



Implementation Manual: Pilot Concept for Local Implementation of an International Data Literacy Standard

Author:
Rüdiger Weißbach – HAW Hamburg

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AUTHOR

Rüdiger Weißbach – HAW HH

Contributors

Alberto Conejero – UPV

Christine Hoffmann – HAW HH

Judit Fazekas-Paragh – UD

Paul Postmes – HU

Ulrike Spree – HAW HH

ABSTRACT

This document is the Implementation Manual and shows the essentials of the concept how to introduce Data Literacy content at a university.

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Introduction

This document shows the essentials of the concept how to introduce DL content at a university.

Check of Constraints

Legal and Organizational Constraints

Legal and organizational constraints are very important for implementation. Accountability and also formal competence are crucial for the ability to initiate and steer change processes. The circumstances are very different between the nations with its different educational systems and the different types of HEI (public vs. private universities).

With the Bologna Process, the accreditation of teaching programmes added a formal threshold: Changes in the programmes or completely new programmes have to be accepted by the committee.

While this is a general aspect in Europe, we have to take into account the different specific regulations, that influence the time perspective of the change processes. Important questions are:

- Who is allowed to start a change process?
- Which boards have influence and power in the change process?

The longer the formal processes, the more it can be a solution to implement new content – as DL - in an intracurricular way to start with it informally. This experience can be a starting point for the next formal curriculum development process.

While intracurricular implementations can be result of top down as well as bottom up processes, extracurricular implementations need regularly a top down support.

Official support processes, tenders etc. can focus top down and self-organizing processes on the DL topic. The activities in a HEI for a tender submission can be the trigger for internal development processes.

Domain Related Constraints

The domain is important for all aspects of DL frameworks. In natural sciences, the concept of “data” has another tradition and other concrete implementation than in humanities. Due to these traditions, different skills and competencies have to be selected for teaching in different disciplines. But it is a dynamic process, therefore the importance of data increases for many disciplines and the alignment of skills to disciplines must be adjusted regularly.

Resources

Quality and quantity of resources are relevant. The most relevant resource for teaching and for initiating change processes is staff. An institution has to check:

- Are enough skilled teachers available?
- If not – how to qualify (or to hire) the teaching staff? Are train the trainer or mentor / mentee concepts applicable?
- How much time will the qualification process need?

Teaching Resources for DL content could be organized in a central competence group or aligned to the different faculties, departments etc. While this is mainly a strategic decision, this can also influence the speed of dissemination.

The relevance of financial resources for hardware and software depends on the concepts: While a proof-of-concept demonstration of different data processing methods is possible in a low-cost setting with low end computers and open source software, research work and real life problem solving typically need powerful hardware.

The most important object in teaching DL is data. Which (amount of) data is available under which conditions? While Open Government Data is available for years, data for other domains is sometimes expensive or needs own research work.

Identification of Needs

Qualification Objectives

The DL shift can be motivated by several causes: Existing curricula can be extended by DL content, existing subjects can be redefined from a DL viewpoint, DL can be taught as a specialized topic and an on-top qualification, especially for graduate courses and vocational trainings.

One central problem is the definition of the qualification needs. HEIs have not only to fulfill current needs, but they have to predict future needs and to teach the students for these.

Stakeholder Analysis

Students

The objective of an HEI is the teaching of students. While students are the most relevant stakeholder group, they are by no means specialists in their needs for a quality curriculum. In the courses we see that the students' idea of their future professional work is often a traditional view, overlooking new trends.

A dedicated DL programme will be attractive for some students, while others prefer "traditional" programmes like business, mechanical engineering, medicine, chemistry, philosophy, or literature. But these disciplines also need DL knowledge.

Colleagues

To implement DL teaching, HEIs have to check the existing "DL profile" of the teaching staff. Because science is inherently aligned with the concept of data, there will be no problem in accepting the idea of DL. Nevertheless, this doesn't mean that such a central top down DL teaching concept will be accepted, if there is neither an individual advantage nor a mandatory management plan.

Professional Groups

Like other current topics, DL topics are discussed in many different professional associations, typically on the level of position papers. Such position papers have relevance in the communication process and curriculum planning groups have to react on these papers. "To react" does not mean that these positions have to be implemented directly.

External Organisations

Even for public universities, political and economic organisations like business associations, trade unions, chambers of commerce etc. are relevant for the development process. The need for qualified graduates is expressed regularly by these organisations. The definition of “future skills” is also a political topic: Is the focus on a set of direct applicable skills and knowledge or more on higher level competencies, methods and concepts?

The situation in Germany is different to other European countries because the dual system of vocational education for more practically oriented trainings is different to the system on other European countries.

Different Settings

Overview

We have different settings with different circumstances. They are different in scope and integration, in the stakeholder setting and therefor also in the time perspective.

The settings mentioned below can exist side by side in one organization and they also can serve as different steps in a transition process towards a more DL oriented programme or a “DL mission statement university”.

Setting (1): DL as Intracurricular Topic in a Course

The easiest way to introduce DL in a curriculum is to implement it as an intracurricular topic in a course as a part of a complete programme. Much of the content currently being taught is related to DL – for example statistics, research ethics, evaluation of data sources.

Function		Grade				Scope		
Intrac.	Extrac.	Bachelor	Master	Ph.D.	Vocational Trainings	Complete Course	Part of Course	Complete Programme
X		X	X	X	X		X	—

In this case not the facts are specific to DL, but the point of view. It’s useful to apply the DL framework to identify the role of the content in a DL perspective.

Typically such changes can be implemented by the teachers themselves. They can start with small “content bricks” of 30-180+ minutes to handle a single topic. Co-operating teachers can co-ordinate such bricks in different courses

Such implementations are not restricted to a single grade.

Setting (2): Dedicated DL Course

Dedicated DL courses in a programme can enrich a curriculum by adding new content and / or by gathering DL content in a single course. Typically, such changes need more co-operation and formal adjustments. They influence the accreditation process and can need dedicated resources.

Function		Grade				Scope		
Intrac.	Extrac.	Bachelor	Master	Ph.D.	Vacational Trainings	Complete Course	Part of Course	Complete Programme
X	X	x	x	x	x	X	—	—

It's possible to offer such courses centralized for students of different programmes.

Setting (3): Dedicated DL Programme

In our experience, special DL programmes are particularly useful for graduates or professionals, as specialization and / or further training. Such programmes extend what a university offers and need most formal work and effort to implement.

Function		Grade				Scope		
Intrac.	Extrac.	Bachelor	Master	Ph.D.	Vacational Trainings	Complete Course	Part of Course	Complete Programme
—	X	—	x	x	x	—	—	x

On a lower threshold offerings like Summer Schools could be organized. The DaLiCo team did this in the project.

For the settings (2) and (3) the organization of personal and financial resources is a relevant topic. Its treatment is different for the different HEI.

Usage and Impact

While DL remains a relevant topic, it would be useful to gather DL teaching and implementation cases in the future to analyse success and failure factors. Even if the constraints are different between the universities and nations, some general results and approaches can be identified.

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