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Towards a Culture of Data: Ten Proposals for a Research Data Policy in Social Sciences and Humanities

Joachim Schöpfel

Open science as a national priority

Open science has become one of the priorities of France. In line with the French government's plans for the digital transformation and modernization of the state, the second national action plan for a transparent and collaborative public action states that France "supports the implementation of principles of open government to foster (...) access to research materials and results". The Ministry of Higher Education, Research and Innovation is designated to build an ecosystem of open science in which "science will be more cumulative, more strongly supported by data, more transparent, more honest, faster and more accessible (to induce) a democratization of access to knowledge, useful for research, education, society".¹

This roadmap announces the creation of a national Open Science Committee, requires more communication to the scientific communities on the implications of the 2016 French digital law for the opening of publications and data, and recommends some actions that refer to research data, such as the development of the national infrastructure Huma-Num, the adoption of an open data policy associated with articles and the development of data papers as part of public support for

¹ ETALAB, 2018.

academic journals, the gradual generalization of the implementation of data management plans in calls for research projects, and the incentive to open the data produced by the funded programs.

The national plan for open science, presented in early July 2018 at the LIBER conference in Lille confirms this ambition. The goal is for the data produced by public research to be progressively structured in compliance with FAIR principles², preserved and, whenever possible, open. The plan announces three measures:

- The obligation of open dissemination of data from publicly funded programs.
- The creation of a data administration function and the associated network within the institutions.
- The promotion of an open data policy associated with articles published by researchers.

These measures are translated into ten actions to be progressively put in place, from 2018 on, among which are the launch of specific calls for projects by the French National Research Agency (ANR) similar to the European H2020 program, the generalization of data management plans in public research programs and the development of thematic and disciplinary data centers and a generic service for the deposit and dissemination of research data. These actions will be accompanied by the certification of research data infrastructures and specific incentives and awards for exemplary research teams and projects.³

The development of an open science ecosystem is part of a global context characterized by digital technology, online networks and collaborative tools. The action plan refers in particular to the initiative of the GOFAIR International Support and Coordination Office (GFISCO) whose “objective is to progressively open up existing research data to within scientific and academic institutions, in all fields of research and beyond national borders, constituting a stepping stone towards the realization of the European Open Science Cloud”.

Open Science on the campus as a challenge

Recently, the League of European Research Universities (LERU) has published an advisory paper to accelerate the development of an open science culture within institutions. LERU advocates for cultural change and proposes a general framework, based on the eight axes of the European Commission, e.g. the adoption of an insti-

2 Cf. WILKINSON et al., 2016.

3 Cf. MESRI, 2018.

tutional policy in line with EU principles, the setting up of services and infrastructures, the publishing of data and metadata, all accompanied by training and cooperation at local, national and international levels.⁴

How can these roadmaps, action plans and principles be translated into pragmatic and realistic research data policy on a French university campus? How can an open science ecosystem be implemented in the specific environment field of social sciences and humanities? After a couple of scientific projects on research data conducted since 2013 at the University of Lille⁵, we carried out interviews with about 50 researchers, PhD students, data engineers, laboratory and project managers, with three objectives:

1. To place the researchers at the heart of the implementation of the open science ecosystem on the campus, with their needs, priorities and doubts.
2. To identify opportunities and locks for a data policy.
3. To recommend ten actions to develop the data culture on the campus.

Conducted as an audit on the human and social sciences campus⁶ of the University of Lille, our study has a pragmatic scope: to identify the essential elements for a coherent policy of the production, management and reuse of research data on a campus in the humanities and social sciences, and thus contribute to the appropriation of the concept of open science by the development of a “culture of the data”. The national action plan states that there is still a lot of work to be done to make open science a part of scientific practice. To succeed, such an approach requires knowledge of the reality of the field; it needs the support of research communities, the coordination of all actors on the campus, and institutional and scientific steering. It will take time. But it is a necessary investment to maintain excellence in research.

Data literacy, priorities, incentives and locks

A growing corpus of surveys in France as well as in other countries provides detailed evidence on data behaviors, needs and attitudes in academic communities, on the researchers’ data literacy, i.e. their control of the way data is produced and then exploited⁷, and on related services.⁸ In particular, our study refers to surveys by the

4 Cf. LERU, 2018.

5 Cf. PROST/SCHÖPFEL, 2015.

6 Campus Pont de Bois, former University of Lille 3.

7 Cf. KOLTAY, 2016.

8 Cf. for instance BAUER et al., 2015, BORGMAN, 2015, PRYOR et al., 2014.

French national research organization CNRS⁹ and at the Universities of Rennes¹⁰, Strasbourg¹¹, Berlin¹² and Wageningen¹³.

These studies resulted in a detailed inventory of data practice, with a large range of different, more or less functional and efficient behaviors, with different variants of governance, a long tail of primary and secondary research data and more or less motivation to share the research results with other communities, industry or the whole of society. Another result is that even though discipline is one of the independent variables of field practice, two other factors exert a determining influence on data management, i.e. methods and equipment (qualitative surveys, archaeological excavations, neuropsychological experimentation protocols, network analyses, etc.) and the regulation for certain types of data (personal data), persons (minors) or treatments.

This empirical evidence of individual and collective data behavior is necessary for the development of data services, e.g. repositories, tools and platforms, training programs, assistance etc. It is also helpful for a better knowledge of the management, the curation¹⁴ and the very nature of research data.

What is more important, yet, for an institutional data policy, is the understanding of the scientists' own priorities related to research data, of incentives and locks. What is on their agenda? What are the opportunities and threats of the development of a data culture? Some elements are based on our interviews.

Priorities: When it comes to their data, the researchers' first concern is not management as such, preservation or sharing, but data security and in a broader sense, the security of the devices used for their storage and their analysis. This observation joins the conclusion of the Rennes survey that "the lack of data security is (...) undoubtedly one of the most crucial points highlighted". The researchers' second concern is the communication of "hot data" (in process) throughout the project, within the scientific team. It is not a matter of sharing data in the sense of opening up or publishing to a wider audience, but of an exchange or transfer of data within the framework of the specifications of a project. The crucial question is the opposition between the "need for communication" and the "imposed protection", and this question arises during the entire process of research, not just at the end of a project ("cold data").

Incentives: What factors favor good data practices in the sense of FAIR-compliant management? Or more broadly, what are the reasons for researchers to implement thoughtful management of their data? According to our answers, the following are six factors that can overlap: the EU H2020 program, the national ANR

9 Cf. SCHÖPFEL et al., 2018.

10 Cf. SERRES et al., 2017.

11 Cf. REGE, 2015.

12 Cf. SIMUKOVIC et al., 2013.

13 Cf. VAN ZEELAND/RINGERSMA, 2017.

14 Cf. NEUROTH et al., 2013.

programs, project management especially in larger research projects, legal constraints for specific data (privacy, health, minors...), ethic protocols and standards, and academic journals' editorial policy (availability of related datasets).

Locks: Papers on data management sometimes give the impression that the major obstacle to good management is the lack of motivation and/or skills of the researchers themselves. The interviews on our SSH campus draw another image. The main problem is not psychology or know-how but the absence of dedicated IT (storage, communication, databases etc.) and human resources (IT and legal department, academic library, laboratories...). Researchers and other staff concerned are generally aware of what should be done to ensure a minimum of good research data management, but they are often unable to do it properly because of a lack of resources and heavy workloads. Among the problems identified are the lack of tools and assistance for PhD students, insufficient academic programs, long-term conservation problems on laboratory servers, a lack of follow-up of large-scale projects, lack of procedures, and lack of monitoring of data software on university servers. These problems can be reduced to a lack of financial resources. However, in the field, the experience is not the absence of money but the lack of dedicated staff and the lack of computer resources at two levels - in the research units and in the common and central services. This observation does not minimize the reality of what Serres et al. (2017) call "the impact of 'ecosystems' and research practices" in certain disciplines, e.g. the predominant place of traditional journals, individualism, competition, or a weak culture of open access. But when it comes to good practices and constraints due to legislation or research programs, the main lock is not psychological or sociological but material, due to lack of resources.

Ten proposals

All researchers deal with data in one way or another. Knowing how to collect, analyze, interpret, preserve or communicate data is part of good scientific practice. This know-how mobilizes the fundamental values of scientific research, such as integrity, transparency, exchange and openness. However, our field study shows the limits and failures of practices and tools. Today, open science policy creates a new environment, with new constraints and injunctions not only from evaluation and funding agencies, but also from publishers, ethics committees and data protection officers.

How can practices be improved? How can know-how be transformed into a culture of data? The University of Bielefeld proposes a three main-pillar strategy based on the integration of the three dimensions technical infrastructure, policy and advocacy and support structure.¹⁵ This strategy includes the creation of an interdisciplinary training and research unit, the *Bielefeld Center for Data Science*, and is currently moving towards a competence center for all data-related services and stakeholders.

15 Cf. SCHIRRWAGEN et al., 2018.

Our own model for the training of doctoral students has developed a three-level approach around information and teaching, personalized assistance and advice and infrastructures.¹⁶ This type of model determines the framework of a strategy. From our own surveys and observations, we formulate ten proposals for the development of a culture of data on our social sciences and humanities campus, with a scientific management and in connection with the national policy of open science. These proposals are driven by two convictions: we must move from a phase of reflection and preparation (“working group”) to coordination and steering (“steering committee”); and rather than developing a strategy of injunctive, moralizing or guilt-rousing rhetoric on the issue of data sharing, which would in any case be doomed to failure, priority must be given to the real needs and constraints to which researchers and technical staff are confronted every day.

(1) Set up a scientific steering

To develop a data culture in the social sciences and humanities, the priority must be scientific steering, through a steering and coordination committee attached to the research department, with political and scientific competencies. This committee would bring together the Vice-President of Research, representatives of laboratories and scientific projects, representatives of the departments of research, information systems and legal affairs, the people in charge of system security and data protection, the chair of the ethics committee and the head of the academic library. The objective of such a committee would be the preparation of a data policy to be decided by the central councils and the coordination of its implementation.

(2) Invest in a targeted way

It is impossible to conduct a “general, unique and identical policy for all”¹⁷, not appropriate because of the richness of the practices and the diversity of the needs, and unrealistic because of the limited human, IT and financial resources. Any data policy and strategy must take into account the particular institutional context. Our proposal is to limit the offer of service “for everyone” to a minimum of online information and communication and give up the goal of finding a solution to all the data-related problems and needs. The idea is to rethink a strategy of data acculturation starting from the research policy and to define priority fields of action, such as:

- Focus on PhD students, not only for management plans but also for secure storage spaces and training in the management of personal and sensitive data.
- Setting up and monitoring of European (or international) and ANR projects.

16 Cf. CHAUDIRON et al., 2015.

17 SERRES et al., 2017.

- Training and animation of a network of data protection correspondents in laboratories.
- Development of services targeting specific tools and research methods, such as questionnaires, qualitative interviews, ethnographic observations, physiological measurements, treatment evaluations, etc.

On the other hand, our interviews as well as the experience with our doctoral training suggest that a disciplinary approach is not necessary; it is therefore not worthwhile to propose a specific offer for psychologists, sociologists, archaeologists, etc.

Focusing resources on certain priority areas of action allows for an effective and efficient approach. In addition, if this approach is accompanied by appropriate communication, one can count on a viral marketing effect among the scientific communities on campus. Let us add in the line of recommendations of the LERU the proposal to gradually integrate data management in the Master programs.

(3) Aim for projects, not laboratories

Often, when it comes to planning a data-setting policy, laboratories are considered and solicited as the main vector and transmission belt. However, our interviews strongly relativize this approach. In fact, the development of a data culture seems more pragmatic and promising if the approach is primarily aimed at research projects, especially EU and ANR projects. This is so for several reasons including specific and immediate needs, constraints imposed by funding, legal and regulatory obligations, governance and experience of collaborative practices within teams. The legal, ethical, technical and also political issues concern above all research projects, where they manifest themselves not as subjects to be debated but as problems waiting for a solution. Averkamp et al. do not say anything else when they observe for the University of Iowa campus that the key issues in data management point to project-oriented services.¹⁸

(4) Use management plans as leverage

To develop a culture of data and to implement good management practices, management plans are probably the best lever. They have become mandatory for the European projects of the H2020 program; they are among the priority actions of the French national open science policy. This is so to the extent that they describe the entire lifecycle of data management from collection to processing and generation of new data; data management plans are a key part of good data practice. Our proposal is to use them as a lever for setting up a service offer and for developing a culture of data. The idea is to rely on a strong external constraint linked to the most prestigious projects and better endowed, today with H2020, tomorrow with ANR. Such an approach could adopt the reference framework of the Science Europe working

18 Cf. AVERKAMP et al., 2014.

group to establish standard protocols for the management of research data, linking community practices to infrastructure needs (FAIR principle).¹⁹

This approach should first and foremost establish the link between management plans and ethical protocols at the level of service provision, procedures and monitoring. All plans contain an ethics component and all ethical protocols contain information about the nature and processing of the data. In the cycle of a research project, the management plan and the ethical protocol belong to the preparation phase, and it makes sense, from a researcher's point of view, to link them in one way or another, to reduce the workload, optimize and streamline the device on campus. There is another reason for linking the two instruments: the obligation of the H2020 projects to produce a mid-term management plan and another at the end. This requirement could be an opportunity to improve the monitoring of projects at the data level, including spot audits on both aspects.

(5) Provide answers to security issues

An institutional policy on research data that would be limited to an injunction to data preservation and sharing, without providing concrete answers to data security and systems issues, would lack credibility. Security is the primary concern of researchers, and the institution must provide a working environment compliant with the challenges and regulatory obligations, on its own servers and/or in the cloud, with public or private partners. Following the results from our audit, we would suggest as useful actions:

- Ensure data protection against piracy and other risks (fire, theft, crash ...), during the project period.
- Propose a backup and recovery system for data during and after the project.
- Do not separate data protection from the security of other applications of research projects and structures (websites, journal servers, etc.).
- Establish an analysis of computer risks and disasters, with incidents, scenarios, etc., intended for researchers.
- Conduct a collaborative risk analysis of a project, upstream (preparation phase).
- Occasionally conduct a project or laboratory safety audit.

The surveys on research data management in social sciences and humanities generally describe practices centered on the private and/or professional personal computer. It may be that a consistent security policy could change the situation insofar as it puts the cloud at the heart of data protection and management.

19 Cf. DOORN et al., 2018.

(6) Provide answers to communication issues

Secure communication of data within a project team and with other institutions and colleagues is another concern for researchers. A data policy must make this need a second priority. Again, there is probably no one solution and the solution is not necessarily on campus or within the institution. Nevertheless, as part of a data service, the most realistic option today would probably be a temporary storage server with sharing capabilities, similar to Dataverse, with community instances.

(7) Bringing answers to curation issues

None of our interviewees used the word “curation” and very few expressed the need for advice or assistance in describing and managing datasets. However, the need is real, imposed by the national and European data policy in favor of open science and interoperability of infrastructures. There are primarily three areas, related to FAIR principles:

- Contribute to the standardization of generic and specific metadata formats.
- Contribute to the use (attribution) of unique identifiers.
- Contribute to creating links with related publications.

These are activities and skills of data librarians of the academic library, in cooperation with researchers, data officers and other staff from the laboratories.

(8) Propose different solutions for data preservation

We found a wide range of preservation practices and needs, from short-term storage (living archives), for the duration of a project, and longer-term preservation (repositories) for a capitalization, reuse or otherwise, imposed by law as for research in the field of health (15 years), to infrastructures for a long-term preservation without dissemination (dark archive).

Offering solutions does not mean developing a whole range of infrastructures on campus; it would be unrealistic. But it should be possible to provide appropriate spaces (in terms of volume, security, accessibility) for the needs of researchers, either on the servers of the university or in partnership with external providers. Also, in the environment of institutional repositories, the question of the feasibility and the interest of a local solution (by default) for the preservation of part of the data on an institutional server will doubtless soon arise, with systems like Dataverse or Invenio.

(9) Institutionalize the link with the TGIR Huma-Num

The research infrastructure Huma-Num²⁰ implemented by the French Ministry of Higher Education, Research and Innovation in 2013, offers digital services for research programs and leads a consortium network on digital humanities. In the field of

20 Cf. HUMA-NUM, 2018.

data management, Huma-Num provides a set of services to facilitate the access, reporting, preservation and long-term archiving of research data in social sciences and humanities. The Huma-Num platform is intended primarily for teams and research laboratories. Some Lille laboratories have already established contact with Huma-Num to find a solution to the archiving of their research data. In order to promote the system, to coordinate and facilitate contact with the research community of the University of Lille, we suggest the appointment of a local Huma-Num correspondent within the academic library. Such a partnership could also develop the presence of the University of Lille in the European DARIAH and CLARIN infrastructures in which Huma-Num represents France.

(10) Support good practices

The last proposal is to analyze and valorize good practices on campus as an example and model for communication, training, and also for the promotion and marketing of new services and tools. Such a strategy would involve several steps:

- Identify good practice cases, by discipline, laboratory, equipment, methodology or type of project.
- Describe these cases in their context with their key factors of success, their impact, etc. (“story-telling”).
- Create virtual showcases to make them visible to the greatest number.
- Build communication and training materials (videos, guides, procedures, etc.) based on examples of good practice.

This valorization could target, at least initially, some priority areas and cases such as health research, European projects, surveys, video recordings, secure storage, data processing in the ethics protocol, communication tools for file transfer or the use of repositories like Zenodo.

Perspectives

Open science is now among the priorities of the French state. The national plan of the Ministry of Higher Education, Research and Innovation pursues the objective that the data produced by public research are progressively structured in accordance with the FAIR principles, that they are preserved and, wherever possible, open.

Based on a campus-wide audit and other studies, our paper makes ten proposals to facilitate the implementation of an open science ecosystem and the development of a culture of data in the field of a social sciences and humanities campus. Their essence is in three points:

1. Set up a scientific steering and governance for the coordination of actions and services of all stakeholders.
2. Focus the policy on specific targeted actions, taking into account the researchers' priorities and focusing on research projects, not on structures.
3. Position the approach clearly within the national and European infrastructures in SSH.

Any ideological injunction discourse on the issue of data openness must be avoided just as the scattering of efforts and resources. It is not possible to answer all requests, especially since some of the solutions are located outside the campus, in research projects and communities, in infrastructures and services at the national level and in international networks. The institutional policy should apply principles of subsidiarity and complementarity, which implies a very good knowledge of the field of research and data devices. Data governance must be valued to ensure the quality and compliance of research data management. The development of a culture of data will not be limited to setting up new services and changing practices, but will require a critical analysis, a critical stance and step back and an understanding of the issues and challenges in the best academic tradition.

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