only on a fixed-term basis. It is recommended to allocate long-term funding to establish permanent Data Stewardship positions across Austrian RPOs to ensure the continuity and stability of RDM efforts and provide consistent support for researchers, enhancing their capacity to manage research data and foster a culture of data sharing. It is advisable to explore the implementation of a national funding scheme for Data Stewards, similar to those seen in other European countries.

- **Professionalize Data Stewardship:** The FAIR Data Austria project has emphasized the importance of comprehensive training to Data Stewards to equip them with the necessary skills and knowledge to implement sustainable RDM practices. The successful implementation of the “Data Steward” certificate course at the University of Vienna has provided a viable training option to Data Stewards in Austria. Nonetheless, further resources need to be dedicated to make similar training available to a larger group of emerging Data Stewards in the country.
- **Create Long-Term Career Paths for Data Stewards:** FAIR Data Austria has highlighted the need for Data Stewards and the competencies and training necessary for their success. Drawing on international knowledge exchange within the EOSC TF Data Stewardship and Career Paths¹², it is crucial to establish long-term career paths that complement the initial training. By providing opportunities for advancement and professional development, qualified candidates can be incentivized to pursue a career as Data Stewards. Investing in the professional growth of Data Stewards will not only enhance the quality of Data Stewardship services but also contribute to RPOs achieving their RDM goals.
- **Support Collaboration and Interdisciplinarity:** The FAIR Data Austria project has recognized the importance of fostering collaboration and interdisciplinary cooperation to successfully implement Data Stewardship programs and develop needs based RDM support services. The exchange of knowledge, best practices, and resources should be facilitated further through awareness building and funding options such as BMBWF future calls, exploring approaches to shared infrastructure, tools, and guidelines promoting FAIR RDM.

12 <https://eosc.eu/advisory-groups/data-stewardship-curricula-and-career-paths>

- **Openness:** Support for various research fields requires some flexibility to adapt to different needs. This is particularly true in case of assistance to multiple research groups by one single person who cannot hold the in-depth expertise of every corresponding area of science. High experience in only one given field of research could go together with some narrow-mindedness that has to be avoided. The idea of openness can likewise be applied to every researcher. In order for research data management to be effective, every single technical and scientific staff member has to apply adequate practices that are based on the knowhow of a basic skill set for everyone.

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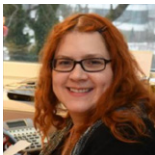
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