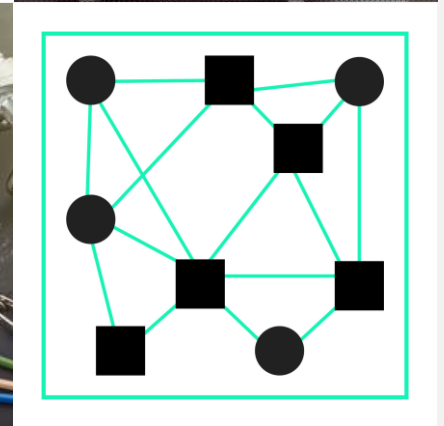


“Data in the disciplines” Curricula development at Bielefeld University

Dr. Juliane Theiß
Projectcoordinator Data Literacy Education

Strategies beyond borders, December 10, 2019



Agenda

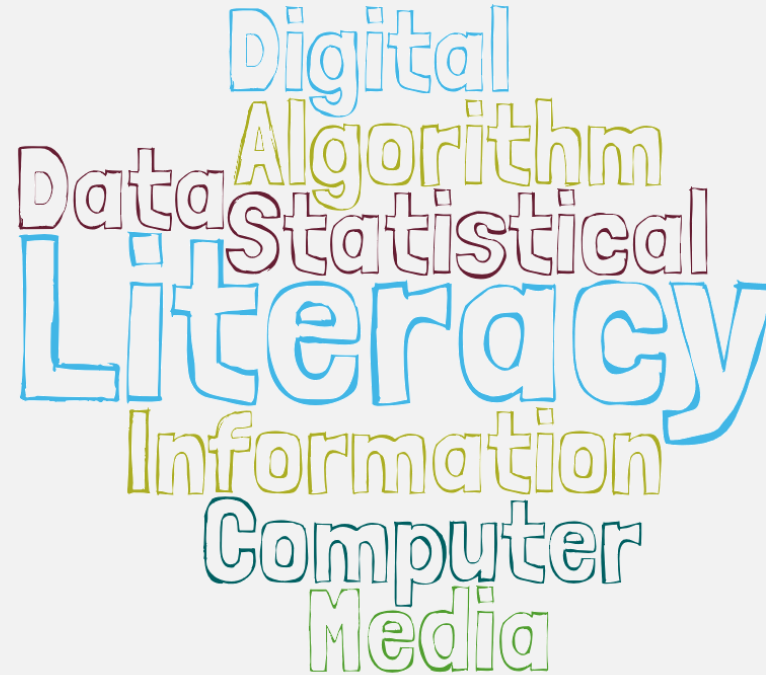
Literacies for the Digital Age

The DatKom project at Bielefeld University

- The organizational perspective
- The teaching perspective

Data literacy education as a joint task

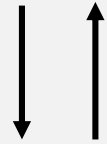
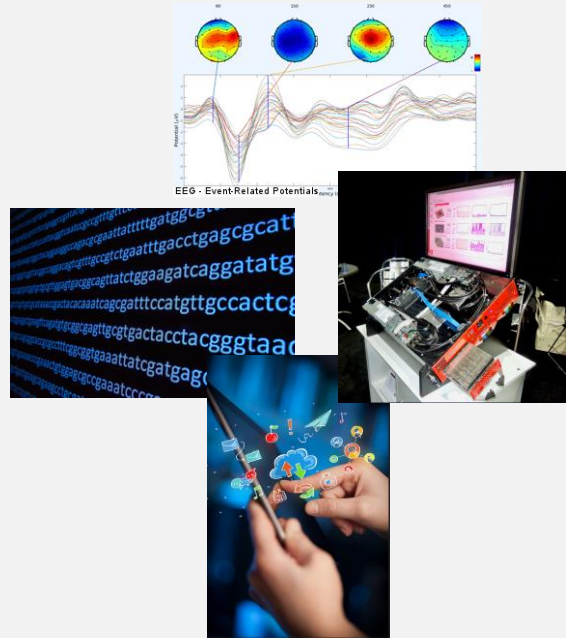
Literacies for the Digital Age



A word cloud centered on the slide, featuring the word 'Literacy' in the largest, blue font. Other words in various sizes and colors (yellow, red, green) include 'Digital', 'Algorithm', 'Data', 'Statistical', 'Information', 'Computer', and 'Media'.

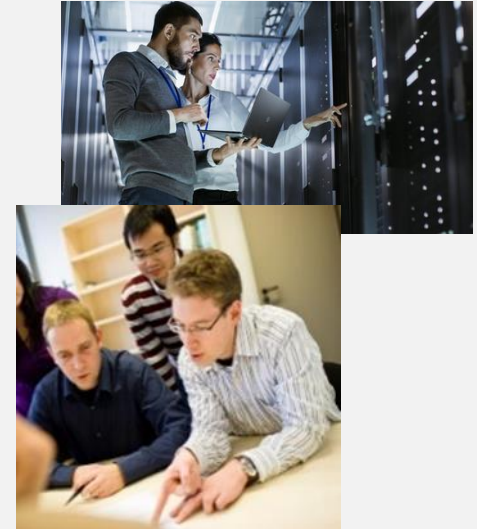
Or are they just new terms for old competencies?

Literacies for the Digital Age



Digital
Data Algorithm
Statistical
Literacy
Information
Computer
Media

Shaping Digital Transformation



Understanding and using technologies and data

What is Data Literacy?

„Data literacy is the ability to collect, manage, evaluate and apply data in a critical manner.”

Ridsdale, et al. (2016)

Data literacy is a future skill in all sectors and all disciplines.

Data literacy is a prerequisite for active citizenship.

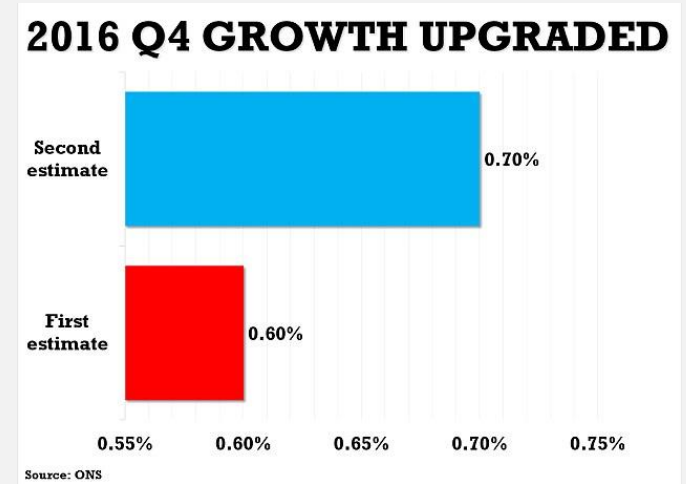
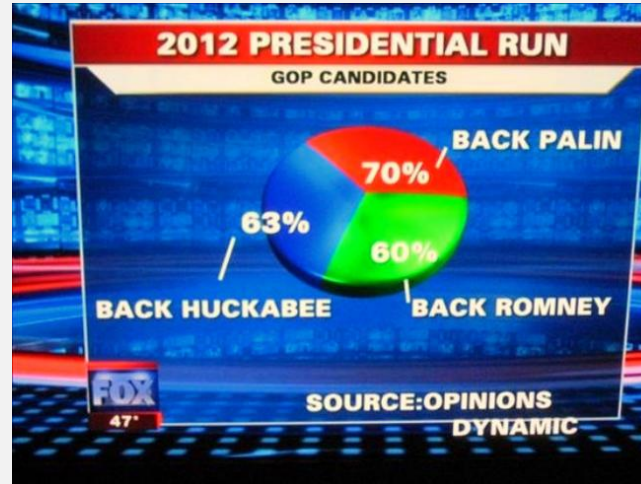
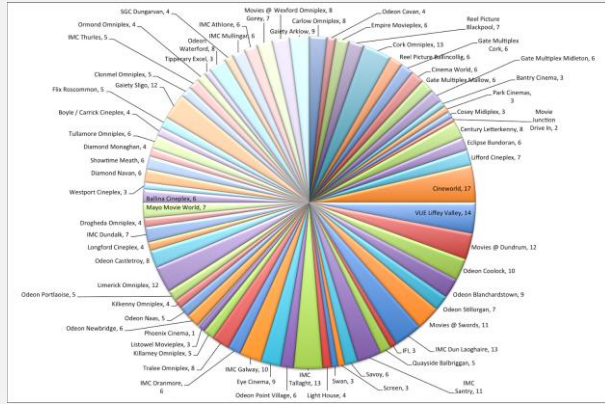


Why do we need Data Literacy?



Christmas is all around
And so is data!

Why do we need Data Literacy?



Individuals have to be empowered to responsibly handle data...

...and to understand information derived from data

Data Literacy Skills and Competencies

Conceptual Framework

Introduction to data

Data Collection

Data Discovery and Collection

Evaluating Quality of Data and Sources

Data Management

Data Organisation

Data Manipulation

Data Conversion

Metadata Creation and Use

Data Curation, Security and Re-Use

Data Preservation

Conceptual Competencies

Core Competencies

Advanced Competencies

Data Evaluation

Data Tools

Basic Data Analytics

Data Interpretation (Understanding Data)

Identifying Problems Using

Data Visualization

Data Presentation (verbally)

Data Driven Decision Making

Data Application

Critical Thinking

Data Culture

Data Ethics

Data Citation

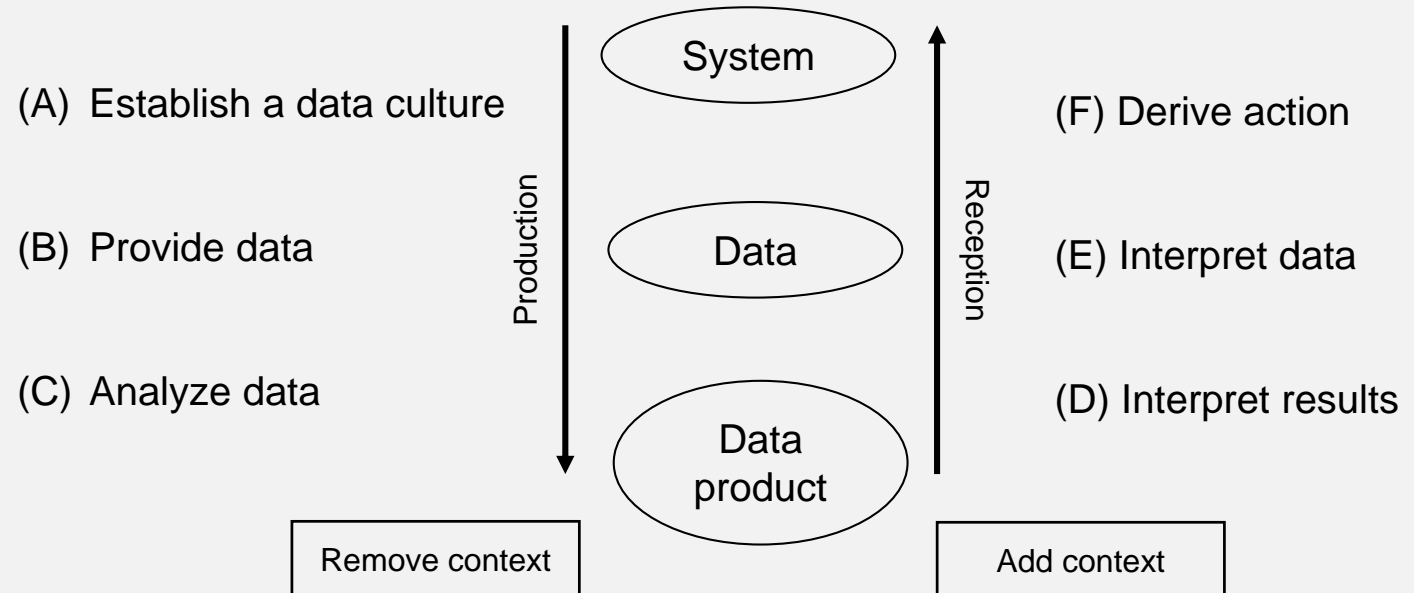
Data Sharing

Evaluation Decisions based on Data

Data Literacy Skills and Competencies



6 fields of competence



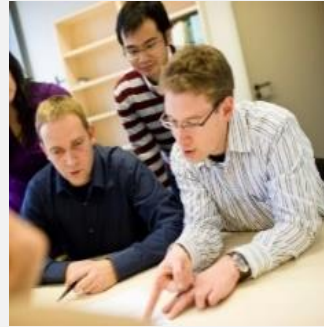
How can we teach Data Skills?



Raise awareness for data competencies at an **early stage**



Emerging teaching approaches



Iterative, project based learning with complementary skills integrated



Increasing engagement with the content by using **real world data**

*richtig
einsteigen.*

collaboration between educators, organizations, and institutions to ensure goals are being met by all stakeholders

The DatKom Project at Bielefeld University

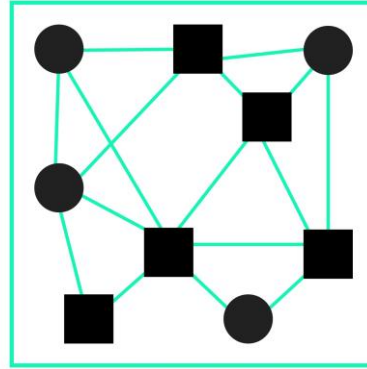


Vision of the DatKom Project

Data Literacy Education

Integrate data-competencies into the curricula of all degree courses

- Discipline specific courses
- Interdisciplinary courses
- Sustainable educational (online-) resources



Data Awareness

Raise and sharpen awareness for data and data-competencies throughout Bielefeld University

- Events
- Exchange

Vision of the DatKom Project



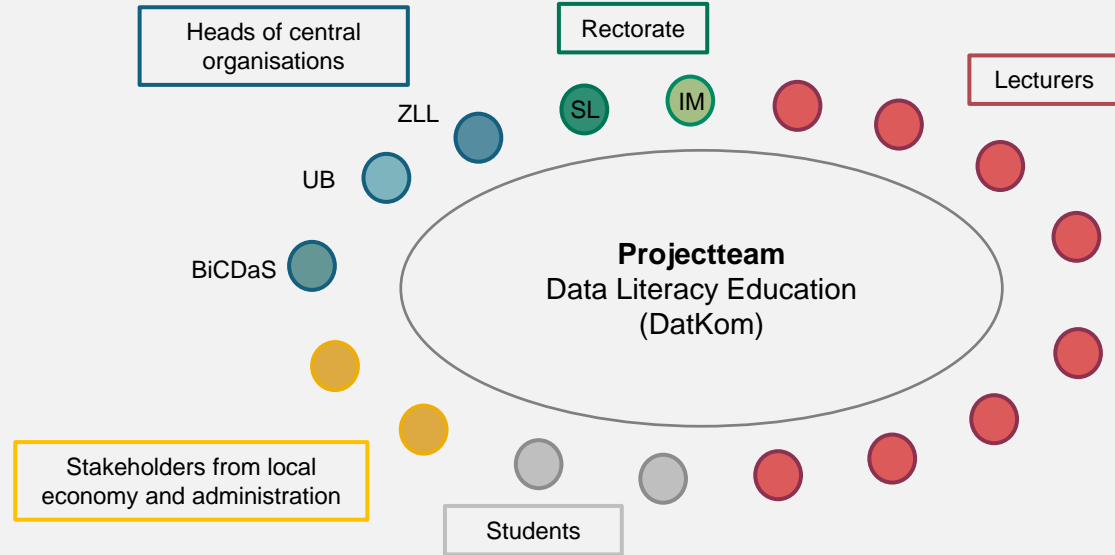
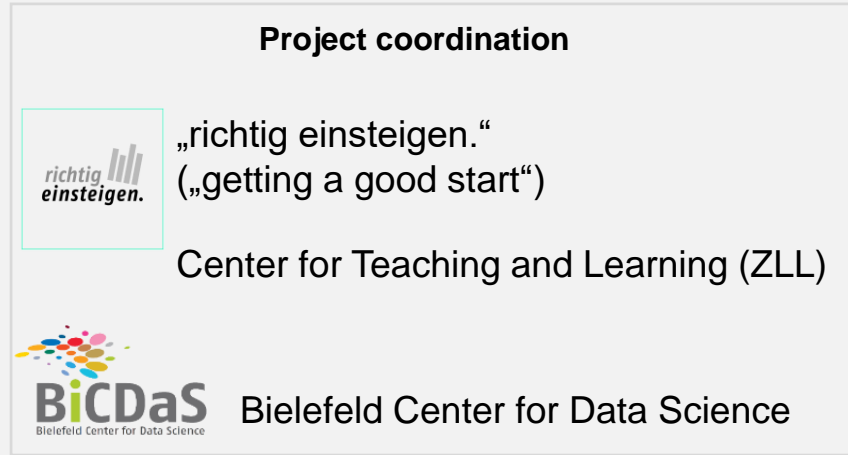
Projectcoordinator

Make Data Literacy Education
an integral part of the
curriculum for every student at
Bielefeld University



~ 25.000 students
118 degree programs

Organization is everything...



+ Interdisciplinary

+ Collaborative

+ Needs-orientated

How can we reach as many students as possible?

Bielefeld University's study model:

- **Standard module sizes** (10 CPs) -> share or exchange teaching units between subjects and across degree programs
- **General examination regulations** for all the university's degree programs
- **Elective Module** -> 30 CPs for Bachelor students, 20 CPs for Master students

Development of a novel Elective Module:

Input:

- 6 lecturers (Educational Sciences, History, Sociology, Business Administration, Data Science)
- Administration
- 4 months

Output: ...



Data Literacy Module

„Data Literacy – cultural technology of the 21st century“

- Winter term 2019/20
- Elective Module
- 10 CPS
- Faculty of Educational Science

Big Data is watching you!
How to deal with data in the modern world.

Lecture series & tutorials

Data Literacy for all students from
an interdisciplinary perspective

- I. The role of data in the modern world
- II. How do we face data?
- III. Transformation of data into knowledge

Connecting courses (different faculties)

Selectable courses
Hands-on
Project-based

Analysis tools
Programming languages
Visualisation and presentation
...

Big data is watching you!

How to deal with data in the modern world.

Part I

The role of data in the modern world

The data based perspective

From idea to data – part I

From idea to data – part II

Data-based decision making - experts from local economy and administration*

Part II

How do we face data?

Data management (quantitative focus)

Data management (qualitative focus)

Data protection and data ethics*

Part III

Transformation of data into knowledge

Explorative data analysis with R

Tools for data analysis

Tutorial for data analysis with R**

Data modeling (quantitative focus)

Tutorial for data analysis with R**

Data Science-Toolbox

Data modeling (qualitative focus)

Machine Learning*

*Invited Speakers

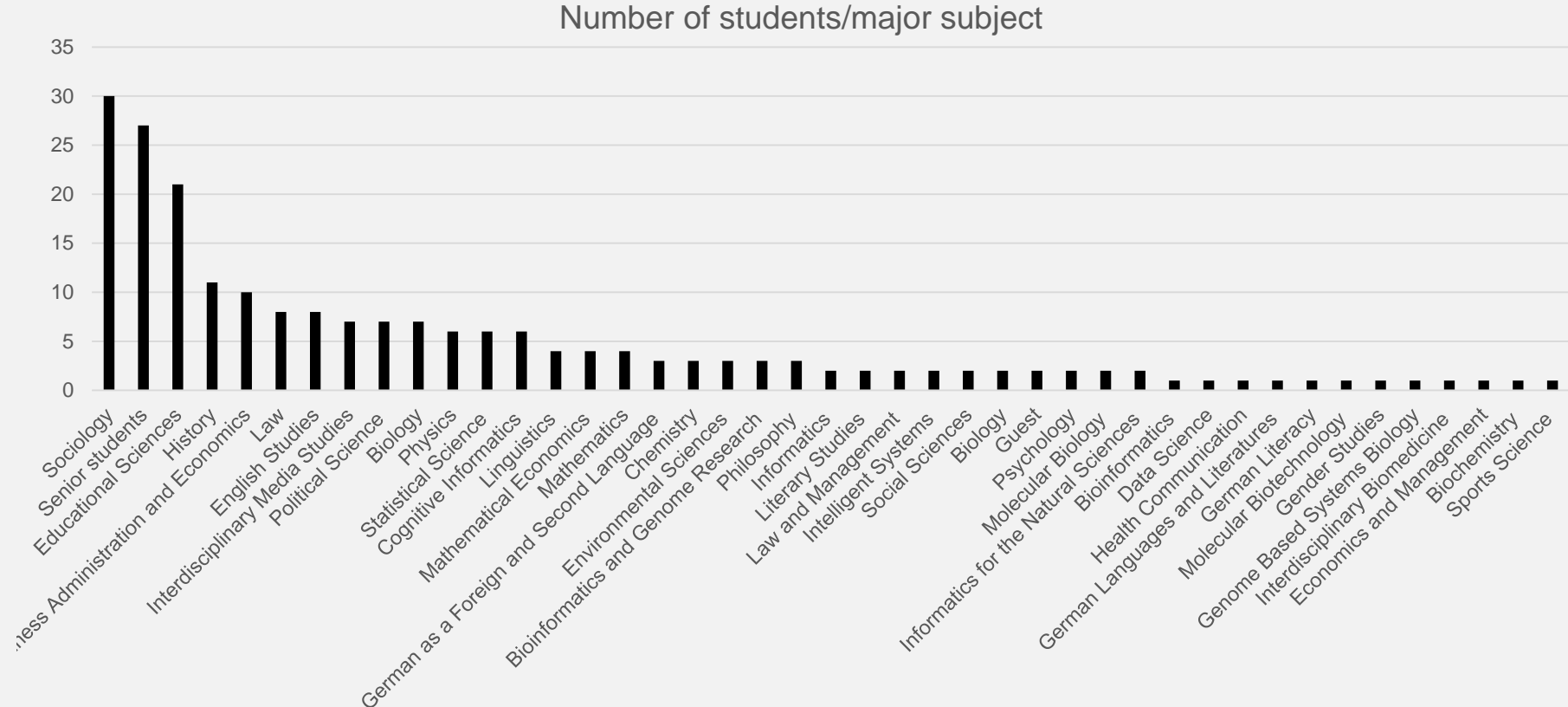
**Tutorials



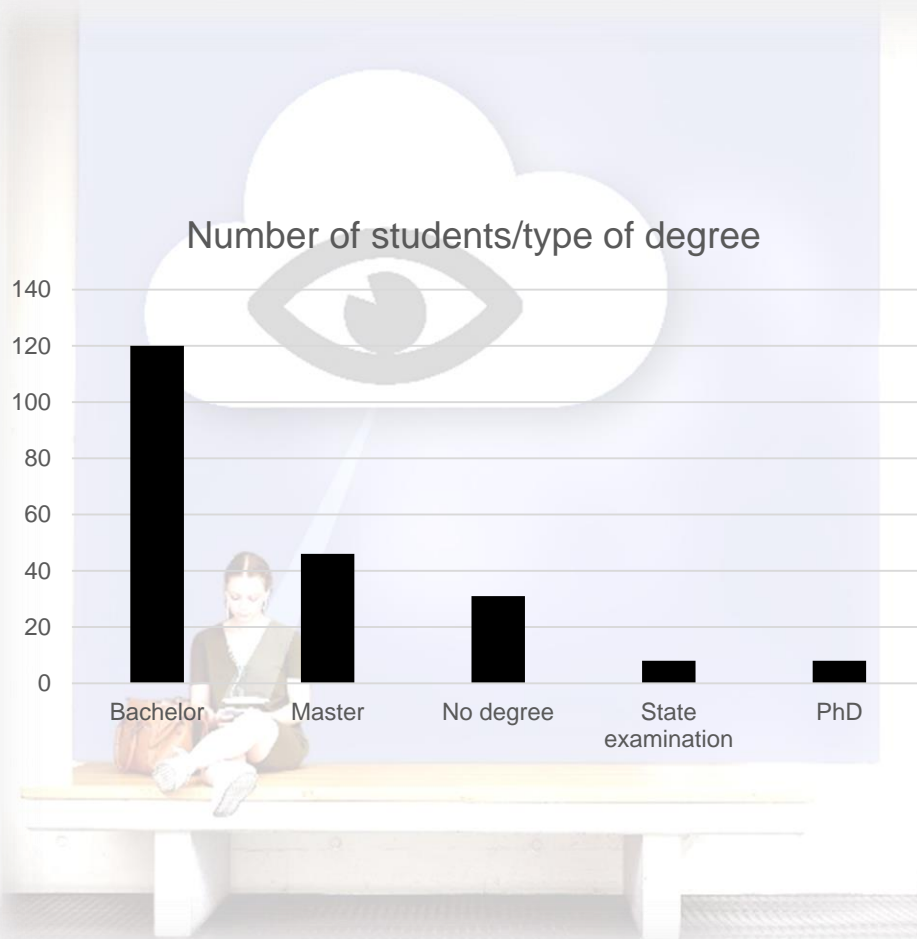
Big data is watching you!

213 registered participants

42 different major subjects



Big data is watching you!



Curricular integration

#History #Physics #Sociology

Establishing Data Literacy as a goal for teaching and learning

Development of (discipline-specific) concepts:

- Which are the key data competencies for which discipline?
- How can these competencies fit into existing curricula?
- Which requirements have to be met (i.e. training, infrastructure)?
- Evaluate if basic data courses can be opened for students of other disciplines
- Exchange for teachers



Quality Fund for Teaching

Internal call for proposals for innovative teaching concept
(up to 5.000 €/concept)

Summer term 2019 and winter term 2019/2020:
call for concepts to support literal, mathematical and data
competencies

-> The majority of proposals has a clear focus on data
literacy education



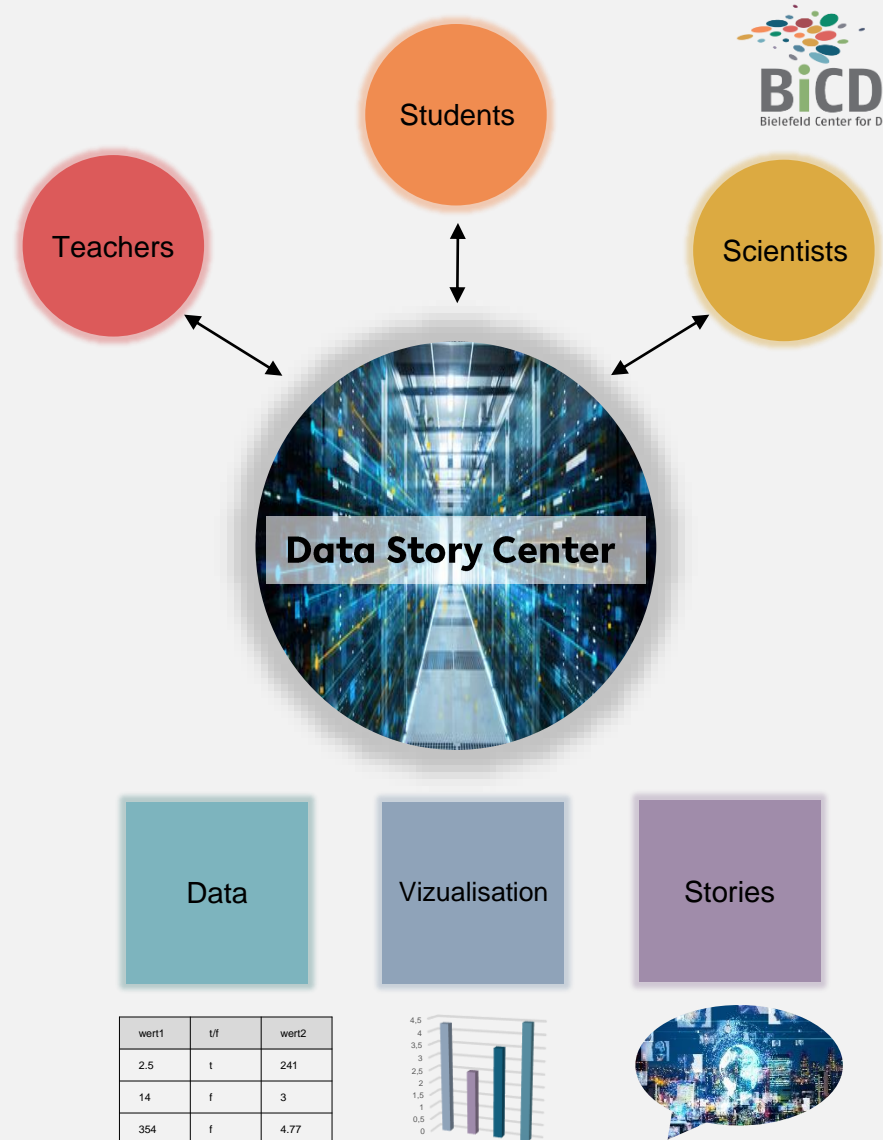
Data Story Center

Find, share and understand data

Web portal for students, teachers and scientists

Resource for real world data

Case studies for analysis, visualisation and interpretation of different types of data



Data Literacy Education as a Joint Task



Data Literacy Education.nrw

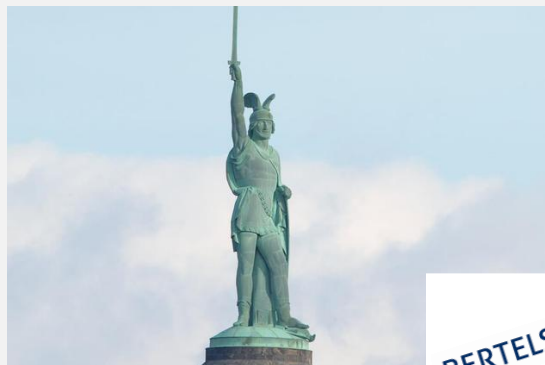


Die Landesregierung
Nordrhein-Westfalen



State funding program

OWL = Ostwestfalen-Lippe



Das Technologie-Netzwerk
Intelligente Technische Systeme OstWestfalenLippe

it's owl

BERTELSMANN

Miele



PHÖNIX
CONTACT

CLAAS



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BIELEFELD

UNIVERSITÄT
PADERBORN

FH Bielefeld
University of
Applied Sciences

TH OWL
TECHNISCHE HOCHSCHULE
OSTWESTFALEN-LIPPE
UNIVERSITY OF
APPLIED SCIENCES
AND ARTS

HfM Detmold
HOCHSCHULE FÜR MUSIK

DataLiteracySkills@OWL

Aims of the concept:

1. Raising Data Awareness
2. Developing and anchoring data competencies as a subject in teaching and learning for all disciplines
3. Paving the way for lecturers
4. Developing a corporate data literacy education framework as a basis for an OWL-wide data literacy certificate



FH Bielefeld
University of
Applied Sciences

Coming in 2020

Data Literacy Skills for science, economy and society in OWL **and beyond**

Conclusion

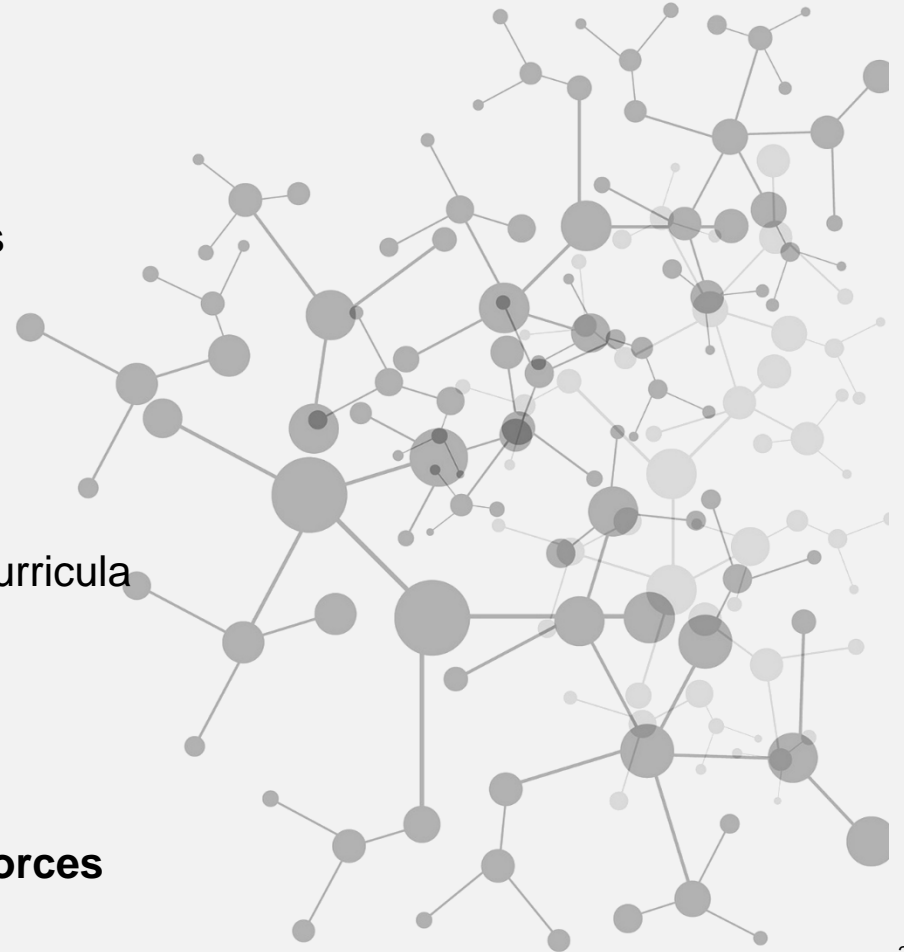
The Digital Turn is cause and consequence for novel skills and competencies...

...but how can we implement them?

Develop strategies to bring these competencies into the curricula

Bring together stakeholders, foster interdisciplinarity

Overcome borders to learn from each other and join forces



Thank you!



Juliane Theiß
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