

The Flemish Research Discipline Standard: an interoperable metadata model for research discipline classification. Review and update procedure.

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Introduction

This contribution describes the review and update process of the *Flemish Research Discipline Standard (FRDS)*, a regional classification for research disciplines in Flanders, and will discuss the limitations of the current approach while introducing a new framework.

The Flemish Research Discipline Standard

The Flemish Research Discipline Standard (FRDS) is a Flemish classification scheme that is used to classify researchers and their output according to their research discipline. ECOOM-Hasselt developed this classification in 2018 (Vancauwenbergh & Poelmans, 2019) responding to the need of administrative streamlining in the Flemish research landscape. The plethora of research discipline classifications that were formerly used (e.g. FWO, VLIR, FRIS) were merged into one standardised classification scheme that includes all research in Flanders and is readily translatable to the most common (inter)national classifications.

The Flemish Research Discipline Standard (FRDS) consists of four hierarchical levels, each of which comprising 7, 42, 382, and 2866 research disciplines respectively. Each discipline is provided with a unique code that carries the hierarchy of the list, and a definition to ensure a uniform understanding and semantic interoperability among all actors in the Flemish research landscape thereby enhancing the accuracy of the data. Level one of the FRDS aligns one-to-one with the international *Fields of Research and Development (FORD)* classification¹ in order to enable international comparisons and reporting. The classification list has a built-in mechanism to detect new or emerging disciplines by adding a 'Not Elsewhere classified category' at the lowest level of each discipline at level 3 and 4. Researchers situate themselves and their activities in one or more disciplines using the CRIS-systems of their host institution(s). The FRDS is used as part of research reporting to the Flemish government, for example to identify trends in the academic staff and research activities and to report on the allocation of funding by research discipline. The classification is also used on *Flanders Research Information Space*, the research portal of the Flemish government, to retrieve research objects (researchers, research organisations, projects, publications and datasets) according to their discipline.

Review and update procedure

The FRDS was first implemented in Flanders in 2018 by a large number of stakeholders. After a 4-year term of use, it is time to evaluate the use of this standard, identify the gaps and emerging research disciplines and update the list to correspond with current research practices. The classification needs to remain in line with the needs of the stakeholders and the day to day research practice. Alignment with international standards also has to be assured to enable international comparisons and reporting.

To complete this review-and update procedure, we used a four phase approach:

Phase 1 (registration) recorded the gaps in terms of definitions and disciplines. This consisted of a public consultation phase, where a call for the update procedure was distributed to the Flemish

¹ OECD (2015), Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development.

research performing and funding institutions in 2020. They were asked to report any disciplines that needed to be added, removed, or adapted. The registration phase also includes an analysis of the use of the disciplines at level 3 and 4, and the use of the 'Not elsewhere classified categories' on the FRIS-portal. A high usage of the 'Not elsewhere classified categories' (>5%) indicates a need for new disciplines. Finally, in the registration phase we examine the impact of changes in two international reference standards- the *Australian and New Zealand Scientific Research Classification (ANZSRC)* and the *FORD*- on the FRDS.

In phase 2 (analysis) the gaps were analysed and a division was made based on the type of gap (technical and structural gaps vs content gaps). Technical and structural gaps do not concern the content of the disciplines but rather their structure or technical implementation. For these gaps, advice was sought from all stakeholders who have implemented the FRDS in their system. Content gaps were divided into gaps at levels 1 and 2 and gaps at levels 3 and 4. For the analysis of these gaps, we undertook *targeted expert consultations*: knowledge domain experts were contacted to give their advice on the proposed changes. Hereby, a representative expert consultation (spread across five Flemish universities) and consensus among the experts was pursued.

In phase 3 (evaluation), the expert advice obtained was evaluated and submitted to the steering committee. The steering committee reviews the proposed changes and decides which adjustments are to be made. In phase 4 (implementation), the new version of the FRDS will be implemented in the CRIS-systems of each stakeholder.

Conclusion

During this initial review and update procedure, several gaps were recorded and addressed. At level 1 of the FRDS no changes have been introduced, this level continues with seven key research domains. At level 2, there are major shifts in the areas of 'Mathematical sciences' and 'Sociology and anthropology'. Based on the targeted expert consultation, it was decided to divide the 2nd-level research discipline 'Sociology and anthropology' into two separate disciplines: 'Sociology' and 'Anthropology'. This decision aligns our classification with the daily research practice at Flemish knowledge institutions and corresponds to the *Australian and New Zealand Scientific Research Classification (ANZSRC)*. Anthropology is further subdivided into 'Social and cultural anthropology' with an expansion of the 4th-level disciplines underneath to include five new disciplines.

Regarding 'Mathematical sciences', the 3rd-level discipline 'Statistics and numerical methods' was divided into two separate disciplines: 'Statistics' and 'Numerical methods'. The sub disciplines under Statistics were expanded from three to thirteen 4th-level disciplines. The newly created research discipline 'Numerical methods' gained four disciplines at level 4. To align with these changes, the level 2 discipline 'Mathematical sciences' was renamed to 'Mathematical sciences and statistics'.

Another major change was that the 3rd-level disciplines 'Human movement and sports sciences' and 'Rehabilitation sciences' were relocated from 'Paramedical sciences' to 'Health sciences' at level 2 of the FRDS. This implies that these disciplines and their underlying fourth level are given a new position and code in the classification list.

Further adjustments included the addition of 6 disciplines at level 3, and the addition of 46 new disciplines at level 4 of the FRDS. Eight disciplines were renamed at levels 3 and 4 of the classification, and a total of 4 research domains were subdivided into two separate disciplines.

These proposed adjustments were approved by the steering committee, a group with representatives of the users of the classification standard that makes decisions based on consensus. At the moment we are working towards the practical implementation of the updated *Flemish Research Discipline Standard* in the CRIS-systems of the knowledge institutions. This implies that concordance tables will have to be made in order to compare the new version of the classification to the previous

one. Furthermore, mappings should also be re-created between the classification and other international standards to enable international comparisons and reporting.

The review and update procedure was a very labour-intensive and time-consuming project as a process of expert consultation was initiated for each reported gap. Domain experts were sought and contacted for each gap. When experts disagreed, the process was repeated until consensus was reached. In the future we are going to simplify and automate the review and update procedure. An eligibility phase will be added in which each reported gap is first assessed for eligibility based on a set of standard criteria. These criteria will establish when a gap is in scope or not by considering for example the level at which an adjustment is requested, the number of times a gap is reported, the number and quality of the arguments etc. Only the admissible gaps are then processed further. We are also currently looking to partially automate the procedure so that gaps can be easily submitted and reviewed by several experts simultaneously, leaving only a residual category of more complex gaps to be discussed by the steering committee.

References

Vancauwenbergh, S., & Poelmans, H. (2019). The creation of the Flemish research discipline list, an important step forward in harmonising research information (systems). *Procedia computer science*, 146, 265-278.

