# Education about Datafication

## Conceptualising "Critical Datafication Literacy"

Projekt Data Science und Big Data in der Schule (ProDaBi)
Online Colloquium
15.01.2025, 17-18:00

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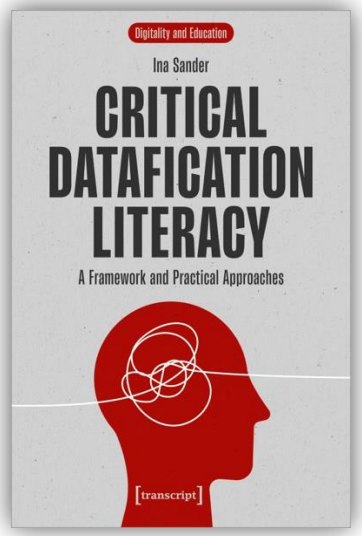
# The Project

- PhD research at *Data Justice Lab*, Cardiff University
- “Collaborative Doctoral Training Partnership”, supported by the *Economic and Social Research Council Wales*
- Cooperation partner: NGO *Privacy International*
- Results published in 2024 book:
  **Critical Datafication Literacy. A Framework and Practical Approaches**



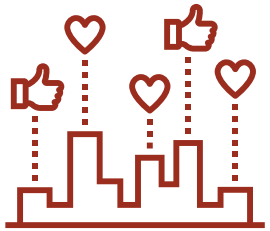
# Background

Why do we need critical education about datafication?

# Context: The datafication of our societies

**The "age of datafication":**

"Profound transformation in how society is ordered, decisions are made, and citizens are monitored through 'big data'" (Hintz et al. 2018, p.2f)



- Data systems & algorithms in almost all areas of life, growing decision-making power
- Opportunities and hopes around efficiency, objectivity, modernisation, …
- But also various risks, such as:
  - Privacy & surveillance
  - Personalisation & microtargeting
  - Misinformation & deep fakes
  - Lacking transparency
  - Influence of private companies, shifts in power dynamics
  - Data are never neutral → reinforcement of existing discriminations
  - Etc.

# Lacking knowledge

**But:**

The **majority** of users don’t know why **Google and Facebook are free** of charge to use
(Akman 2022, p.22, 26)

**48 percent** of Europeans don‘t know what an **algorithm** is and are unaware “that algorithms are already being used in many areas of life“
(Grzymek & Puntschuh 2019, p.10)

“**95%** say it's important to know their data is **secure**”
"**42%** would like to do more to change their **privacy settings** but don't know how”
(Miller et al. 2018, p. 16f)

# Datafication as a challenge for education

Apart from regulation and stronger data protection measures, education about data technologies is increasingly discussed as:

"**the most plausible and successful strategy to combat the challenges of datafication**"

(Pangrazio und Sefton-Green 2020, p.212).

→ **Various new literacies:**

Data Infrastructure Literacy

Information Literacy

Algorithm Literacy

Personal Data Literacy

Big Data Literacy

Digital Literacy

Creative Data Literacy

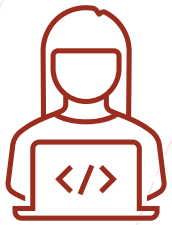
Data Literacy

Statistical Literacy

Digital Sovereignty

→ ‚Literacification of everything'? (Hug 2019)

# Datafication as a challenge for education



- Various new literacies are developed, but most focus on **practical skills**: collecting, analysing, interpreting data etc. = ‚key future skill'?
  - Is this **enough**? How useful for **societal challenges**?
  - Fostering merely practical skills can in fact be **harmful for children and young people** (Livingstone 2021, p.21f)
- Growing discourse around **critical data literacy**, but:
  - Rarely focus on critical, reflexive understanding of the structural implications of datafication on our society
  - Only few concepts have a grounded theoretical foundation and connect to established educational theories

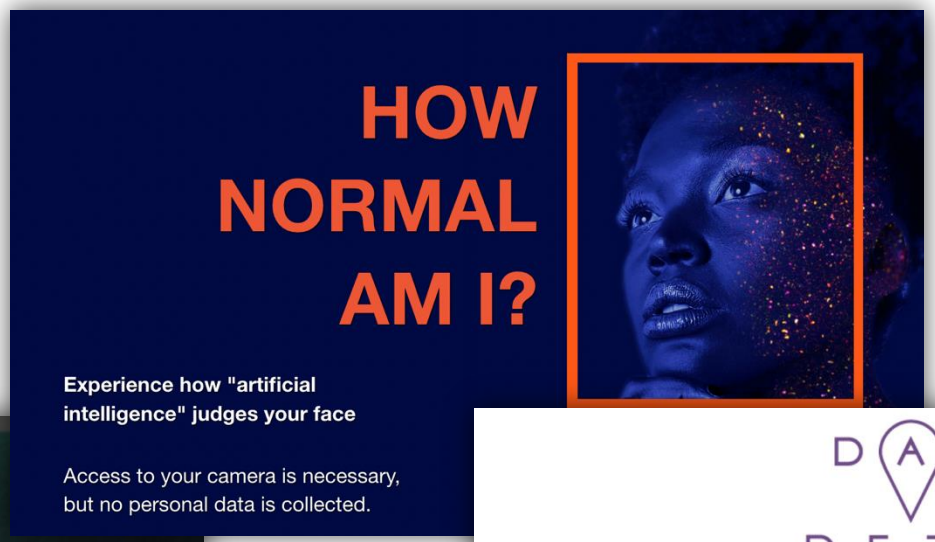
„To become a meaningful strategy 'data literacy' requires both a **more complete theorisation** and **complex practical development**."
(Pangrazio & Sefton-Green 2020, S.208)

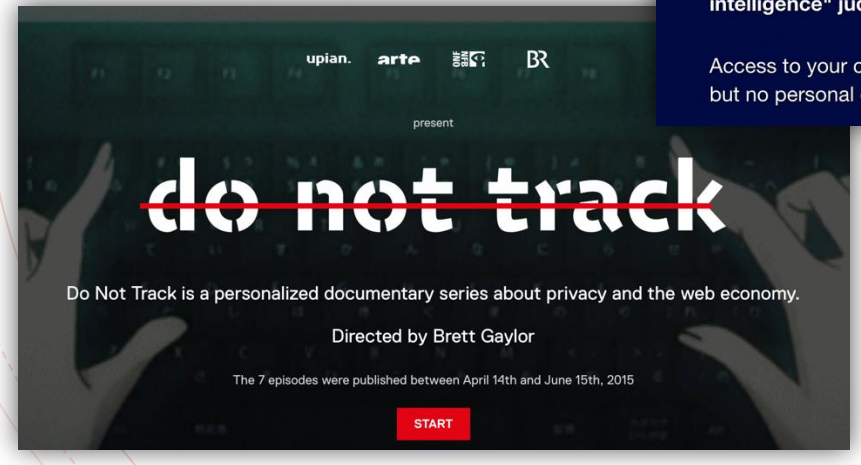
# How can a more grounded conceptualisation be developed?

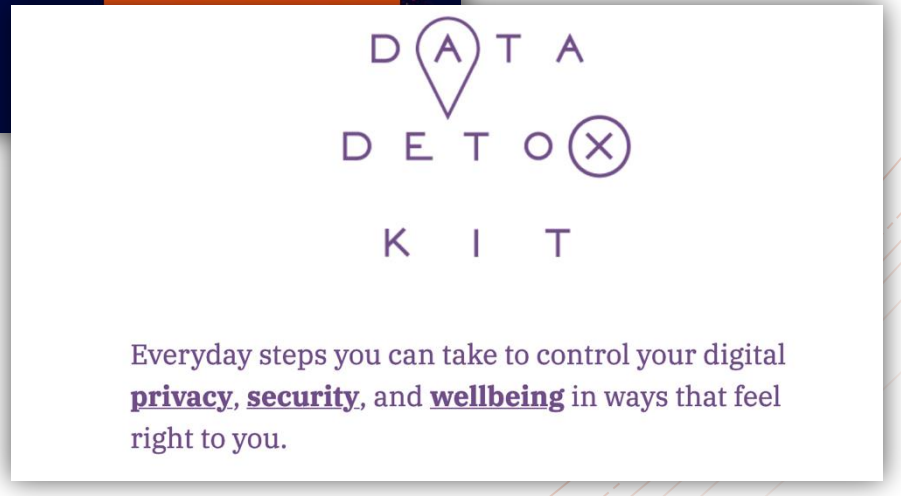
**Goal: Interconnection of theory and practice to develop grounded literacy framework**

Learn from:

- → Existing literacies,
- → Established education theories,
- → Practitioners, who foster critical education about data(fication) on a daily basis

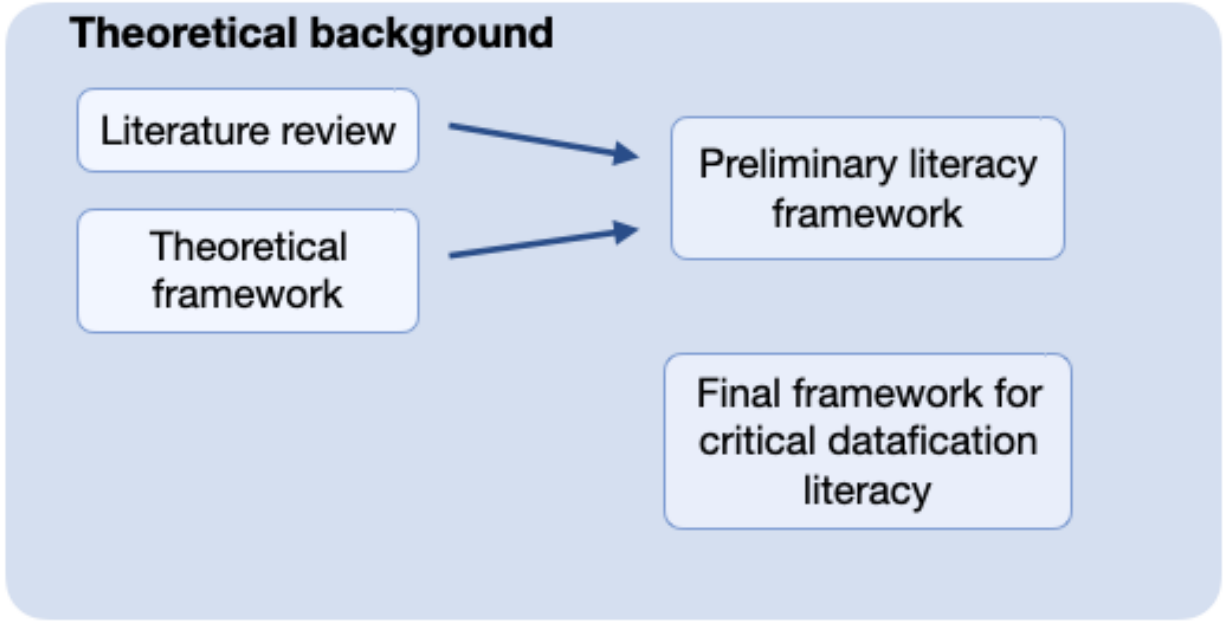


# Study design

Developing a theoretically and empirically grounded framework for education about datafication



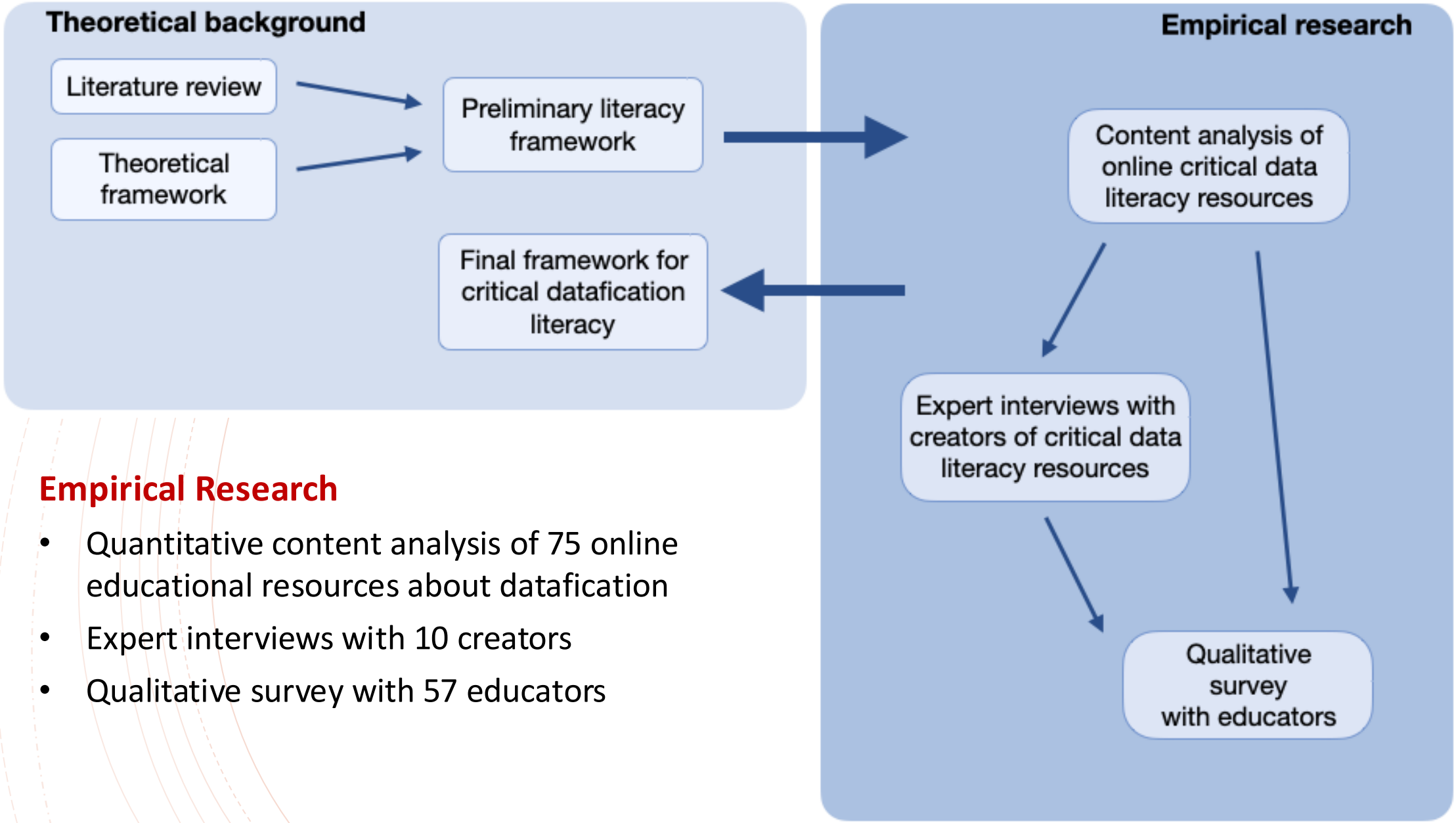

# Toward Critical Datafication Literacy

**Study design:**

→ Goal: Interconnection of theory and practice to develop grounded literacy framework

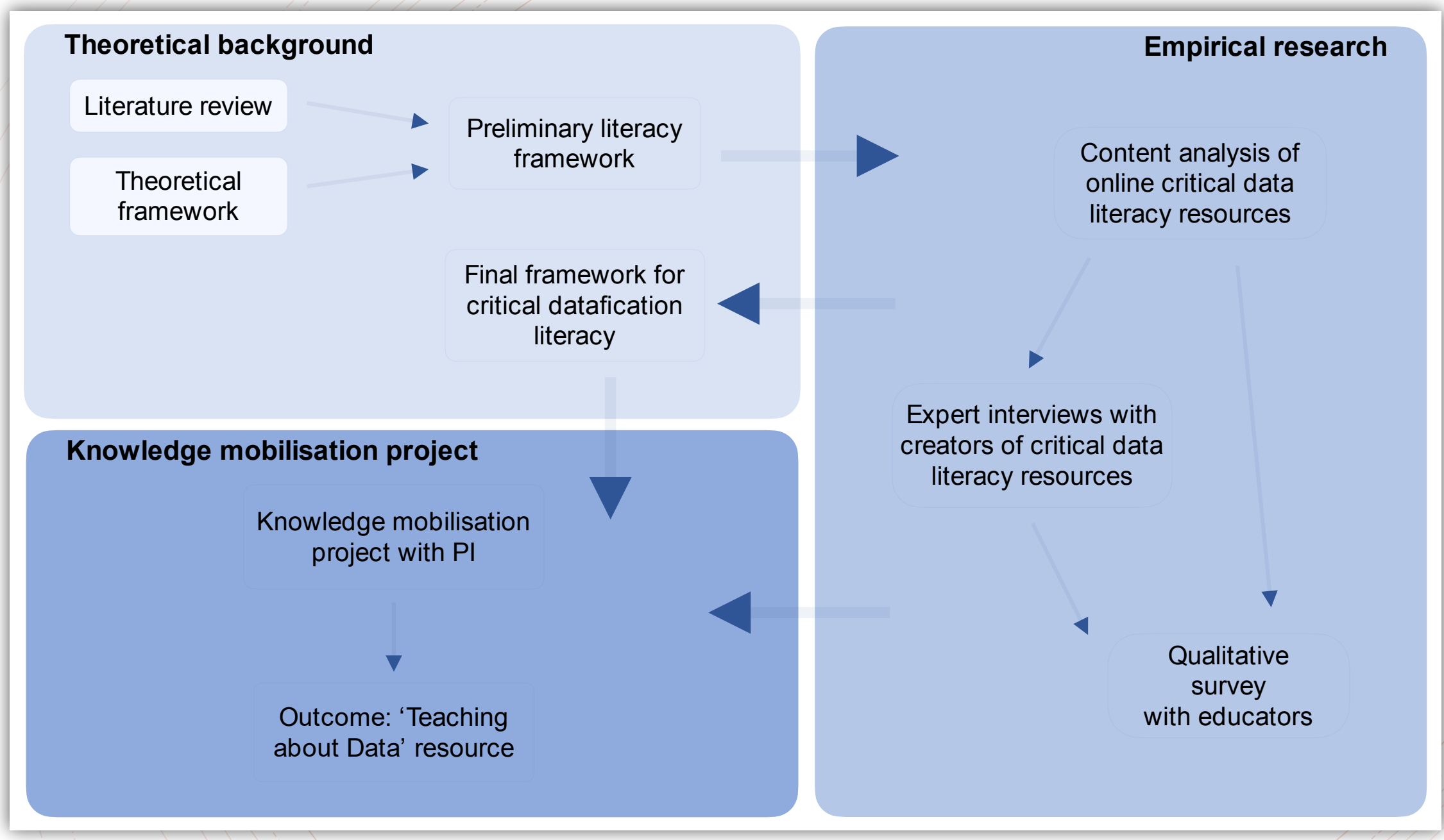
## Theory

- Review of Critical Data Studies, (Critical) Data Literacies
- Theoretical Framework: Media Literacy, (politische) Bildung, Paulo Freire‘s Critical Pedagogy




## Empirical Research

- Quantitative content analysis of 75 online educational resources about datafication
- Expert interviews with 10 creators
- Qualitative survey with 57 educators

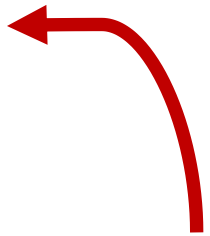

Theoretical background
Literature review
Theoretical framework
Preliminary literacy framework
Final framework for critical datafication literacy
Empirical research
Content analysis of online critical data literacy resources
Expert interviews with creators of critical data literacy resources
Qualitative survey with educators
Knowledge mobilisation project
Knowledge mobilisation project with PI
Outcome: 'Teaching about Data' resource

# Theory

Critical data literacy & established educational theories

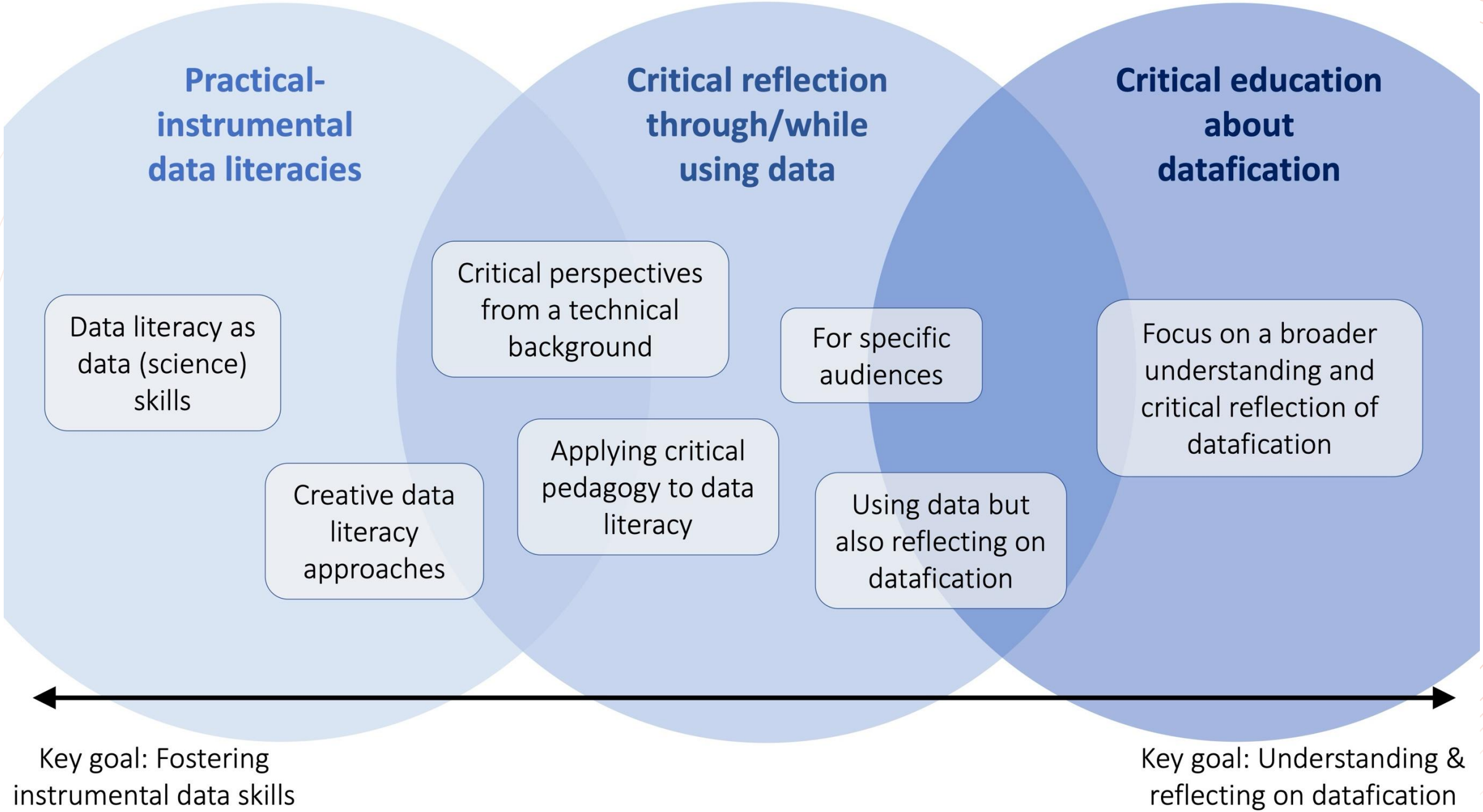
# Erkenntnisse aus der Theorie

1. Review of existing (critical) data literacy concepts
2. Theoretical analysis of established education theories
   a) **Digital / Media literacy**
   b) **(Politische) Bildung**
   c) **Critical Pedagogy** by Paulo Freire



Selection criteria:

- Established, internationally recognised educational concepts with strong theoretical foundation
- Understanding of education in the sense of empowering learners to form their own opinions and critique the world rather than a mere passing of knowledge
- Initial connections to data literacy


Practical-instrumental data literacies
Critical reflection through/while using data
Critical education about datafication
Data literacy as data (science) skills
Creative data literacy approaches
Critical perspectives from a technical background
Applying critical pedagogy to data literacy
For specific audiences
Using data but also reflecting on datafication
Focus on a broader understanding and critical reflection of datafication
Key goal: Fostering instrumental data skills
Key goal: Understanding & reflecting on datafication

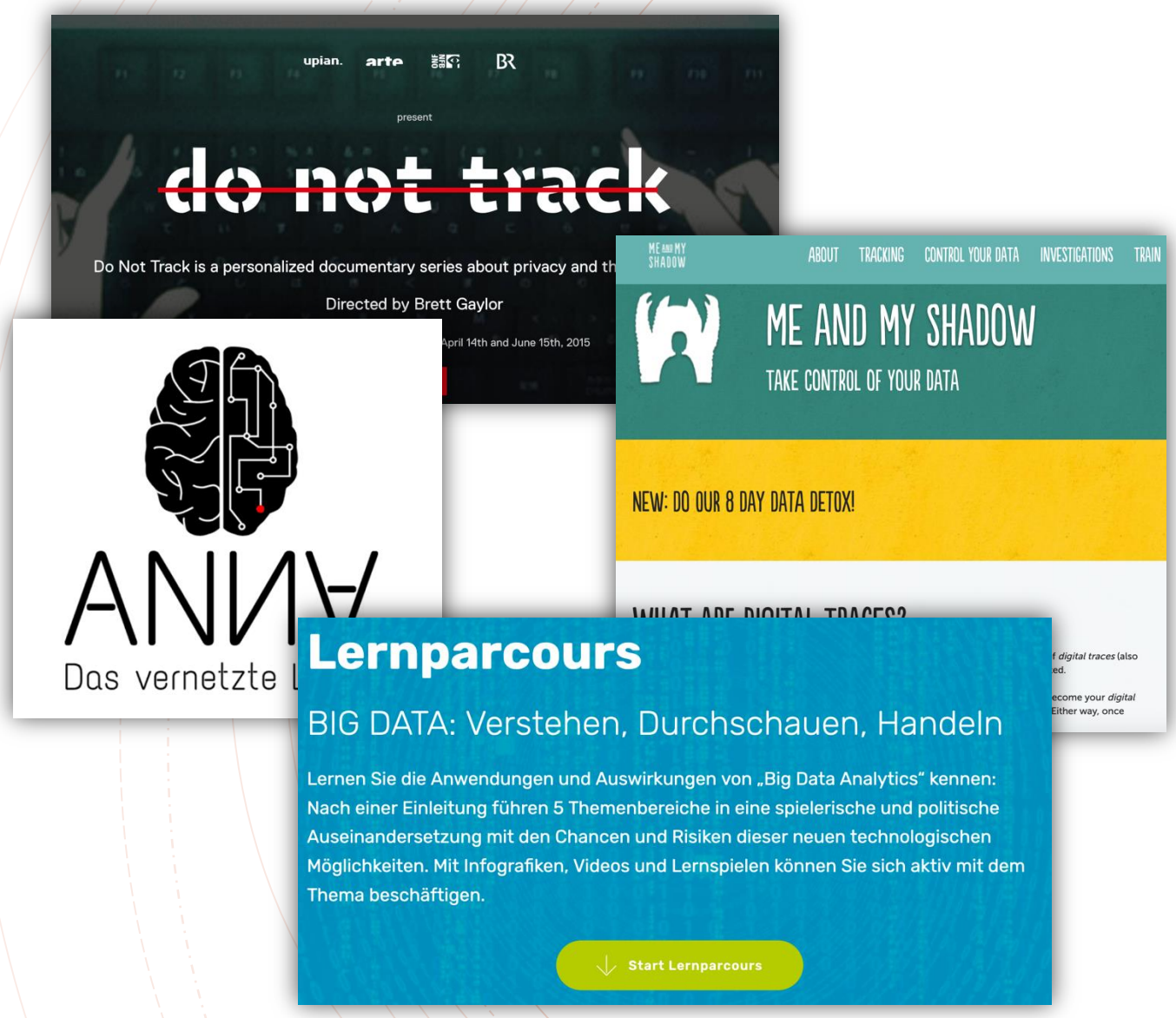
# Learning from established educational theories

- Fostering critique in the sense of: an analysis of **problematic societal processes**, reflection of one's own actions, ethical understanding of societal responsibility (Baacke 1997)
- Goals of education: **Sovereignty, critical thinking** and **empowerment** to form society according to one's own ideals (Aßman u.a. 2016; Autorengruppe Fachdidaktik 2016; Freire 2017)
- Foster **public discourse** and **citizen participation** (Mihailidis 2018; Autorengruppe Fachdidaktik 2016)
- Literacy should not be restricted to a subjective-individualistic level, but should rather be implemented at a s**upra-individual, societal level** (Baacke 1997)
- **Pedagogy *with* the learners** (Freire 2017)
- **No predefined topics**, but react to current societal challenges (Autorengruppe Fachdidaktik 2016)

# Empirical research

Online educational resources about datafication

# Quantitative content analysis + Expert interviews



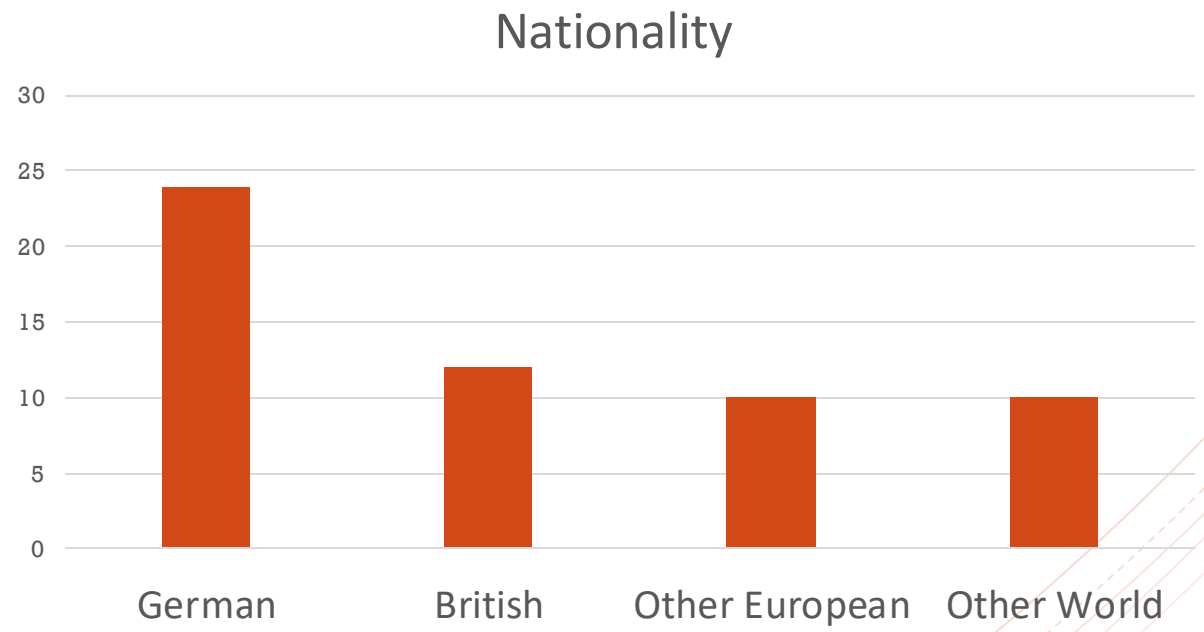

1. Anna. Das vernetzte Leben
2. Automating NYC
3. Center for Humane Technology
4. Clear Your Tracks
5. Datak – A game about personal data
6. Do Not Track
7. Lehrmittel Big Data
8. Lernparcours Big Data
9. Me and My Shadow
10. My Data and Privacy Online

**Goal**: understand the creators’ idea of literacy & the strategies they applied to foster this literacy with the users of their resource

# Qualitative survey with educators

→ What are educators' experiences with the topic datafication and what do educators from different backgrounds need and wish for from a critical data literacy resource?

- 57 participants
- 24 Germans, 12 British, 10 other European, 10 other world
- Different age groups
- Different areas of education



# Learning from the practitioners

**Three broad categories identified in interviews and survey:**

- *Topics and goals / understanding of CDL*: Which topics should be covered, what should people know / understand, which actions should they ideally take etc.
- *Strategies & methods*: How can the above be reached? Design principles, pedagogical strategies, methods etc.
- *Challenges, practical considerations & needs*: key challenges, practical considerations in the implementation of CDL, needs and wishes of educators

# Goals of the…

**… creators:**

*Awareness & basic understanding:*
Of the "assumptions baked into the product development process" (Jay)

*Thinking critically about datafication:*
"Give people a conceptual framework from which to enter" (Truong)
Apply "their own social and political frameworks" to technology (Jansen)

*Systemic or (infra)structural understanding:*
"Helping people have a systemic view on how this technology is limiting their agency" and
"Reveal[ing] the systemic forces underneath [social media]" (Jay)
"Sociological, societal understanding" (Younge)

**… educators:**

*Understanding & reflection*
"Myth of objective knowledge" (209)
"The social factors shaping technology" (202)
"Societal decisions on technology affect all of us" (122)

*Critical, systemic understanding:*
- Learners should "understand how society shapes technology and how technology shapes society, and what role power and agency play in these things" (301)
- "Technical perspectives" and skills are less important than "analytical-reflexive abilities" (174)
- Prepare students for "an ethical thinking on unforeseeable yet emerging technologies" (282)

# Goals of the…

**… creators:**

*Taking action:*
"The question is then always: What now? […] What results from this?" (Reicherstorfer)
vs.
The question of "what can I do?" is "not the right question to ask about systemic issues. You probably can't do that much" (Gaylor)

- Give users "better control" of their data (Stoilova) & empower people to make "enlightened choices" (Schekter)
- Make "children more active participants and citizens in a digital environment" (Stoilova)
- "Sure, you can change your device settings, but you could also message a political party. […] Form your opinion and then voice it!" (Lordieck)

**… educators:**

*Practical skills*
"Basic facility in accessing and using technology (skills)" (345) / "Production skills for social media" (319) / "Statistical literacy" (289)
vs.
"Digital selfdefense ..., avoid tracking and surveillance and manipulation" (341)
&
"Tech intuition: the ability to make confident decisions about technology due to an understanding of social impact even if lacking a full understanding of the nuts and bolts of every tool or system." (316)

*(Ability to) take action:*
"This type of engagement is political" (209)
"Actively helping to shape the digitising society" (218)

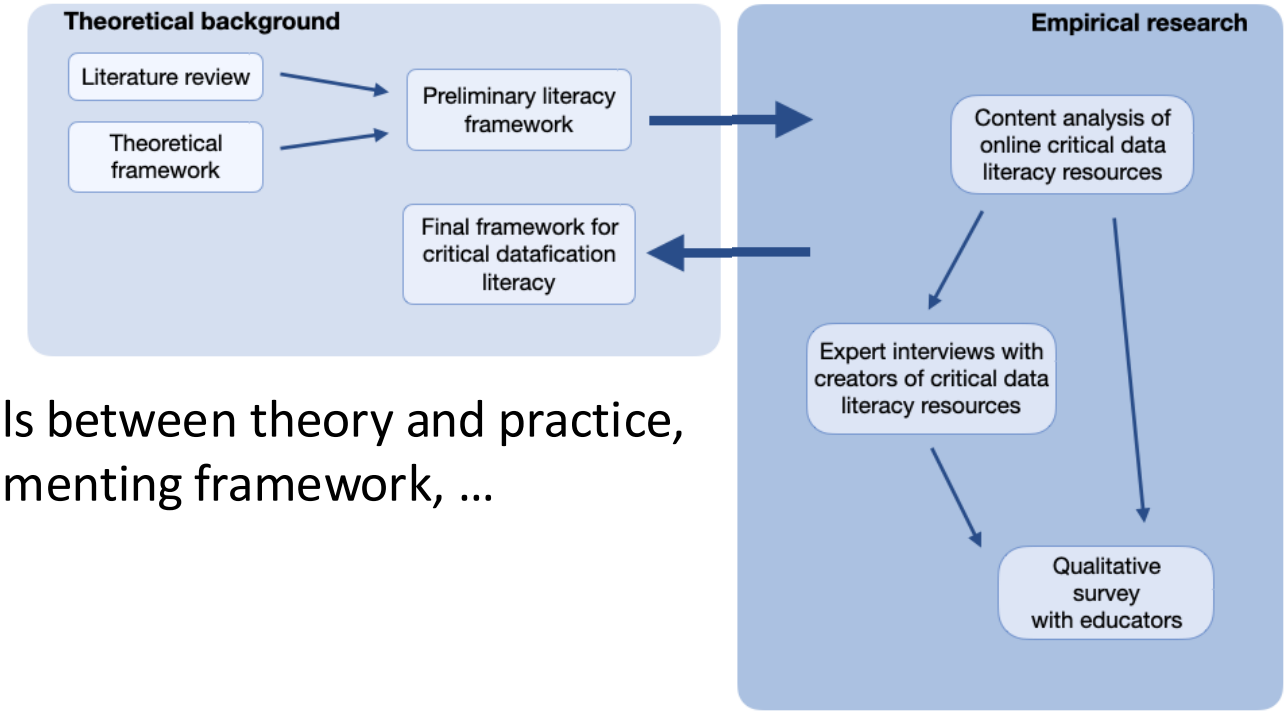
# Learning from the practitioners

**Key insights:**

- Parallels between creators and educators – despite different sampling criteria!
- Manifold parallels to theoretical insights
- Many participants follow a **reflective** and **emancipatory** notion of education and aim to foster **critical thinking** about data technologies
- Surprisingly common: **collective approaches** (e.g., fostering societal or political action)

# Developing the critical datafication literacy framework

- Development of preliminary framework after theoretical analysis:
  collecting and structuring all findings on what critical education about datafication should encompass; identifying overlaps and patterns; successively narrowing down to key aspects; writing draft framework.
- Decision against including the implementation into the framework → needs to be specific to the individual group of learners! No 'one-size-fits-all'
- Empirical research: Thematic Content Analysis to identify key themes in (among others) goals:
  *What should citizens know / understand, which actions should they ideally take?*
- Revision of preliminary framework based on these themes: Identifying many parallels between theory and practice, reviewing and settling differences, complementing framework, …
- → Final framework!



# Final framework

Critical datafication literacy

# Critical datafication literacy

Published in:
Sander, I. (2024). "Critical datafication literacy – a framework for educating about datafication", *Information and Learning Sciences*, 125(3/4), p.270-292.
https://doi.org/10.1108/ILS-06-2023-0064

## 1) Fostering systemic understanding of datafication

- Awareness & understanding of the datafication of our societies
- 'Tech intuition' rather than understanding technical details
- Topics & examples determined by current challenges

## 2) Encouraging critical thinking about data technologies

- Evoke scrutiny & critical reflection of datafication processes
- Frameworks for thinking differently & forming own opinion
- 'Mündigkeit' in datafied societies

## 3) Enabling learners to take different forms of action

- Enable: giving 'enlightened' users the *choice* to resist
- Different forms of action: data protection, but also alternative & more collective approaches to address the *systemic issues* around datafication

# Conclusion

- Many **parallels** between education theory and education practices
  → often not yet common in existing critical data literacy concepts
  - **Much can be learned from (small group of) critical data literacy practitioners!**
- **Standing on the shoulders of giants** → Developing a framework that builds on established education theory AND on experiences of practitioners
- Methodological challenge: combining numerous approaches into one framework
- Besides CDFL framework, novel findings on **practical strategies and methods** for critical education about datafication
  - Detailed findings in Open Access book “Critical Datafication Literacy. A Framework and Practical Approaches” (transcript, 2024)
  - Knowledge Mobilisation Project with NGO Privacy International: Guide ”Teaching about data” for educators

OA book:

Guidebook in English and German:

# Thank you

… for your attention!