
# Standards and Practices of Teacher Preparation in Germany and the USA
# &
# Models and Perspectives of International Student Exchanges in Teacher Education

Prof. Dr. André Bresges
Nina Glutsch

University of Cologne
Institute of Physics and its Didactics
Center for Teacher Education (ZfL)

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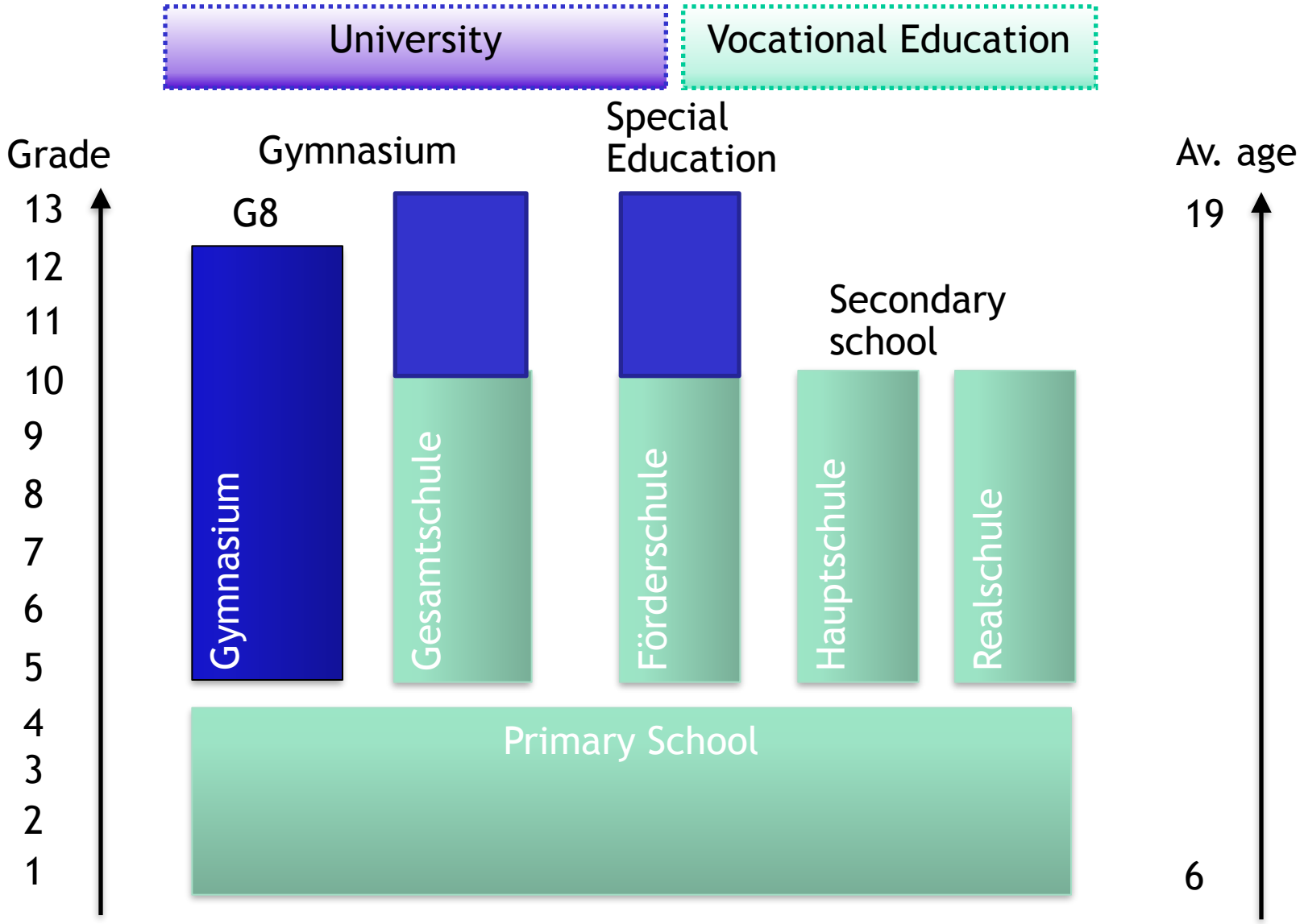
Zentrum für LehrerInnenbildung

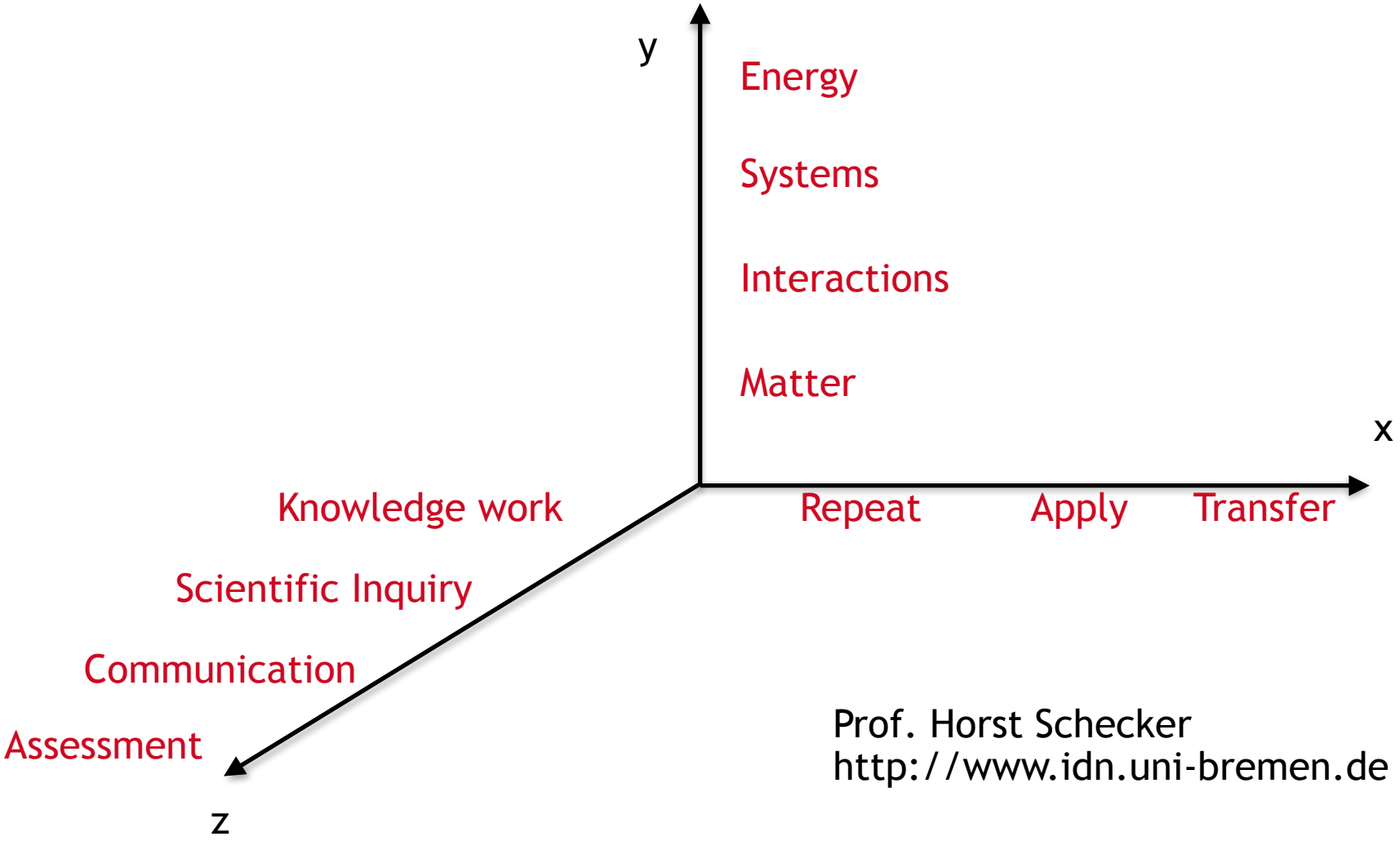
Universität zu Köln

# School System in Germany (simplified)



# KMK National STEM Standards

## middle school




Prof. Horst Schecker
http://www.idn.uni-bremen.de

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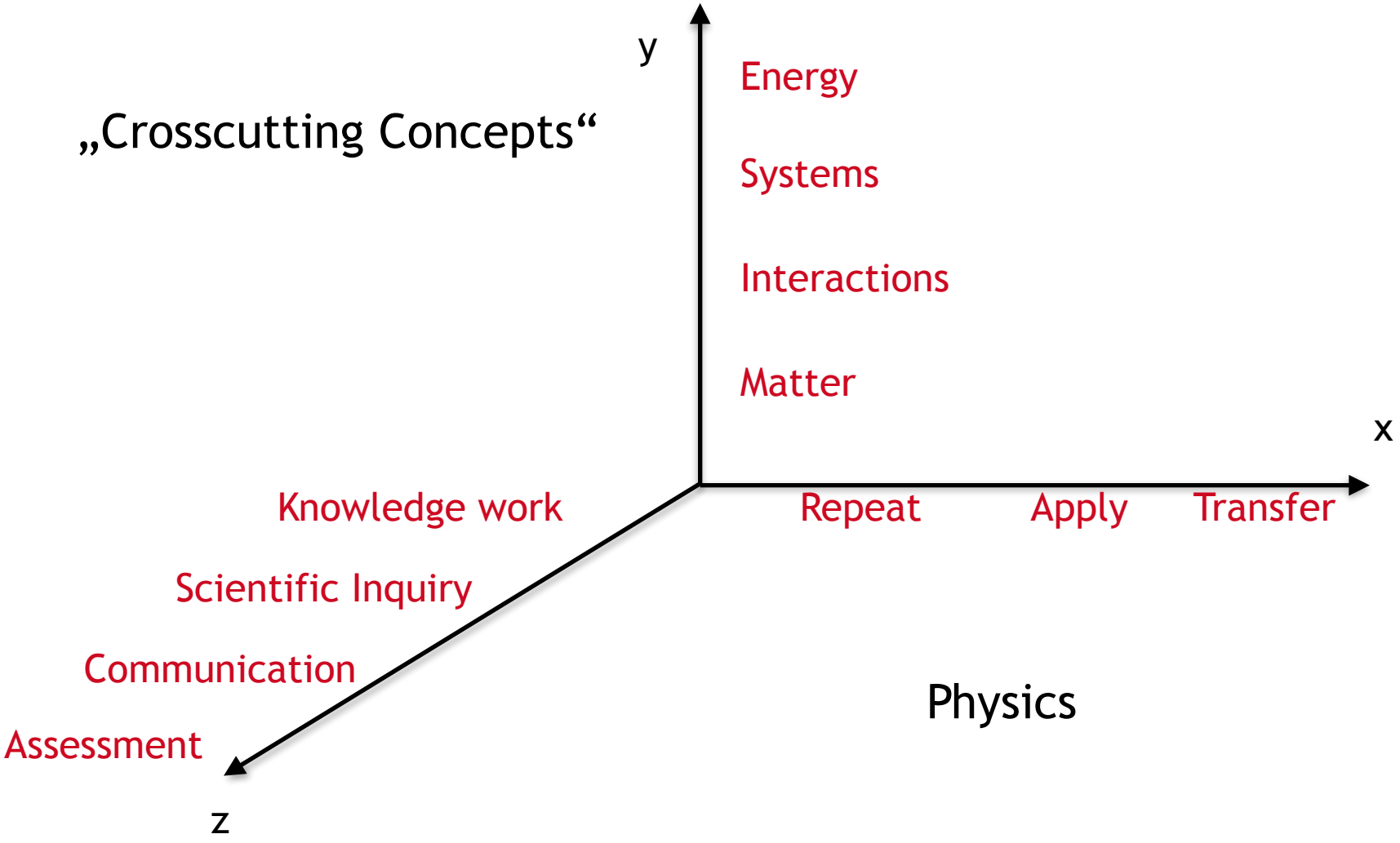
„Crosscutting Concepts“




Physics

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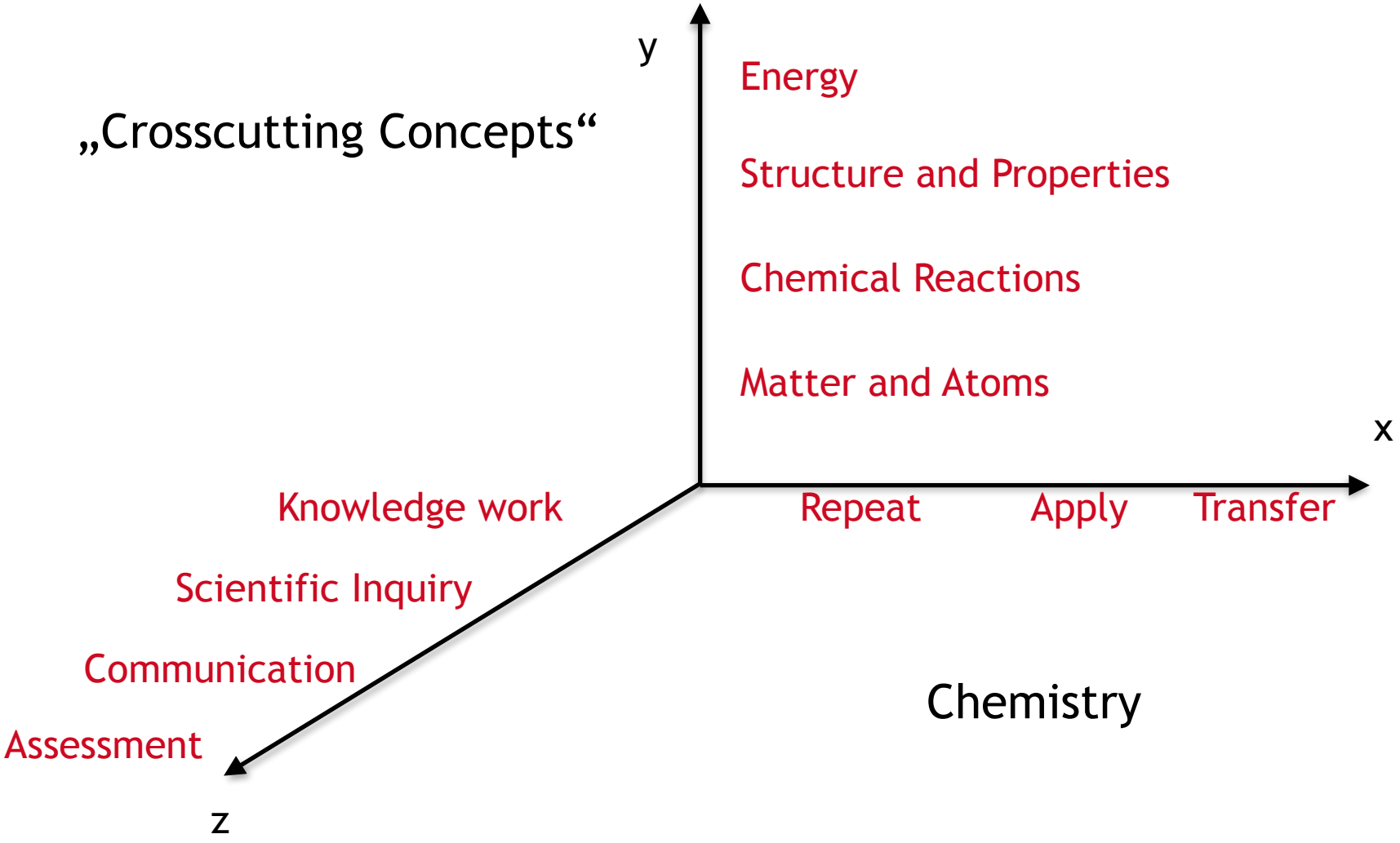


Chemistry

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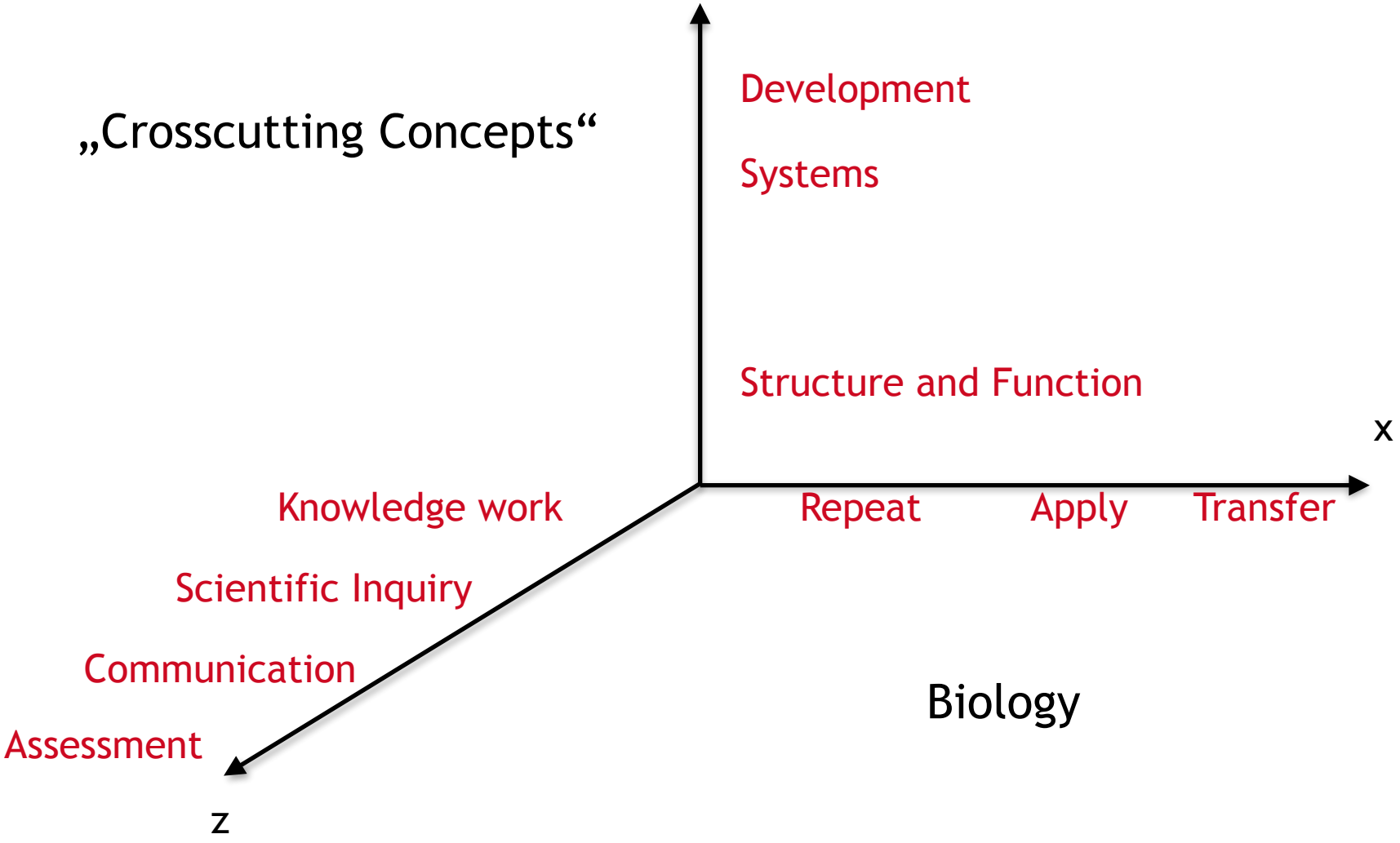


Biology

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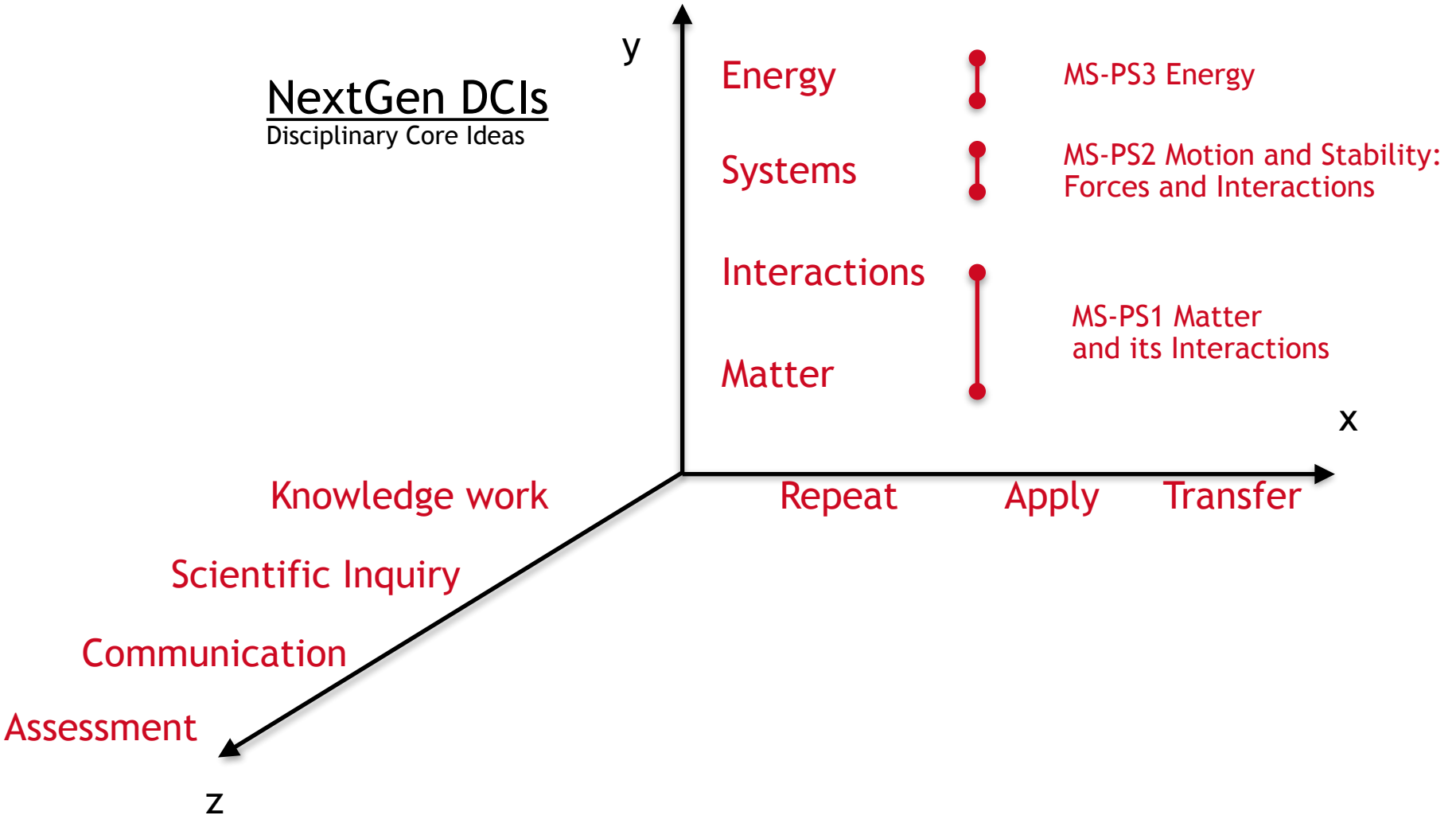

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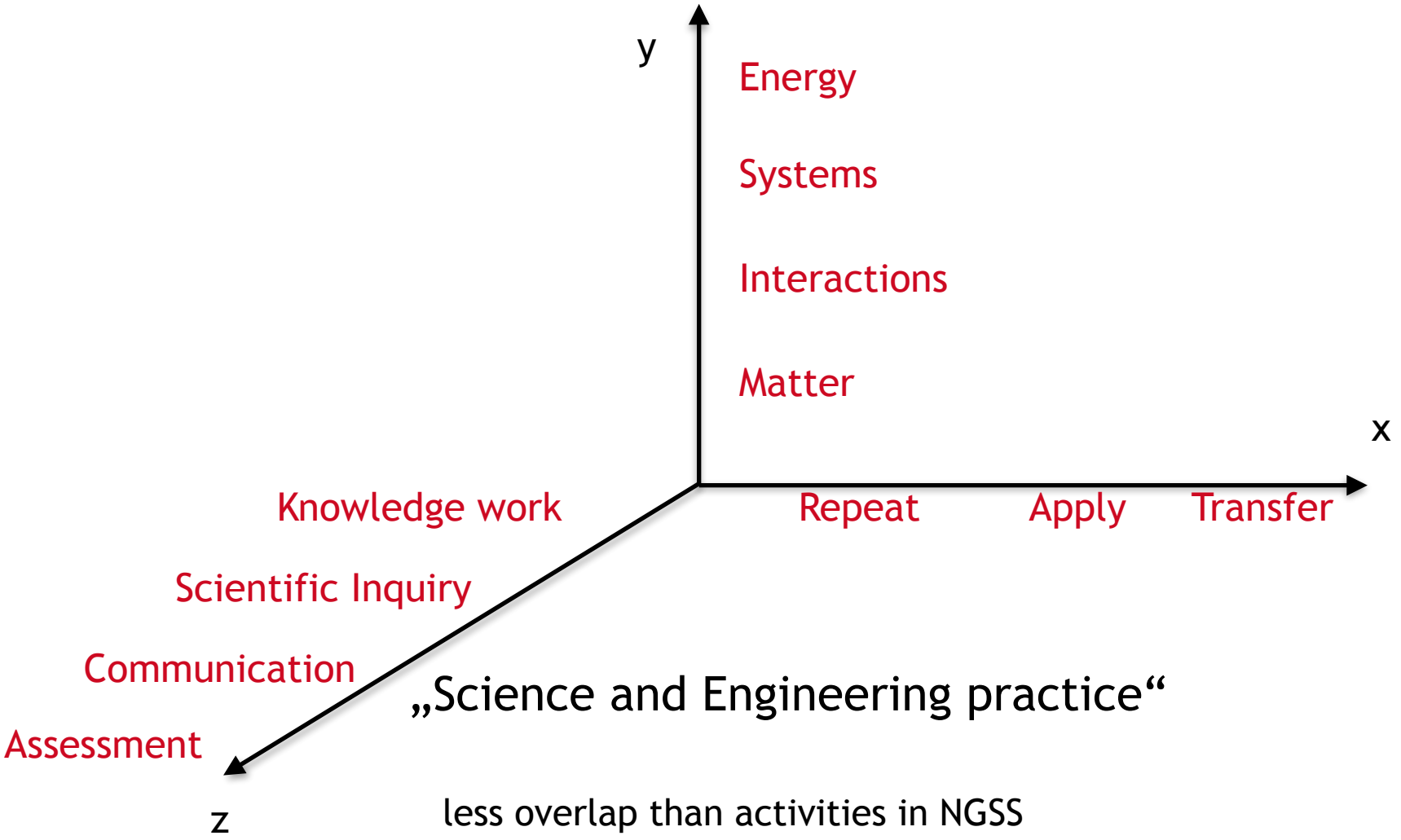


less overlap than activities in NGSS

# KMK National STEM Standards

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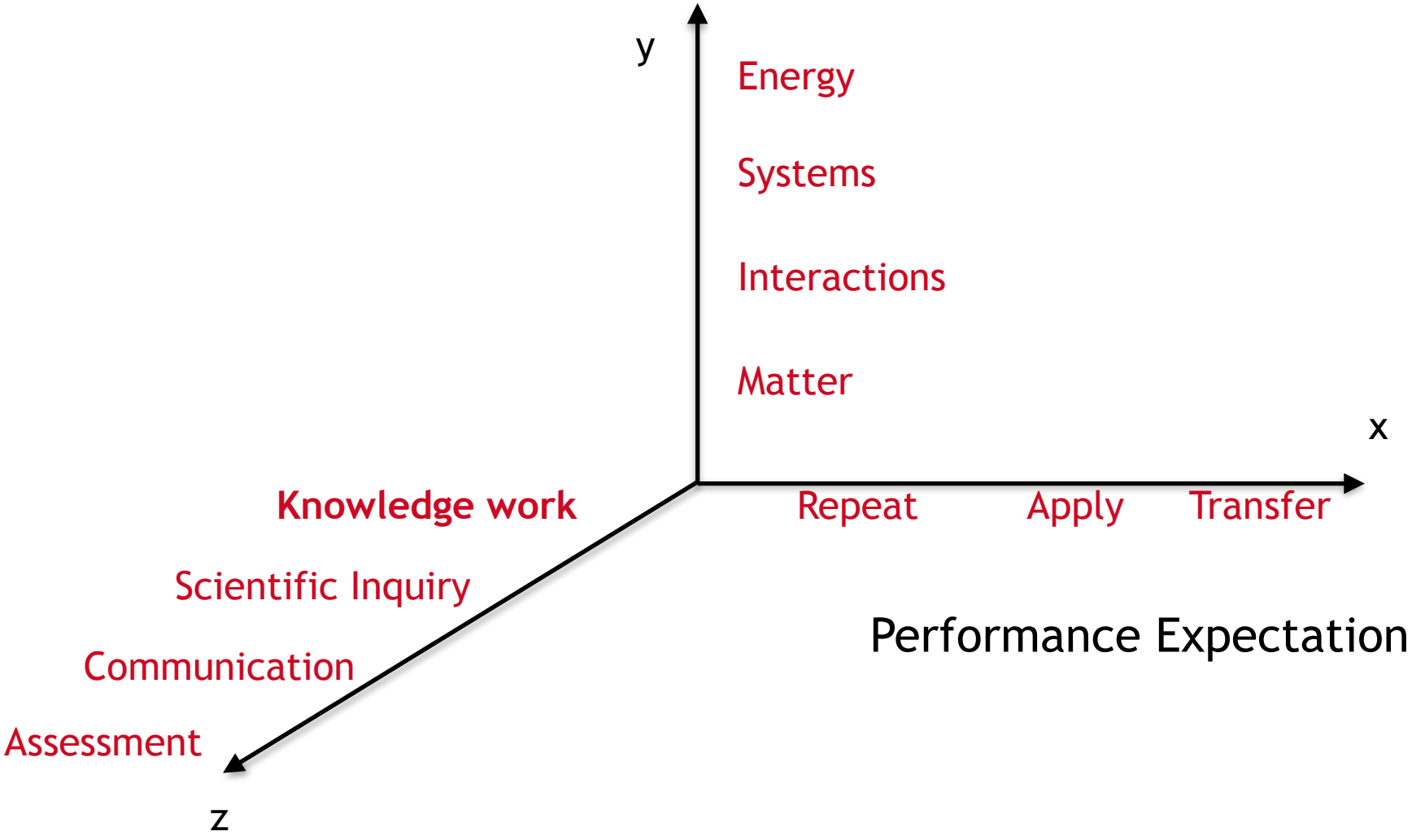
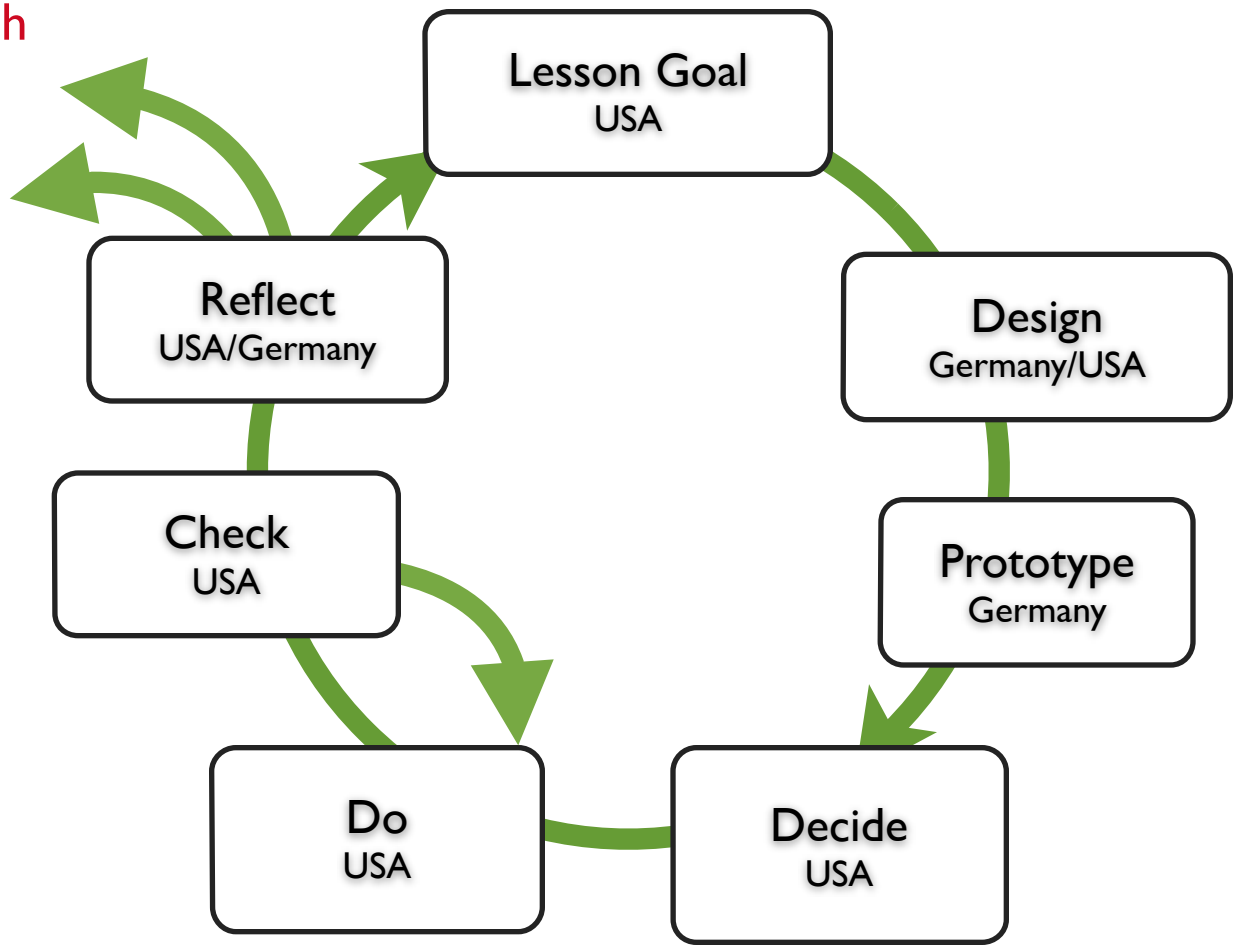


# Small Research Project

Publish

Derive Theories of Learning, related to cultural background

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# DBR Study abroad

- International Student arrives
- Discusses actual and future development of school and its goals
- Connects to STEM Teacher
- Student AND homebased Seminar helps to develop Experiment/Design/Lesson
  - optional mit relevance to origin country (e.g. cars and traffic in Germany…)

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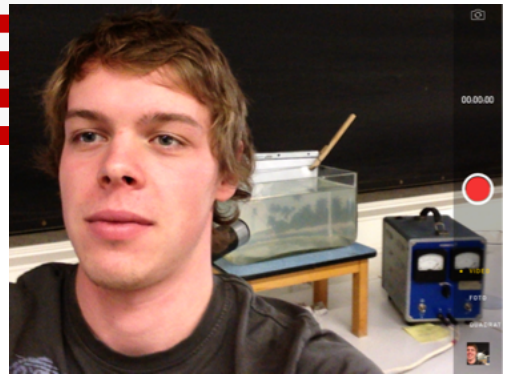
# DBR Study abroad

- STEM Teacher conducts planned lesson, international student observes and helps out
- STEM Teacher and Student discuss outcome, under the background of local cultural issues
- International Student files report to homebased seminar



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# DBR Study abroad

- At home, Student and homebased seminar discusses report under the **background of local cultural issues**
- Conclusion for next visit are made

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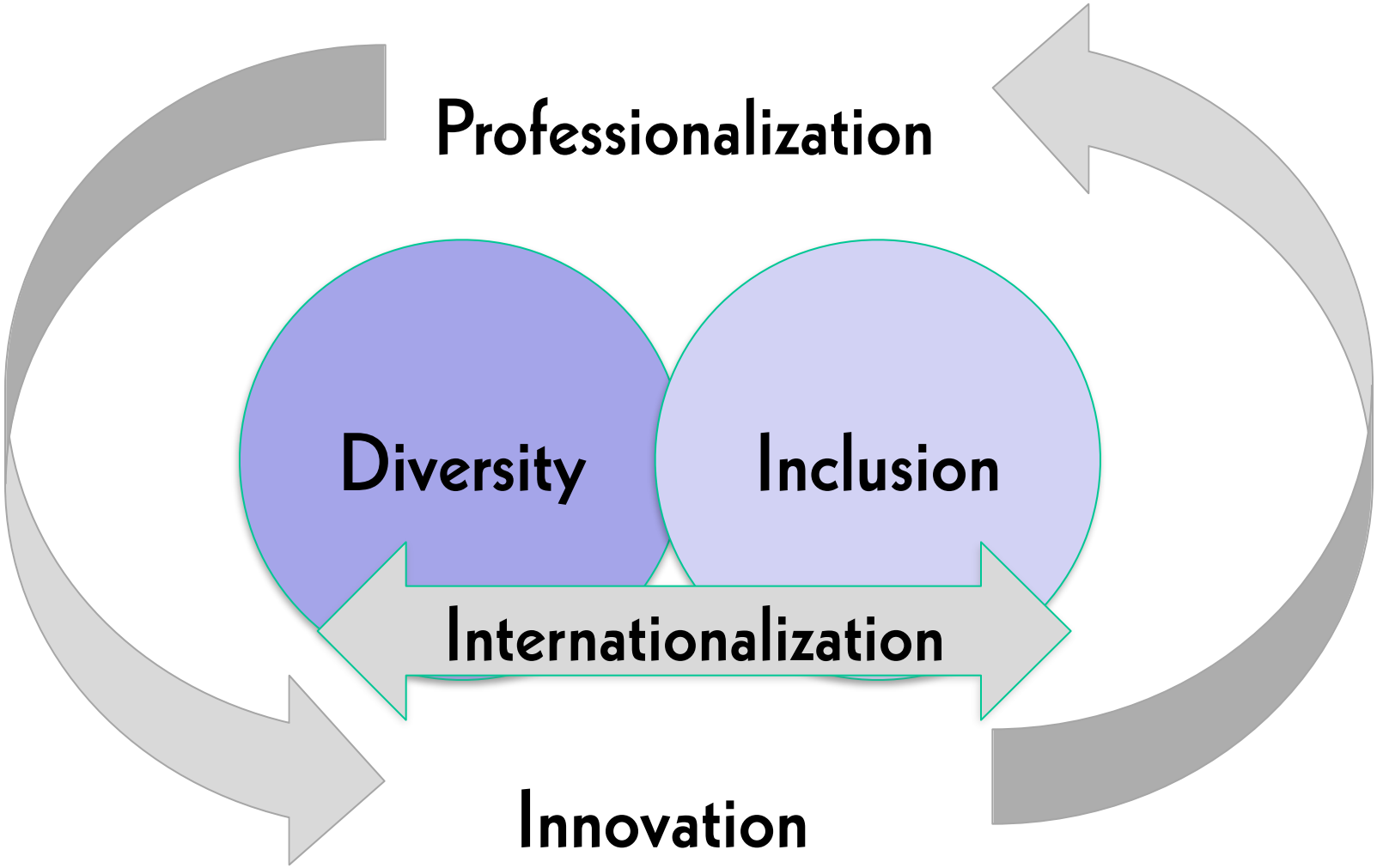
# Internationalization of Teacher Education

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"The job description for teachers is increasingly determined by **their ability** to apply their pedagogical skills **successfully in heterogeneous and culturally diverse** learning groups."

(Recommendation of the 14th General Meeting of the German Rectors' Conference (HRK), 2013, Recommendations on Teacher Education, p. 6)

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# Solution: Mobility!

"The job description for teachers is increasingly determined by **their ability** to apply their pedagogical skills **successfully in heterogeneous and culturally diverse** learning groups."

(Recommendation of the 14th General Meeting of the German Rectors' Conference (HRK), 2013, Recommendations on Teacher Education, p. 6)

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# Aims

**Students gain…**

✓a higher professional self-esteem, communication and language skills

✓a greater appreciation of cultural heterogeneity in school classe (Pence & Macgillivray, 2008)

✓intercultural competences

**and adapt…**

✓a more global perspective in teaching (vs. acting as "local players") (Jaritz 2011,p. 7)

"I suspected I would learn a lot about the cultural differences between Italy and America, but I never thought I would learn so much about myself as a teacher" (ibid., p. 20).

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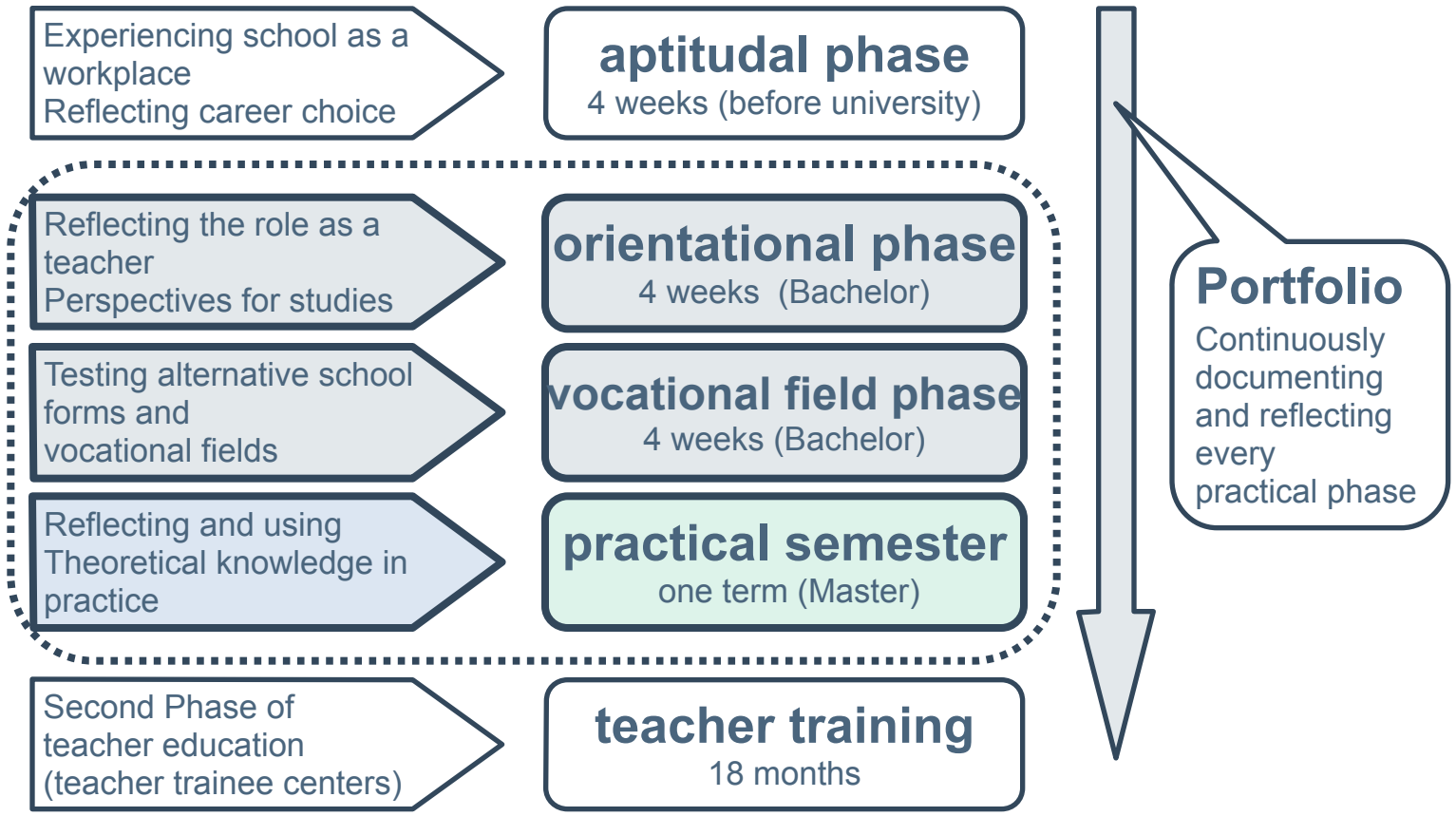
# Practical Phases in German Teacher Education




**Goal: connecting theory with practice in a structured way**

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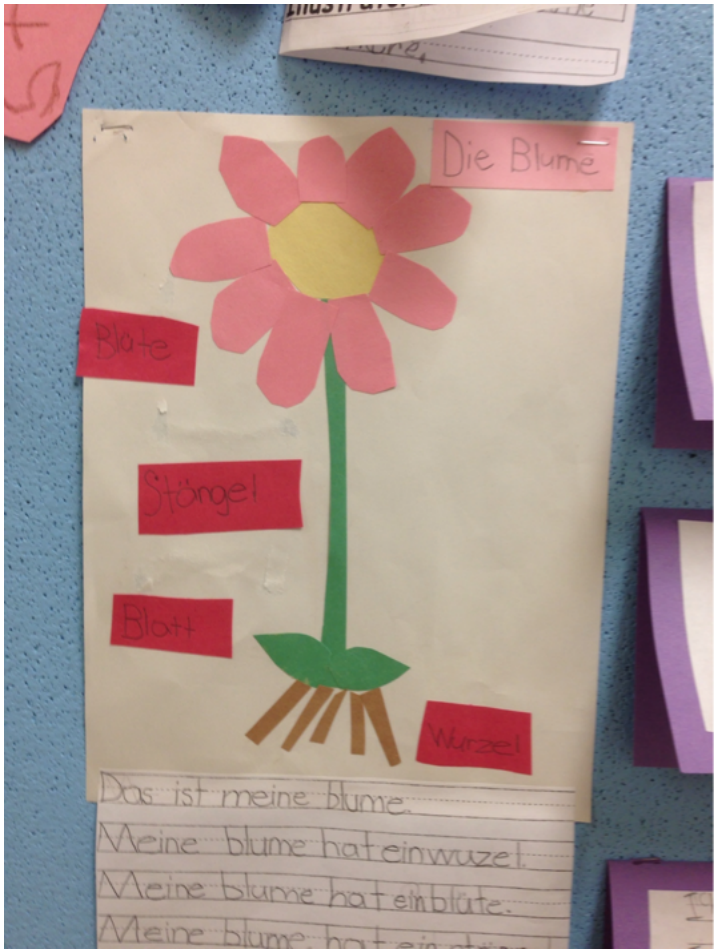
# Mobility: Example

## Immersion at Waddell Language Academy


### Goals:

- ✓ heterogeneity
- ✓ multilingualism
- ✓ inclusion



# Mobility: Example

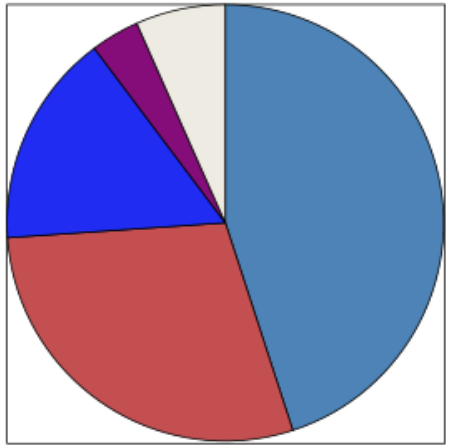
## Waddell Language Academy

**Inklusive magnet school**

K–8 (Kindergarten to 8th grade)

**Language immersion:**

German, French, Spanish, Japanese, Chinese

**K-8 Students at Smith**
(34% free/reduced lunch= measure of poverty)

- White
- Black
- Hispanic
- Asian
- Multiracial

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# The Role of Reflection in Teacher Education

"Great Teachers are neither born nor made but they may develop"

(Theo Bergen, University of Nijmegen/ Netherlands)

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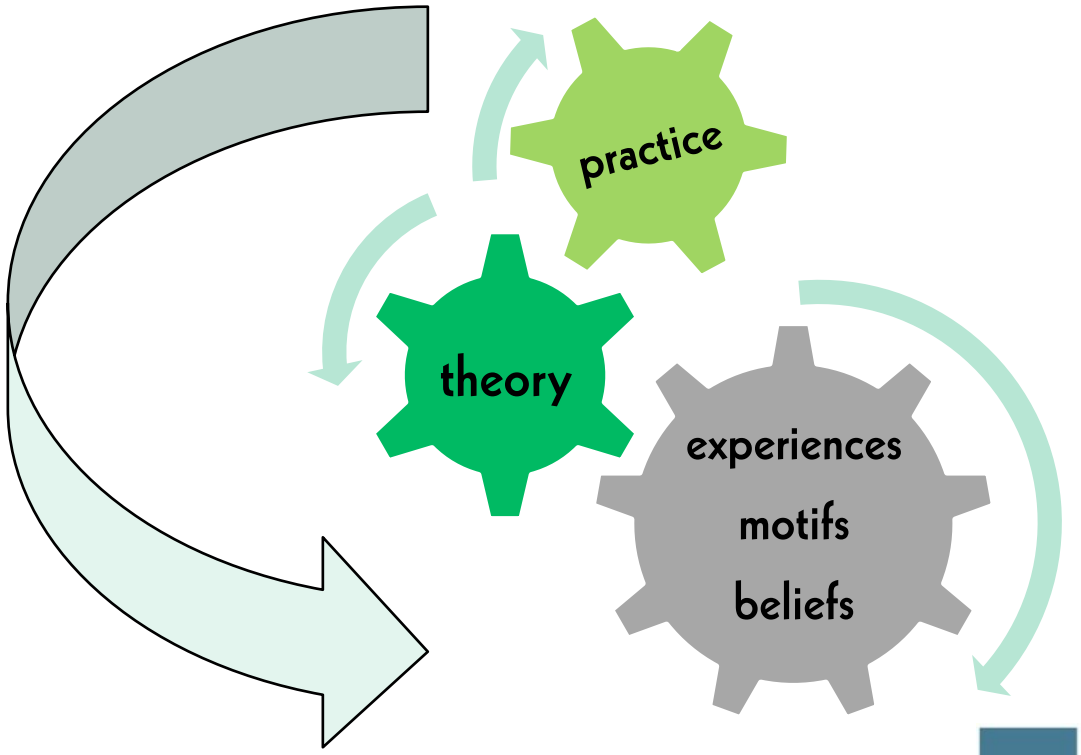
# The Role of Reflection in Teacher Education

Documentation and reflection are central in teacher education!

E-learning

Feedback

P2P/ teams




Multiperspective interaction

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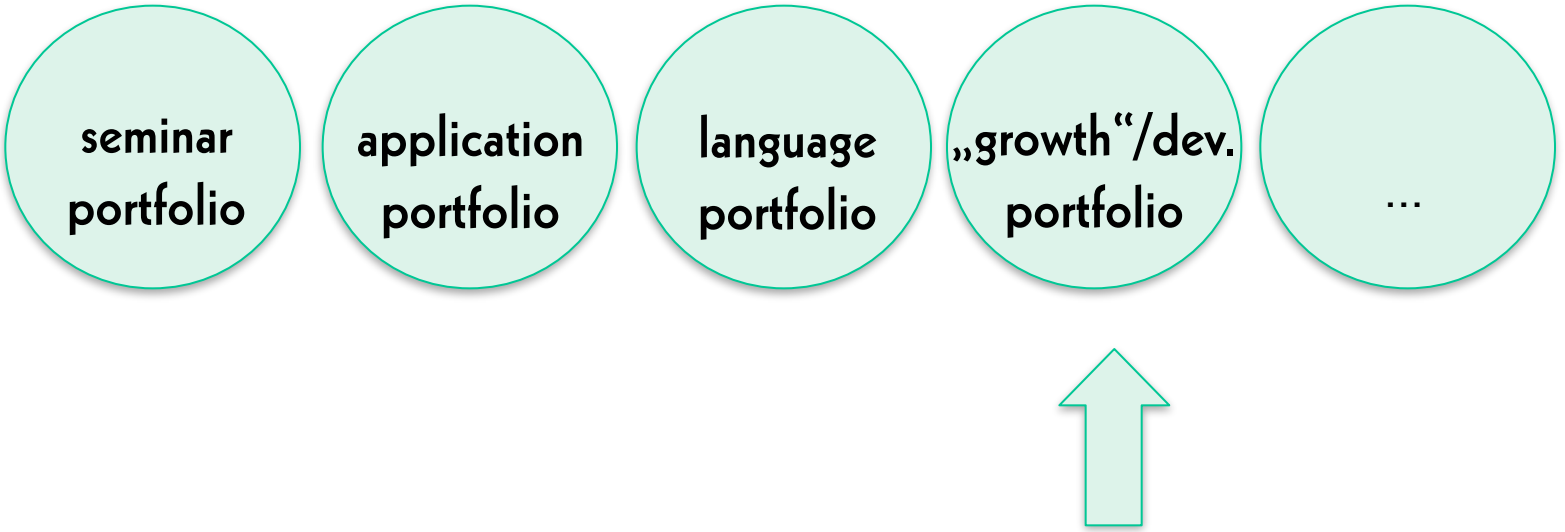
# Portfolio

lat.: portare "to carry"; folium "paper"

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# Portfolio: Working Theory


- no research theory
- subjective theory: theory of oneself as a teacher (beliefs)
- students write their working theory at the beginning of their studies and continuously before and after every practical phase
- based on experiences and theoretical knowledge, this subjective theory will develop and "grow"

**Student reflection of her/his development of becoming a professional teacher**

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# Questions:

See us at Poster PST2B07
Mon 01/06, 8:30PM - 9:15PM

What do YOU expect from a transatlantic training and research network for PER?

What is your opinion about Design Based Research in PER?

In your opinion, what is the main advantage students will gain from the exchange?

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# Integrating Studies in Physics Education and Teacher Preparation in Germany

Stefan Hoffmann

University of Cologne
Institute of Physics Education

Institute of
Physics Education

Universität
zu Köln

# Demands on teacher preparation…

**German teacher education standards:**

…Students have to gain experience in planning, conducting and reflecting own teaching attempts…

**Cologne Solution:**

**Learning by Teaching** concept in physics teacher education

Emphasis on reflection of the personal development of becoming a teacher

# Agenda

- **Involved courses and students at UoC**
- **„Learning by Teaching“-Concept**
- **Two seperate Feedback and Reflection Loops:**
  - Micro reflection
  - Macro reflection
- **Reflection as key competence for becoming teachers**
  - Evaluation of study achievements
  - Selection of students for intercurltural exchange projects

# Involved courses and students at UoC

- **Physics majors with different types of schools**
  - Primary School (science focus)
  - Secondary School
  - Gymnasium (pre-university school)
  - Special Education
- **Physics minors**
  - Basic science module for biology, chemistry, geography

**Experimental Physics**

# Involved courses and students at UoC

- **Physics majors with different types of schools**
  - Primary School (science focus)
  - Secondary School
  - Gymnasium (pre-university school)
  - Special Education
- **Physics minors**
  - Basic science module for biology, chemistry, geography

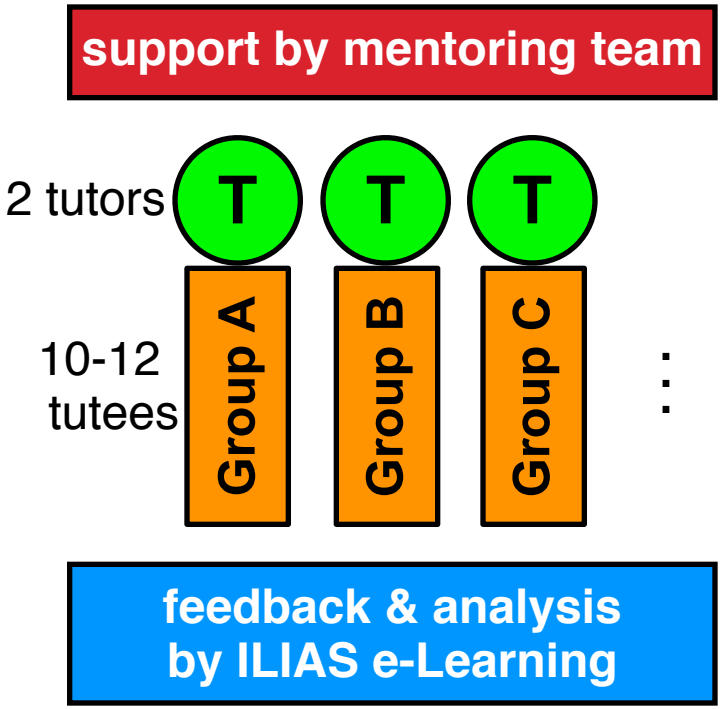
**30-40 students**

**200-250 students**

**Experimental Physics Lecture**

! inhomogengeneous clientele !

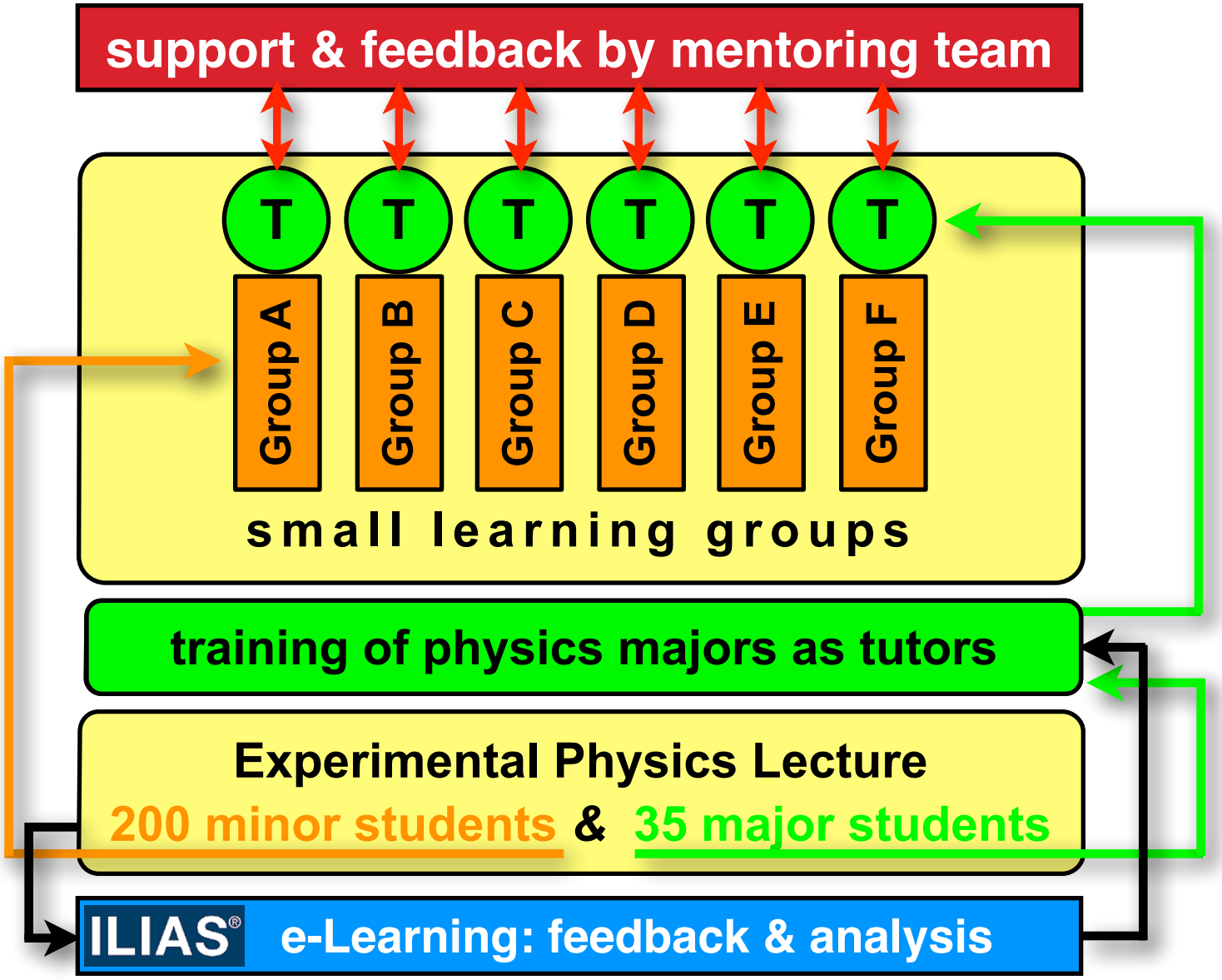
# Learning by Teaching – the nucleus



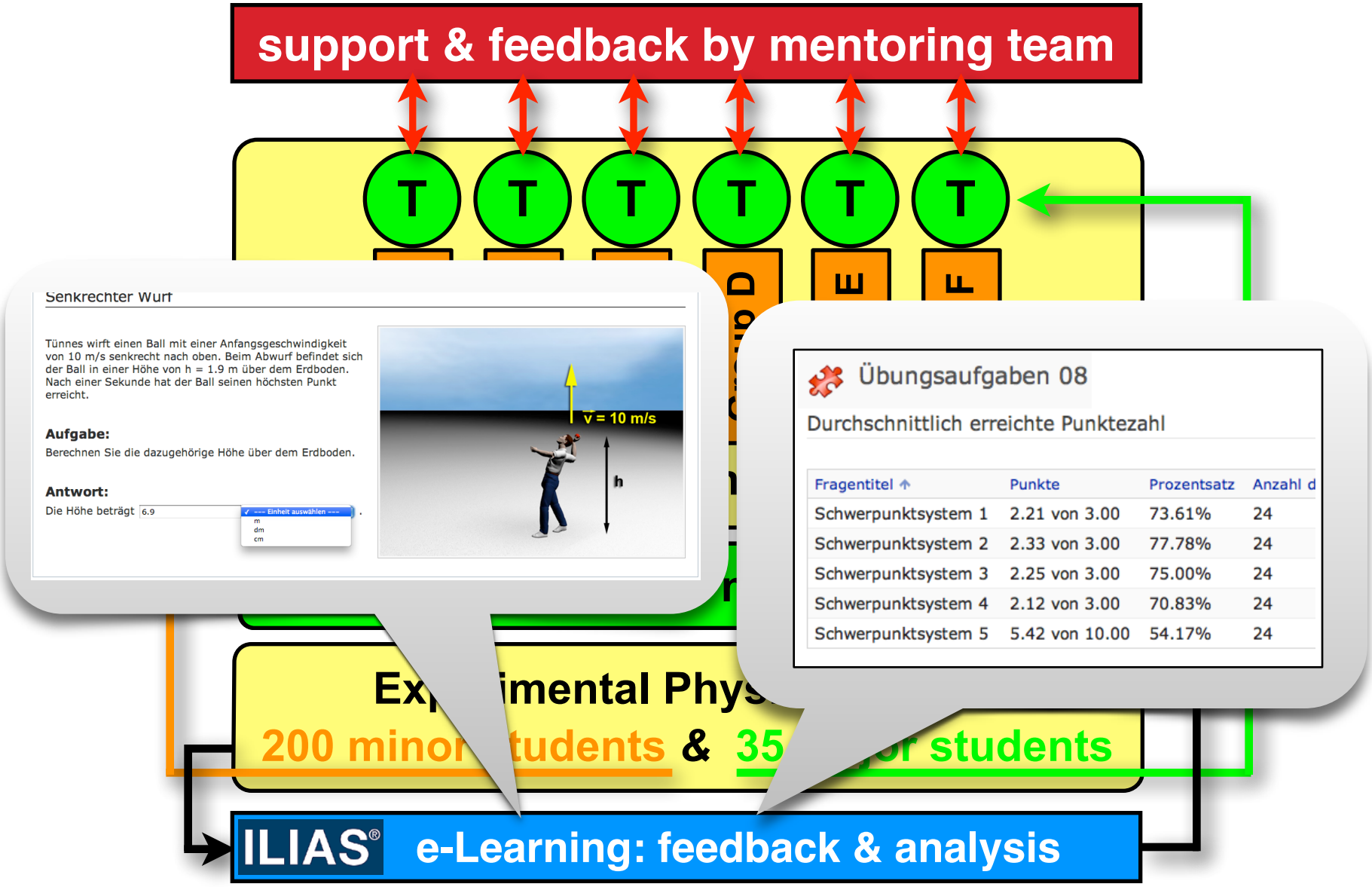

**Teaching** in small learning groups **enables:**

- ✓ …first controlled teaching attempts
- ✓ …e-learning enhanced flipped classroom situations
- ✓ …individual support & reflection

# Learning by Teaching – the concept



# Learning by Teaching – the concept



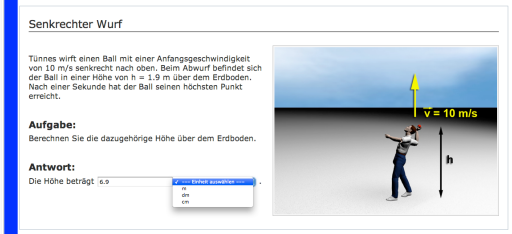
# Learning by Teaching – the workflow

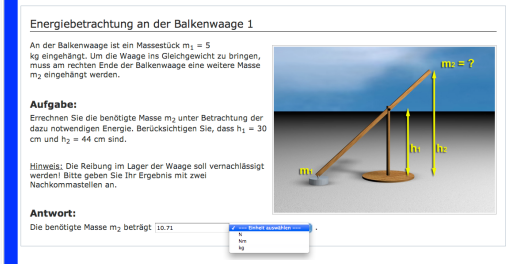
**training of physics majors as tutors**

## Planning and Preparation:

ILIAS®

### Learning tasks

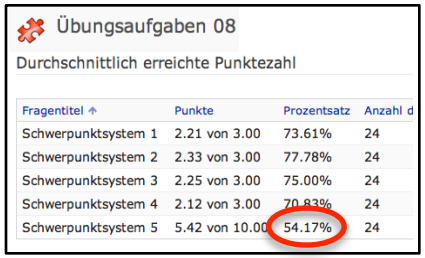


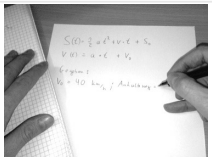

### Supporting media


### Course


### Statistics




### Discussing content



### Lesson planning

### Documentation

ILIAS®

E-Portfolio containing:

- Pre statistics
- Lesson planning
- Social forms
- Tools

# Learning by Teaching – the workflow

## Conducting the tutorial

# Learning by Teaching – the workflow

## Conducting the tutorial

## Documenting the tutorial – Reporting the feedback

ILIAS®

E-Portfolio containing:

…

- Report
- Post statistics
- Conclusion

Übungsaufgaben 08

Durchschnittlich erreichte Punktezahl

(1 - 5 von 5)

| Fragentitel | Punkte | Prozentsatz | Anzahl der Antworten |
|---|---|---|---|
| Schwerpunktsystem 1 | 2.69 von 3.00 | 89.74% | 26 |
| Schwerpunktsystem 2 | 2.88 von 3.00 | 96.15% | 26 |
| Schwerpunktsystem 3 | 2.62 von 3.00 | 87.18% | 26 |
| Schwerpunktsystem 4 | 2.23 von 3.00 | 74.36% | 26 |
| Schwerpunktsystem 5 | 7.85 von 10.00 | 78.46% | 26 |

# Learning by Teaching – the workflow

## Conducting the tutorial

## Discussion and supervision

## Documenting the tutorial – Reporting the feedback

ILIAS®

E-Portfolio containing:

…

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- Post statistics
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Übungsaufgaben 08

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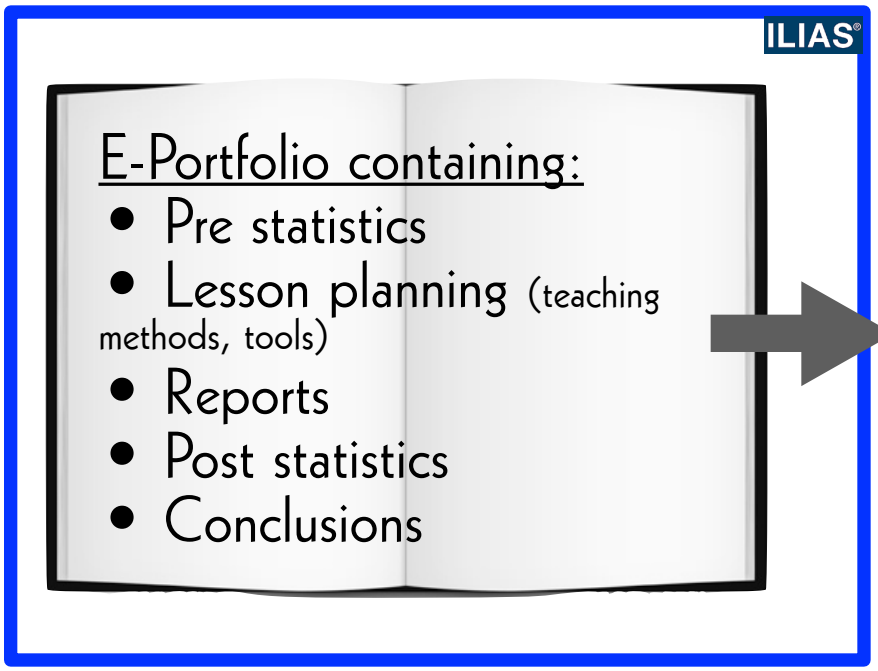
# Learning by Teaching – the reflection

## Final reflection

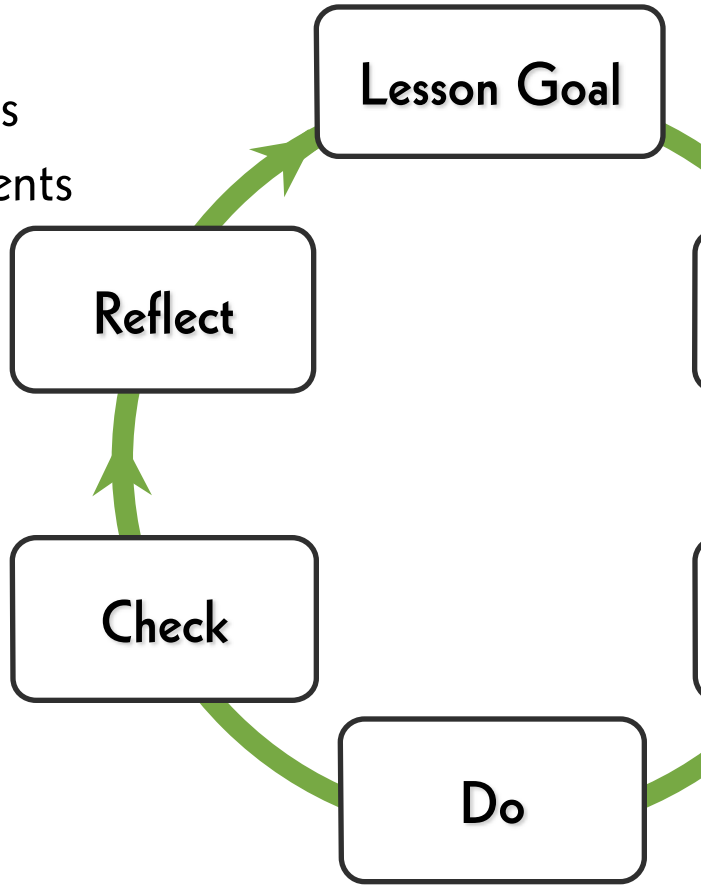



✓ Reflecting their own learning progress using the complete E-Portfolio.

✓ Creating their own personal theory of teaching & learning.

# Learning by Teaching – the micro reflection

**Weekly reflection:**




conclusion:
- ✓ suggestions
- ✓ improvements
- ✓ post-tests

usage of:
- ✓ media
- ✓ test statistics
- ✓ tools
- ✓ experiments
- ✓ learning technique

- ✓ feedback
- ✓ analysis
- ✓ report

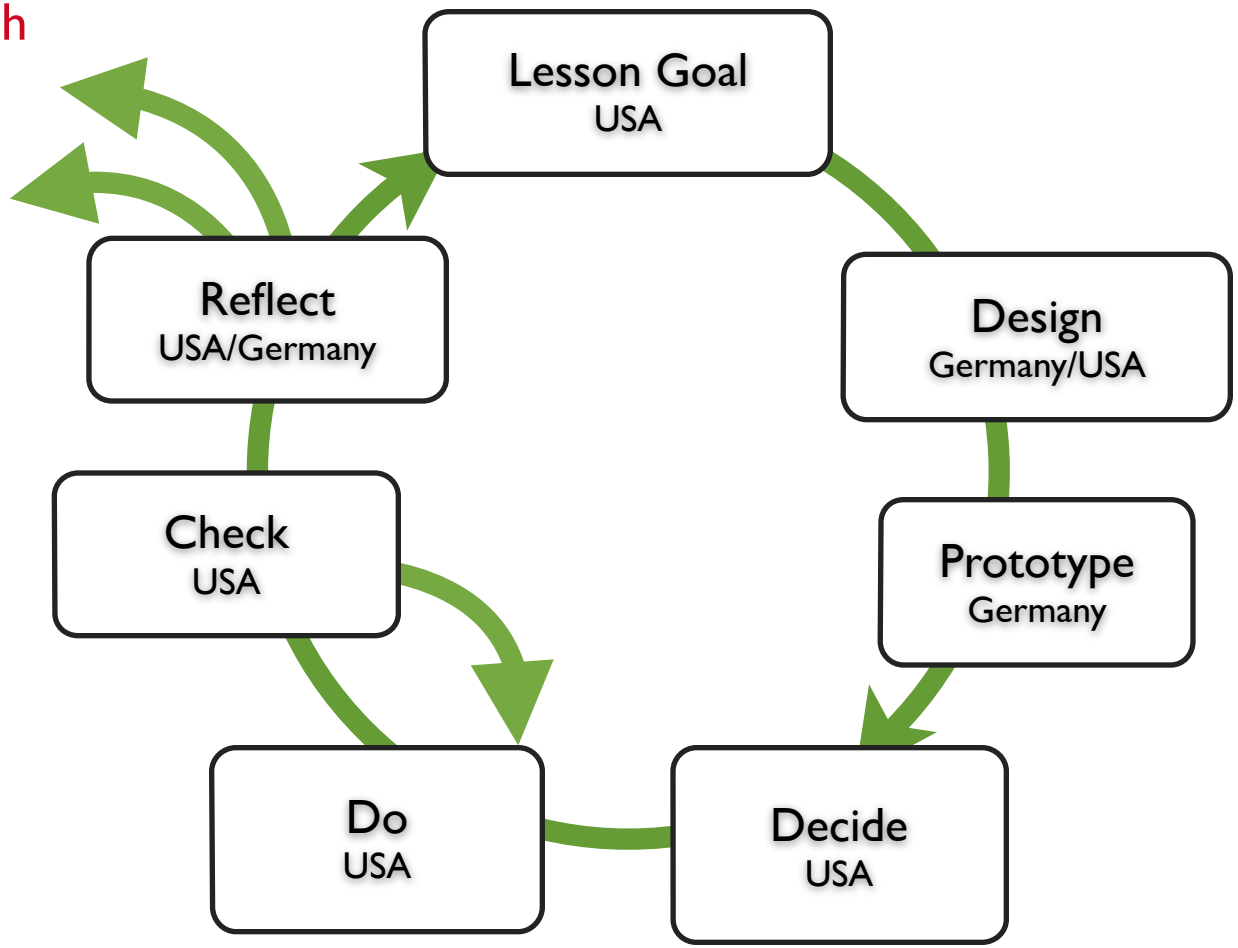
- ✓ documentation of data based decisions

- ✓ conduct the lesson

# Small Research Project

Publish

Derive Theories of Learning, related to cultural background

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# DBR Study abroad

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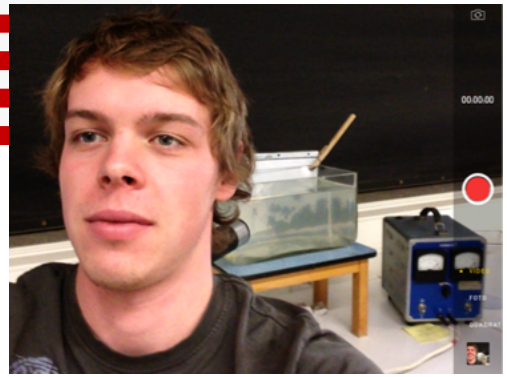

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- Conclusion for next visit are made

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# Comparing Finland to Germany: lessons learned in teacher preparation

Meike Kricke

Center for Teacher Education (ZfL)
University of Cologne
January 6 th 2014

# Contents

- Introduction: Why Finland?
- Finnish school system
- Finnish teacher education
  - ➔ characteristics
  - ➔ Voices of Finnish teacher educators and teachers

- What we have learned from Finland: International educational laboratory
- … in Physics education

Meike Kricke

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# Tervetuola! My portfolio

- 2002: teacher education program (Cologne Uni)
- 2005: Erasmus student (educational scienes)
- 2009: teacher certificate, university lecture
- 2009: starting PhD
- 2010: research journey & excursion: Joensuu
- 2012: teacher exchange program (university)
- 2013: excursion Joensuu

Meike Kricke

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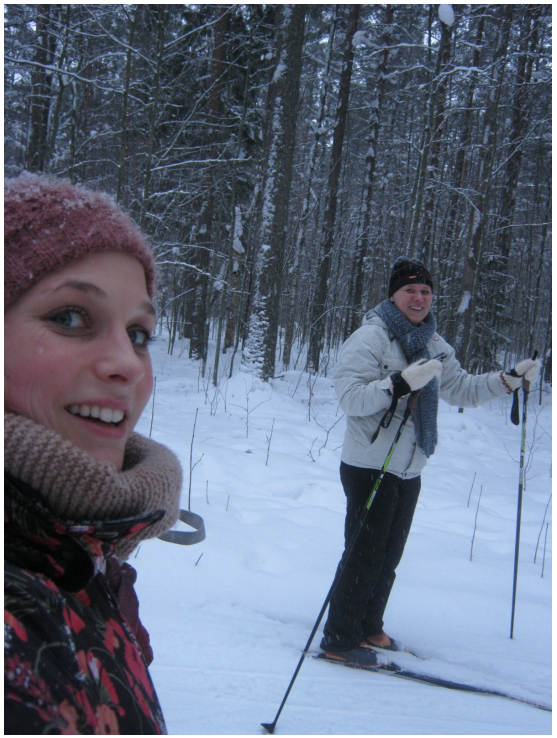
# My portfolio



Meike Kricke

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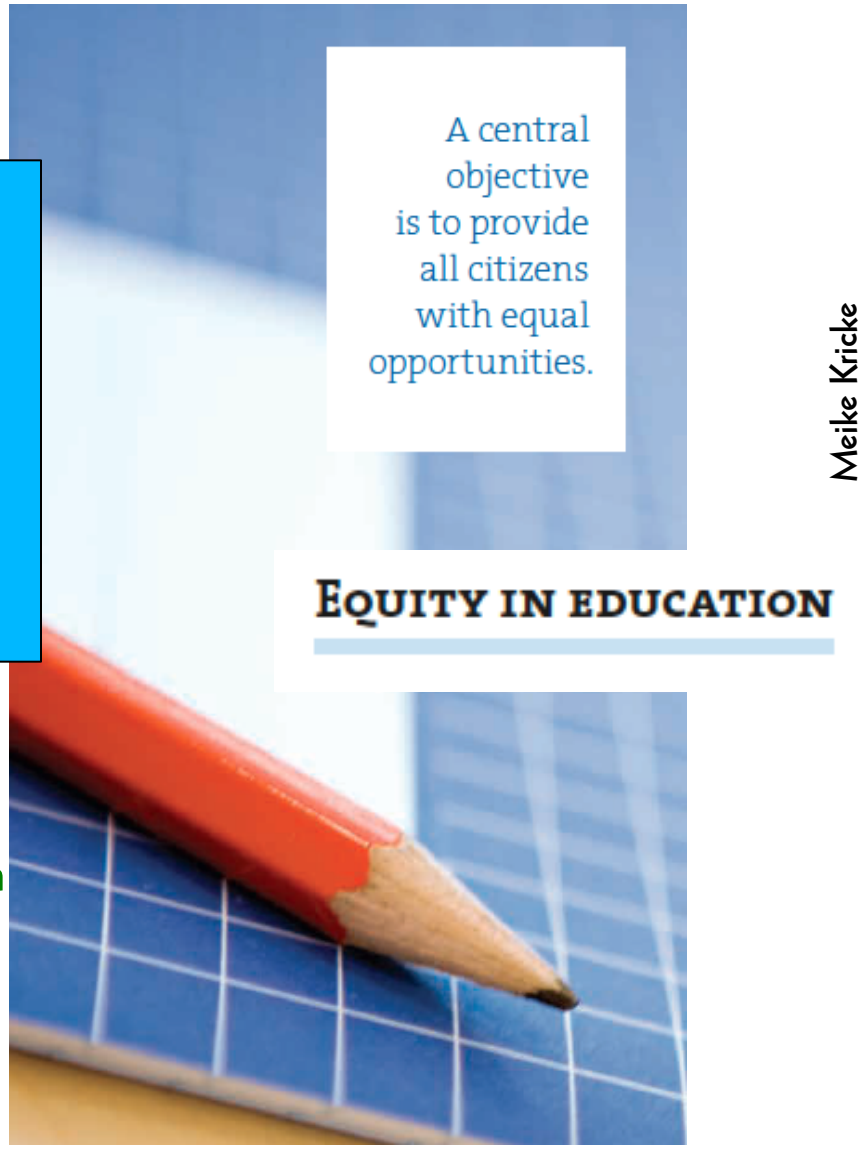
# Introduction

Educational autonomy is high at all levels

More than 90 per cent of the relevant age group starts general or vocational upper secondary studies immediately after basic education.

Education is free at all levels

The potential of every individual should be maximised.




Meike Kricke

Most students continue their studies after basic education

Finland is "seen as a major international leader in education" (OECD 2010, 118)

Life-long learning in focus

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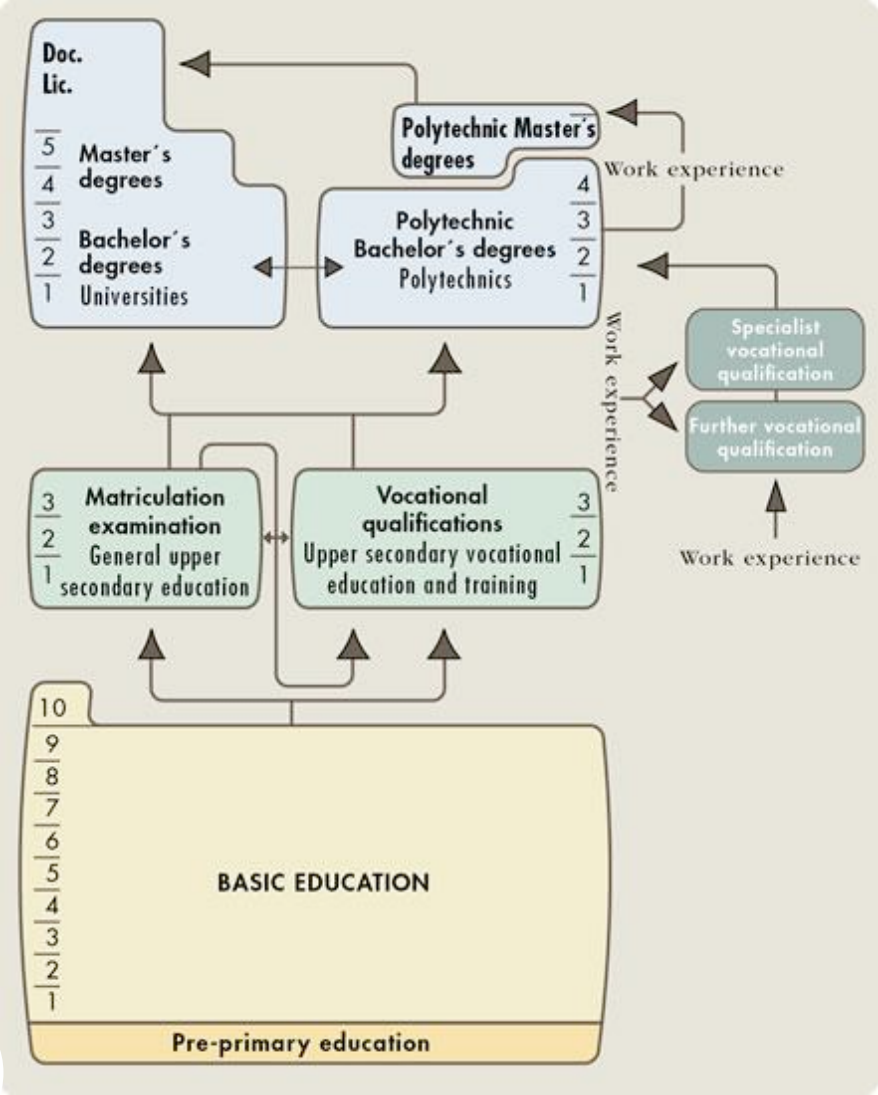
# Introduction: Finnish school system




- high autonomy of schools
- community
- nine-year comprehensive school (one school for all)
- teachers = teamplayer
- high chances for all students (supporting system)
- multiperspective experts: welfare teams
- No "dead ends"

Meike Kricke

# Introduction

Educational leaders are required a teacher qualification

The most common pre-service requirement is a Master's degree

**"For having the best pupils in the world, you need the best teachers in the world!"**

**(Matti Meri, Finnish professor in education)**

Teachers are recognised as keys to quality in education.

HIGHLY EDUCATED TEACHING PERSONNEL

Meike Kricke

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# Finnish teacher education

**Age-orientated (level of education); high quality**

- Preschool teacher (BA)
- Class teacher (MA)
- Subject teacher (MA)
- Special education teacher (MA)
- Counselors (MA)

**High valued profession:**

Only 10% of applicants are chosen!
(see Hakala 2009: 197 ff)

Meike Kricke

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# Finnish teacher education

## Selection process:

- National written test (VAKAVA)
- Interactive group situation
- Personal interviews


## Focus:

- motivation
- didactical potential
- communication skills
- listen to people
- handle diversity

See: Hakala, 2009: 200

Meike Kricke

# Finnish teacher education

**Characteristic for the Finnish teacher education is the integration of the practical studies** (Hakala 2009: 198)

BA: Orientation & Minor Practice 10 ECTS

MA: Field & Major practice 15 ECTS

**The students are absolving their practice periods in:**

- public schools
- especially in Teacher Training Schools (finn. normaalikoulus)


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# The unique way of organizing teacher training in Finland

## Teacher Training Schools? (TTS)

- Every university, organizing teacher education, has a TTS
- High quality of supervision in TTS
  - functional connection between TTS, department of education and other departments
  - teachers are mentors of students
  - evaluation of teaching practice and supervision
- TTS provide context for research conducted by different faculties

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# Theory & Practice: reflective practice

„The quality of teaching practice defines the quality of teacher education“ (Zeichner 1990)

- Strong emphasis on research
- Theoretical aspects integrate with practice

## Multiperspective interaction

- Student teachers reflect themselves
- Feedback from:
  - Peer student teacher
  - Supervisor from the university (lecture)
  - Supervisor at the school

(see Salo 2013)

Meike Kricke

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# Central aim

Creating an innovative and analytical attitude among the prospective teachers

Meike Kricke

# Voices of Finnish teachers/ educators

## Finnish Teachers' Opinion about Teacher education (see Kricke 2012)

- **Interlocking of theory and practice:** "Perhaps Finnish teacher education is the best in the world, because they are in university (…) and also they are in practice schools to get practical experiences", "connection could be even better", "Lots of university lectures have a teacher-background to discuss real problems"
- **Selection of teacher students:** "Finnish teachers are highly motivated"
- **Support in social skills:** "We learned to network by studying in little groups, giving feedback to each other"
- **No good preparation for behaviour-problems of pupils:** "In university they don't speak very much about these behaviour problems"

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# What we could learn…

- Teacher Training Schools
- Multiperspectives: Dialogue; multiprofessional teams
- Theory and practice: Reflective practice
- Research based practice periods

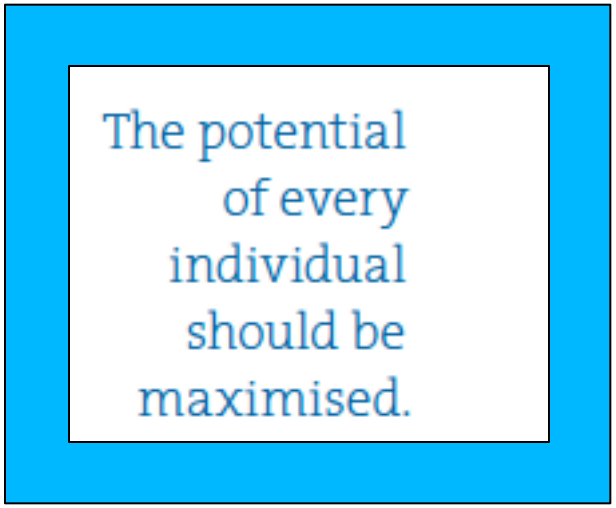
Meike Kricke

Teacher students are the "**teachers of the future**" …


… as **multiplicators for a innovative learning culture**

# What we have learned…

- Teacher Training Schools
- Multiperspectives: Dialogue; feedback, multiprofessional teams
- Theory and practice: Reflective practice
- Research based practice periods



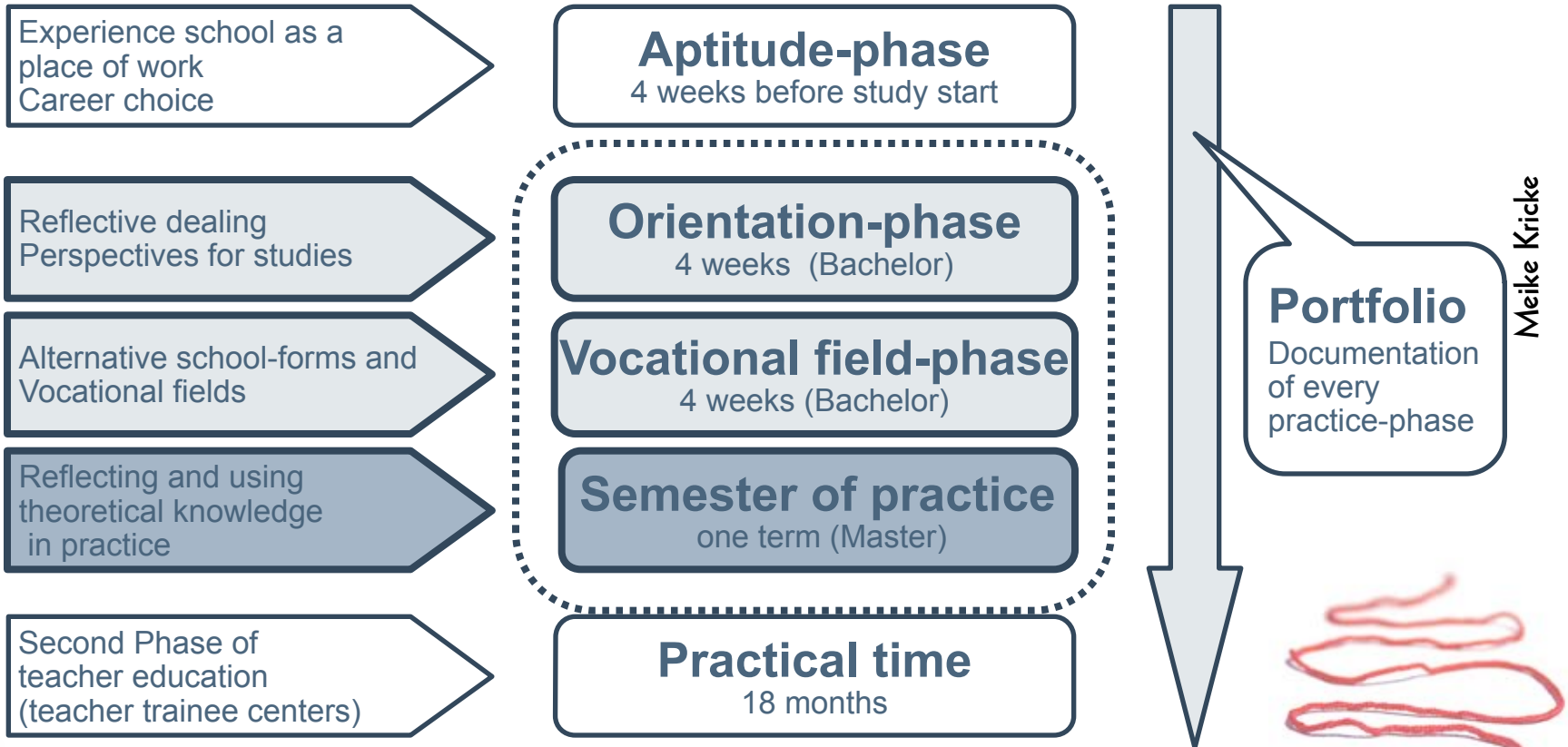

PORTFOLIO WORK

„It's all about the attitude (Reich 2009)

Meike Kricke

# Portfolios in teacher education

… obligatory in practice periods LABG (2009, §12 (1))

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# Reflective practice & portfolio work

„Reflection skills (…) as a key for pedagogical professionalism“ (Combe/Kolbe 2004, 835; Roters 2012).

“Portfolio work promises to support reflection skills.“
(Häcker/Winter 2009, 229)

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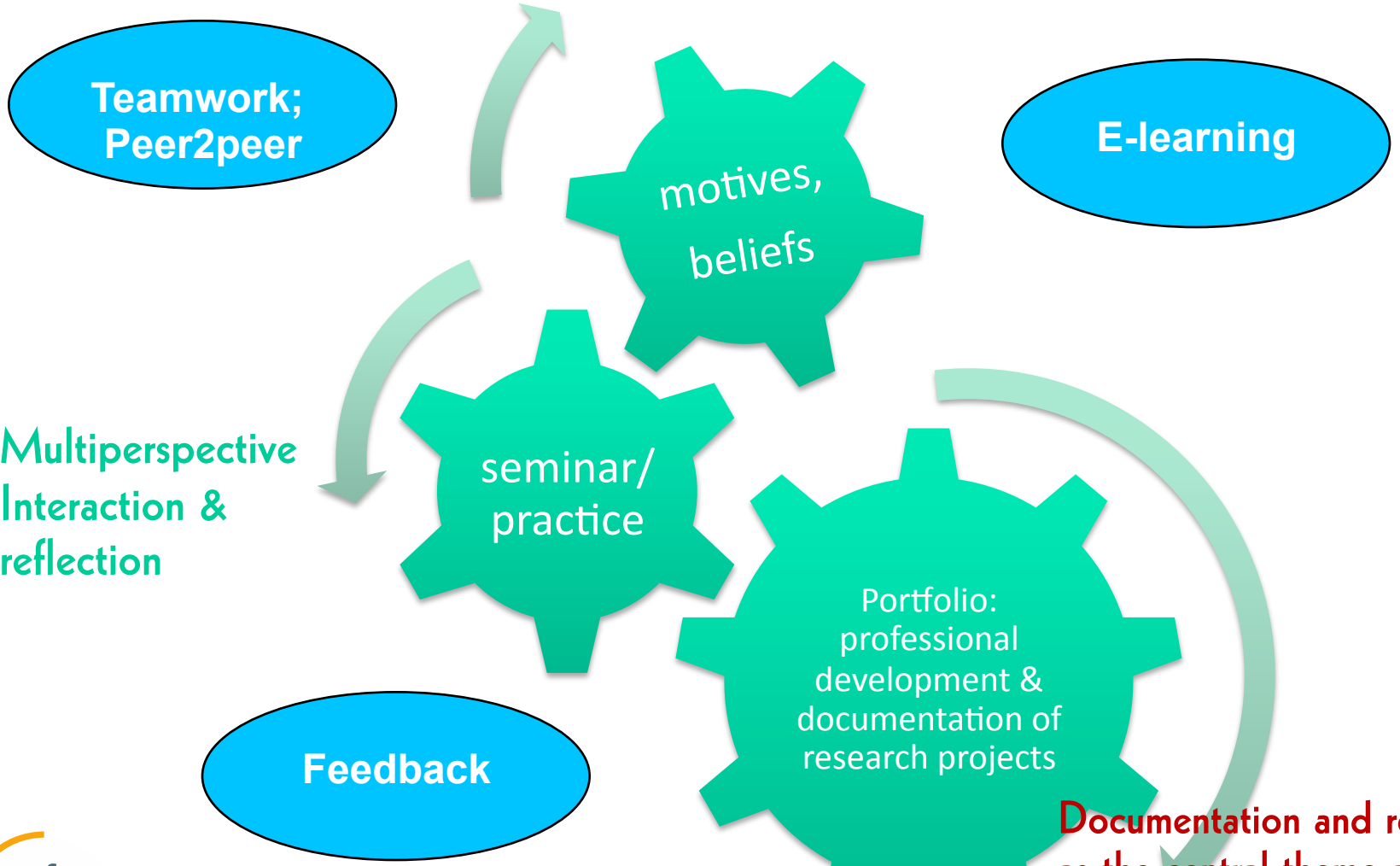
# Portfolios in teacher education




Multiperspective
Interaction &
reflection

Documentation and reflection as the central theme according to teacher education

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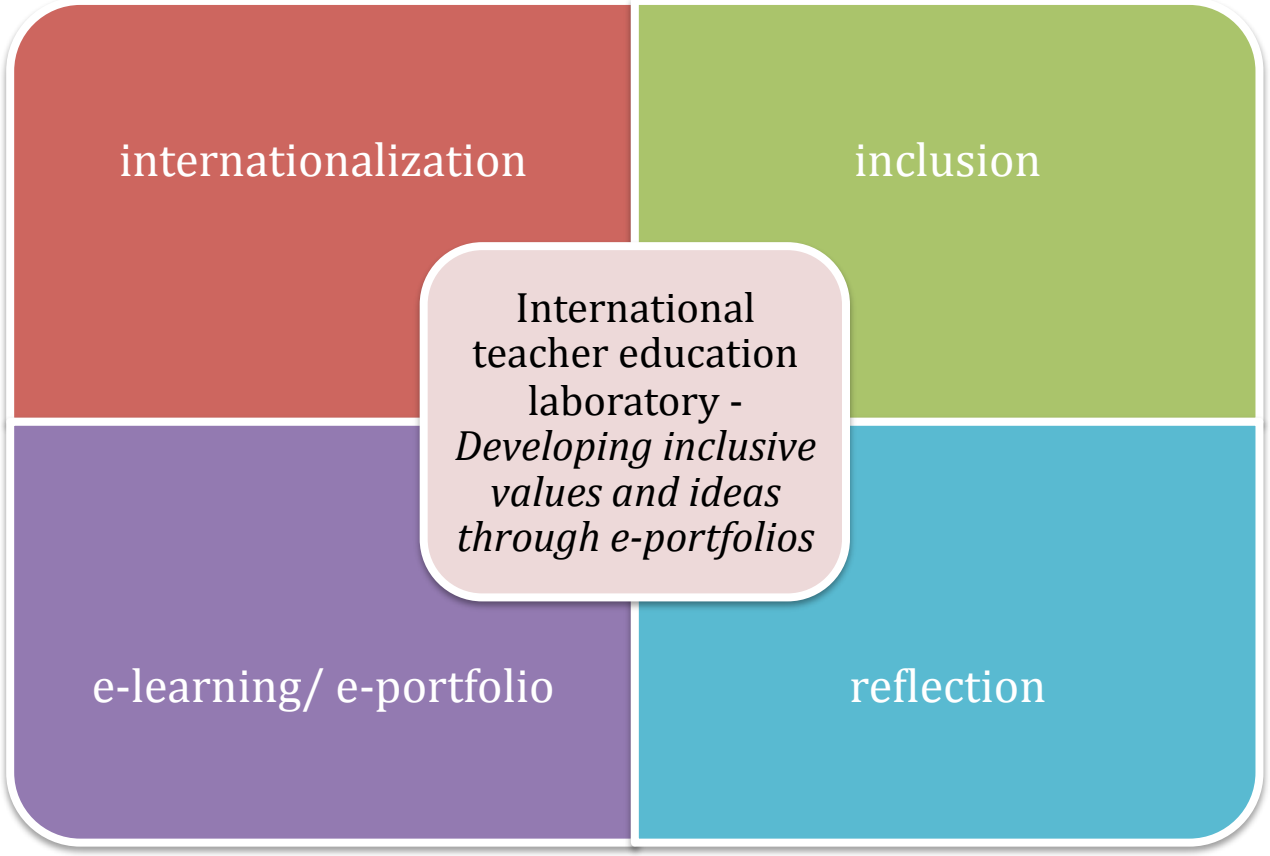
# International teacher education laboratory

## Developing inclusive values through e-portfolios:

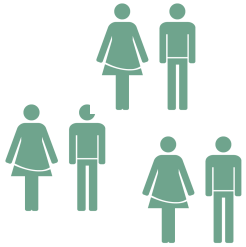
## Inclusion- new requests in teacher education programs



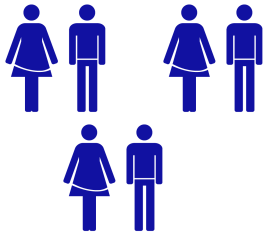

Meike Kricke

# International teacher education laboratory

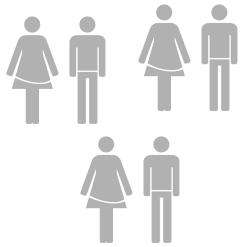
## "Inclusive activities": cross-cultural reflection-process



Cologne students



Finnish students



Canadian students

- (International) peer reflections: metaphorical questions, "working theories", personal attitudes, "biographical journey"-exercises
- practice periods in "integrative" settings: own research focus
- theoretical input & project works about inclusive developments

**e-portfolio documentation and reflection in dialogue**

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# International teacher education laboratory

**Working theory: Some questions**

How do I see the role of a physics teacher?

Teaching Science means to me …

Learning means to me …

Handling diversity/ heterogeneity in the classroom means to me …

….

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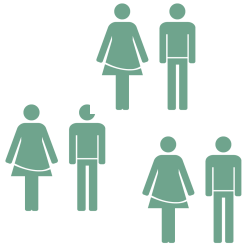
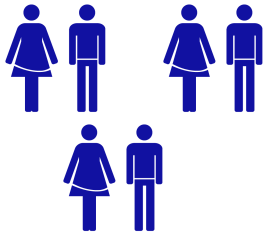
Amrhein/Kricke

# International teacher education laboratory

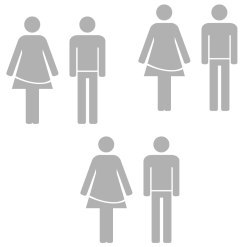
"Sciences activities": **multiperspective reflection-process**



**Cologne students**



**… students**



**… students**

- (International) peer reflections: metaphorical questions, "working theories", personal attitudes to science education, "biographical journey"-exercises
- practice periods teaching STEM: own research focus
- theoretical input & project works

**e-portfolio documentation and reflection in dialogue**

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Amrhein/Kricke

# Thanks for listening!

Prof. André Bresges

Nina Glutsch

Stefan Hoffmann

Meike Kricke

See us at Poster PST2B07
Mon 01/06, 8:30PM - 9:15PM

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