SUMMARY OF THE STUDY

Opening source codes in Higher Education and Research (HE&R)

Considerations in terms of use and value

January 2021

CUBE inno
Innovation & Openness

GENERAL OVERVIEW

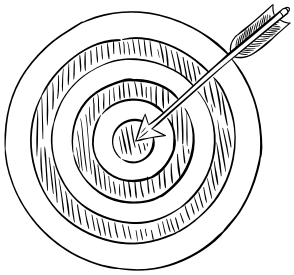
→ Conducted for : etalab

→ With the support of : OUVRIR LA SCIENCE !

→ It presents findings in **4 areas** and makes **30 recommendations** for opening source codes within Higher Education and Research (HE&R).

→ It provides information that was used and cited in the **parliamentary mission report "For a public policy on data"**, which was submitted to the Prime Minister on December 23, 2020 by Member of the French Parliament Éric Bothorel.

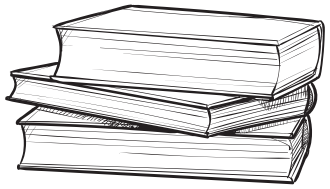
Objectives



- Provide an overview of source code publication practices in French HE&R (challenges, obstacles and needs) ;
- Identify and define existing or would-be open source projects ;
- Describe the various institutionally held positions and policies around open source and connect them to value-creation strategies.

Appendices

- Presentation of the questionnaire and interviews ;
- Description of the study's open methodology ;
- Examples of open source software produced by French HE&R ;
- Selected bibliography.



Resources

→ The report (CC-BY 4.0 license and Open License 2.0) is available on **HAL** (France's national academic open access platform) and a browser-friendly version is also available via **PubPub**'s sub-domaine dedicated to open source ;

→ The data under Open License 2.0 are available on **data.gouv.fr** ;

→ The source code used to analyze the questionnaire and produce the graphs is stored in a public git directory : **Framagit**.

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SUMMARY

1. Source code publication: a common practice among different HE&R institutions

- Scientific production and open source development share common motivations and closely related cultures.
- Source codes in the HE&R are mostly developed by people holding research-support positions. In general, coding activities are rarely considered as research activities in their own right.
- Open source projects and their ecosystems are difficult to define and do not fit into the monetization frameworks generally applied within HE&R. Currently, open source development methodologies are not well recognized seeing as they are typically based on distributed and international communities whose involvement and contributions are facilitated by projects' open governance.

Recommendation

Recognize the role and place of open source in French HE&R to put France on the map internationally.

2. Opening source codes: making France's public HE&R more reliable

- France offers a legal framework based on the principle of open data by default that is favorable to open source. However, this framework remains vague due to the diversity of recommended licences and is not widely applied.
- Opening source code contributes to the quality and the integrity of scientific results and connects with the current debate around reproducibility in open science. However, as a practice, opening source code doesn't yet benefit from a system of recognition or evaluation that would facilitate its implementation.
- The archiving, maintenance, evaluation and value of source codes are intersecting issues for different HE&R professional communities. They require specific support and a set of infrastructures that promote sharing and pooling.

Recommendation

Pool the software resources used to develop and maintain an infrastructural support system to publish HE&R source codes.

SUMMARY

3. Open source practices and dissemination: from contradictory requirements to productive collaborations

- Software developers in research institutions don't often call on the services of innovation and value-creation departments because the injunction to commercialize is seen as incompatible with open source distribution.
- A differentiated open source strategy needs to be defined for research projects according to their level of technological maturity, and in terms of different HE&R institutions' missions and purposes. Institutional policies regarding source code publication are still very low-profile, informal and often uncoordinated.
- In order to take into account the specificities of open source, open access and open data, the notion of value-creation must be broadened to include non-financial criteria such as social impact, usage, sharing and pooling, technological independence, outreach or organizational support.

Recommendation

Formalize development policies within HE&R institutions based on the State's open source software contribution policy by extending the National Plan for Open Science to cover issues related to open source.

4. National strategy: support for open source software development and publication in French HE&R

- Even though there is strong intrinsic motivation for people to open up source codes, the current institutional HE&R system doesn't create the necessary incentives for these initiatives to flourish. For the time being, HE&R communities are still very reluctant to publish source codes, mainly because of apprehensions about the quality of their code, feeling vulnerable about competitors and lacking recognition for coding activities.
- The Committee for Open Science (CoSO) and a new committee for digital infrastructures (that is currently being set up) are key players for the implementation of coherent policies throughout different HE&R institutions.
- There is a strong need for human resources to enhance open source production and perpetuate these projects, but also a need for interoperable infrastructures, such as France's academic publication referencing platform HAL, in order to reference, index, and link code to permanent identifiers.

Recommendation

Recruit and create permanent positions for support officers and include development and maintenance of open source projects in job descriptions.

CONCLUSIONS

- **French HE&R is fertile ground for open source** because of the community dynamics, practices and values that are already at work.
- **Open source initiatives often developed by research communities could benefit from being made more visible** in order to encourage sharing, pooling and the use of collaborative open methods.
- **With institutional support, these practices and methods can be built up and strengthened** by linking them to value-creation processes that are already in place within HE&R.
- In order to highlight the impact of open source projects (financial, social, environmental, etc.), **we need to think of "value" more broadly and develop appropriate indicators** to evaluate ecosystems based on their vitality.

Outlook

This study opens several avenues for further exploration, such as :

→ Tracking the evolution of open source practices inHE&R communities with different practices and the triggers for the adoption of specific practices;

→ Identifying open source projects and contributions connected to "virtuous" evaluation methods for open source communities ;

→ Taking stock of shared digital research infrastructure development, maintenance and connected frameworks (economic model, governance) ;

→ Revaluating open source value-creation methods and the evolution of economic models for HE&R value creation and knowledge transfer departments ;

→ Assessing value-creation through open source on a national or European scale ;

→ Comparing and analyzing practices and policies that support free software and open source development on an international scale.

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« Opening source codes in Higher Education and Research (HE&R) : Considerations in terms of use and value ». Research report conducted by Inno³ ; Etalab ; Comité pour la Science Ouverte, January 2021 https://hal.archives-ouvertes.fr/hal-03125456.