



Towards a Framework for Data & AI Literacy

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AML D Lausanne

katharina.schueller@stat-up.com





HFD Data Literacy Framework

2019: Systematic Review, Research Report, Competence Framework

2020: English version



Data Literacy Charter

Stifterverband, DStatG and many more

>100 signatories from the beginning

German & English version



Stadt | Land | DatenFluss

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Ed.: DVV, sponsored by BMBF

Patronage of the Federal Chancellor

Awards:

- App of the month July (German Academy for Children's and Youth Literature)
- Comenius-EduMedia-Award (Society for Pedagogics, Information and Media e.V.)
- Shortlist for „Innovation of the year“, German OnlineCommunication Award
- German Design Award



KI-Campus

2. Ideas Competition

Focus: Data Literacy

By EOY development of ~15 new MOOCs

IEEE SA STANDARDS ASSOCIATION

Project Authorization Request

Standard for Data & AI Literacy, Skills, and Readiness

Partners a.o.: DStatG, FENStatS, Stifterverband, KI-Campus, PARIS21

STAT-UP
Statistical Consulting & Data Science



PREAMBLE

With the Data Literacy Charter, the signatories express their common understanding of data literacy in the sense of comprehensive data literacy and its overall importance in educational processes.

Data literacy enables people, businesses, and scientific institutions as well as governmental or civil society organizations,

- to actively participate in opportunities to use data;
- to deal confidently and responsibly with one's own and other people's data;
- to use new drivers and technologies such as Big Data, Artificial Intelligence or Internet of Things to meet individual needs, address societal challenges and solve global problems.



GUIDING PRINCIPLES

Five principles characterize the importance and role of data literacy as a key competence of the 21st century.

(1) DL must be accessible to all people. We are committed to ensuring that DL and the respective set of skills and competencies are widely taught and can be acquired by all people.

(2) DL must be taught throughout life in all areas of education: in curricula and educational standards of schools, teacher training and higher education, and in DL programs for extracurricular and vocational training.

(3) DL must be taught as a transdisciplinary competence across all subjects from three perspectives: the application-oriented (*What is to be done?*), the technical-methodological (*How is it to be done?*) and the socio-cultural (*What is it to be done for?*)

(4) DL must systematically cover the entire process of insight and decision-making with data and includes the areas:

- Use and protect data
- Classify data and information derived from it
- Act in a data-driven way

(5) DL must include knowledge, skills, and values for a conscious and ethically sound handling of data. Data ethics is a central component of any set of data-related skills and competencies, reflected in all sub-areas of DL.

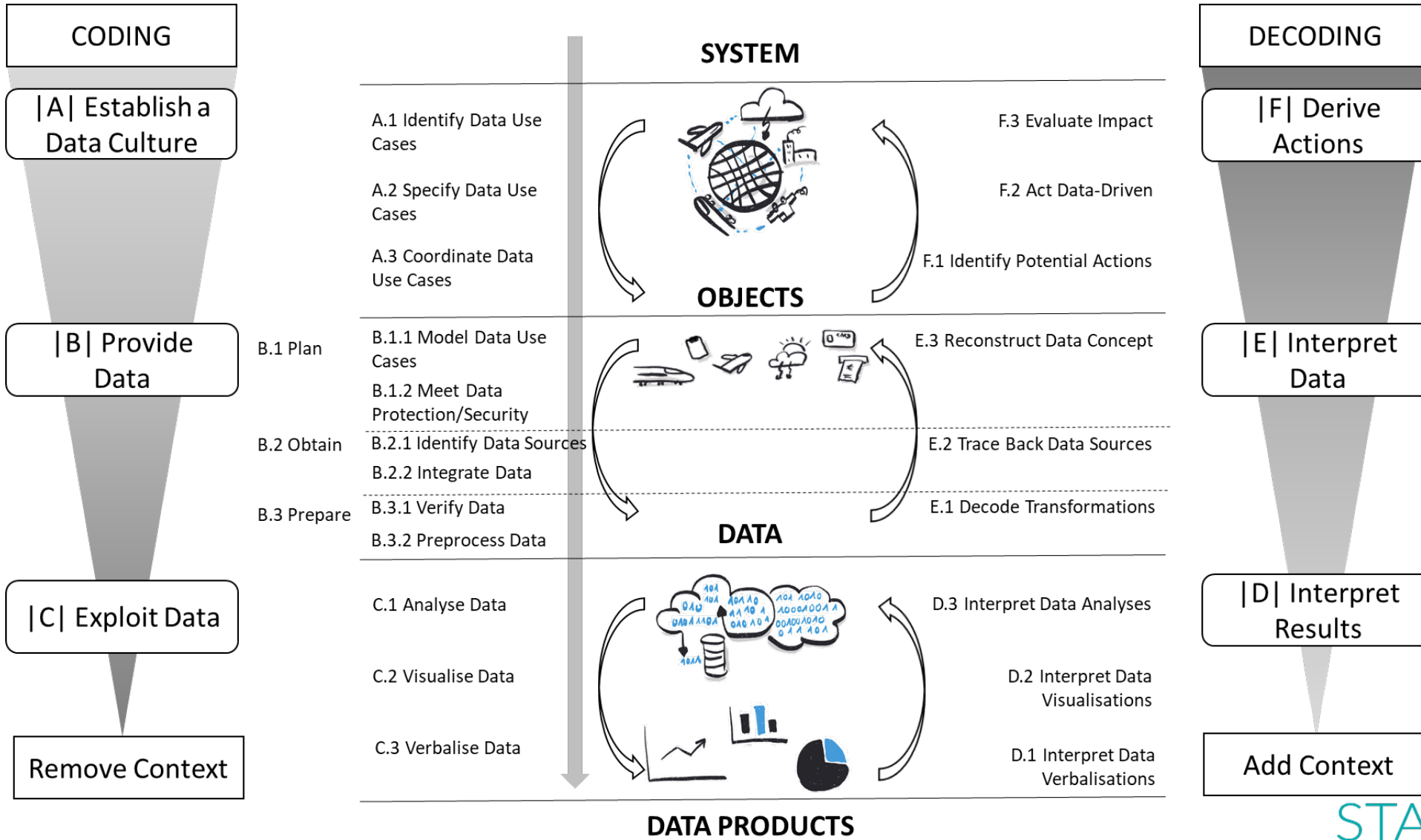


CLOSING

- Reference to further information
- List of signatories (incl. photos & citations)

The HFD Data Literacy Framework

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Example C1: Analyse Data

Competence		Dimensions			Levels
Labelling	Description	Examples of knowledge	Examples of skills	Examples of attitude	Examples of ascending levels
C.1: Analysing data	Uses analysis methods from various (statistics, analytics, machine learning), actual and purpose-oriented manner	Knowledge of procedures for different tasks (description, exploration, prognosis) as well as their strengths, and	<p>The skill to map measurable relationships in models</p> <p>The ability to identify and select appropriate analytical methods</p>	<p>Willingness to implement and adapt models in an iterative and often time-consuming process</p> <p>Sceptical basic attitude in data analysis</p> <p>Willingness to weigh up and accept information losses in the analysis process</p> <p>Willingness to comply with "good analytics standards", even if</p>	<p>(1) Can handle basic statistical methods such as mean value and standard deviation</p> <p>(2) Can handle and use more complex models, can assess which methods provide meaningful results for which questions and data, and recognises the limitations of analytical results</p> <p>(3) Masters and uses highly complex models and recognises</p>

- Knowledge about estimation methods and algorithms
- Knowledge about possible causes of artifacts

- Ability to represent measurable relationships in models
- Ability to anticipate future uses of analysis results

- "Analytical fairness" as a basic attitude, i.e. willingness not to perform analyses if the risk of misuse is high



Data and AI Literacy

The ability to generate, process, analyze, present meaningful information from data and develop, use, and apply artificial intelligence (AI) and related algorithmic tools and strategies in order to guide informed, optimized, and contextually relevant decision-making processes.

**DQ Global Standards
(IEEE 3527.1™)**



Knowledge	Skills	Attitudes / Values
<p>Individuals understand the theory of data analysis, statistics, and AI-related mathematical concepts and computer programming. They understand how data are generated, to process data based on statistical understanding, and to create and/or use AI algorithms (e.g., machine learning, neural networks, deep learning) to recognise significant patterns and to improve decision-making processes. They understand concepts across multiple disciplines and identify the benefits, limits, and risks brought about through big data, AI, and related technology.</p>	<p>Individuals develop efficient and stable processes to collect, store, extract, transform, load, and integrate data at various stages in the data pipeline. They read, manage, analyze, and process data from a variety of sources, and prepare data in a structure that is easily accessed and analyzed according to specific requirements. They create and build knowledge by analyzing data, communicate its meaning to others with various data visualization tools (e.g., infographics, dynamic, illustrative, and interactive graphics), and present patterns, trends, analytical insights from data or new concepts in a strategic manner for the intended audience. In turn, they communicate the limitations of data by telling when data is being manipulated to support a limited or false narrative. With understanding of AI, they develop, select, and apply relevant algorithms and advanced computational methods to enable systems or software agents to learn, improve, adapt, and produce desired outcomes or tasks. They use it as a tool to enhance efficiency in creative processes, and develop strategies on how they utilise it in optimizing their own work performance (e.g., predictive behavior analytics, pattern recognition, and decision-making processes). They understand how data and AI may affect one's perception and reasoning. Individuals are also able to leverage AI to augment their own intelligence while remaining aware of how human value judgements play into the applications of big data and AI in society.</p>	<p>Individuals are confident in pursuing innovative and analytical careers. They are also proactive in applying their knowledge of data and AI into evaluating whether broader systems are acting in ways aligned with community values that promote well-being.</p>

IEEE P7015: Data & AI Literacy

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IEEE SA STANDARDS ASSOCIATION



P7015

Submitter Email: katharina.schueller@stat-up.com
Type of Project: New IEEE Standard
Project Request Type: Initiation / New
PAR Request Date: 16 Aug 2021
PAR Approval Date:
PAR Expiration Date:
PAR Status: Submitted

1.1 Project Number: P7015
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Project Title: Standard for Data and Artificial Intelligence (AI) Literacy, Skills, and Readiness

5.2 Scope of proposed standard: The standard establishes a common operational framework and associated capabilities that can form the basis to design targeted policy interventions, track their progress, and empirically evaluate their outcomes to coordinate global data and AI literacy building efforts. It includes a common set of definitions, language, and understanding of data and AI literacy, skills, and readiness.

5.3 Is the completion of this standard contingent upon the completion of another standard? No

5.4 Purpose: The purpose of the standard is to enable that the respective set of skills and competencies are widely taught as a transdisciplinary competence across all subjects from three perspectives (application-oriented, technical-methodological, and socio-cultural) and can be acquired by all people so that every individual, and our society as a whole, will be enabled to deal with data and AI in a conscious and ethically sound manner. The standard creates a common understanding of data and AI literacy so that it can be systematically included into curricula and educational standards of schools, teacher training, higher education, and further education. Furthermore, the standard is intended to serve as a reference for data and AI literacy programs for extracurricular and vocational training, to enable lifelong learning of data and AI literacy. Given that, such a standard can serve as a basis for eventually developing a convergent, coherent data literacy assessment, measurement and impact evaluation framework for the national, regional and global levels that can help to fill the empirical evidence gap on outcomes from data literacy interventions and programs.

IEEE P7015 - DATA AND AI LITERACY, SKILLS, AND READINESS WORKING GROUP

Title: Standard for Data and Artificial Intelligence (AI) Literacy, Skills, and Readiness

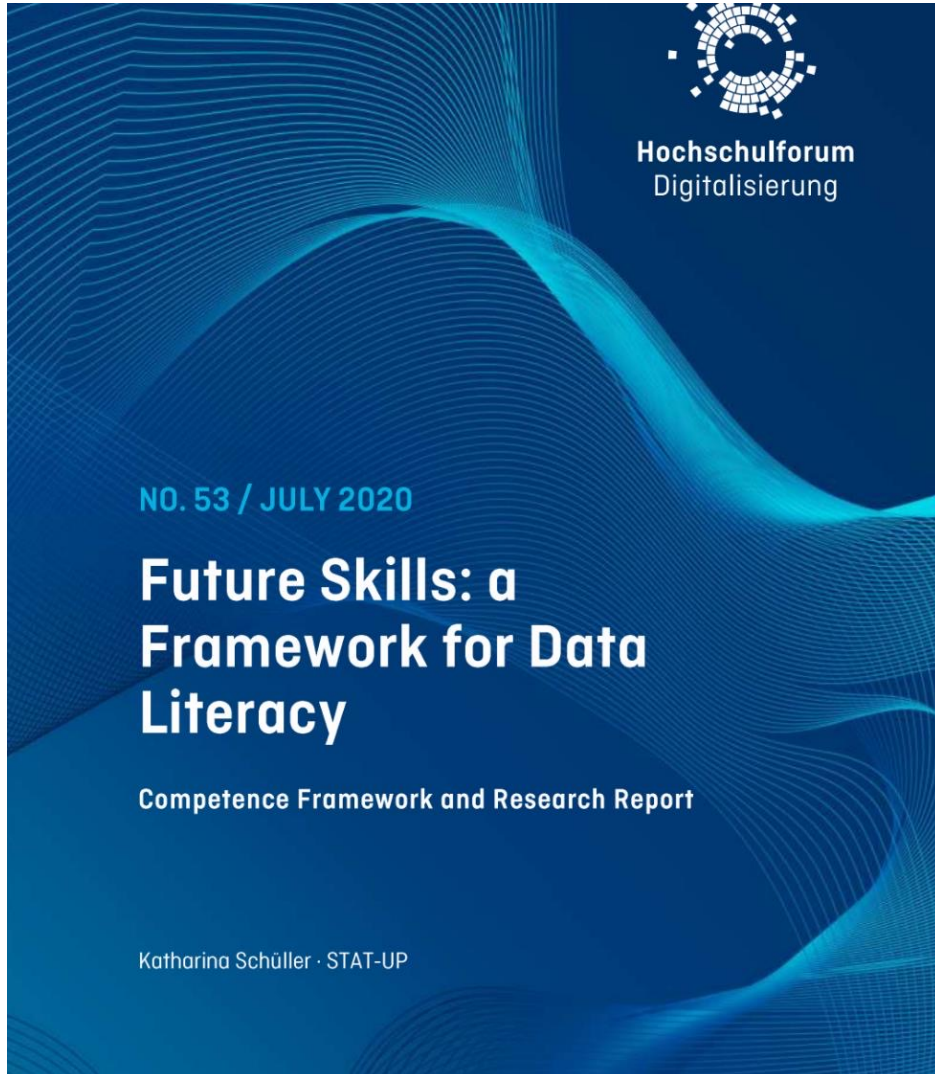
Scope: To coordinate global data and AI literacy building efforts, this standard establishes an operational framework and associated capabilities for designing policy interventions, tracking their progress, and

WG OFFICERS

Chair
Katharina Schueller, katharina.schueller@stat-up.com

Vice Chair

- **Scope:** Establish a global standard that encompasses a common framework to ensure that data and AI literacy building efforts are coordinated globally.
- Standard builds on existing frameworks, e.g., the Data Literacy Framework (DLF) and the Data Literacy Charter (DLC)
- We need additional perspectives (especially Global South)



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