

SciCom Wiki:

A Digital Library to Support the Science Communication Knowledge Infrastructure for Videos and Podcasts

Tim Wittenborg, Niklas Stehr, Oliver Karras, Soren Auer



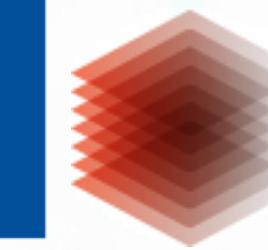
slides



L3S



Leibniz
Universität
Hannover



TIB LEIBNIZ-INFORMATIONSZENTRUM
TECHNIK UND NATURWISSENSCHAFTEN
UNIVERSITÄTSBIBLIOTHEK

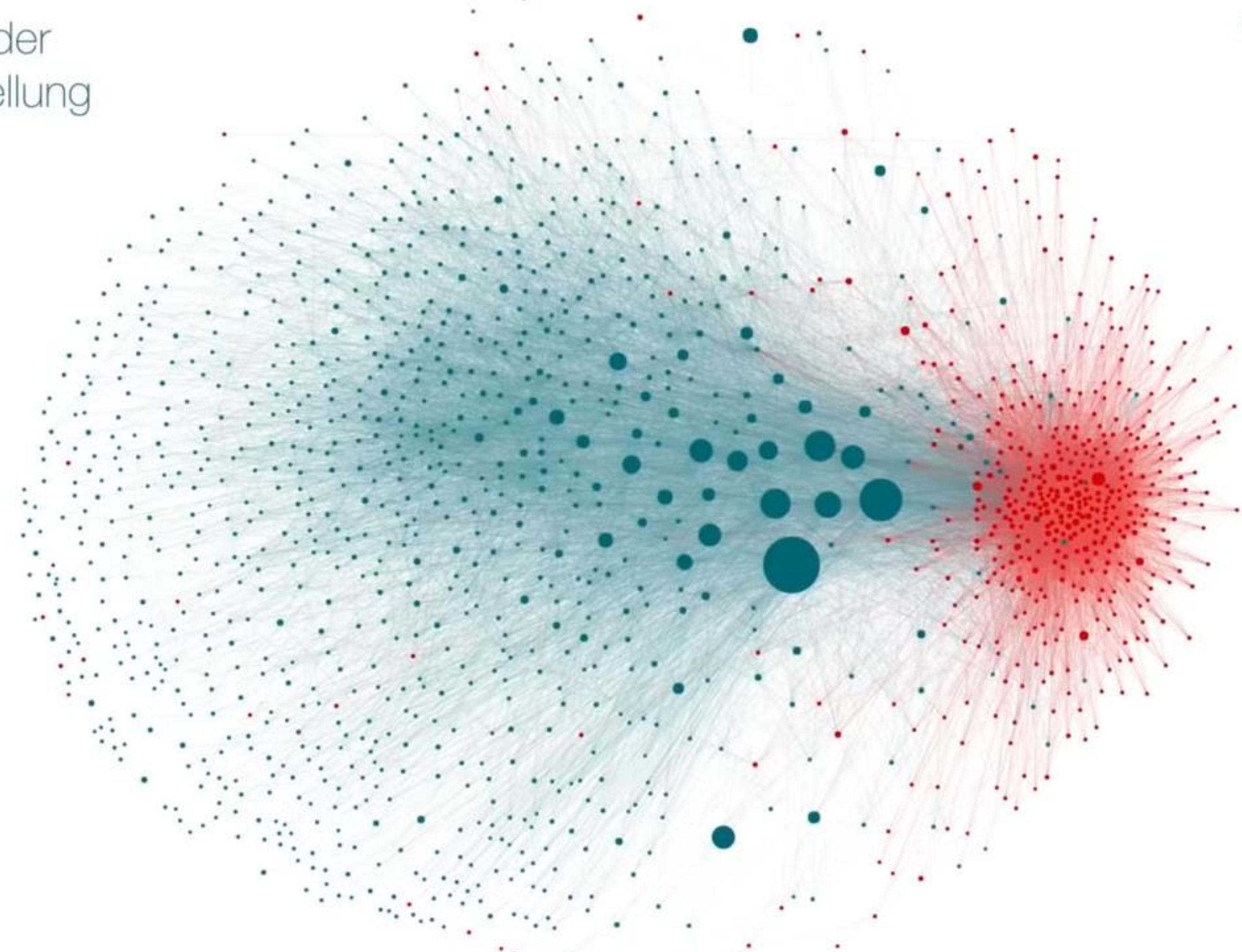


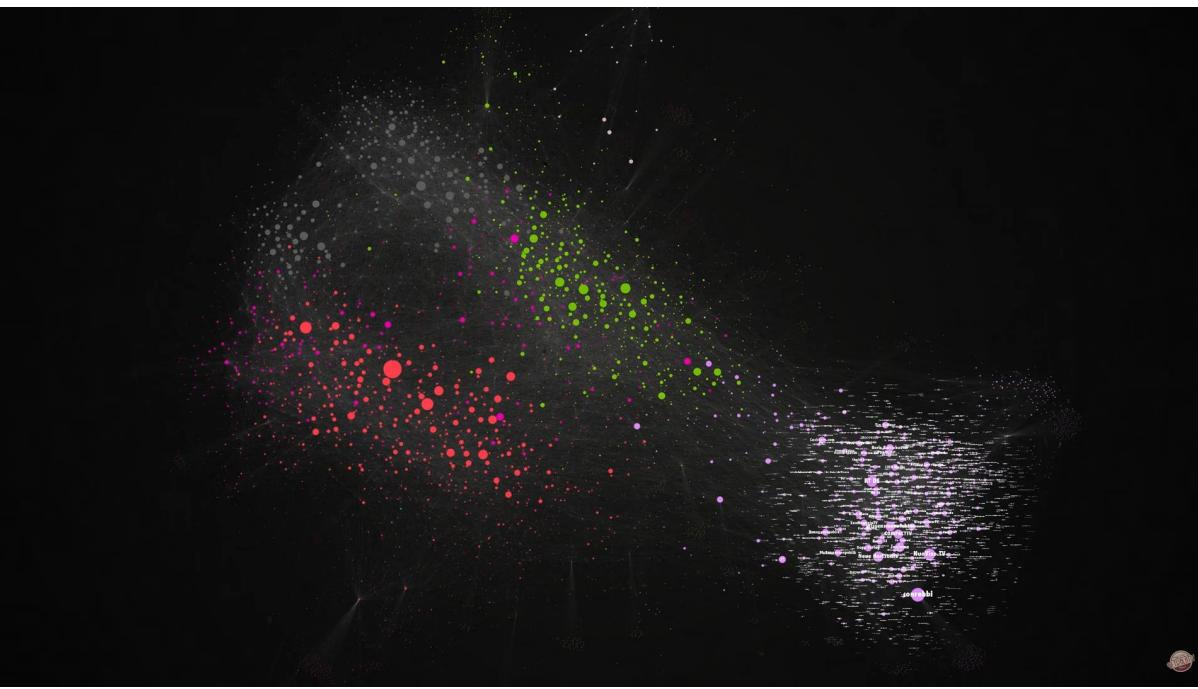


EACH COLOR
=
DIFFERENT COMMUNITIES

Verbreiter der
Gegendarstellung

Verbreiter der
Fake News

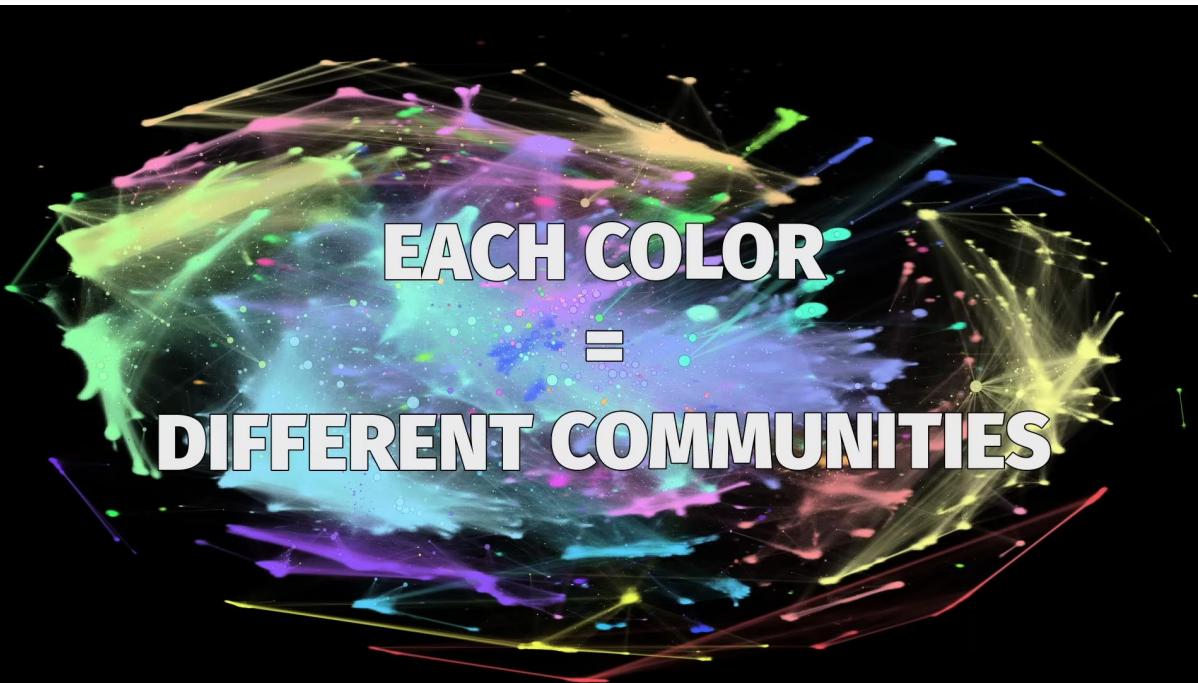




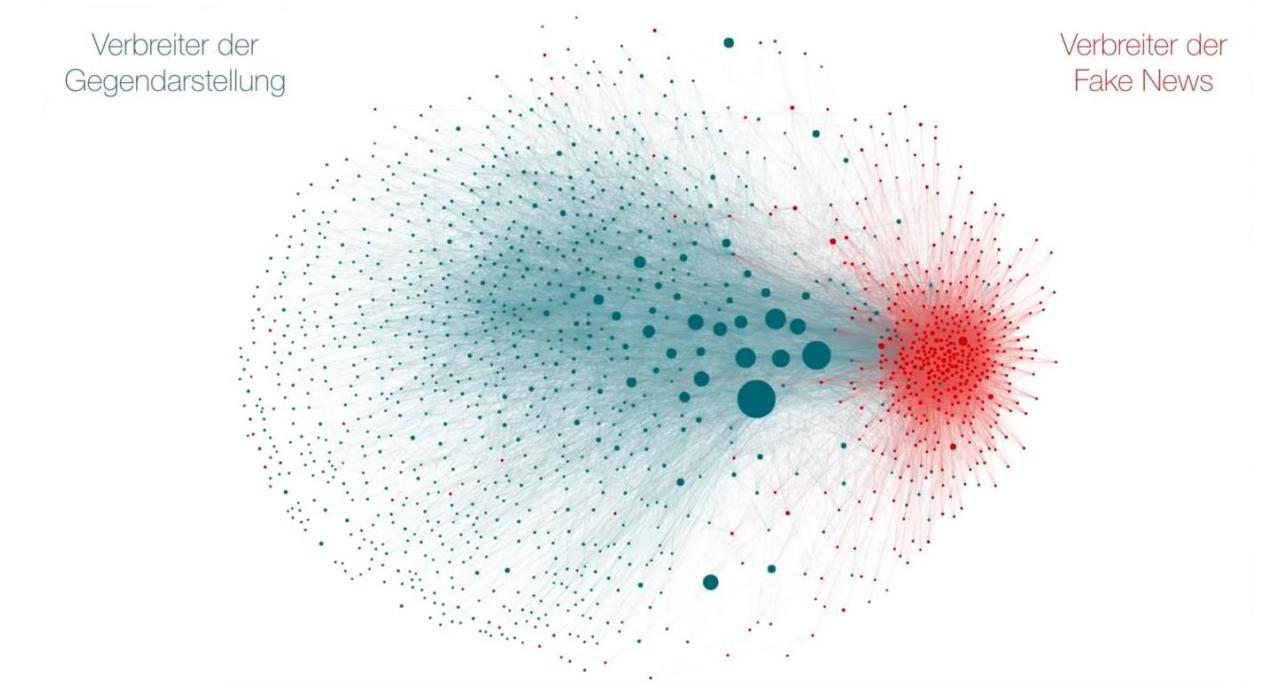
[1]



[2]



[3]



[2]

[1] Ich habe ganz YouTube Deutschland ausgewertet und analysiert, Ultralativ, 2021, <https://www.youtube.com/watch?v=jXb-zSPjhPI>

[2] Y'all Are Nerds (According to Math), Not David, 2023, <https://www.youtube.com/watch?v=o879xRxmwmU>

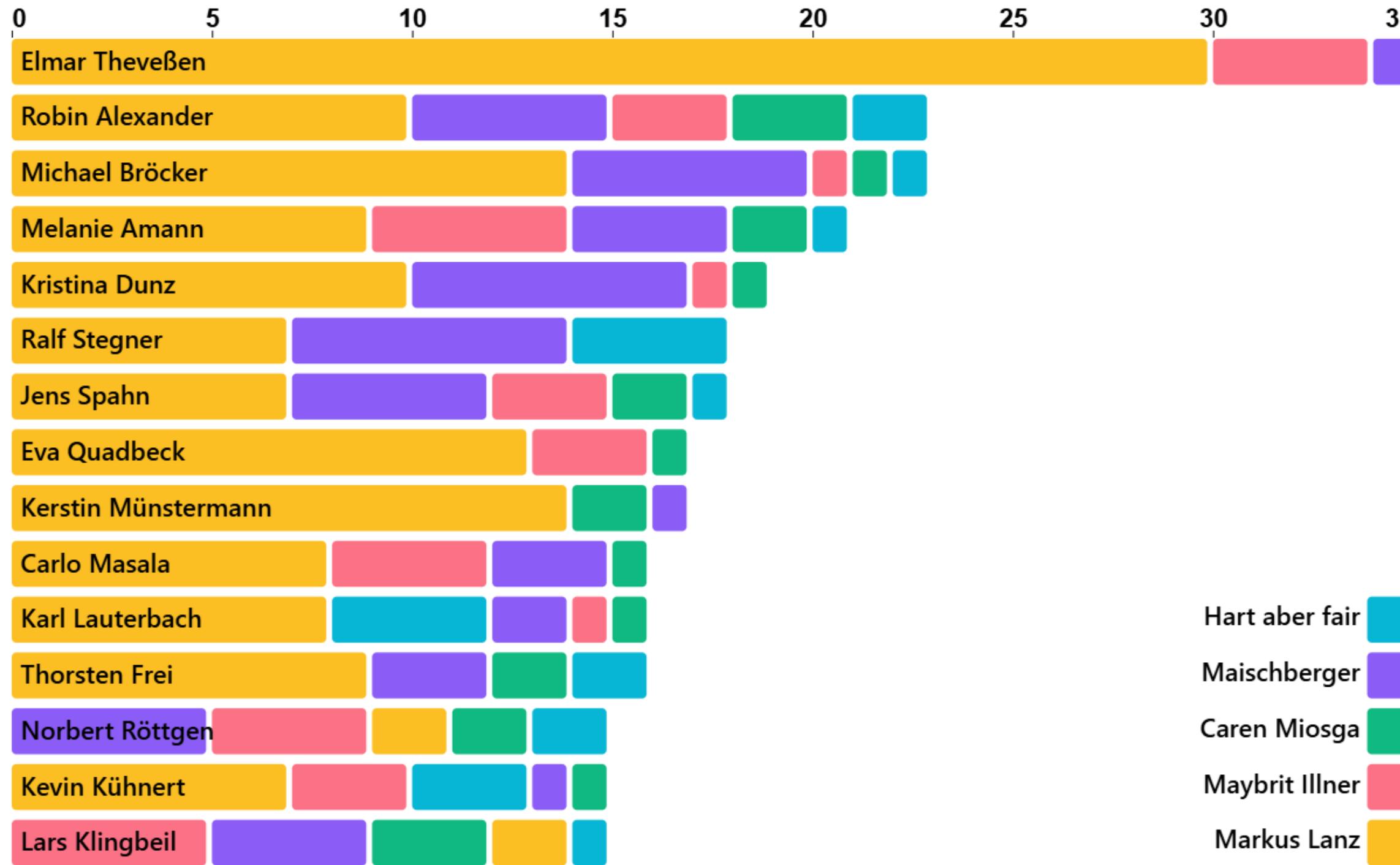
[3] I Made a Graph of Wikipedia... This Is What I Found, adumb, 2024, <https://www.youtube.com/watch?v=JheGL6uSF-4>

[4] Social Bots, Fake News und Filterblasen, Michael Kreil, 34C3, 2017, <https://media.ccc.de/v/34c3-9268-social-bots-fake-news-und-filterblasen>

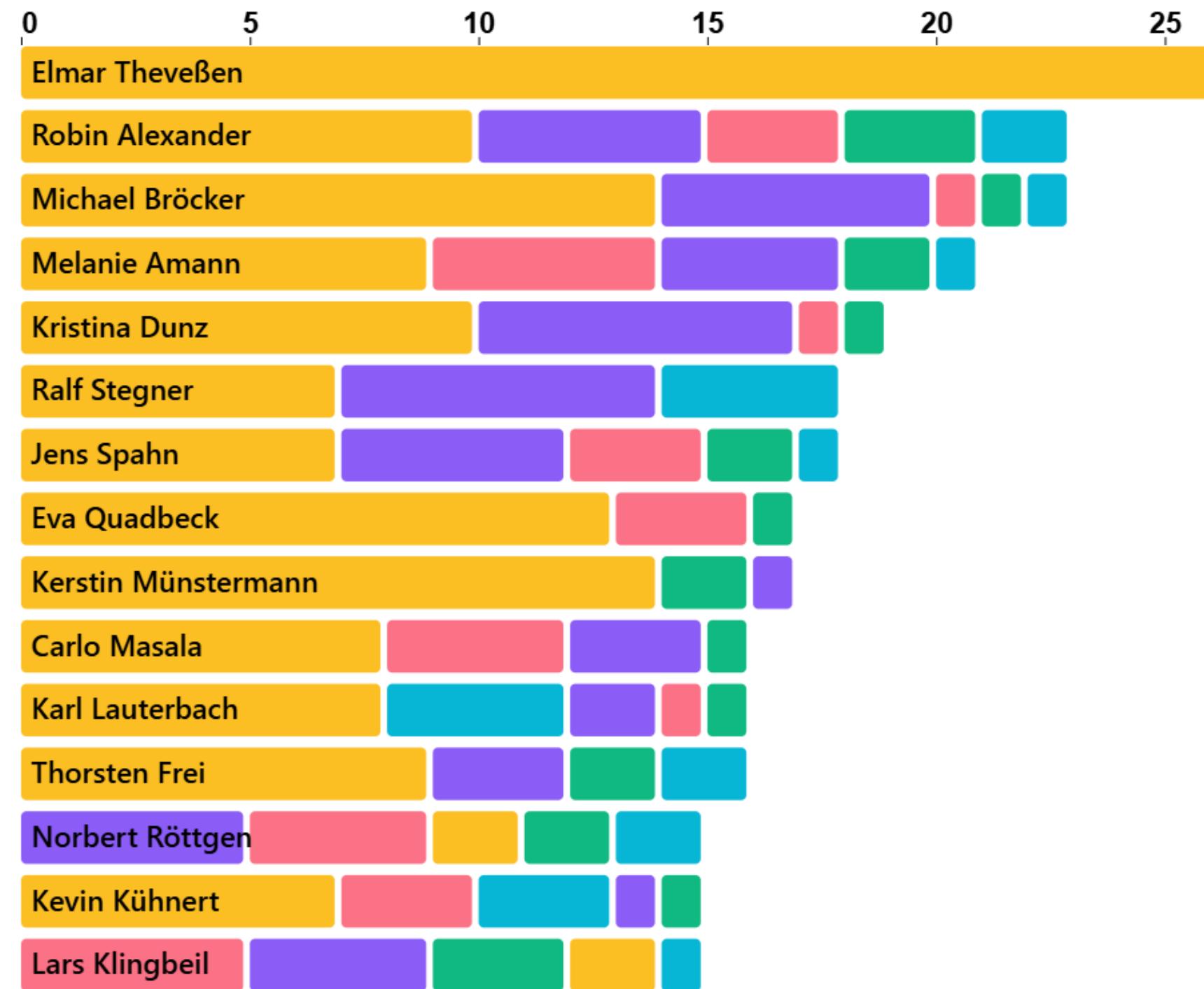
arrrrrmin: LanzMining - Wer spricht denn da?

arrrrrmin: LanzMining - Who's speaking?

(5 r btw.)



Wikimedia DE asked the same:

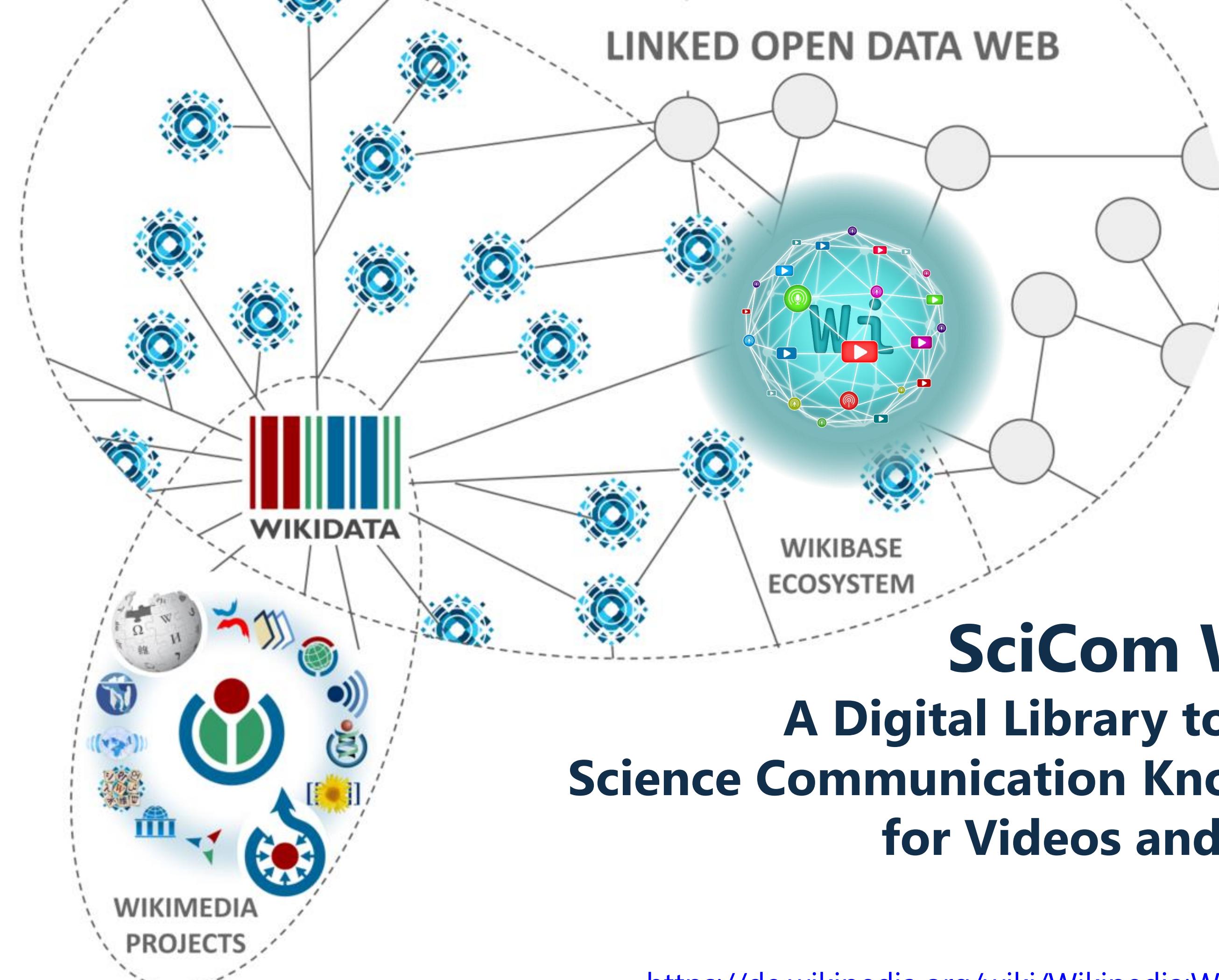


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wd:Q11258387	Kerstin Münstermann	11	
wd:Q19296295	Michael Bröcker	9	
wd:Q2429104	Thorsten Frei	8	Christlich Demokratische Union
wd:Q59195312	Eva Quadbeck	8	
wd:Q28860557	Melanie Amann	7	
wd:Q55387377	Kristina Dunz	7	
wd:Q112815	Carlo Masala	6	
wd:Q105676	Karl Lauterbach	6	Sozialdemokratische Partei Deutschlands
wd:Q16937572	Robin Alexander	6	
wd:Q65966910	Gerald Knaus	5	
wd:Q13156435	Sonja Álvarez	5	
wd:Q86294	Jens Spahn	5	Christlich Demokratische Union



SciCom Wiki:

A Digital Library to Support the Science Communication Knowledge Infrastructure for Videos and Podcasts





SciCom Wiki:

A Digital Library to Support the

Science Communication Knowledge Infrastructure

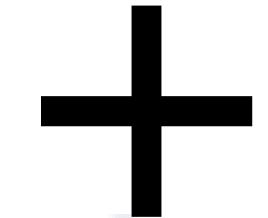
for Videos and Podcasts

LINKED OPEN DATA WEB

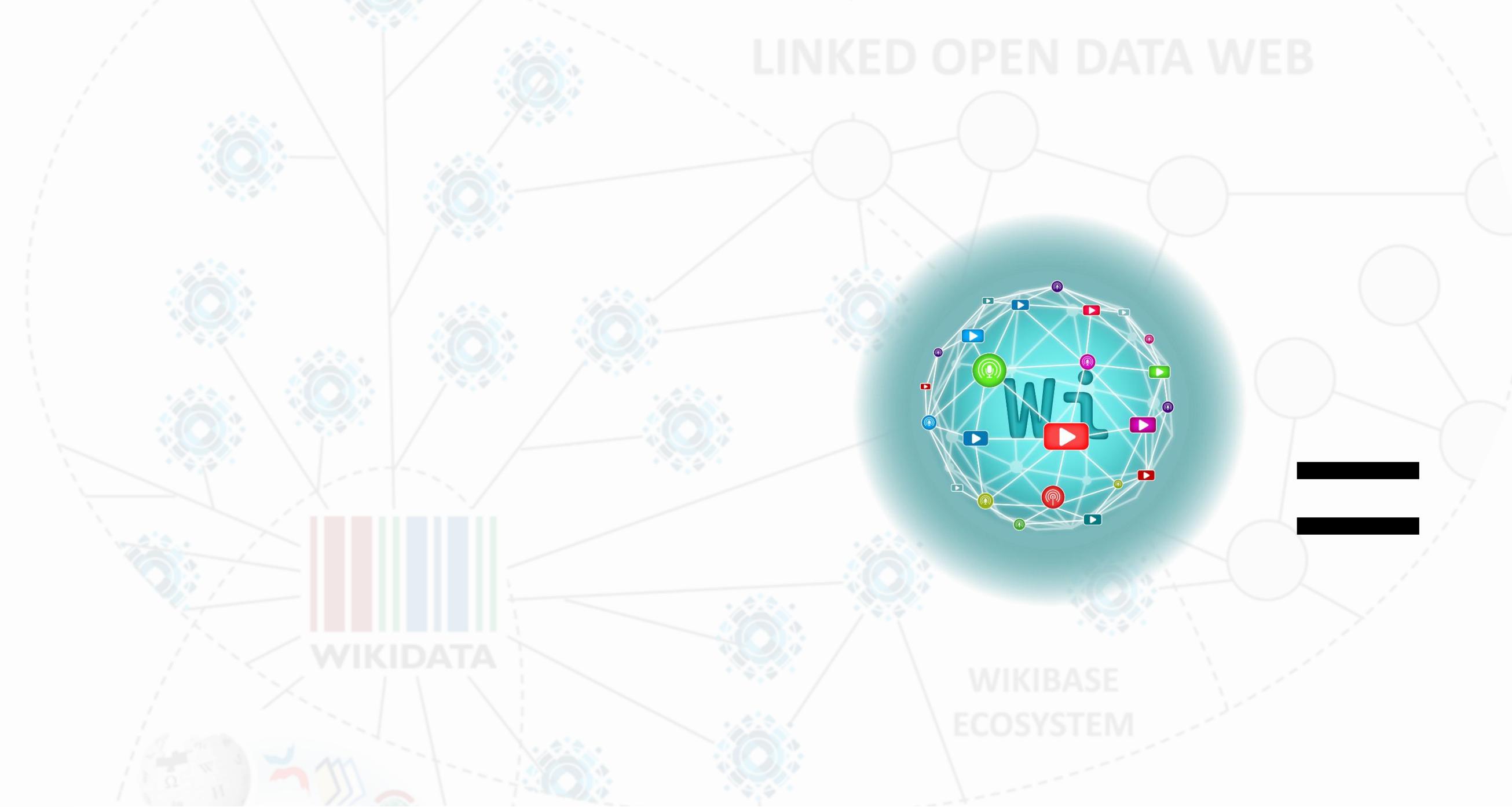


WIKIBASE
ECOSYSTEM

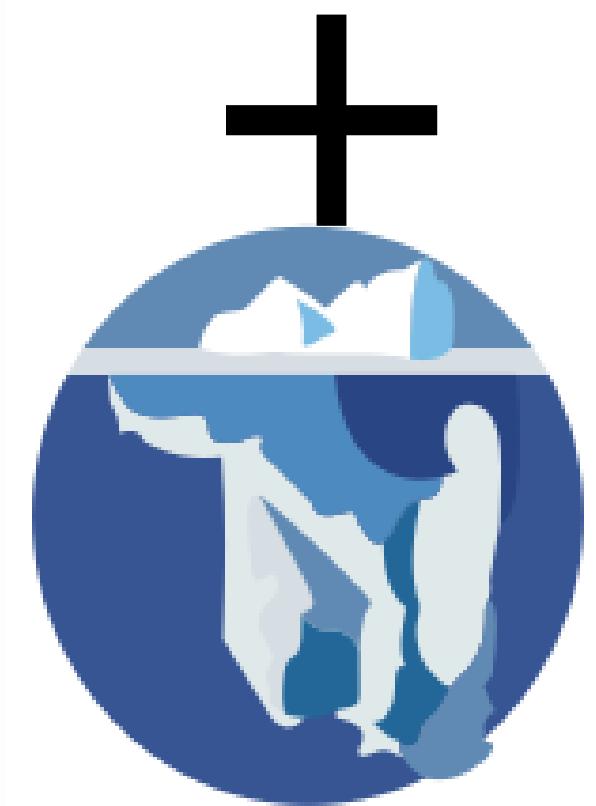
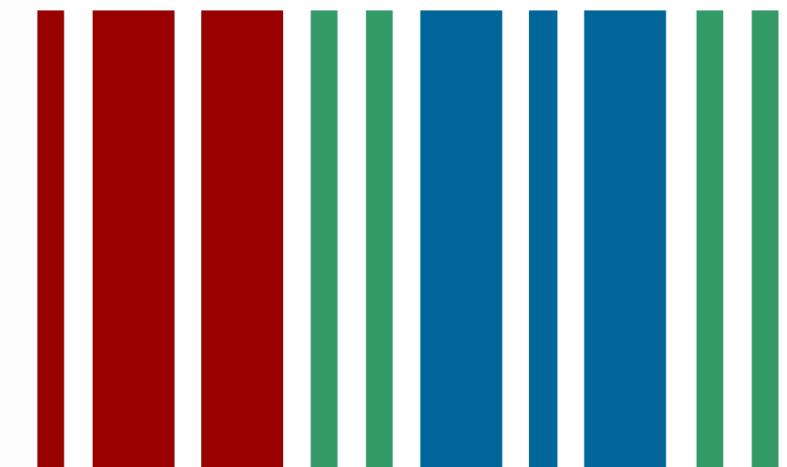
=



WIKISOURCE



- *For not-always-CC0 information about videos and podcasts*



Wi

ALREADY IDENTIFIED:
100.000+ VIDEOS
100+ PROPERTIES
10+DATA SOURCES

ZENODO

ORKG

PAPER



SOURCE

AV-URL

MEDIA FILE



TRANSCRIPT



RESEARCH DATA
(e.g. SALIENCY)

DATASET

MEDIA
ITEM

TOPIC



ORGANISATION



GUEST



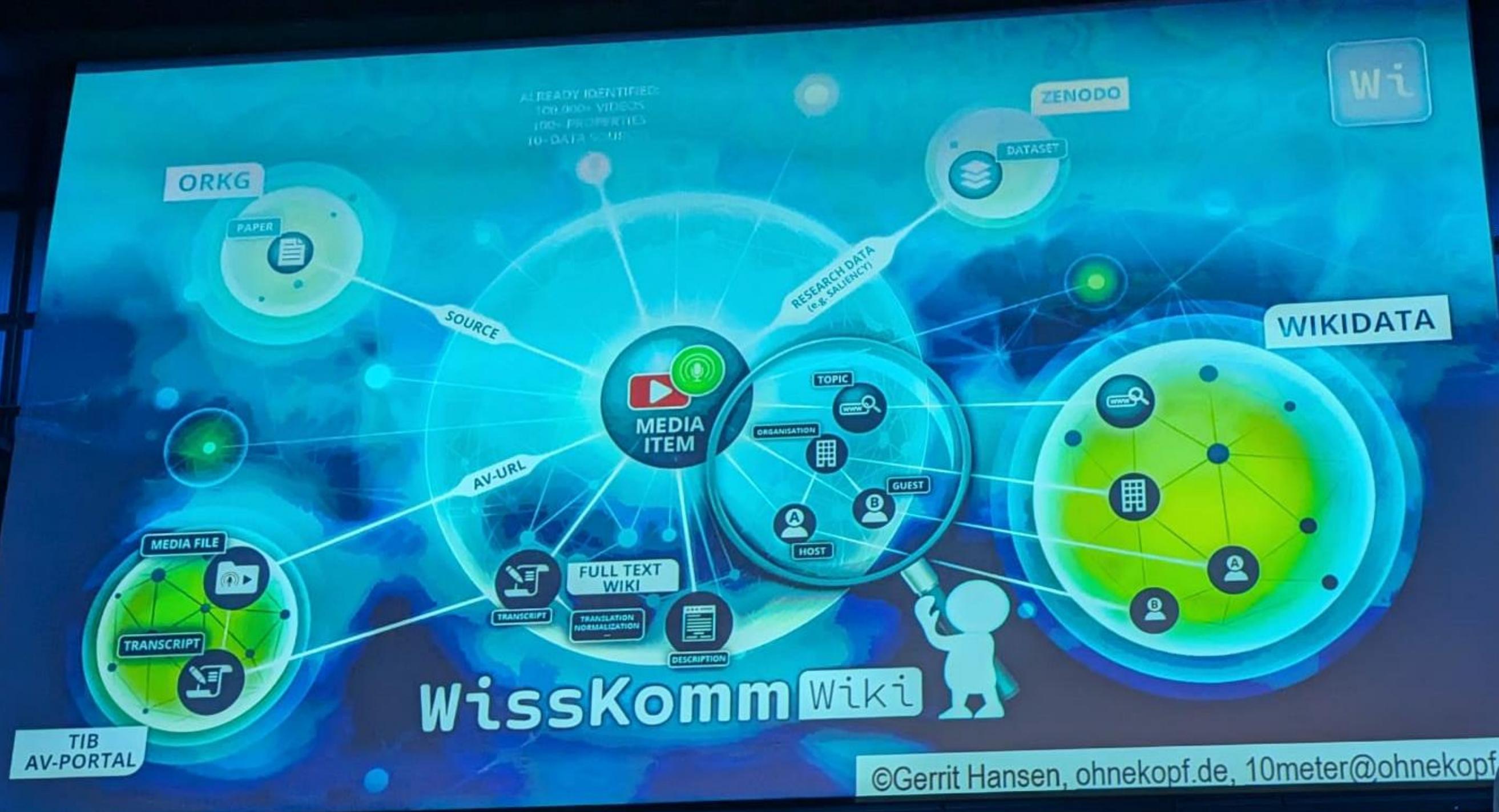
HOST

WIKIDATA

WissKomm Wiki

TIB
AV-PORTAL

©Gerrit Hansen, ohnekopf.de, 10meter@ohnekopf.de



A man stands on stage, holding a microphone and a small white board. The white board has the text "Wisskomm = Wiki" and a small tree icon.





**Develop a platform to index information
on scientific videos and podcasts**



Develop a platform **to index information**
on scientific videos and podcasts
that provides free access and participation
for users **to create and curate content**



Develop a platform **to index information**
on scientific videos and podcasts
that provides free access and participation
for users **to create and curate content**
alongside the principles of open source and open access.

What do we need for such a digital library?

Requirements

- from various stakeholders

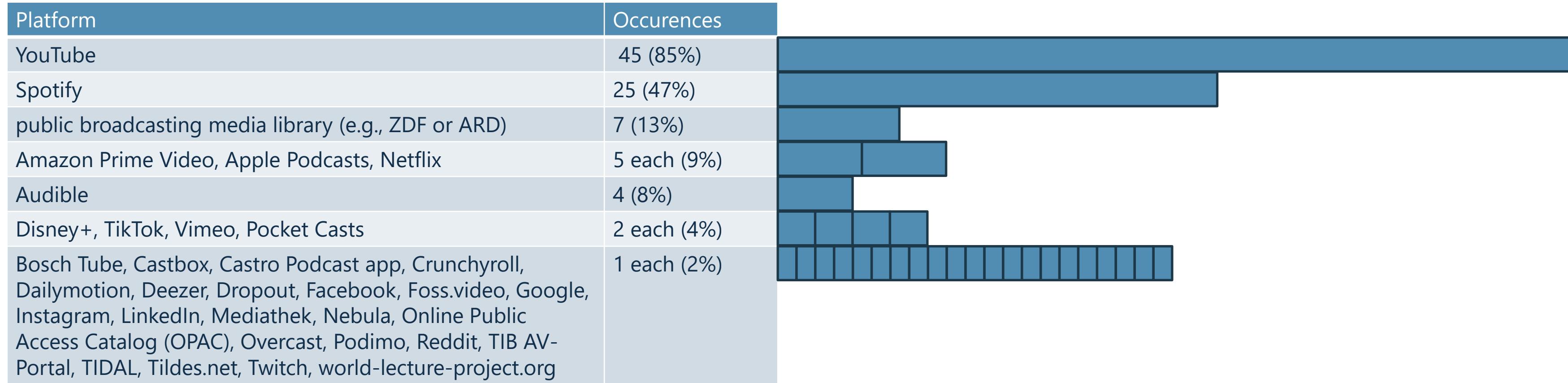
System Development

- using available data & infrastructure

Evaluation

- to know what still needs work

Stakeholder Perspective

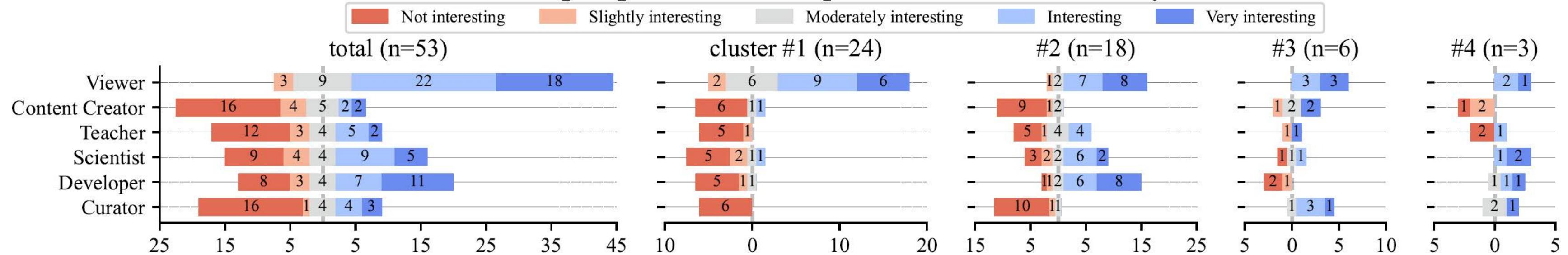


Most Important Tasks:

- 1 Finding media
- 2 Comparing content
- 3 Curating information
- 4 Debating

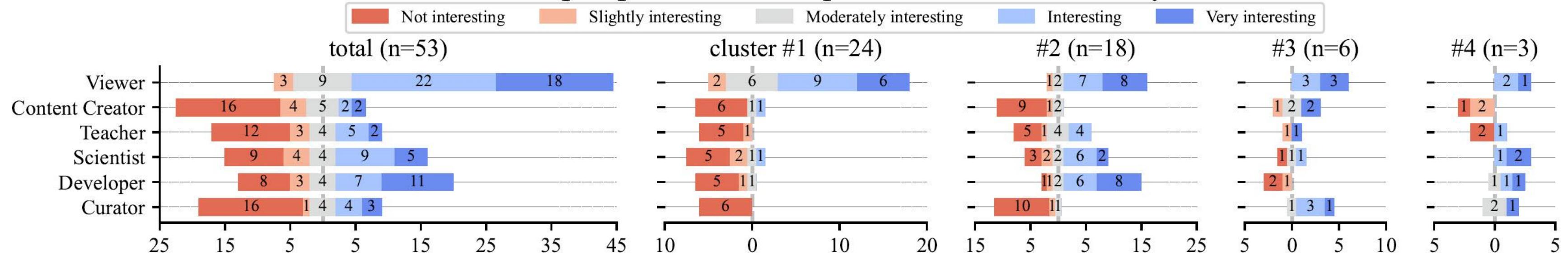
Requirements

Stakeholder perspectives in sample: total and clustered by interest

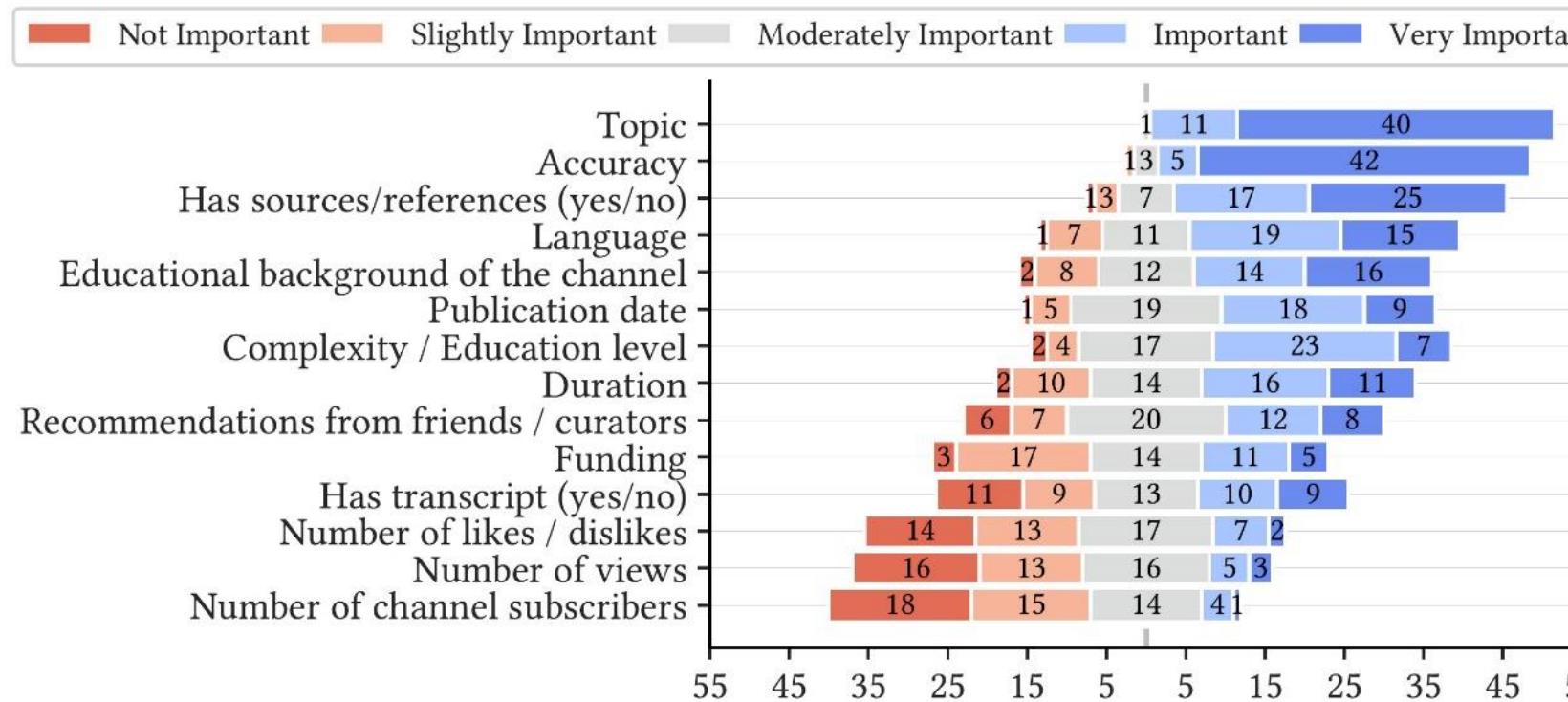


Requirements

Stakeholder perspectives in sample: total and clustered by interest

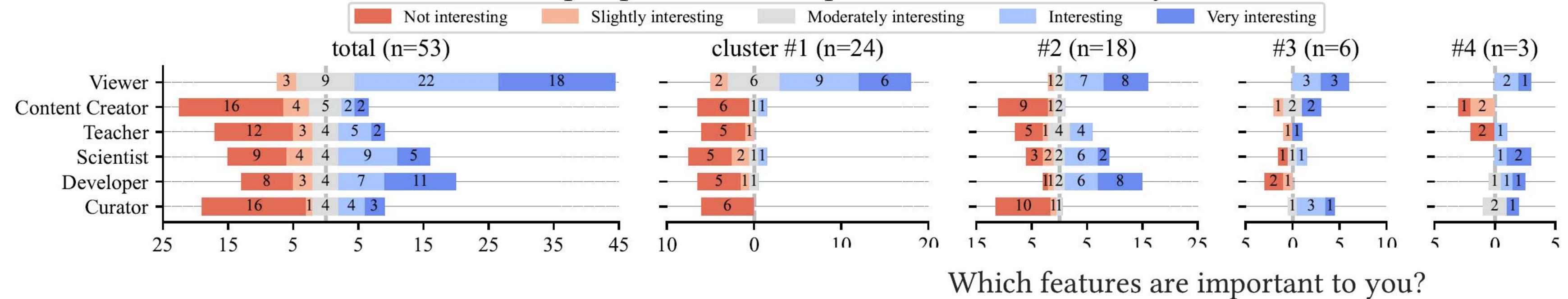


Which criteria are important to you?



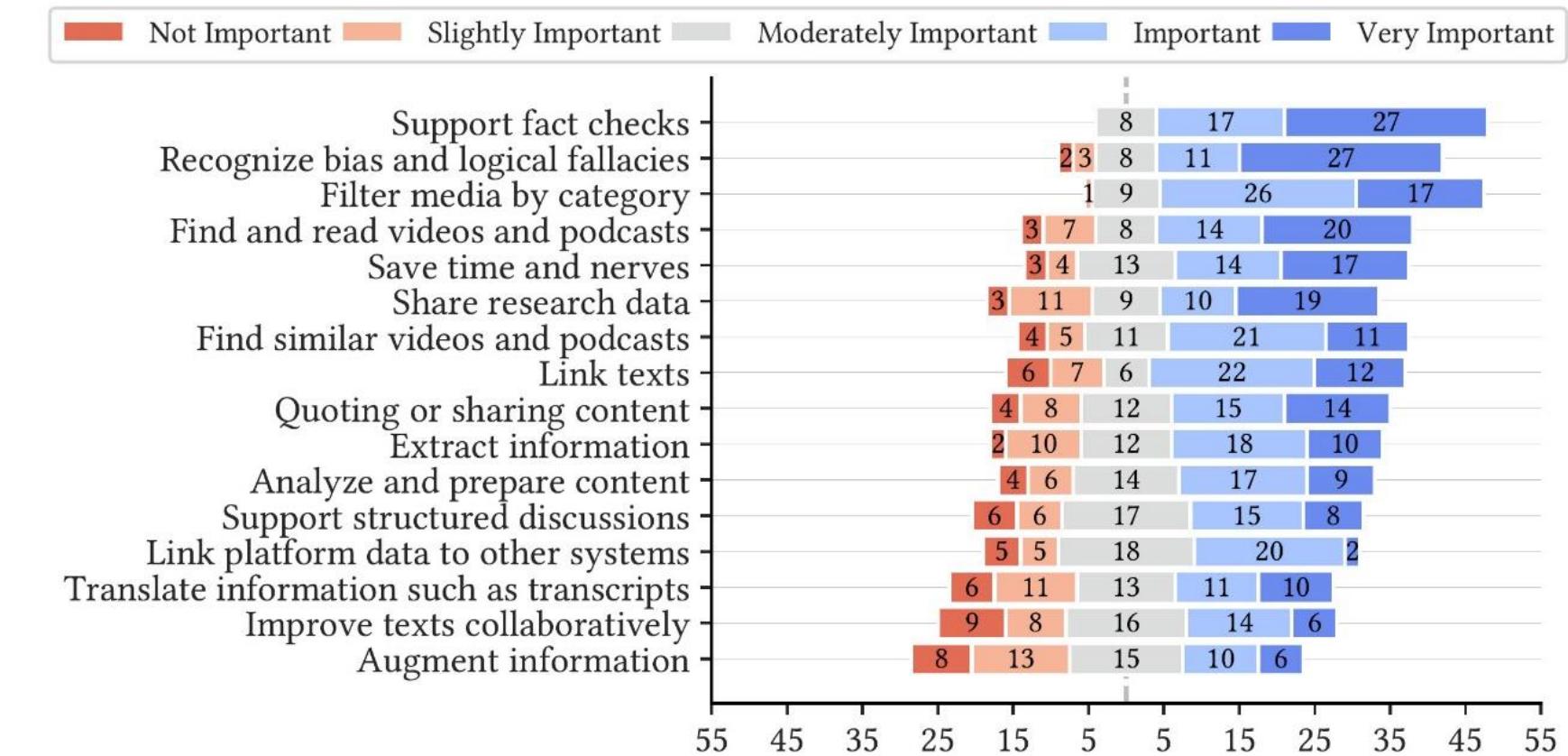
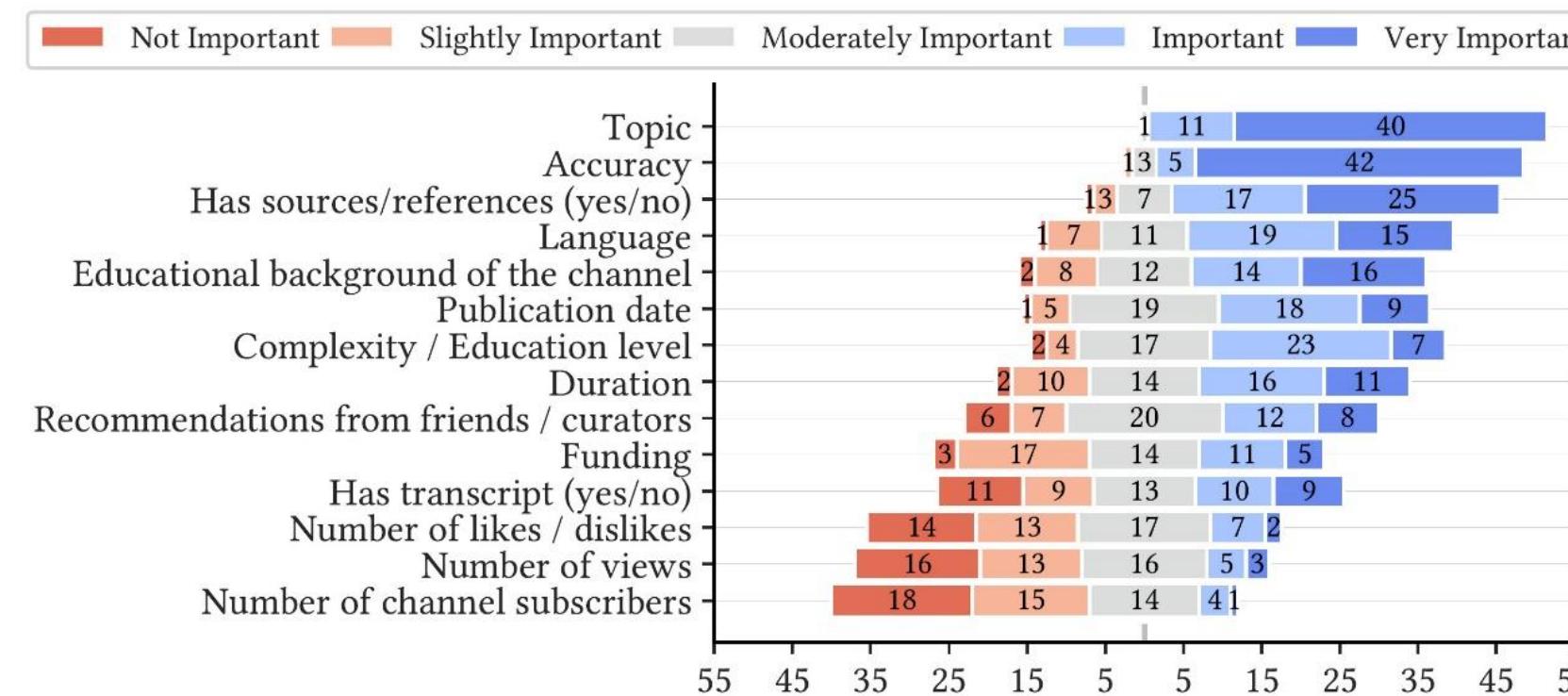
Requirements

Stakeholder perspectives in sample: total and clustered by interest

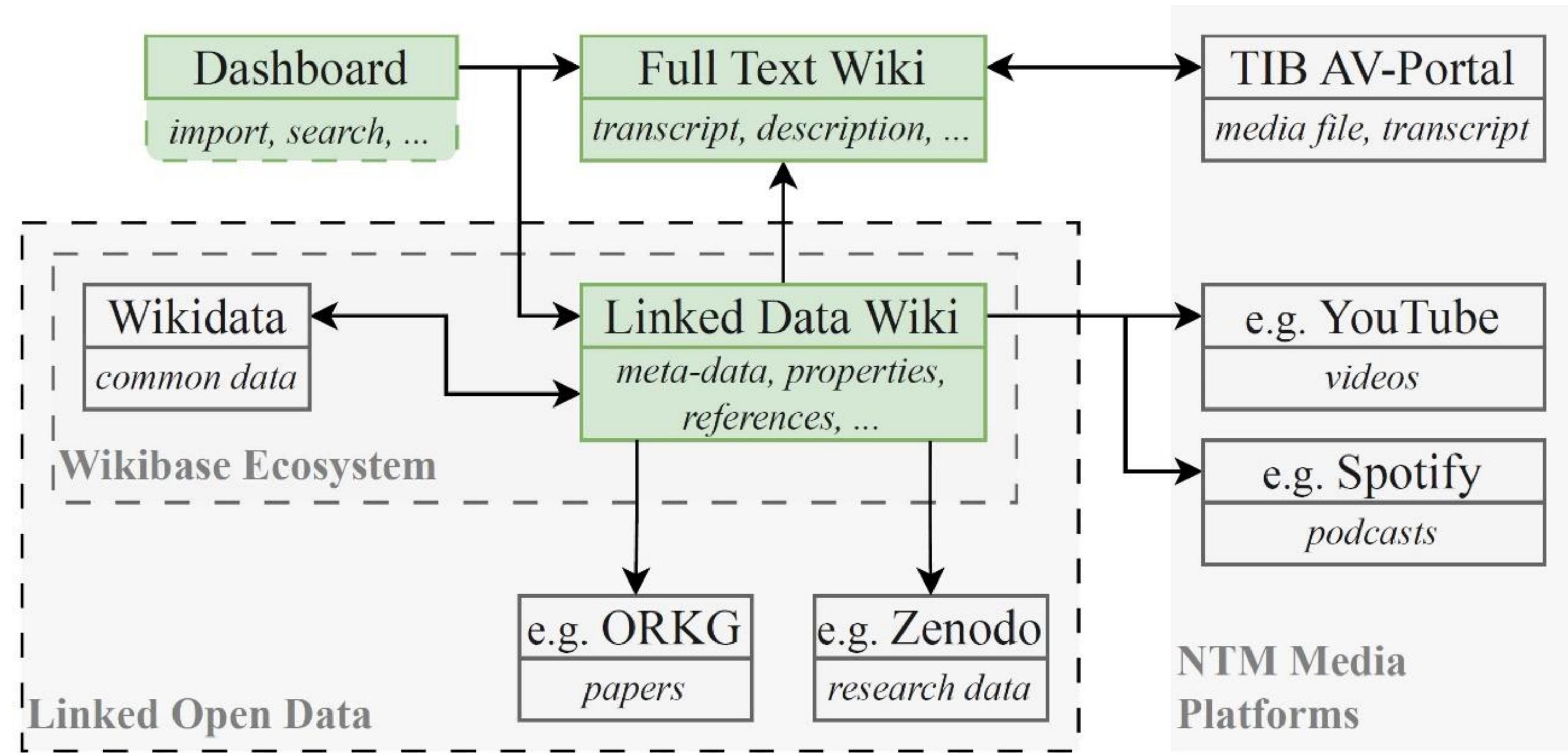


Which features are important to you?

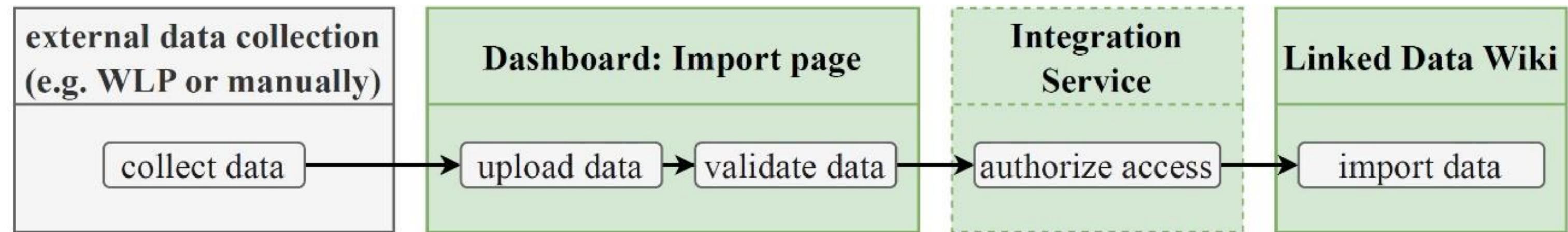
Which criteria are important to you?



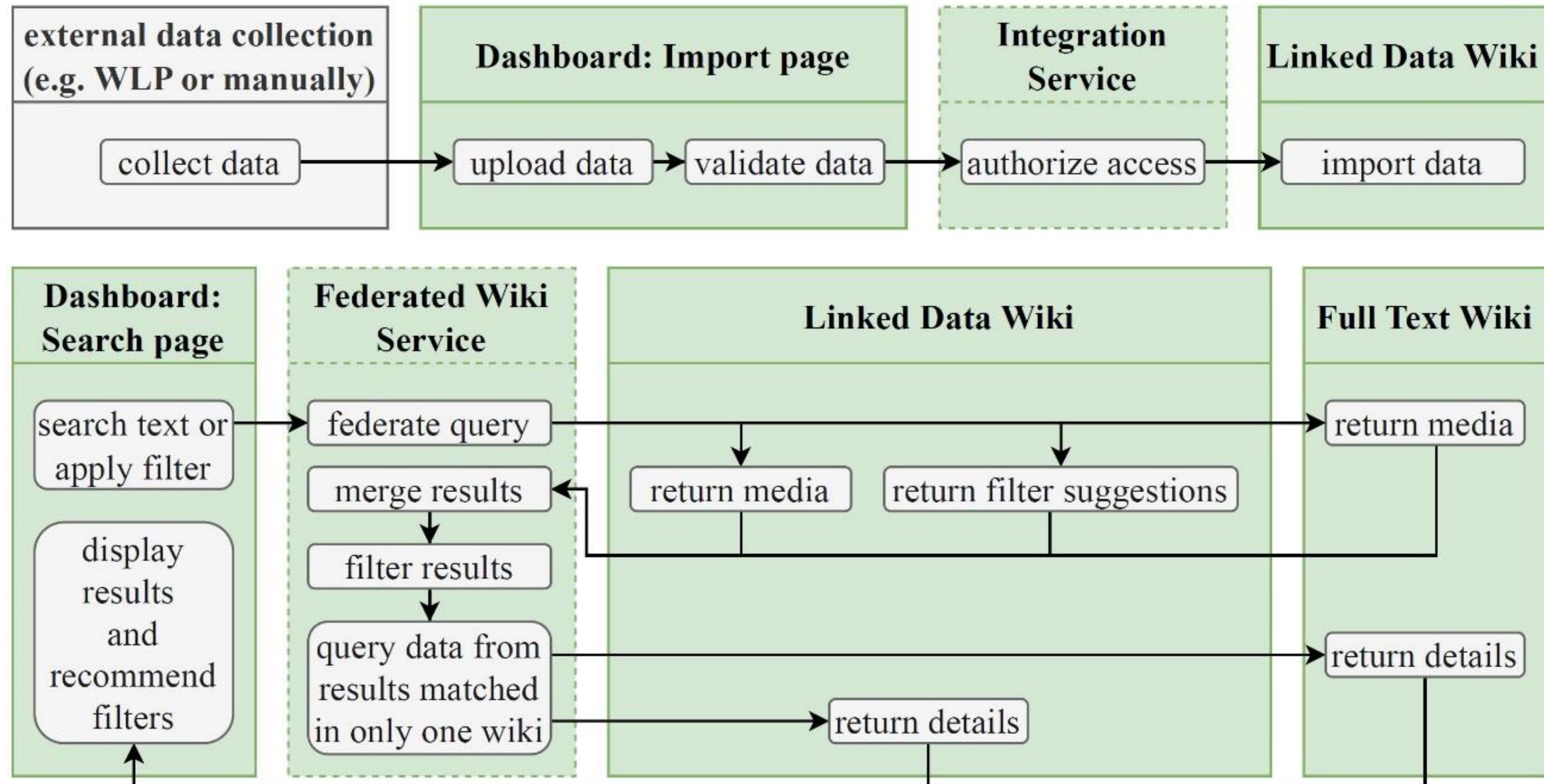
System Architecture Overview



Approach



Approach



32% aller Erwachsenen haben diese Krankheit. Du auch? (Q6)

Wikibase

Search results

Search bar: ernährung

Search button: Search

Result count: Result 1 of 1

Advanced search: Sort by relevance

Search in: (Main) Item

Create the page "[Ernährung](#)" on this wiki! See also the page found with your search.

[Achim Spiller: Nachhaltige Ernährung - Ringvorlesung "Tier oder Tofu? Was isst die Zukunft?" \(Q3046\)](#)

9 statements, 0 sitelinks - 21:14, 13 January 2025

Dashboard search

Language	Label	Description
English	32% aller Erwachsenen haben diese Krankheit. Du auch?	Video by Doktor Whatson about fatty liver disease
Statements		
instance of	Video	
publication date	19 November 2023	
in language	de	
thumbnail	https://i.ytimg.com/vi_webp/FuV3ysSKOsw/maxresdefault.webp	
reference	https://www.youtube.com/watch?v=FuV3ysSKOsw	
retrieved		31 October 2024
hosted by		Youtube
published in		Doktor Whatson
category	Medicine	
subcategory	Gastroenterology	

Item page

32% aller Erwachsenen haben diese Krankheit. Du auch? (Q6)

Wikibase -> Dashboard

ernährung

Faceted Search:

Media

Medium: Selected: 0

Date Range

From: 10.02.2006

To: 19.11.2023

Category

Category: Selected: 0

Host

Channel: Selected: 0

Platform: Selected: 0

Duration

0:13 10:11:31

Achim Spiller: Nachhaltige Ern...
Universität Göttinge...
⌚ 59:21 2019-11-01

Doktor Whatson
⌚ 13:07 2023-11-19

Dashboard search

Video by Doktor Whatson about fatty liver disease

Language	Label	Description
English	32% aller Erwachsenen haben diese Krankheit. Du auch?	Video by Doktor Whatson about fatty liver disease
Statements		
instance of	<input type="button" value="☰"/> Video	
publication date	<input type="button" value="☰"/> 19 November 2023	
in language	<input type="button" value="☰"/> de	
thumbnail	<input type="button" value="☰"/> https://i.ytimg.com/vi_webp/FuV3ysSKOsw/maxresdefault.webp	
reference	<input type="button" value="☰"/> https://www.youtube.com/watch?v=FuV3ysSKOsw	
	retrieved	31 October 2024
	hosted by	Youtube
	published in	Doktor Whatson
category	<input type="button" value="☰"/> Medicine	
	subcategory	Gastroenterology

Item page

Wikibase -> Dashboard

The dashboard search interface includes a search bar with the term "ernährung" highlighted, a facet search section, and several filter panels: Media (Medium: Selected: 0), Date Range (From: 10.02.2006, To: 19.11.2023), Category (Category: Selected: 0), Host (Channel: Selected: 0, Platform: Selected: 0), and Duration (0:13 to 10:11:31). Below these are two video thumbnails: one for a lecture on "Nachhaltige Ernährung" by Achim Spiller, and another for a video titled "FETT-LEBER" by Doktor Whatson.

Dashboard search

The detail page for the "FETT-LEBER" video shows the following information:

- Thumbnail:** A man with a liver image, with the text "FETT-LEBER".
- Categories:** Medicine, Gastroenterology.
- Published:** 13:07, 2023-11-19.
- Description:** 32% aller Erwachsenen haben diese Krankheit. Du auch?
- Spoken languages:** German.
- Subtitle languages:** German, English.
- Transcript languages:** de.
- Summary:** Eine verbreitete Krankheit.
- Text snippet:** Was begünstigt diese Krankheit?
Wie und bei wem entwickelt sie sich? Wichtige Risikofaktoren dafür sind Stoffwechselkrankungen wie Diabetes. Und auch Übergewicht ist mit einem höheren Risiko verbunden. Aber die Entstehung von Übergewicht ist echt komplex. Dazu haben wir übrigens schon mal ein ganzes Video gemacht. Klar, da spielen Ernährung und Bewegungsmangel eine Rolle, aber längst nicht nur: Auch die Erziehung, Gewohnheiten und die Psyche sind entscheidend. Und ein weiterer Grund ist die genetische Prädisposition. Früher war es natürlich von Vorteil, wenn der Körper schnell Fettreserven anlegt. Darum ist die genetische Veranlagung zum Fettspeichern auch relativ weit verbreitet. Aber heute ist die Veranlagung kein Vorteil mehr, weil fett- und zuckerreiche Lebensmittel überall sind. Der Konsum von diesen hochverarbeiteten Produkten korreliert mit Übergewicht. Und die Zahlen steigen: In Deutschland ist mittlerweile über die Hälfte der Erwachsenen betroffen. Weltweit sind 13 Prozent adipös, also krankhaft übergewichtig. Aber wie schon gesagt: Auch normalgewichtige Menschen können die Krankheit bekommen. Und auch hierbei spielen die Gene eine wichtige Rolle. Trotzdem: Man ist auch mit der genetischen Veranlagung nicht seinem Schicksal ausgeliefert. Es ist nicht einmal besonders kompliziert, diese Krankheit zu verhindern. Wie genau, das erklären wir später im Video noch. Besonders gefährlich ist es, wenn sich Fett im Bauchraum anlagert. Dieses sogenannte viszerale Fett umgibt die Organe, und kann sich sogar in den Organen anlagern, zum Beispiel in der Leber. Und genau da entsteht die Krankheit, über die wir heute reden: Es geht um die so genannte Fettleber. Die Leber ist das größte innere
- Bottom navigation:** Unsere Leber, n.a - n.a.

Detail page

climate X 🔍

Faceted Search: ✖

Media

Medium: Selected: 0

Date Range

From: 10.02.2006 📅

To: 19.11.2023 📅

Category

Category: Selected: 0

Host

Channel: Selected: 0

Platform

Platform: Selected: 0

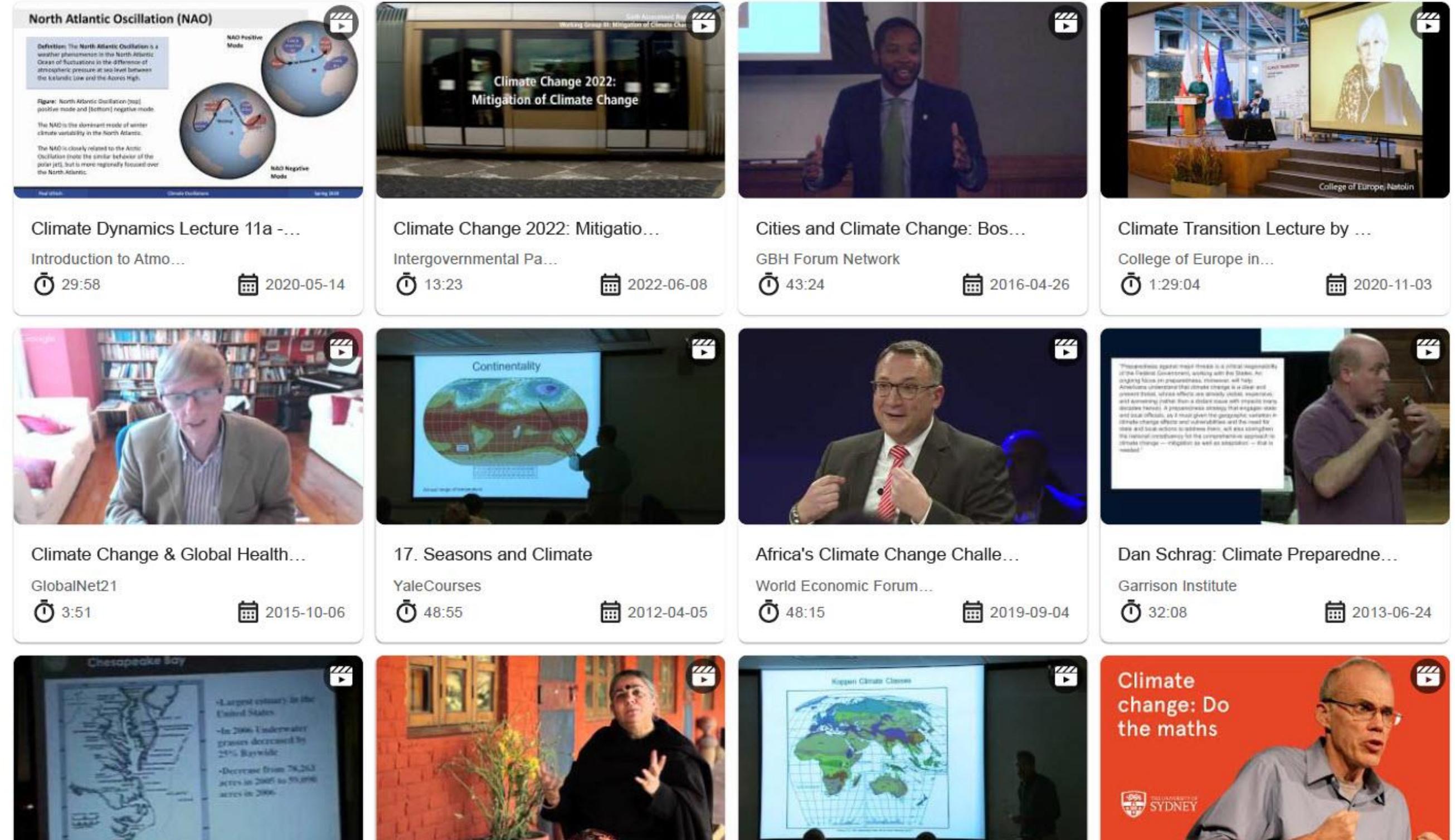
Duration

0:13 10:11:31

We also found these filters for your text search!

Category: Climate Research (Q368) +

Channel: IBS Center for Climate Physics... (Q1427) + Free Us from Climate Chaos BSH... (Q4400) + Intergovernmental Panel on Cli... (Q5294) +



climate



Faceted Search:

Media

Medium: Selected: 0

Date Range

From 10.02.2006



To 19.11.2023



Category

Category: Selected: 0

We also found these filters for your text search!

Category: Climate Research (Q368) +

Channel: IBS Center for Climate Physics... (Q1427) + Free Us from Climate Ch...

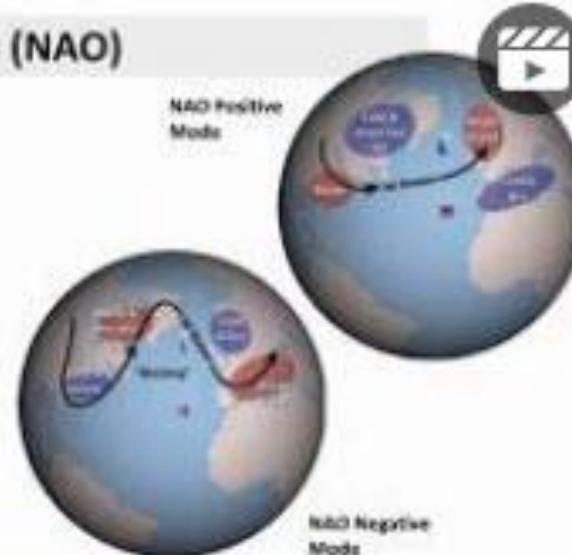
North Atlantic Oscillation (NAO)

Definition: The North Atlantic Oscillation is a weather phenomenon in the North Atlantic Ocean of fluctuations in the difference of atmospheric pressure at sea level between the Icelandic Low and the Azores High.

Figure: North Atlantic Oscillation [top] positive mode and [bottom] negative mode.

The NAO is the dominant mode of winter climate variability in the North Atlantic.

The NAO is closely related to the Arctic Oscillation (note the similar behavior of the polar jet), but is more regionally focused over the North Atlantic.



Climate Dynamics Lecture 11a -...

Introduction to Atmo...

⌚ 29:58

📅 2020-05-14

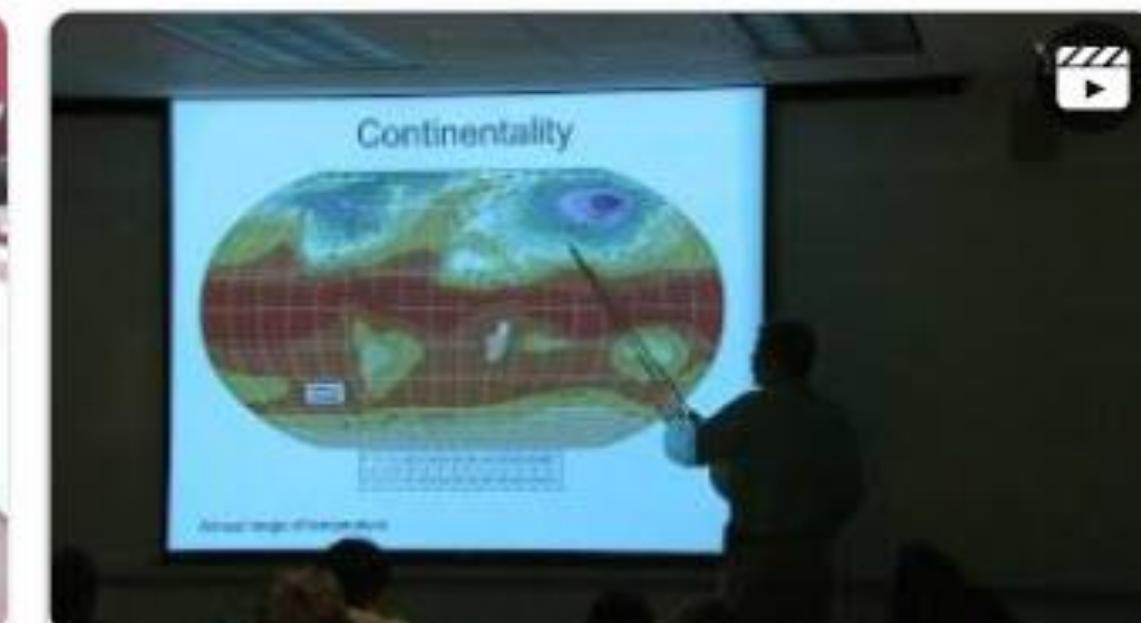


Climate Change 2022: Mitigatio...

Intergovernmental Pa...

⌚ 13:23

📅 2022-06-08



Evaluation

climate

We also found these filters for your text search!

Category: Climate Research (Q368) Channel: IBS Center for Climate Physics... (Q1427) Free Us from Climate Chaos BSH... (Q4400) Intergovernmental Panel on Cli... (Q5294)

Media

Medium: Selected: 0

Date Range

From: 10.02.2006 To: 19.11.2023

Category

Category: Selected: 0

Host

Channel: Selected: 0

Platform: Selected: 0

Duration

0:13 - 10:11:31

Transcript

has Transcript

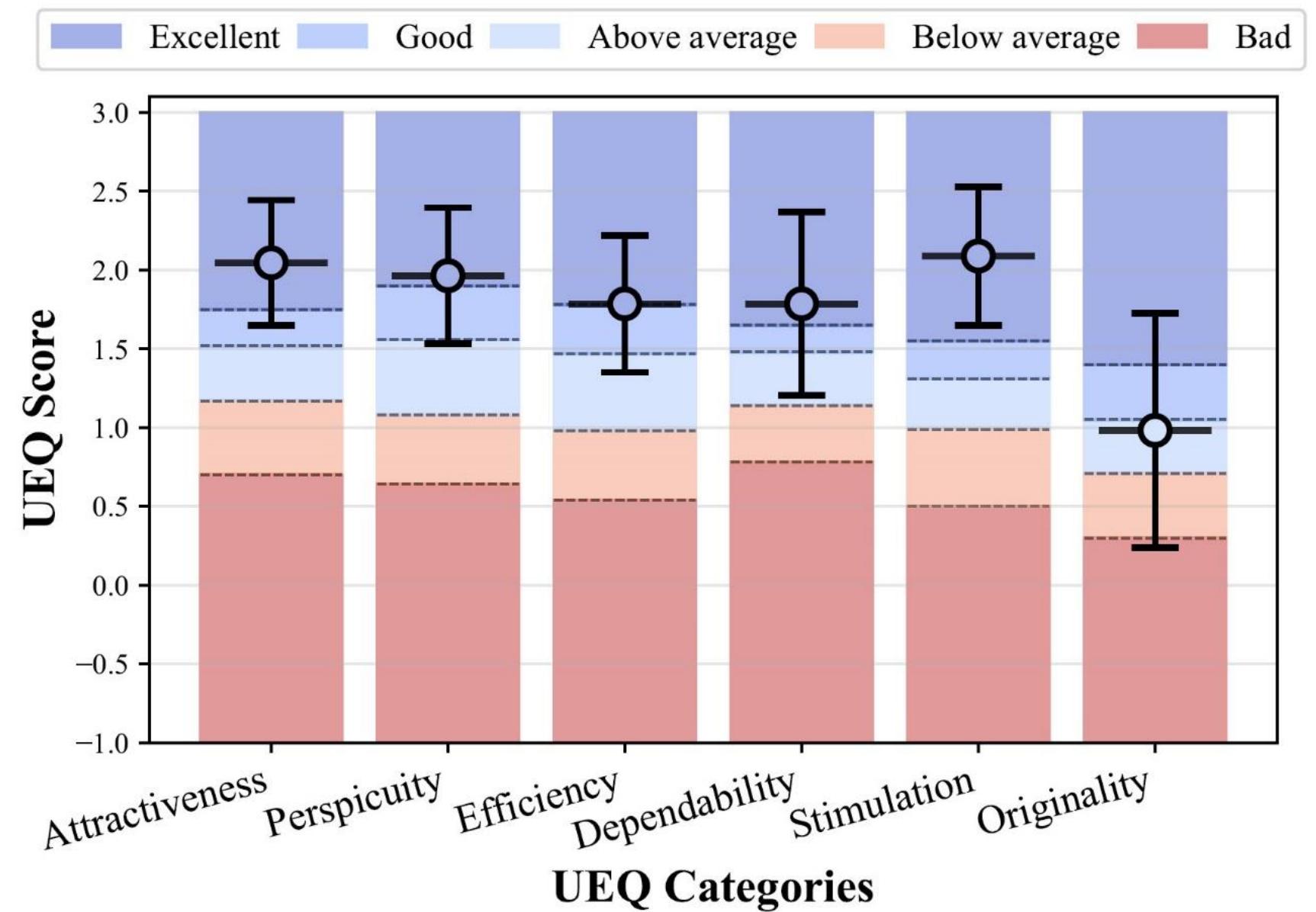
Language

Language: Selected: 0

Subtitle: Selected: 0

The screenshot shows a search interface for 'climate'. At the top, there's a search bar with 'climate' and a magnifying glass icon. Below it, a message says 'We also found these filters for your text search!' followed by a category and channel link. The main area is titled 'Media' and contains several filter sections: 'Medium' (Selected: 0), 'Date Range' (From: 10.02.2006, To: 19.11.2023), 'Category' (Selected: 0), 'Host' (Channel: Selected: 0), 'Platform' (Selected: 0), 'Duration' (0:13 - 10:11:31), 'Transcript' (checkbox checked for 'has Transcript'), 'Language' (Selected: 0), and 'Subtitle' (Selected: 0). Below these filters is a grid of video thumbnails. Each thumbnail includes a title, a small description, and a timestamp. The titles include 'North Atlantic Oscillation (NAO)', 'Climate Dynamics Lecture 11a ...', 'Climate Change 2022: Mitigation ...', 'Cities and Climate Change: Bos...', 'Climate Transition Lecture by ...', 'Climate Change & Global Health...', '17. Seasons and Climate', 'Africa's Climate Change Challe...', 'Dan Schrag: Climate Preparedne...', 'Climate Change: Prospects for ...', 'Climate Change and Water Wars...', '18. Seasons and Climate Classi...', 'Climate change: Do the maths', and 'Greenhouse Climates'. The timestamps range from 3:51 to 48:55.

UEQ Results: Means with 95% Confidence Intervals (n=14)



Evaluation Design

Five search tasks:

1. Find a video by title
2. Find video on “history” from specific university
3. Find video on “fatty liver” published after 2022
4. Find video on “computer science”, 60+ min, from 2013-2014
5. Find any video in English

Measurements:

- Task completion time (efficiency)
- Successful completions (effectiveness)
- User Experience Questionnaire (UEQ)
- After-Scenario Questionnaire (ASQ)

Evaluation Results: Efficiency and Effectiveness

Hypothesis $H_{A,\text{efficiency}}$: Complete tasks in under 3 minutes

- ✓ for Tasks 1, 2, 3, 5
- Task 4 had greater complexity

Hypothesis $H_{A,\text{effectiveness}}$: More than 3 of 5 tasks completed successfully

- ✓

ASQ results:

- Mean effectiveness: 2.04 ($\sigma = 0.76$)
- Mean efficiency: 1.67 ($\sigma = 0.68$)
- Provided support: 2.075 ($\sigma = 0.64$)

Evaluation Results: Criteria Implementation

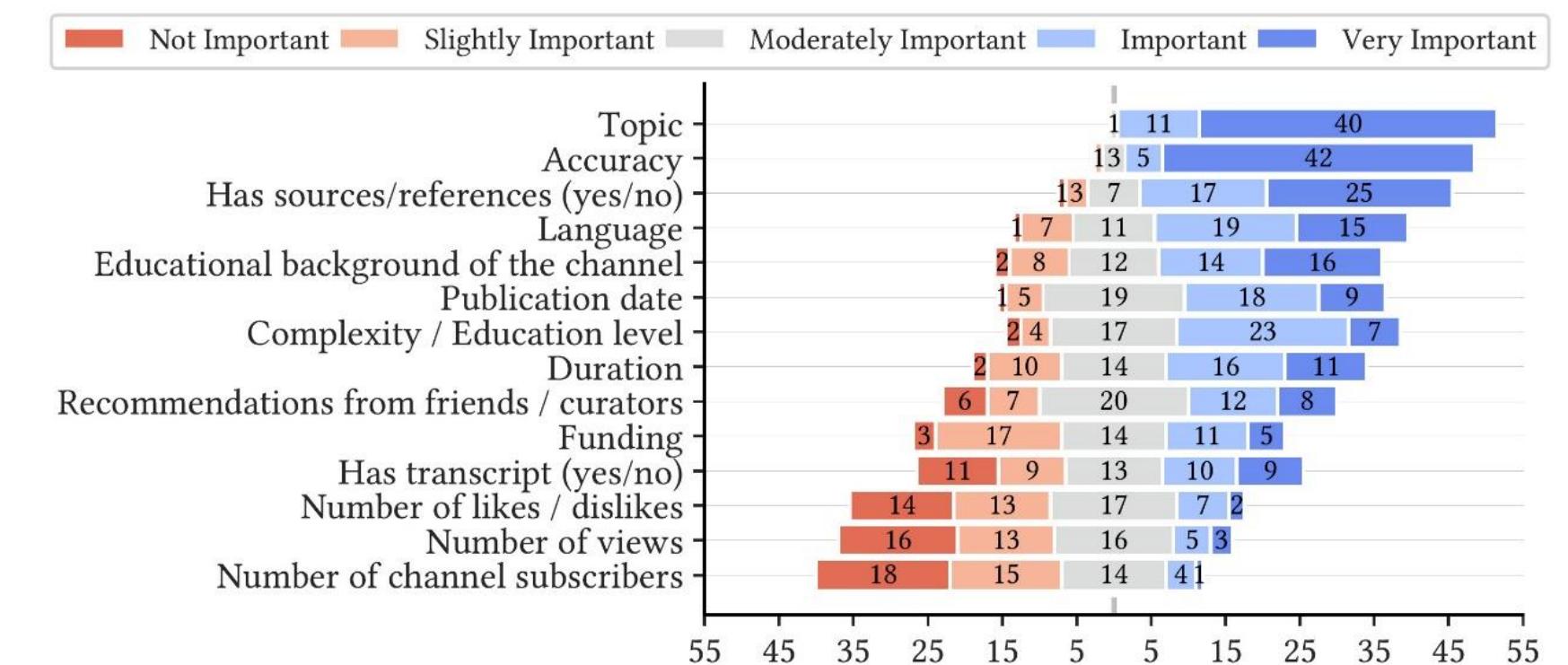
Hypothesis $H_{A,\text{criteria}}$: Rate ≥ 4 of 7 top criteria as "good" or better

Results:

- Well-implemented: **Topic, Language, Release Date**
- Also well-rated: Length, Transcript Availability
- Challenging to measure: Correctness, Complexity
- Data protection concerns: Speaker background

Status: 3 of 7 top criteria achieved "good" or better
(narrowly missed threshold of 4)

Which criteria are important to you?



Overall: System provides consistent, well-rated, usable foundation for future work

A Digital Library is Just the First Step

Current achievements:

- Demonstrate feasibility of semantifying media information
- Semi-automatic processing and storage
- Reliable, open-source infrastructure
- Good user experience

But stakeholders want more:

- More sophisticated annotation capabilities
- Better representation of complexity
- Ethical considerations (personal data, bias detection)
- Community trust mechanisms



Summary

The Components We Need for a Robust Scicom KI

1. Artifacts

- Additional interfaces (browser plugins, etc.)
- Collaborative platforms
- Standardized data access

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- Viewers providing feedback
- Content creators and curators
- Developers building tools
- Low barrier to entry

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2. People

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- Low barrier to entry

3. Institutions

- Media platforms (YouTube, Spotify)
- Research facilities
- Legal and ethical frameworks

Our Contributions

1. An **overview** of the current state of Science Communication Knowledge Infrastructure (SciCom KI), including **requirements** gathered via **53** anonymous **survey participants** and **11 stakeholder interviews**.
2. The design and implementation of a **digital library** and **interface** to provide tool- and infrastructure-support for **collaborative media representation, processing, and annotation**.
3. An **evaluation** by **14 stakeholders**, confirming that the system has a **good user experience** and is capable of **meeting several requirements** already, while **extensive future work is required** to address them all eventually

Future Work

Research

- Further investigate lossless abstraction of complex information
- Expand R&D for meeting potentially role specific stakeholder requirements

Community

- Establish project management platforms (Phabricator, Wiki, Git)
- Connect contributors with low barrier to entry

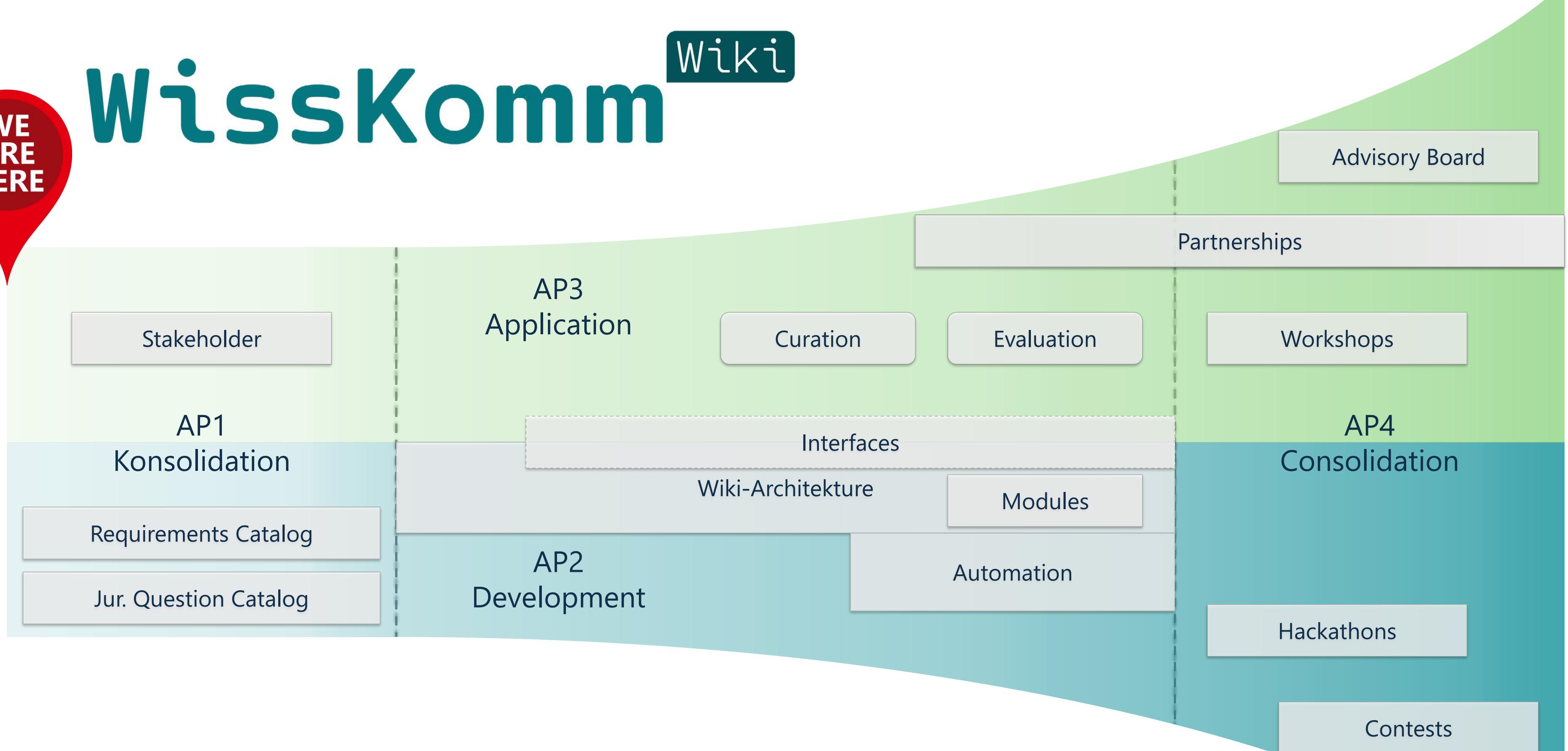
Software

- Ingest more data and onboard more people
- Build interoperable applications with plugin developers



**Collaborate to generate, share, and maintain knowledge
on science communication videos and podcasts,
in an openly accessible, transparent, and interoperable
infrastructure”**

wissKomm^{Wiki}





KNOWLEDGE WANTS TO BE FOUND

AN OVERVIEW OF THE ENTIRE COSMOS
OF SCIENTIFIC VIDEOS AND PODCASTS
ON A SINGLE PLATFORM!

TRANSPARENTLY PRESENTED, INDIVIDUALLY FILTERABLE,
**ALL RELEVANT INFORMATION AND
SOURCES AT A GLANCE**

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LET'S CONNECT!

TIB LEIBNIZ INFORMATION CENTRE FOR SCIENCE AND TECHNOLOGY UNIVERSITY LIBRARY

BorgNetzWerK

Illustration: © www.chirkovs.com/Gerit Hansen 2025

QR code: WISSKOMM.WIKI@TIB.EU

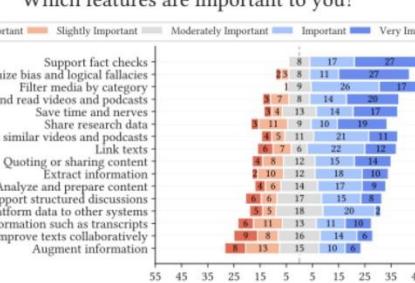
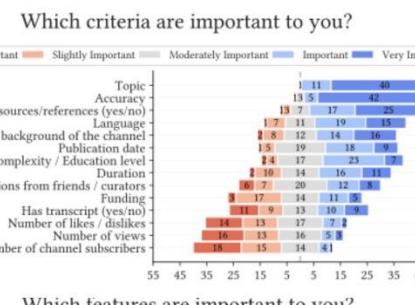
Curated context is key for finding the right videos and podcasts.

We can support this by crowdsourcing FAIR data in collaborative knowledge infrastructure.

Background: Science Communication Knowledge Infrastructure (SciCom KI) for audiovisual media is fragmented, lacks interoperability, and cannot scale with the growing volume of content. Existing platforms insufficiently annotate semantic information, from content to context and background information.

Goal: Establish a collaborative infrastructure towards facilitating FAIR Data Principles (Findability, Accessibility, Interoperability, Reusability) for the curation, annotation, and retrieval of scientific videos and podcasts.

Approach: Stakeholder Survey and Interviews Software Development



Discussion:

WissKomm Wiki closes the infrastructure gap for FAIR audiovisual knowledge representation.

To form a robust network, the SciCom KI requires:

- **Artifacts** (interfaces, collaborating platforms, data)
- **People** (creators and curators, viewer and researcher)
- **Institutions** (networks, media and research facilities)

Tim Wittenborg et al.



Future Work:

- Legal Framework for Copyright and Data Privacy
- Facilitating Collaboration with Creators and Researchers
- Dedicated Support for Fact-Checking and Bias Detection
- Scaling Semantic Integration Across Heterogeneous Platforms
- Transparent Metric Quantification for Complexity Reduction
- Monitoring Gamification and Incentive System Trade-Offs
- Carefully Researching Risk and Potential of AI Integration
- Institutional Repository and Media Outlet Integration,
- Interoperability Standards for Linked Open Audiovisual Data
- Fostering Linked Open Data in SciCom and Public Broadcasts

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