

# **Algorithmic Medicine Based Multilingual Educational Technologies (AMBET): On the need for and implementation of digital educational diagnostics along the lifespan**

**Monika Kil**

# Algorithmic Medicine Based Multilingual Educational Technologies (AMBET): On the need for and implementation of digital educational diagnostics along the lifespan

Kil, M. (2023): AAB College, Pristina, Kosovo (May 15-19 2023): Lectures in Bachelor Childhood and Social Education (Beginners and Bachelor-Thesis Senior-Classes) in the framework of Learning mobility for higher education staff (B2); Staff mobility for teaching and training purposes - Higher education

Kil, M. & Sassenberg, V. (2022) Research colloquium on continuing education research at the University for Continuing Education, Krems 18/5/2022

# Definition

AMBET procedures (Algorithmic Medicine Based Multilingual Educational Technologies) are educational technologies designed on the basis of algorithms and medicine and are able to collect (pre-)school skills and developmental trajectories in multiple languages already within the respective institution individually and with equal opportunities and valid for intersectoral cooperation and to process them for educational monitoring in and outside the institutions.

AMBET procedures support pedagogical diagnosticians in carrying out, evaluating and monitoring fair, valid and high-quality, supportive **encounter behaviour in line with SDG 4.**

# LOGmedia Institute for Digital Education

## Premise:

Educational quality, integrity and the subordination of economic interests to the preservation of the basic prerequisites for lifelong learning with purpose, encounter, and the joy of learning is the starting point of all LOGmedia activities.

What we did during the Covid pandemic:

<https://www.youtube.com/watch?v=ldgkHodXt0c>



Photo: 'DiVA' Digital procedure for multilingual education and language diagnostics and sustainable use: accompanying children and young people fairly and safely!

# LOGmedia Institute for Digital Education

Characteristics that fit to Monika Kil's research:

- the focus is on the production of professional standardised and highly qualitative therapy and! diagnostics software for support of children and adolescents: Quality
- the produced data can be used in real time on an administrative and/or organizational level under data protection law: Innovation
- is based on the interdisciplinary cooperation of specialists in the fields of (early) speech and speech therapy, (early) education, pediatrics and psychology and medicine of statistics in health and education monitoring: Transdisciplinarity

piccoLOG



digitale Sprachstandserfassung  
im Vorschulalter

4-6 Jahre

(multilingual)



Infos

Videos

# Film/Clips piccoLOG and eduLOG

primaLOG



digitale Sprachstandserfassung  
zum Schulbeginn

6-8 Jahre

(multilingual)



Infos

Videos

eduLOG



digitale Erfassung der  
schulischen Fähigkeiten

zum  
Schuleintritt

(multilingual)



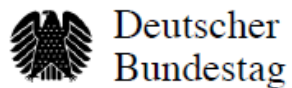
# Quality Audit

Funktionsaudit: „Digitale Bildungsdiagnostik“  
algorithmisch-medizinbasierte mehrsprachiger Bildungstechnologien“



**Functional audit: "Digital educational diagnostics".**

**Algorithmic medicine-based multilingual educational technologies".**



Deutscher  
Bundestag

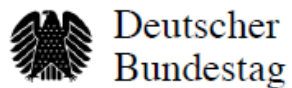
Schirmfrau Claudia Roth MdB  
Vizepräsidentin des Deutschen Bundestages



Die Beauftragte  
der Bundesregierung  
für Digitalisierung

# Digital-Initiative Bildung und Gesundheit

inklusive Initialprojekt



Deutscher  
Bundestag

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Die Beauftragte  
der Bundesregierung  
für Digitalisierung

# Digital-Initiative Bildung und Gesundheit

inklusive Initialprojekt

# Methodology: Field study and case study approach

## Expert Network

**20 transdisciplinary Experts**

**14 realworld labs**

The experts distinguished between therapy and support and therefore commit themselves to a high quality standard and adhere to the rules of their respective professional, legal and ethical principles. The data protection requirements have been ensured.

## Sample

**Digital Initiative- Education and Health (due to the pandemic - ring the Bell!)**

- Primary School Austria
- Primary School Germany

Children in the run-up to school entry in 2021 (66 children)

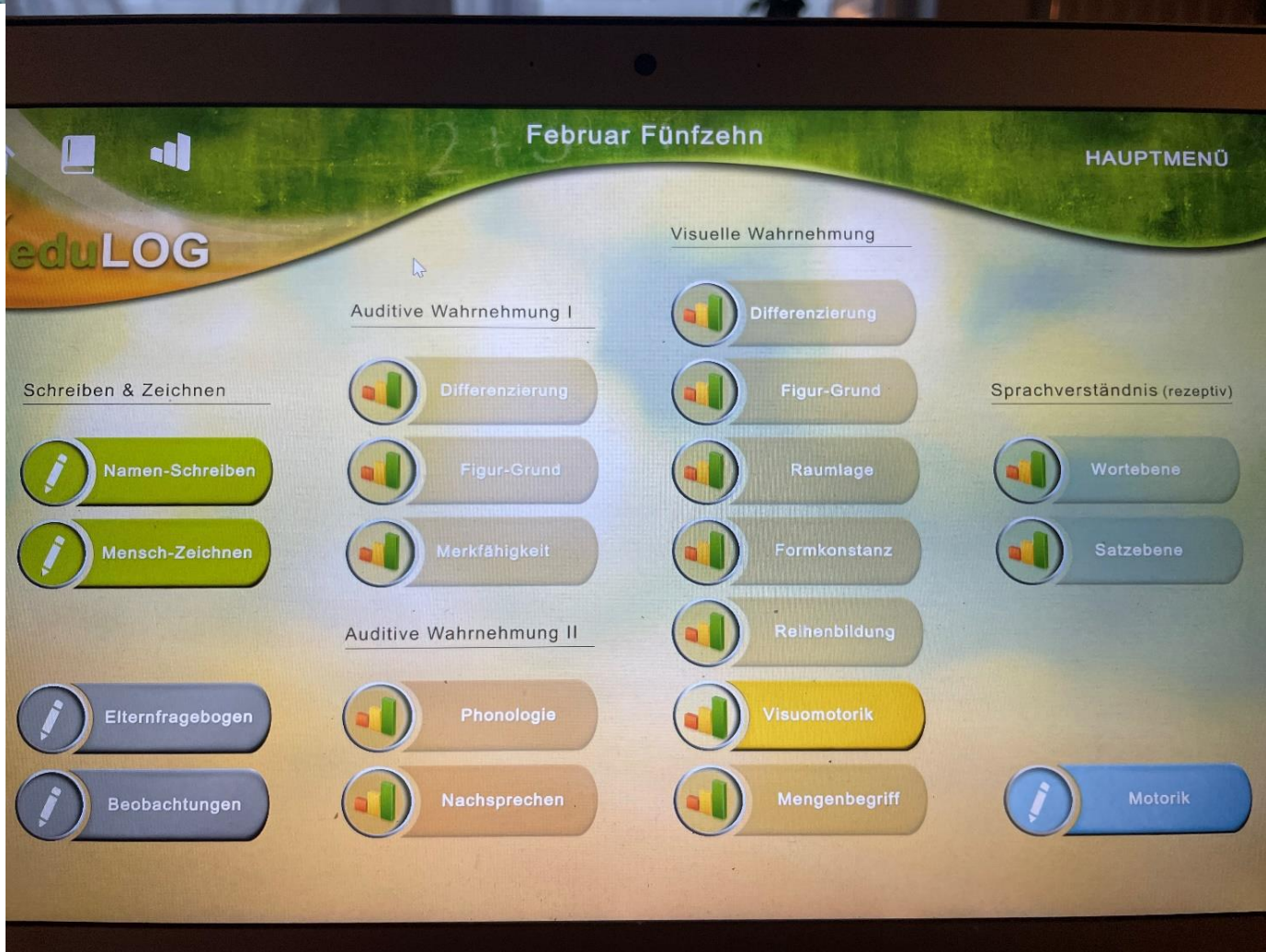
**DiVA – Project (about 200 kids)**

**Kindergarten**

**Special school (cognitive impairments)** usage with students up to 18 years old

**Spillover: other regions (Schleswig-Holstein, Nordrhein-Westfalen, Baden-Württemberg)**

(in sum over 1500 children)



Current task parts with the newly added "motor skills" according to the real labs results of the teachers from Hagen (bottom right)

# Data from the formal learning starting points

## **Language comprehension**

- Word level ((multilingual) considering the first language)
- sentence level ((multilingual) considering the first language)
- German problem? under consideration of the first language
- First language problem?
- Second language problem?

## **Instructional comprehension**

- Vocabulary
- Repeating
- Plural formation

# Data from the formal learning starting points

## Auditory range

- Difference
- Figure-ground hearing
- Memory

## Phonetics

## Semantic Fields

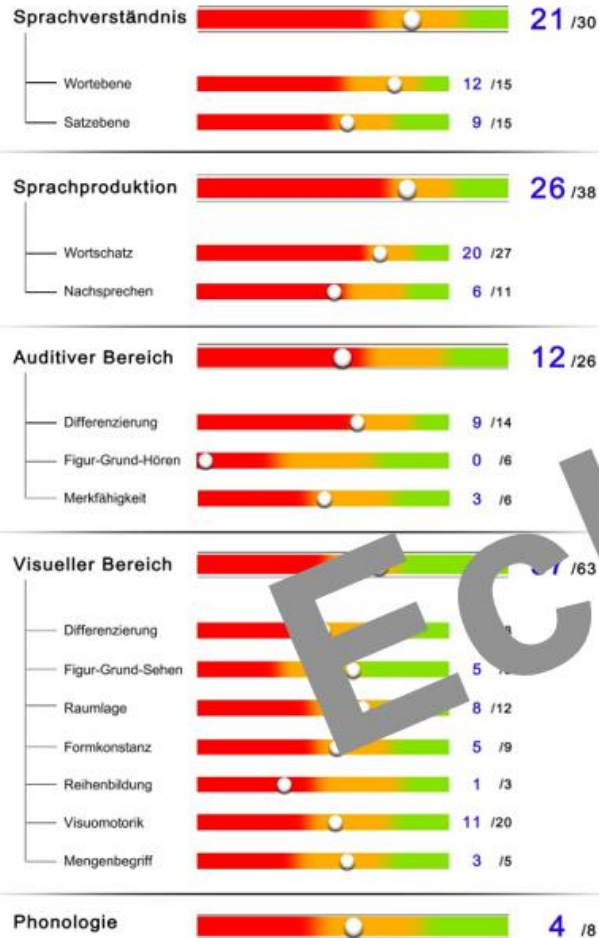
## Visual area

- Difference
- Figure-ground vision
- Spatial position
- Shape constancy
- Series formation
- Visuomotor skills
- Understanding of quantities

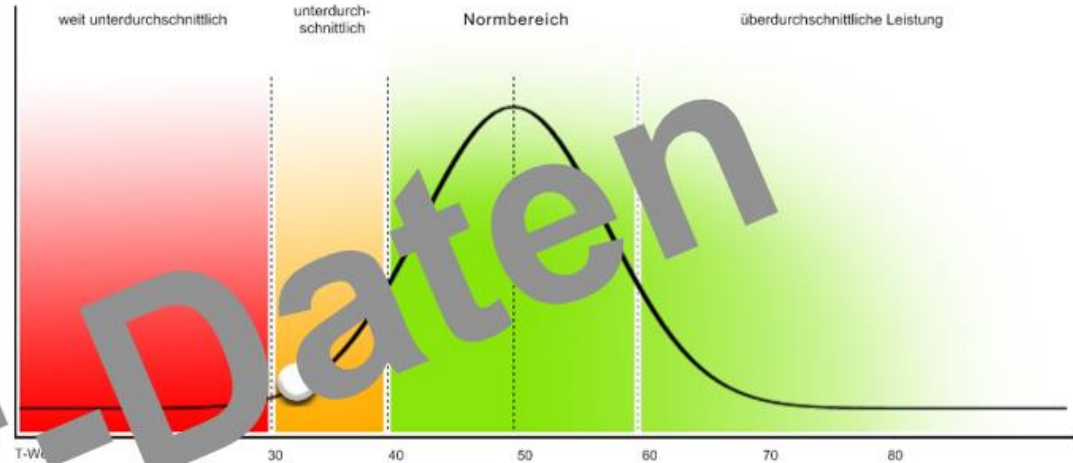
# JAHRGANGSAUSWERTUNG

Astrid-Lindgren-Grundschule Hagen

## Ergebnisse:



## Einordnung im Vergleich zu Gleichaltrigen:



EINORDNUNG: UNTERDURCHSCHNITTLICH und NICHT ALTERSENTSPRECHEND.

### EINSCHÄTZUNG DER LEISTUNGSBEREICHE:

**Sprachverständnis:** Aufgrund des durchschnittlichen Jahrgangsergebnisses im Bereich des VERSTEHENS VON WÖRTERN UND SÄTZEN sollten mögliche Unterrichtsmaßnahmen innerhalb des Kollegiums diskutiert werden.

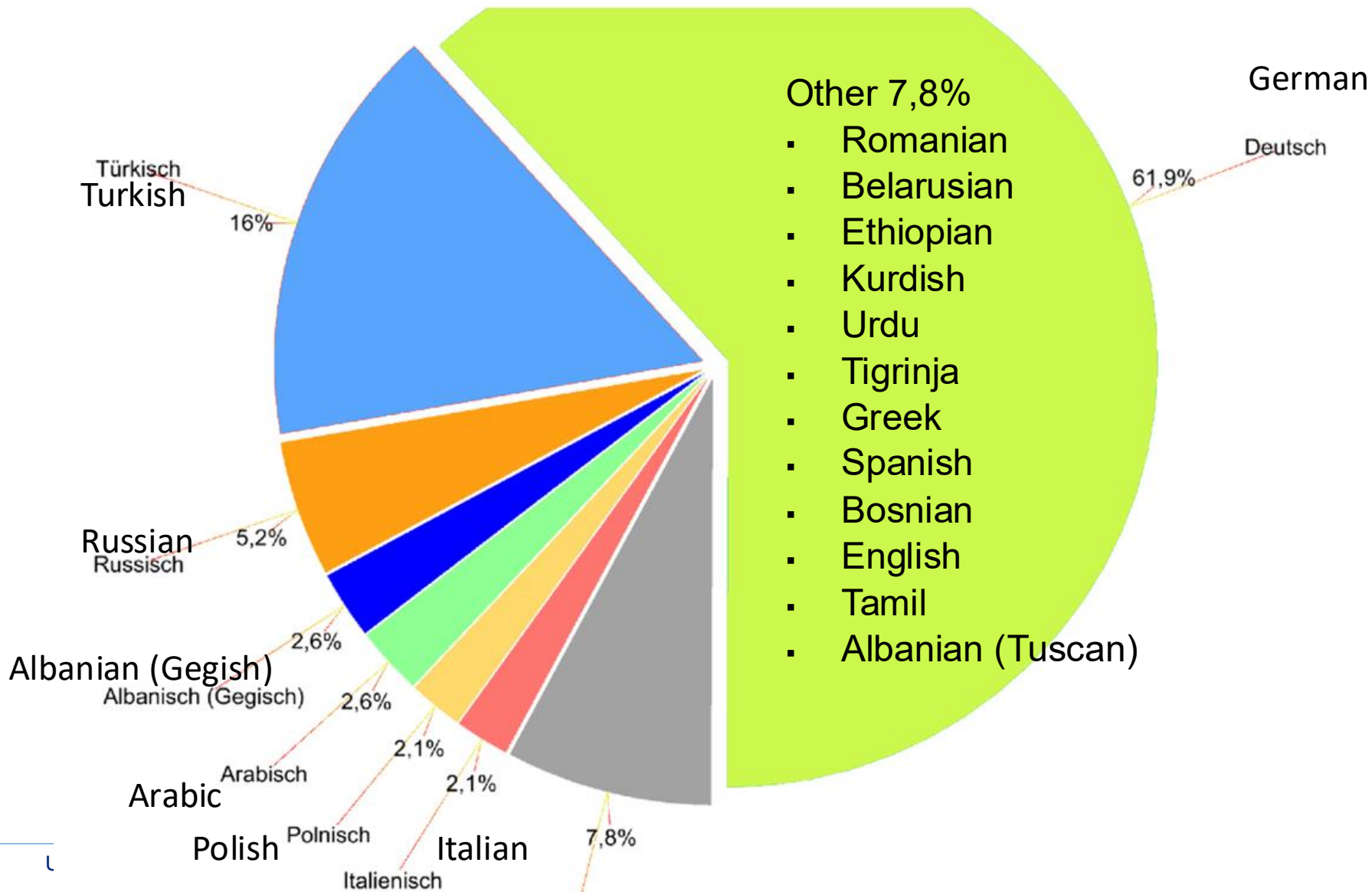
**Sprachproduktion:** Aufgrund des durchschnittlichen Jahrgangsergebnisses im Bereich des NACHSPRECHENS VON SILBEN-, ZAHLEN- UND SATZSTRUKTUREN sollten mögliche Unterrichtsmaßnahmen innerhalb des Kollegiums diskutiert werden.

**Auditiver Bereich:** Aufgrund des durchschnittlichen Jahrgangsergebnisses im Bereich der HÖRWAHRNEHMUNG UND -VERARBEITUNG sollten entsprechende Unterrichtsmaßnahmen innerhalb des Kollegiums dringend diskutiert und ergriffen werden.

**Visueller Bereich:** Aufgrund des durchschnittlichen Jahrgangsergebnisses im Bereich der VISUELLEN WAHRNEHMUNG UND -VERARBEITUNG sollten mögliche Unterrichtsmaßnahmen innerhalb des Kollegiums diskutiert werden.

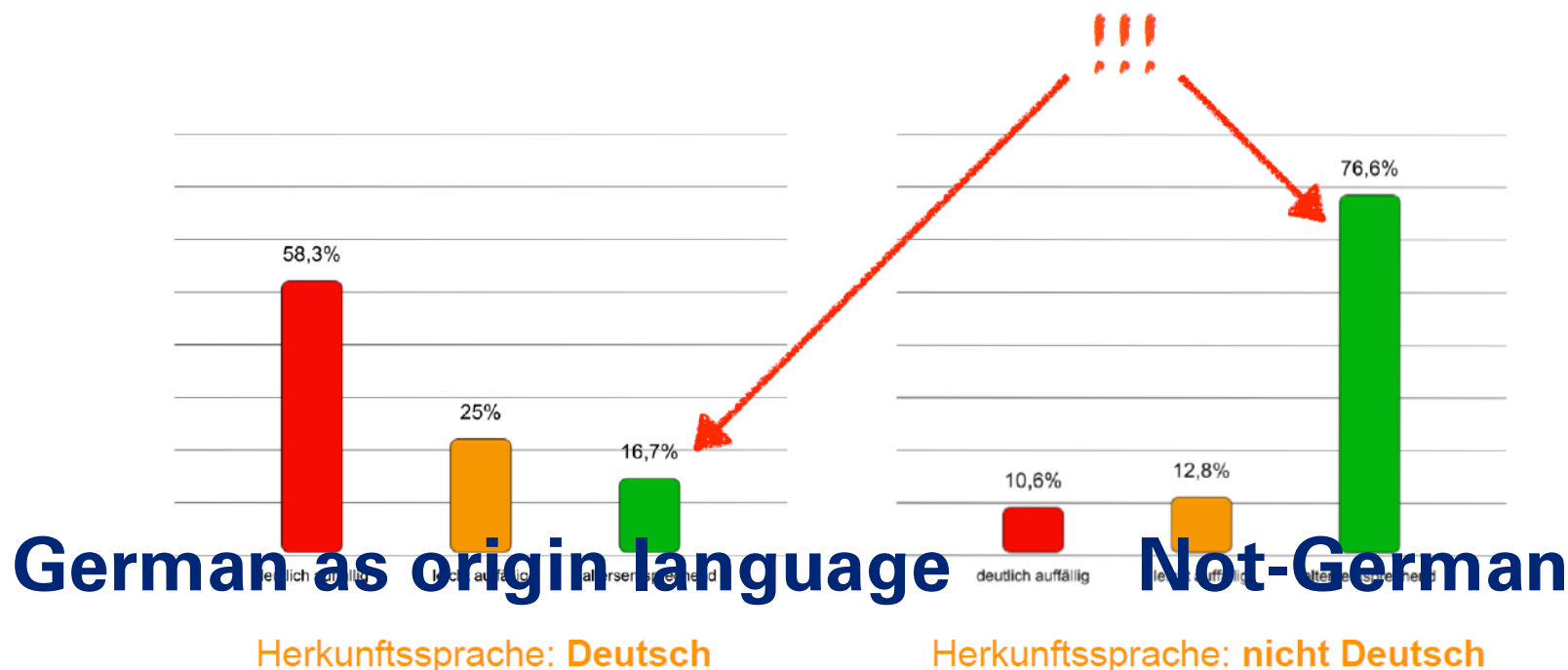
**Phonologischer Bereich:** Aufgrund des durchschnittlichen Jahrgangsergebnisses im Bereich des BEWUSSTEN UMGANGS MIT LAUTEN UND KLEINSTEN EINHEITEN DER GESPROCHENEN SPRACHE sollten entsprechende Unterrichtsmaßnahmen innerhalb des Kollegiums dringend diskutiert und ergriffen werden.

Echt-Daten



## Entdecken von Beurteilungs-Klischees!

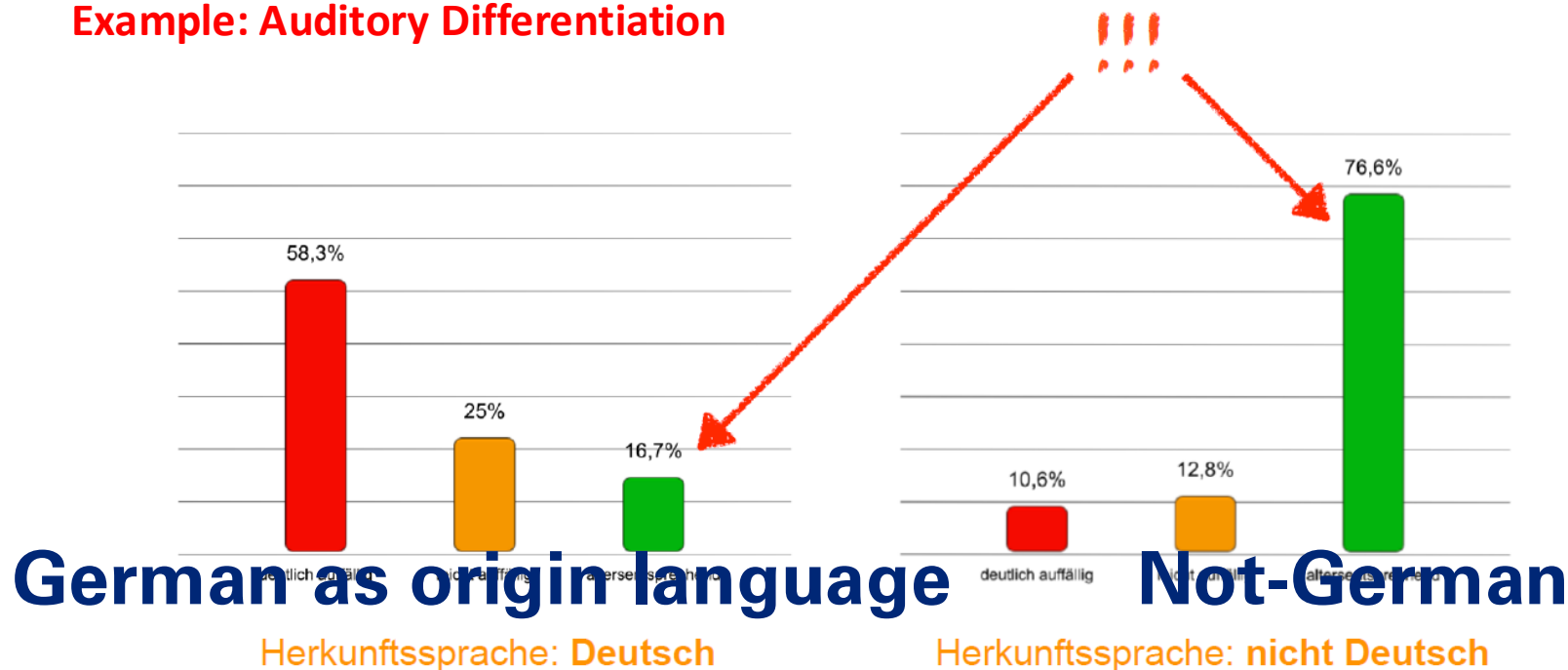
### Beispiel: Auditive Differenzierung



*Auditive Differenzierungsleistungen* sind in Beispieldaten bei nicht-deutschsprachigen Kindern altersentsprechender und günstiger ausgeprägt. Dieses unerwartete Ergebnis ist mit Beobachtungsverfahren *nicht zu entdecken*, da die Erwartung der/s Untersucher\*in (Hofeffekt) das Ergebnis unbewusst vorwegnimmt. LOGmedia-Verfahren schließen Subjektivitäts-Effekte aufgrund der standardisierten Anwendungsweise aus und können zu neuen Erkenntnissen für Förderung, Therapie und Praxis im Bereich „Lernausgangslage“ beitragen.

## Entdecken von Beurteilungs-Klischees!

**A threat in the air!** Beispiel: Auditive Differenzierung  
**Example: Auditory Differentiation**



*Auditive Differenzierungsleistungen* sind in Beispieldaten bei nicht-deutschsprachigen Kindern altersentsprechender und günstiger ausgeprägt. Dieses unerwartete Ergebnis ist mit Beobachtungsverfahren *nicht zu entdecken*, da die Erwartung der/s Untersucher\*in (Hofeffekt) das Ergebnis unbewusst vorwegnimmt. LOGmedia-Verfahren schließen Subjektivitäts-Effekte aufgrund der standardisierten Anwendungsweise aus und können zu neuen Erkenntnissen für Förderung, Therapie und Praxis im Bereich „Lernausgangslage“ beitragen.

# Future Directions

## On the Way to a collaborative Research

### Framework

We need research to establish strong, multidisciplinary evidence on wider benefits of adult learning

- Longitudinal Beginning by PISA Zero
- Quasi-experiments with control groups (diagnostics, intervention, prevention ...)
- Combination of physical and cognitive measures
- Focus on different groups, youth, elderly, migrants, disadvantaged, low skilled: along lifespan
- New factors to be measured as cultural capital, income, and cognitive health (health capital)
- Preventive role of adult education for cognitive, mental and physical health
- Preventive role of adult education for social exclusion in addition to sustain
- New forms of motivated learning and evidence based teaching and their impact on individuals



# Future Directions

## Combination

- AMBET-Technologies
- Benefits of Lifelong Learning
- Educators with LLL-Competencies
- Motivating learning spaces
- Learning Principles:

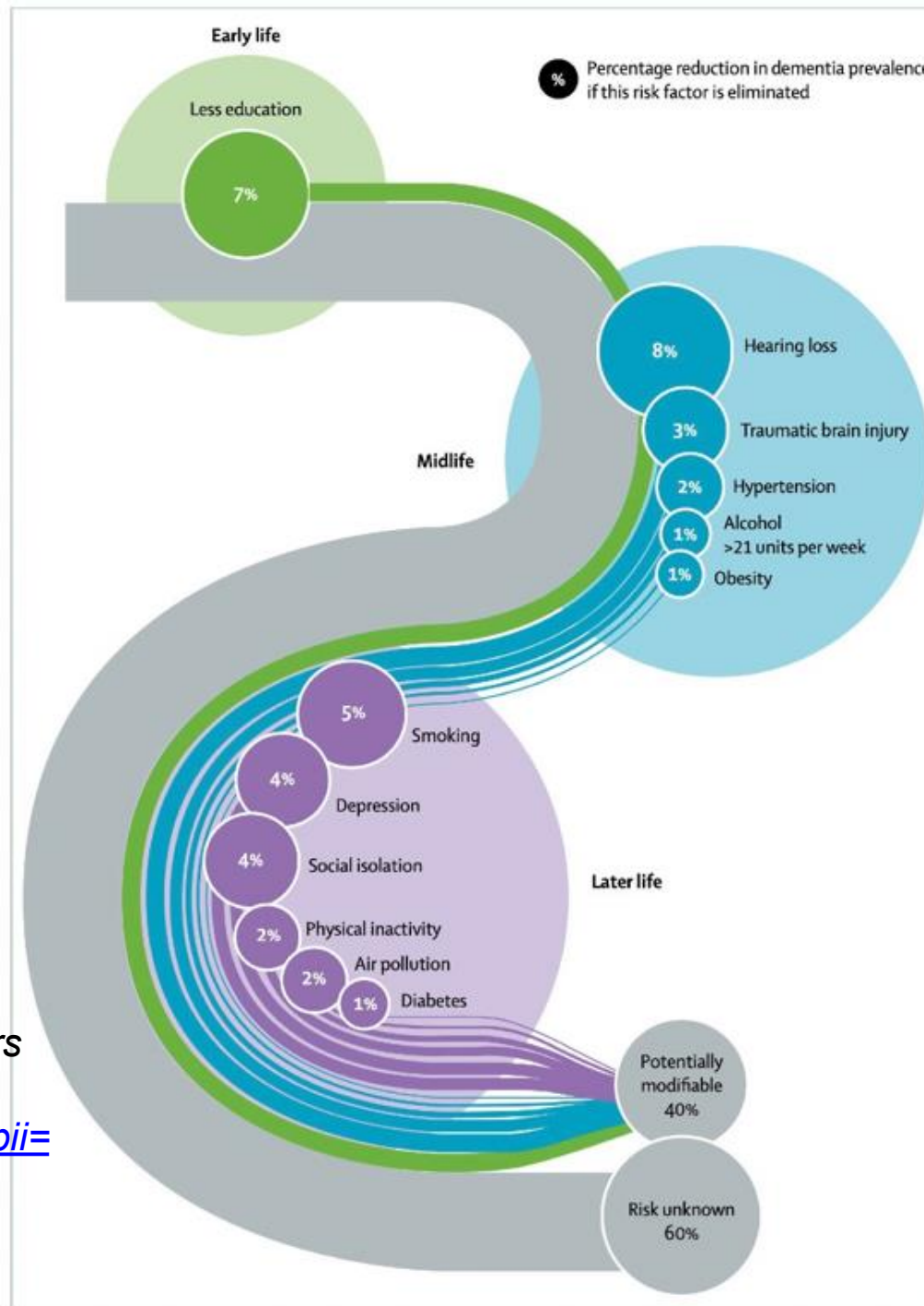
Learning in joy

Learning with purpose

Learning through encounter

*Proportion of potentially modifiable risk factors for dementia, p.418*

<https://www.thelancet.com/action/showPdf?pii=S0140-6736%2820%2930367-6>





# Teaching based research

- AMBET-Technologies

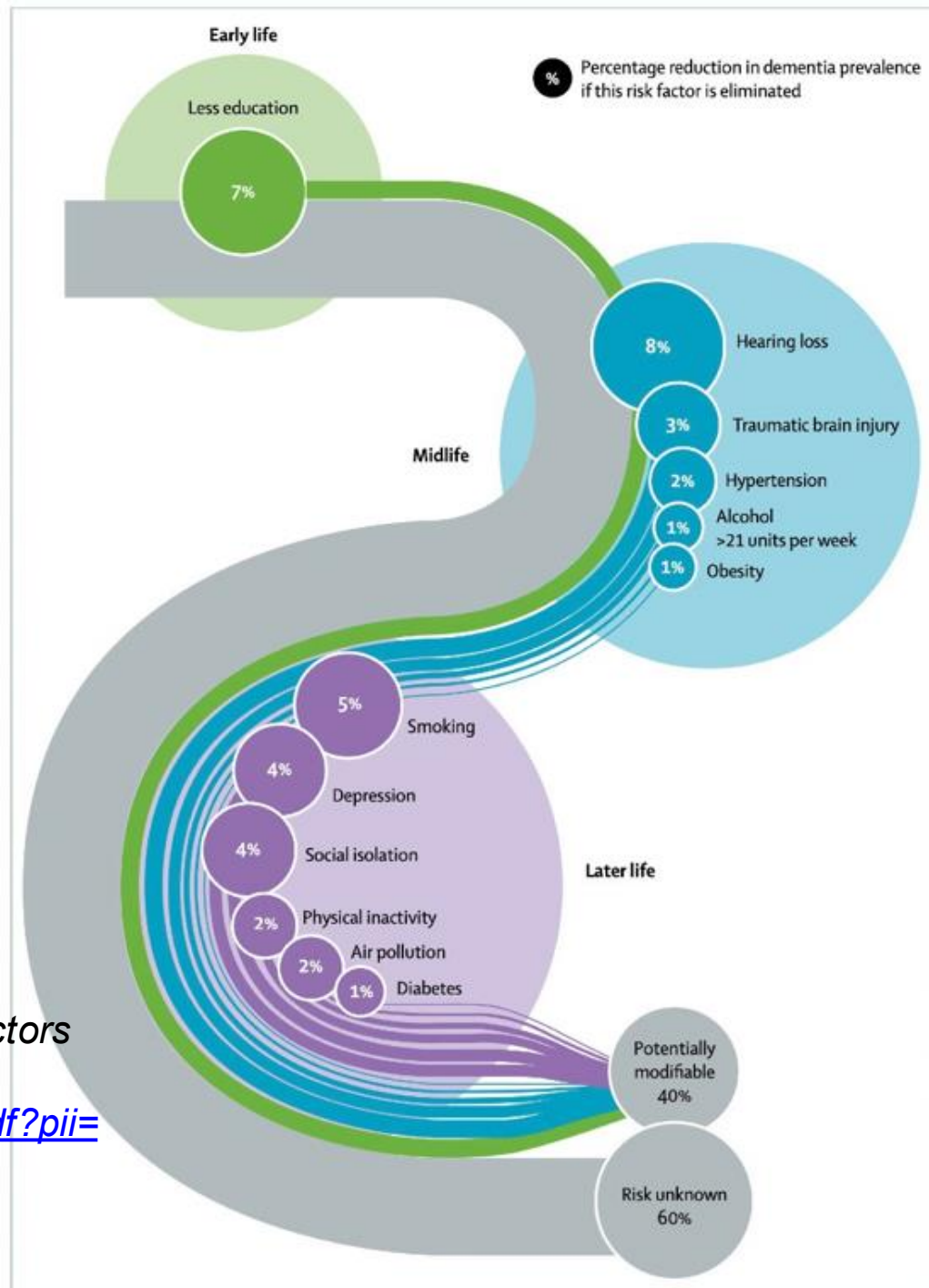
Educators with Knowledge about Learning

Microcredentials

Learning related professionals (caregivers, physiotherapists ...)

*Proportion of potentially modifiable risk factors for dementia, p.418*

<https://www.thelancet.com/action/showPdf?pii=S0140-6736%2820%2930367-6>



# What we can do together

## On the Way to a collaborative Research Framework

A project in Kosovo went in the international direction: demographic dividend) <https://aab-edu.net/en/international-cooperations/projects/setup-a-learning-along-lifespan-community-center-in-pristina/>

Transdisciplinary dialogues on adult learning and education “Early Childhood” was (08.05.2023) with **Assoc.-Prof.in Dr. Serap Sevimli-Celik, PhD** (Elementary & Early Childhood Education, Middle East Technical University, Turkey) and Visiting Professor 2025/26: Play for Learning and Life long Learning

Cooperation: **Center for Applied Game Studies Department for Arts and Cultural Studies (UWK)** Kil, M.; Keser-Aschenberger, F. & Pfeiffer, A. (2023): Procedural Diagnostic

Tools for Assessing and Communication Pre- and Primary School Children’s Learning Prerequisites. Proceedings of ICERI2023 Conference, 13th–15th November 2023, Seville, Spain, 5090- 5098, ISBN: 978-84-09-55942-8

# What we can do together?!

## On the Way to a collaborative Research Framework

Due to the Societal Challenges we have to stop the vicious cycl!!! Instead of more and more support and therapy with the language development “german”(we see disturbing figures; for example: responsible department head announces a wave sweeps over the municipalities; and the german speaking kindergartens are at their limit)

### Save the Date:

The treasure within:  
Inclusive and evidence-  
based educational support  
diagnostics for long-term  
and sustainable adult  
education attainment **at**  
**UWK 11/05/2026**

How can we collaborate with you? (Use it in countries for demographic dividend, lifelong Learning perspectives, Data Analysis ... )

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