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

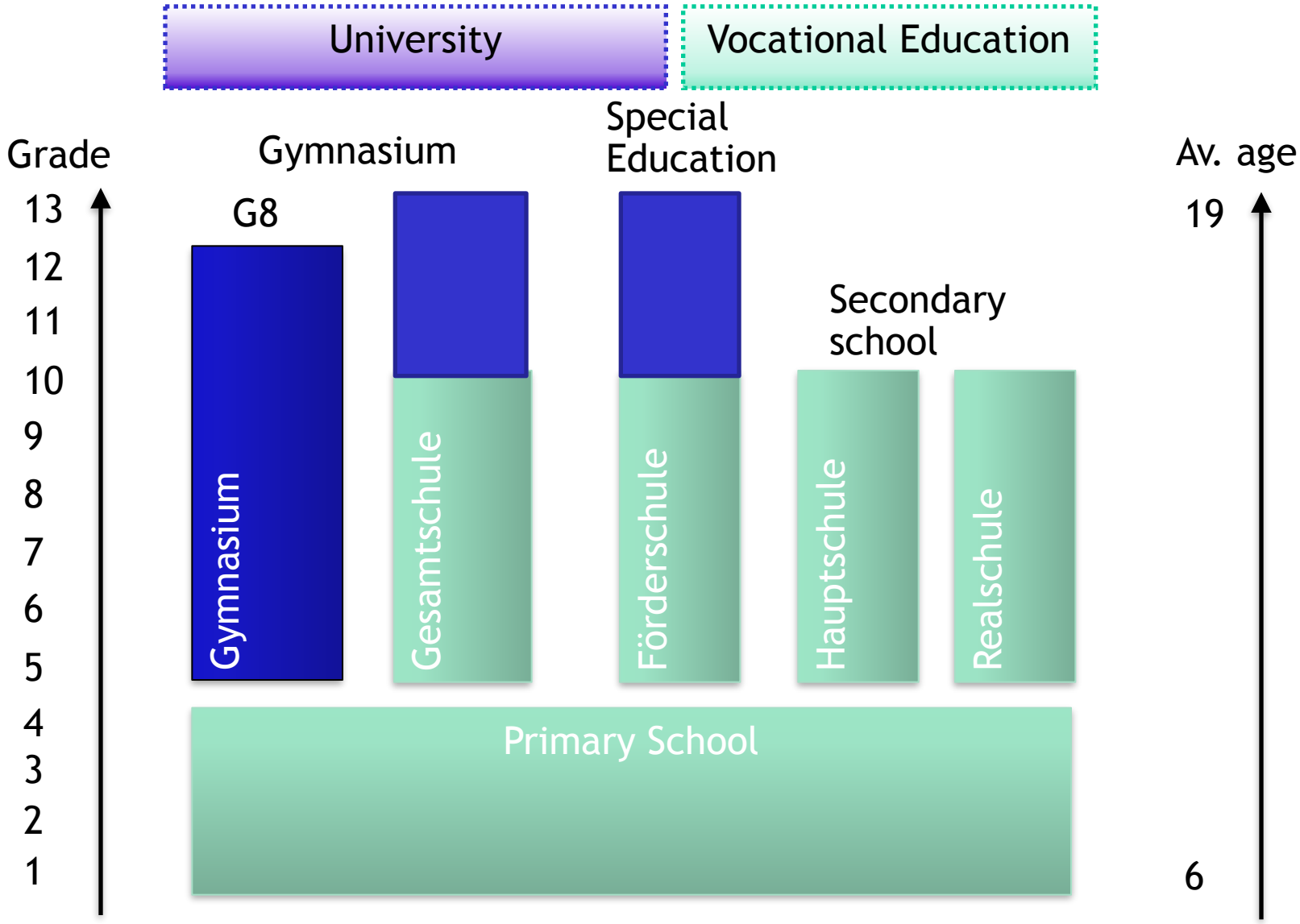
Prof. Dr. André Bresges
Nina Glutsch

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

ZfL
Zentrum für LehrerInnenbildung

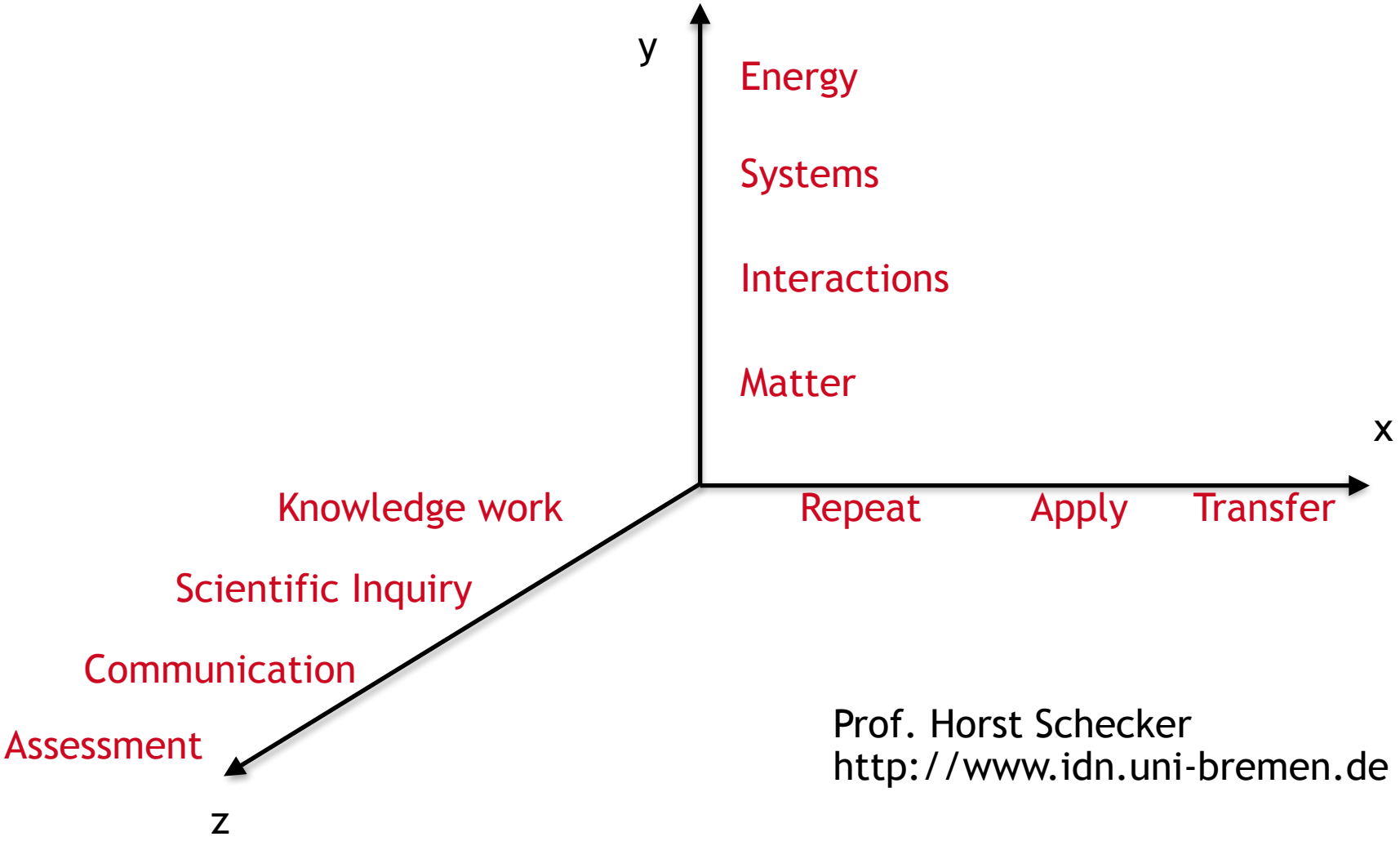
Universität zu Köln

School System in Germany (simplified)



KMK National STEM Standards

middle school

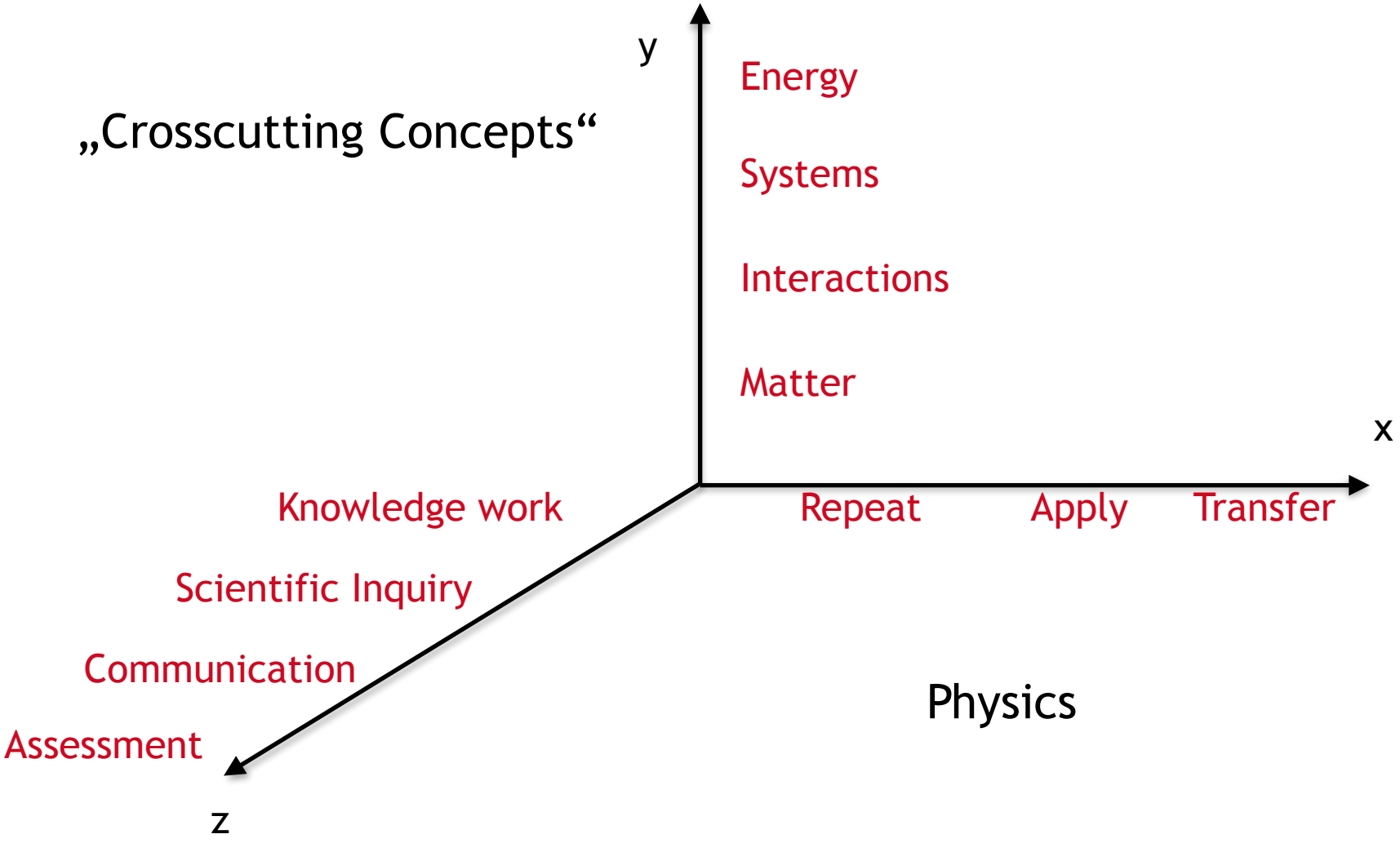


Prof. Horst Schecker
http://www.idn.uni-bremen.de

KMK National STEM Standards

middle school

„Crosscutting Concepts“

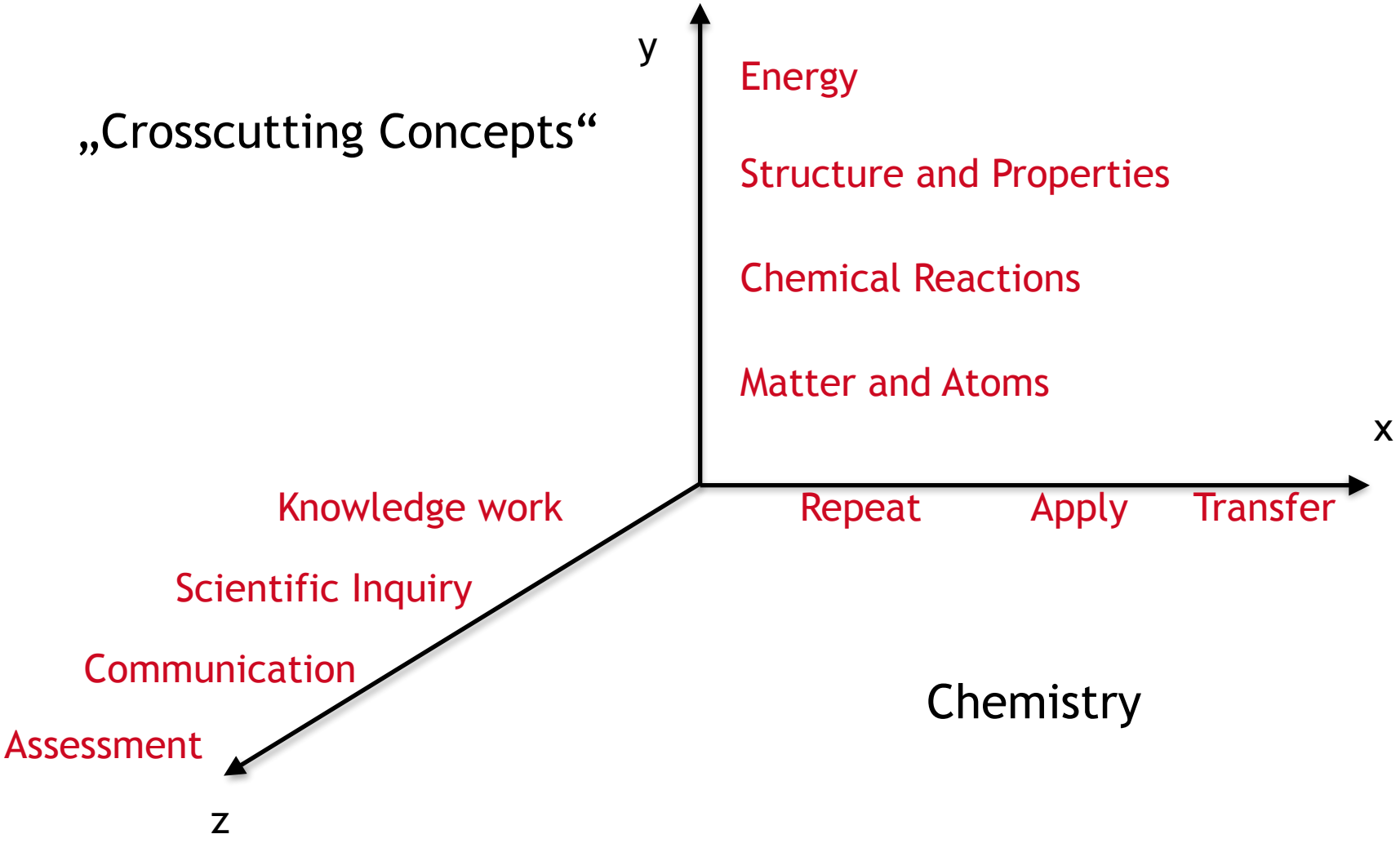


Physics

KMK National STEM Standards

middle school

„Crosscutting Concepts“

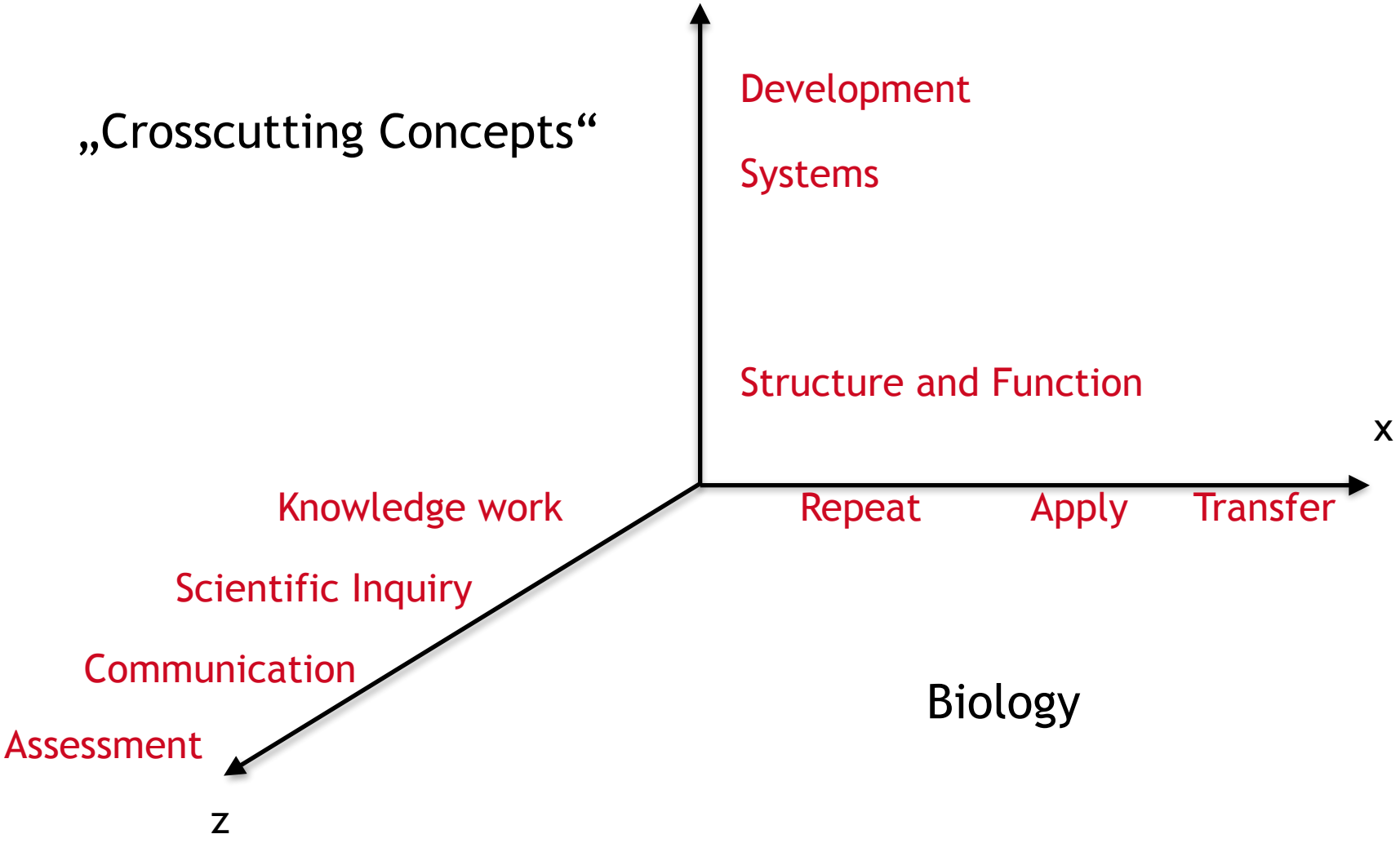


Chemistry

KMK National STEM Standards

middle school

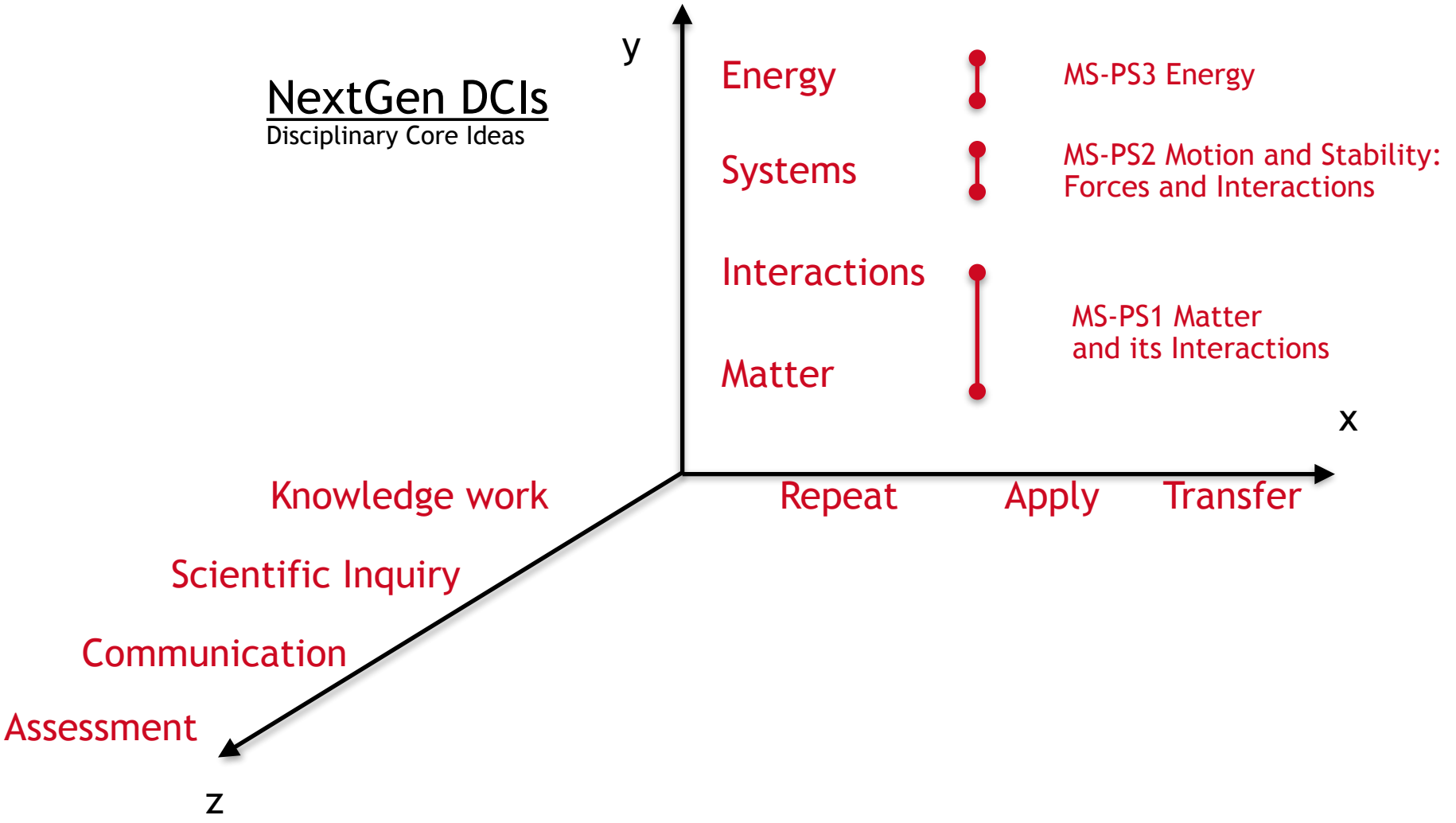
„Crosscutting Concepts“



Biology

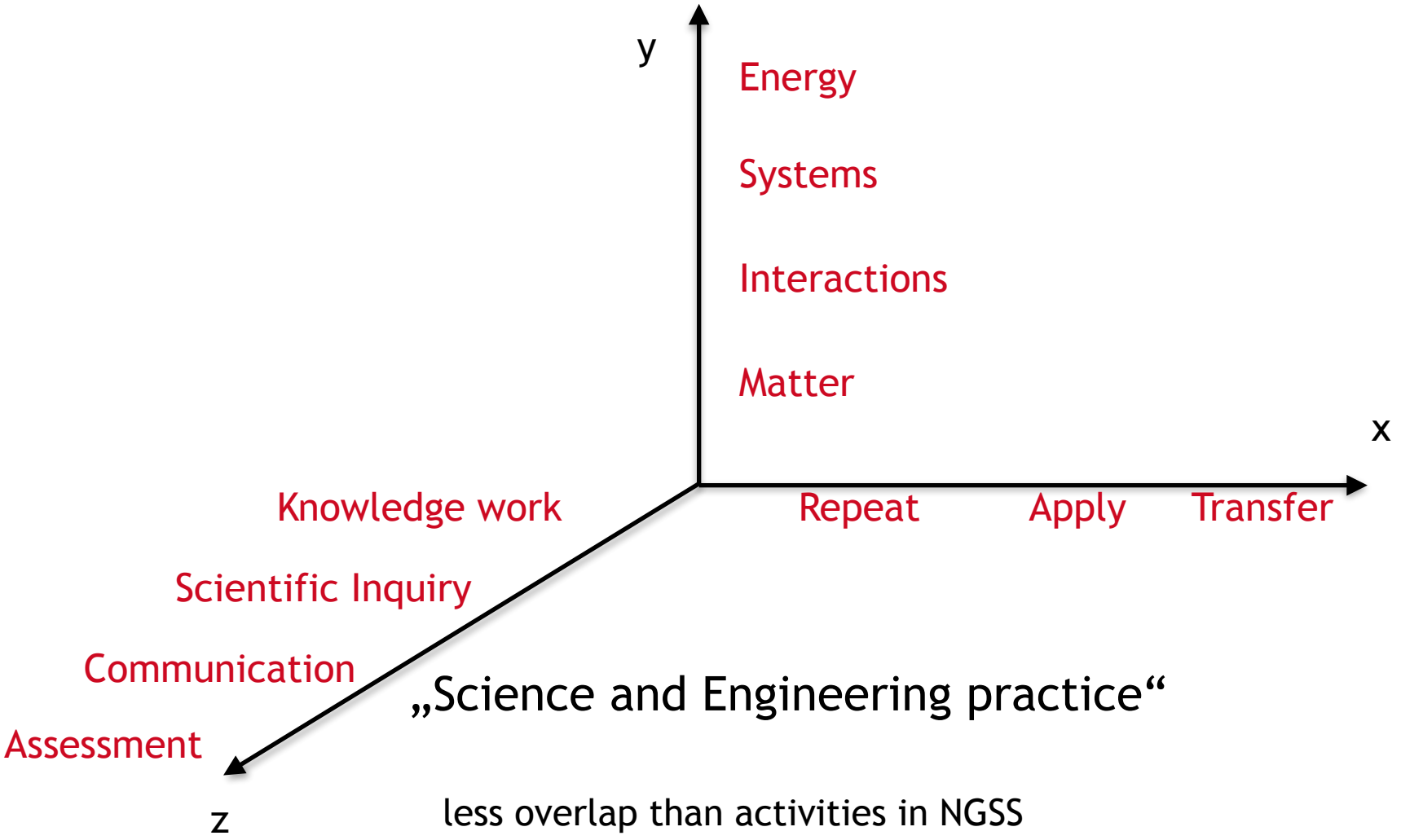
KMK National STEM Standards

middle school



KMK National STEM Standards

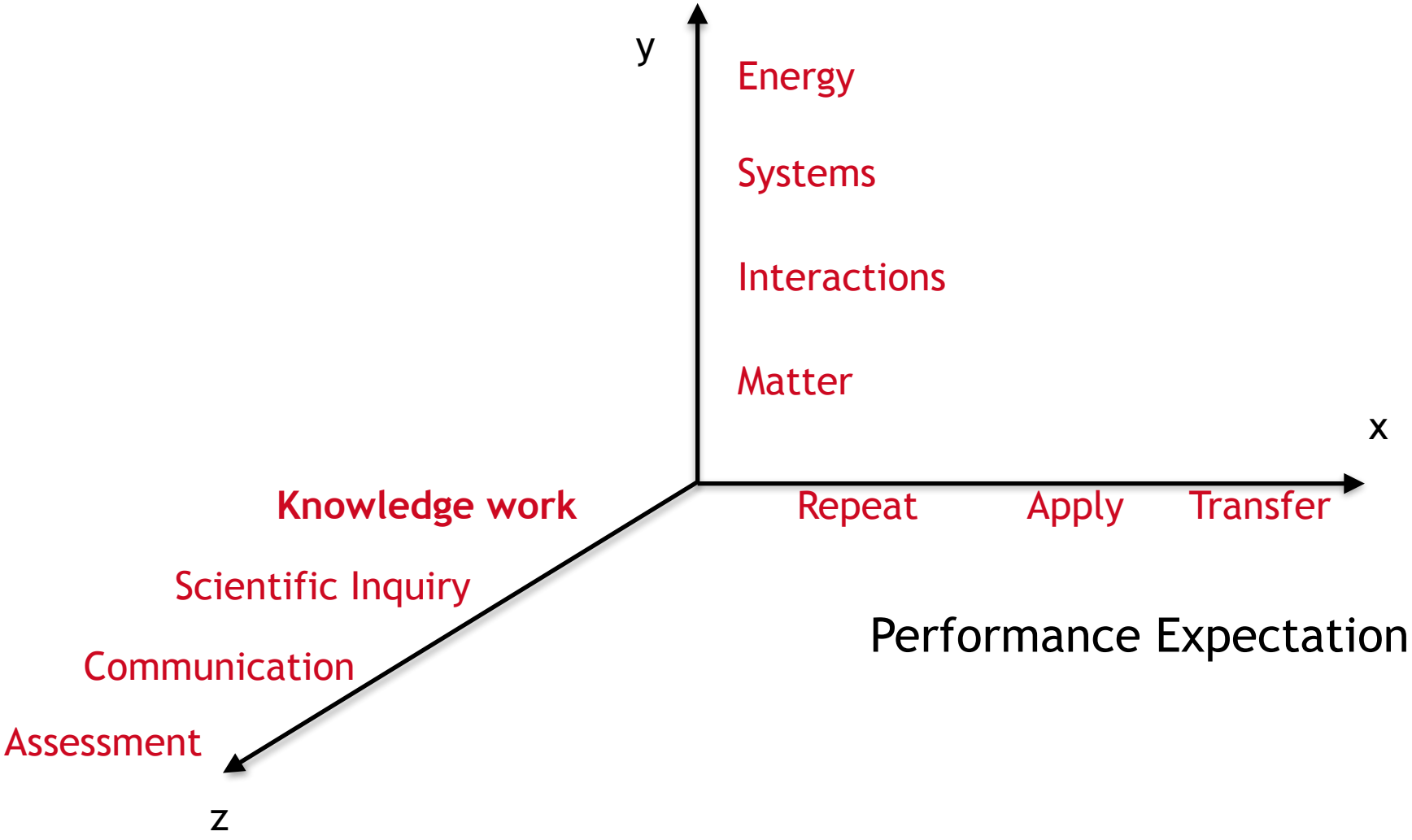
middle school



less overlap than activities in NGSS

KMK National STEM Standards

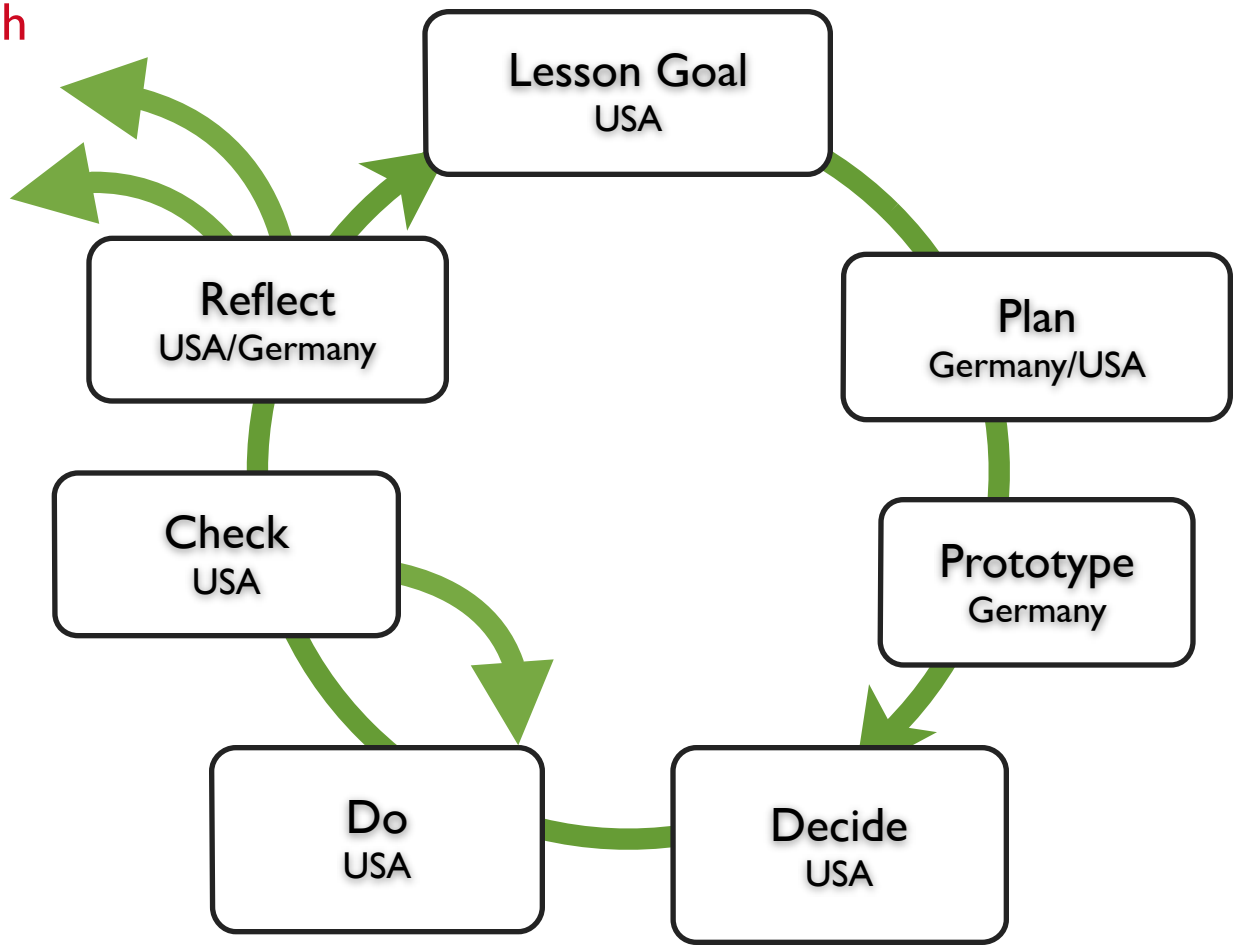
middle school



Small Research Project

Publish

Derive Theories of Learning, related to cultural background



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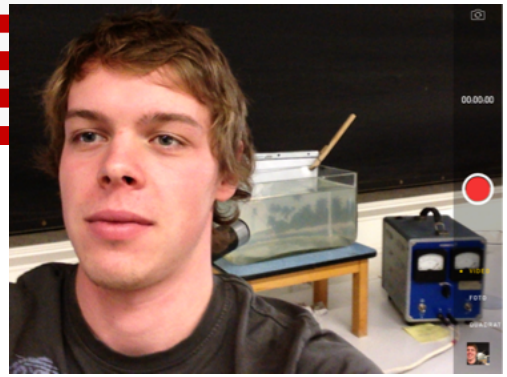
DBR Study abroad

- 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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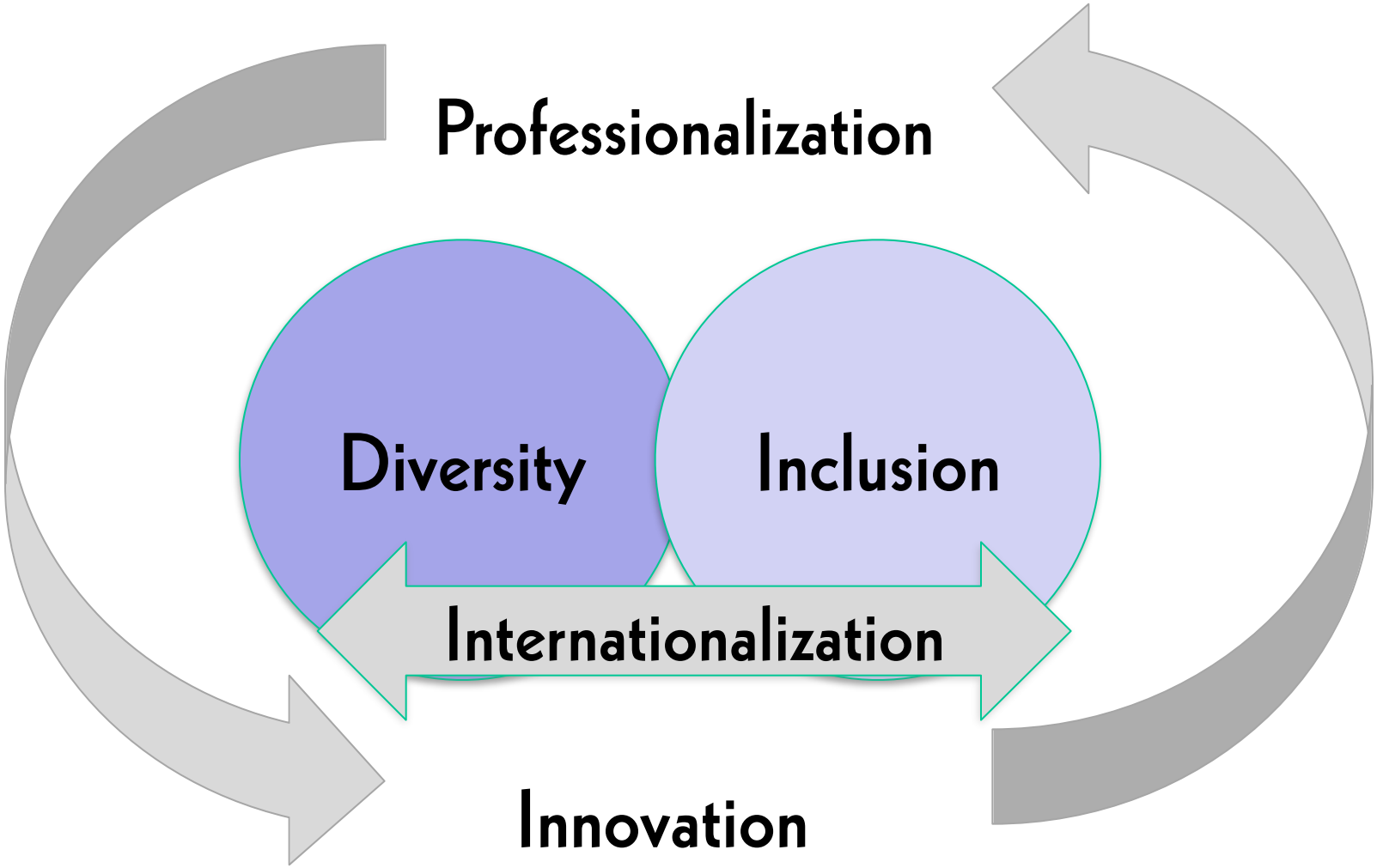
Internationalization of Teacher Education



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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."

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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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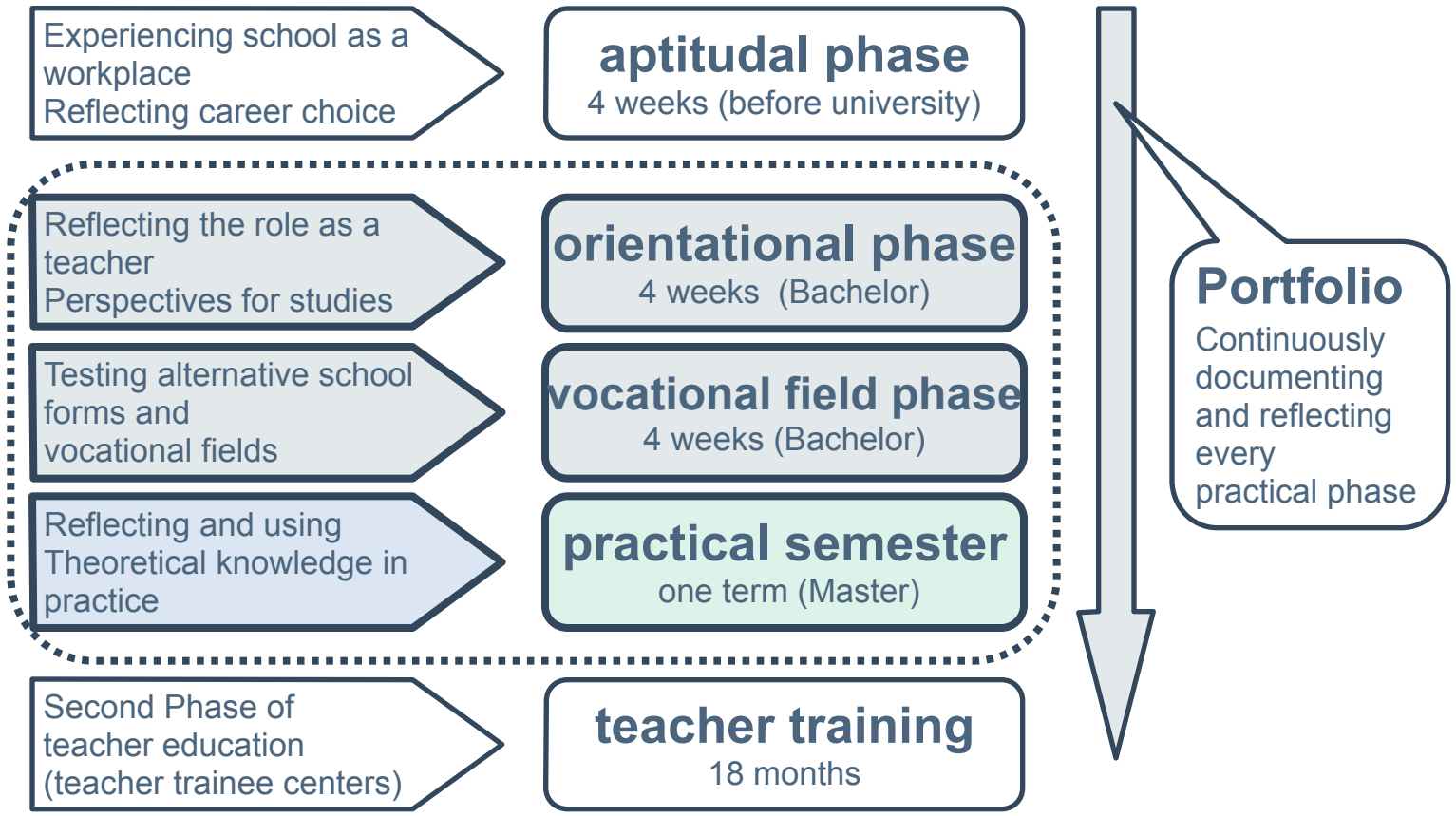
Practical Phases in German Teacher Education



Goal: connecting theory with practice in a structured way

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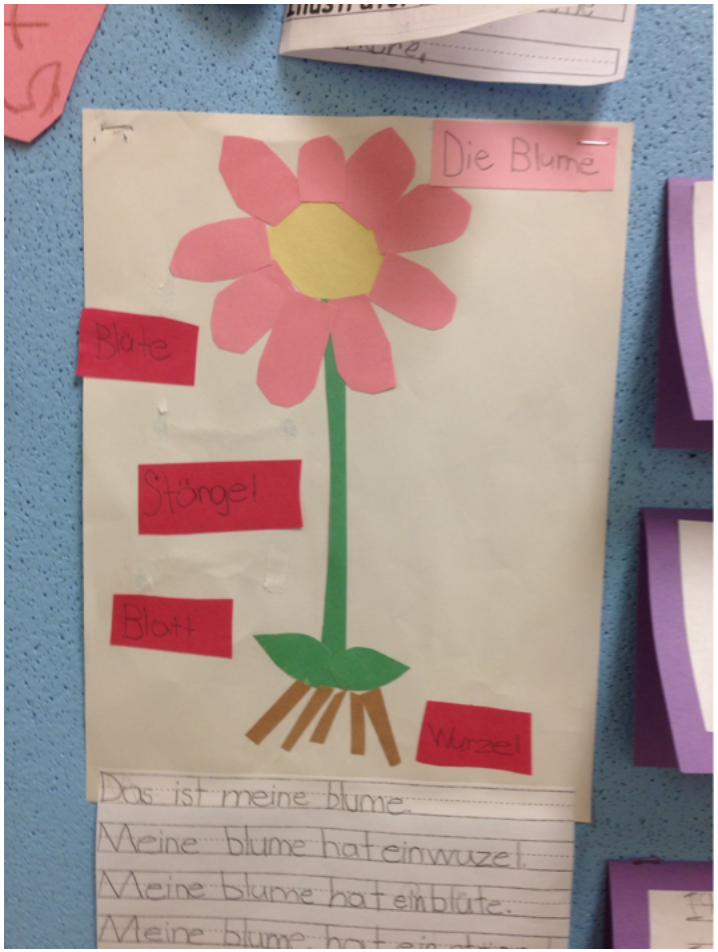
Mobility: Example

Immersion at Waddell Language Academy

Goals:

- ✓ heterogeneity
- ✓ multilingualism
- ✓ inclusion



Mobility: Example

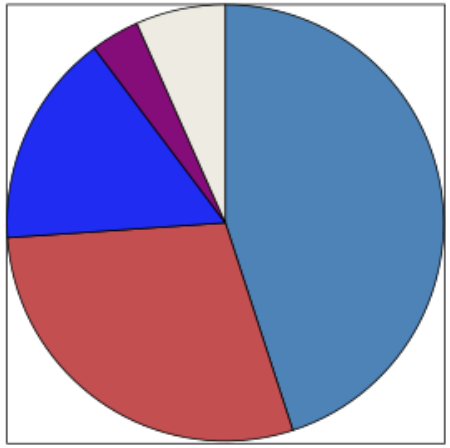
Waddell Language Academy

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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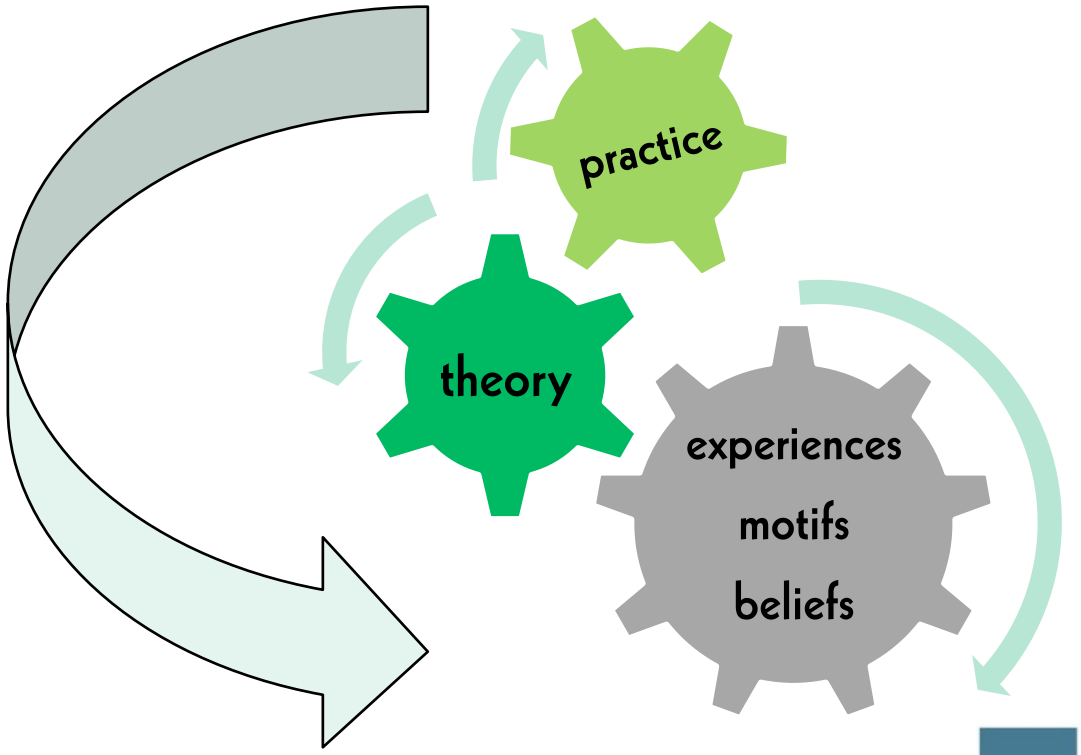
The Role of Reflection in Teacher Education

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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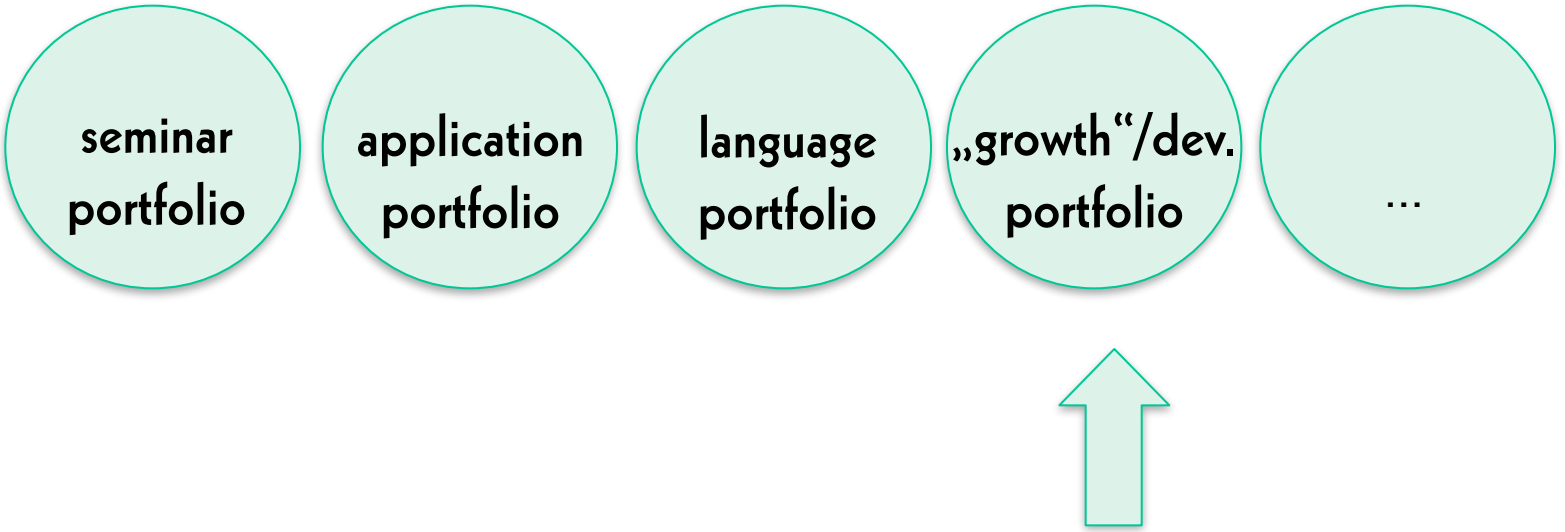

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Portfolio: Working Theory

- 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"

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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

Agenda

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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 Lecture

Involved courses and students at UoC

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30-40 students

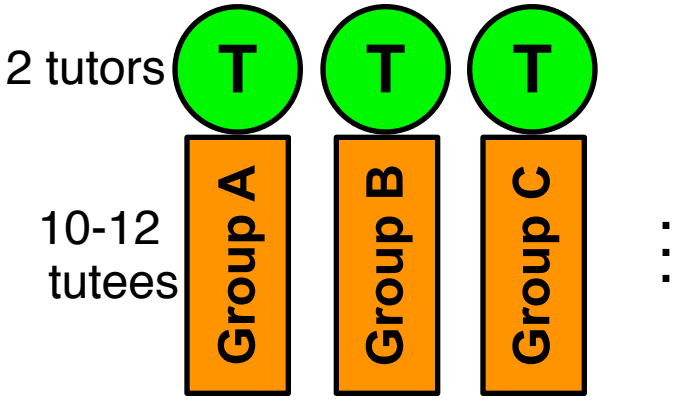
200-250 students

Experimental Physics Lecture

! inhomogengeneous clientele !

Learning by Teaching – the nucleus

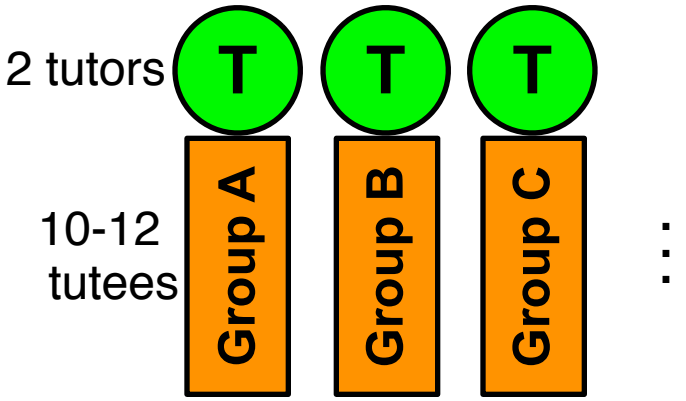
Learning by Teaching – the nucleus



Teaching in small learning groups

enables:

Learning by Teaching – the nucleus

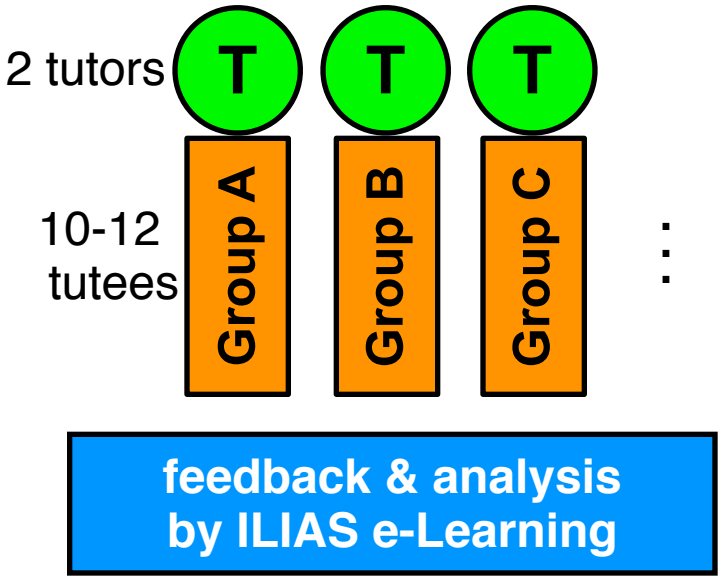


Teaching in small learning groups

enables:

✓ …first controlled teaching attempts

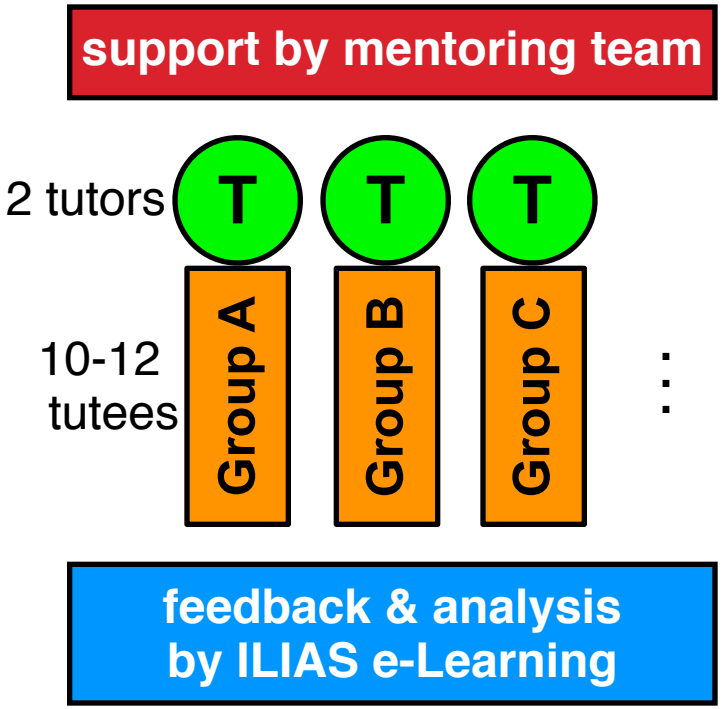
Learning by Teaching – the nucleus



Teaching in small learning groups **enables:**

- ✓ …first controlled teaching attempts
- ✓ …e-learning enhanced flipped classroom situations

Learning by Teaching – the nucleus



Teaching in small learning groups **enables:**

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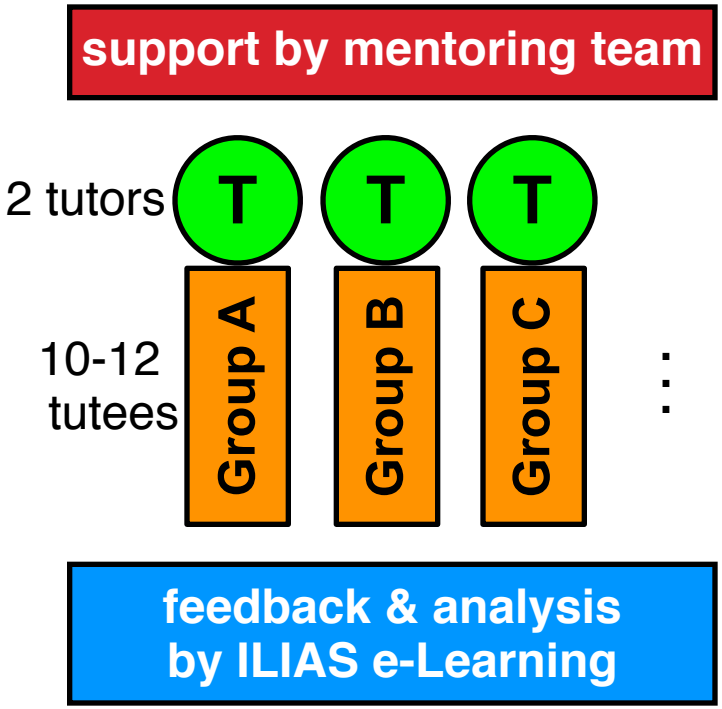
- ✓ …individual support & reflection

Learning by Teaching – the nucleus



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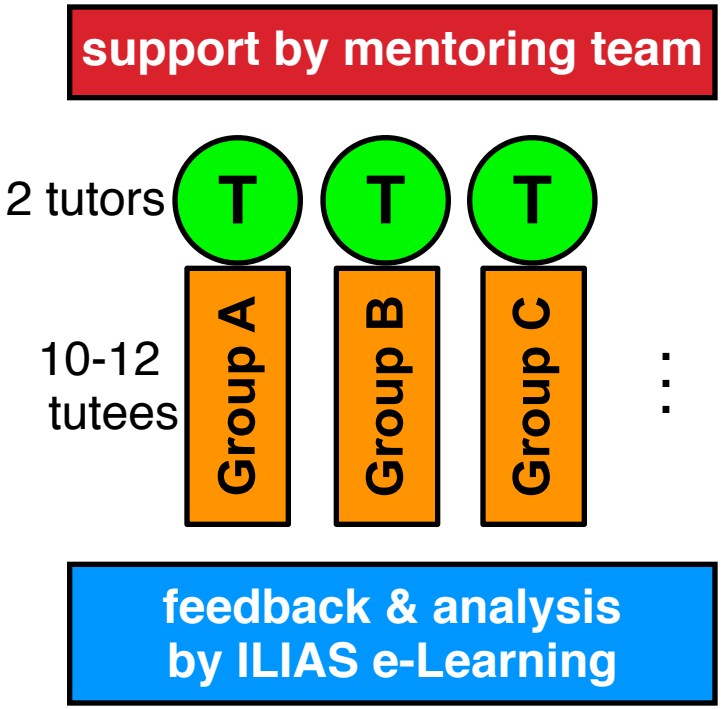

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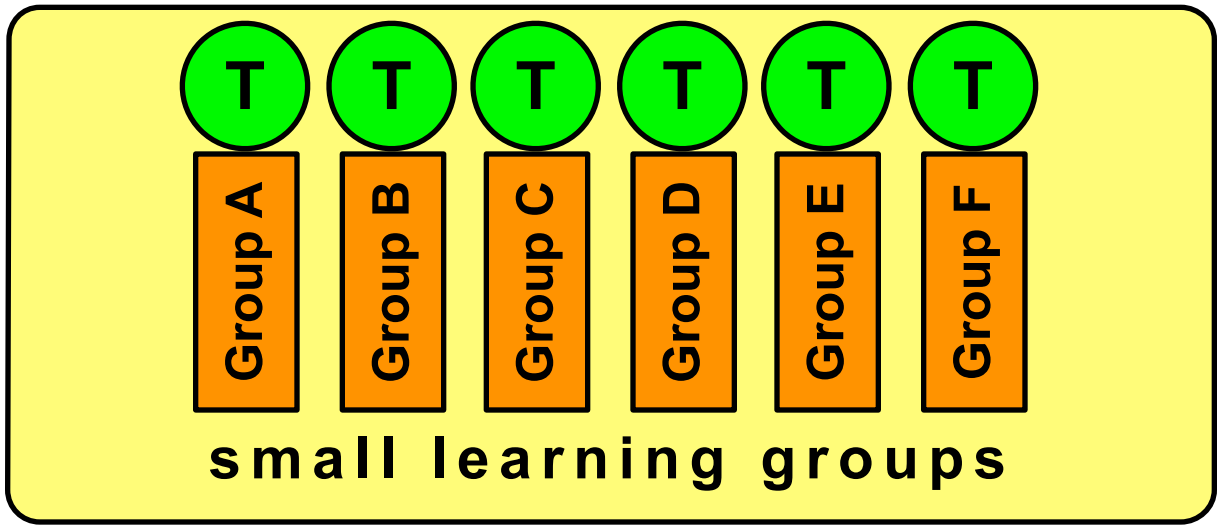
Learning by Teaching – the concept



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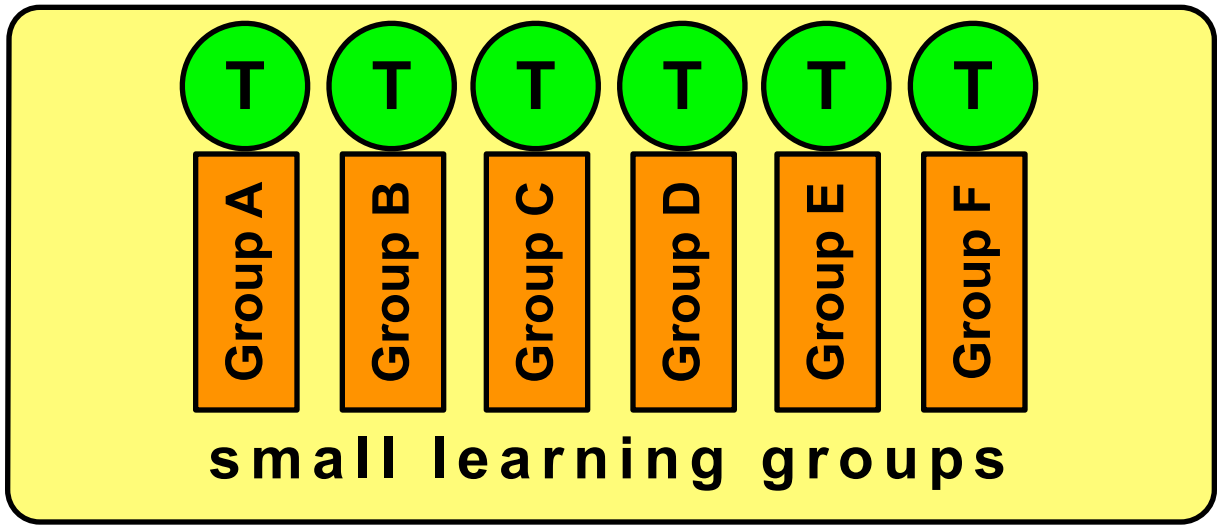
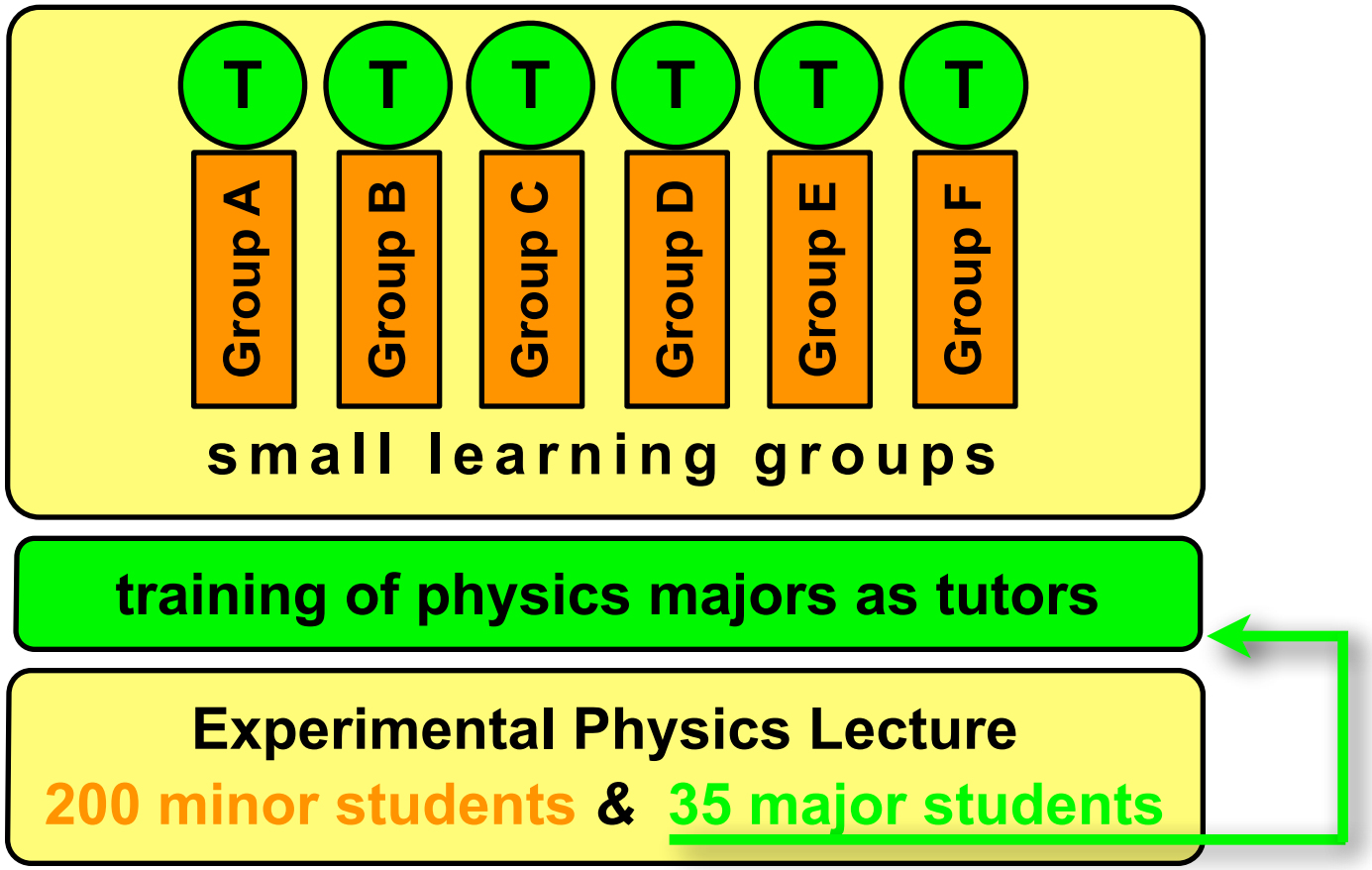


Experimental Physics Lecture

200 minor students & 35 major students

Learning by Teaching – the concept



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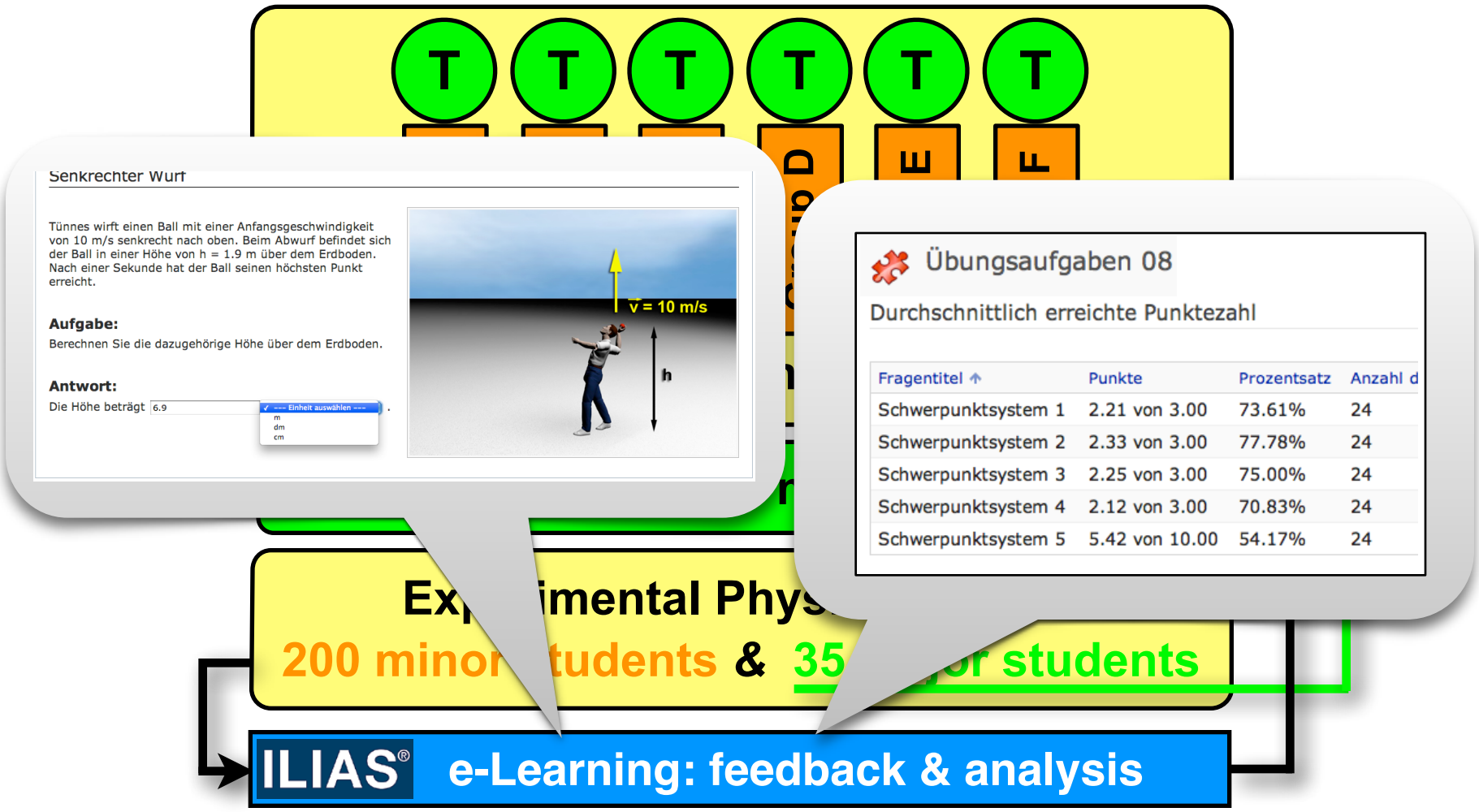

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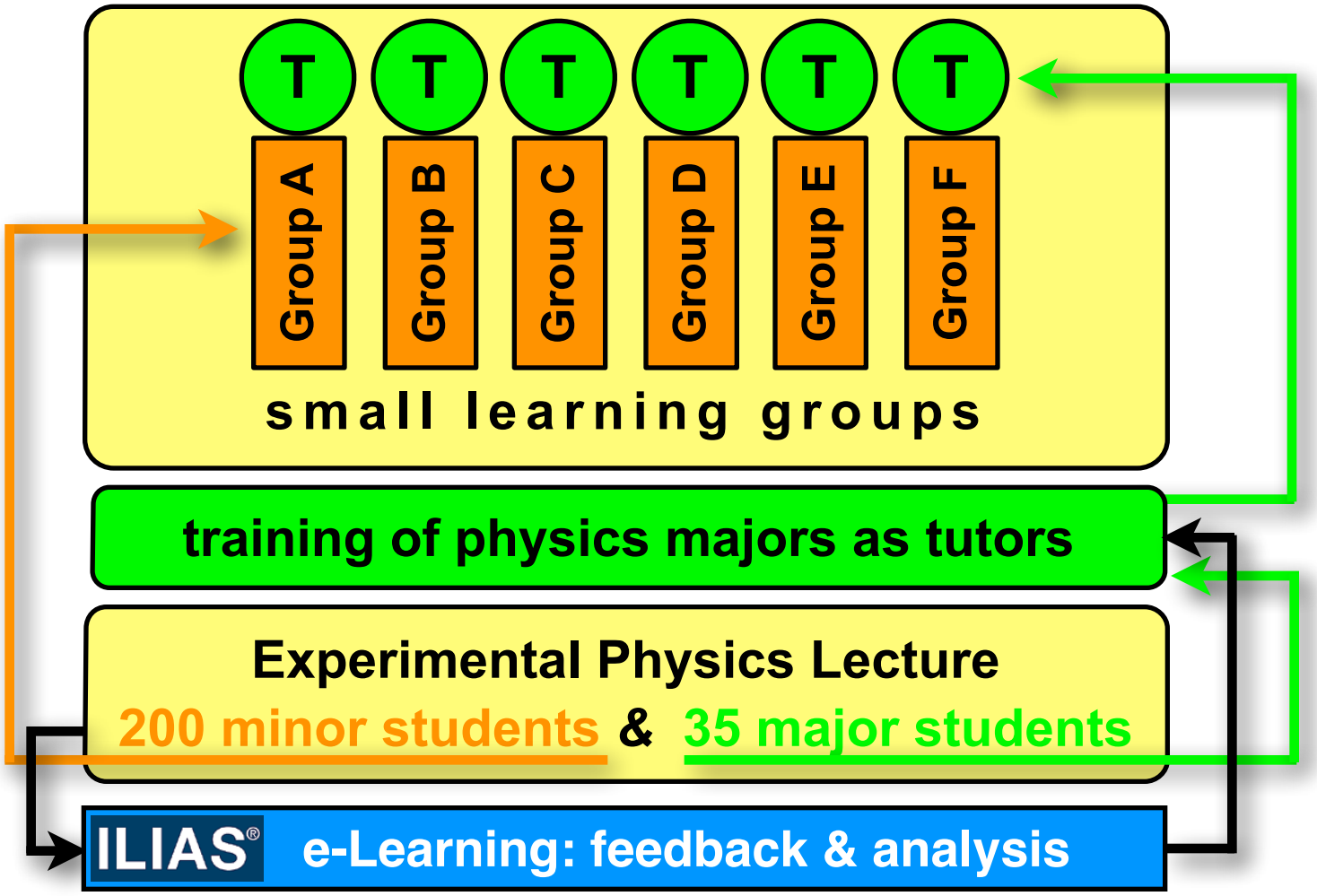

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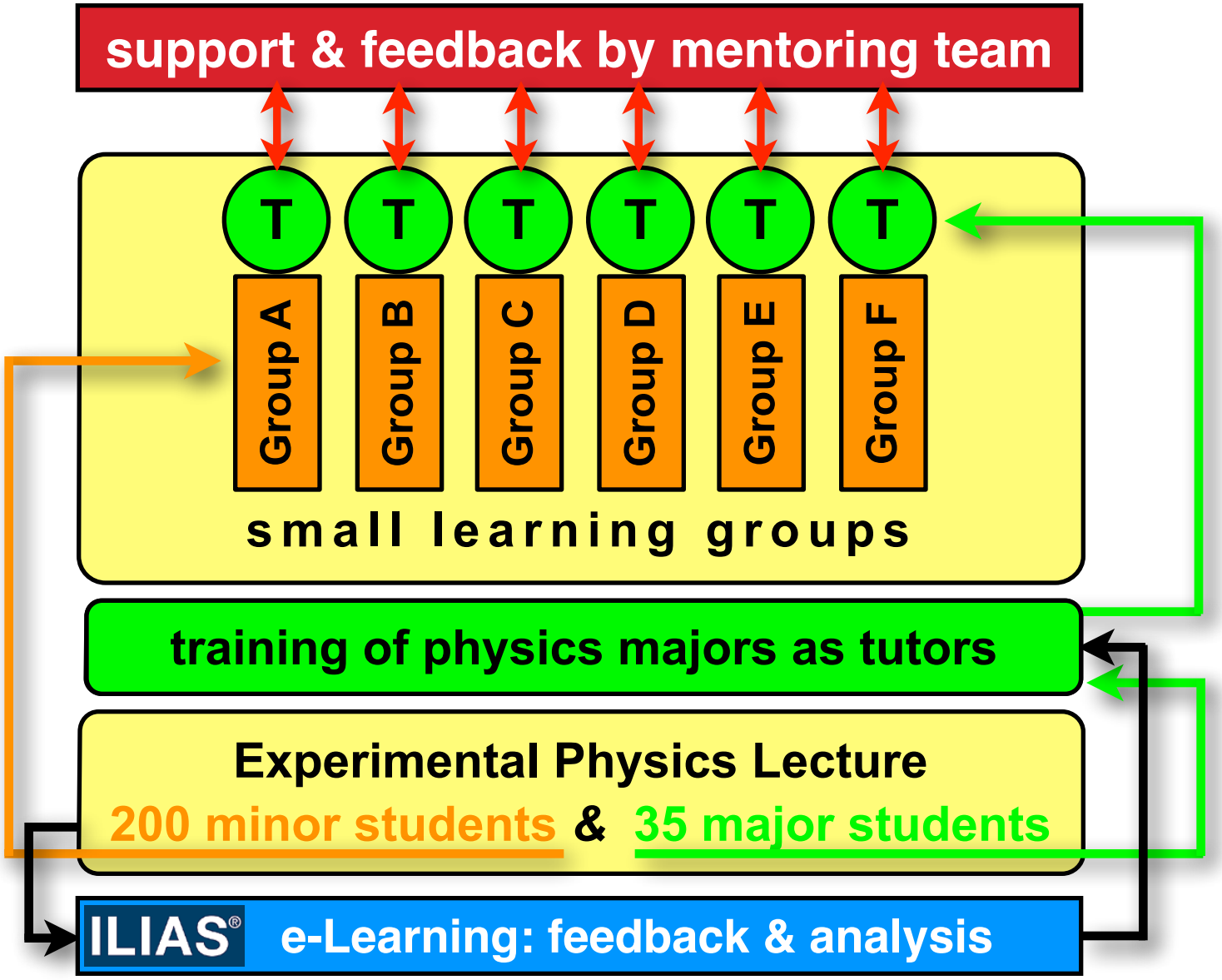

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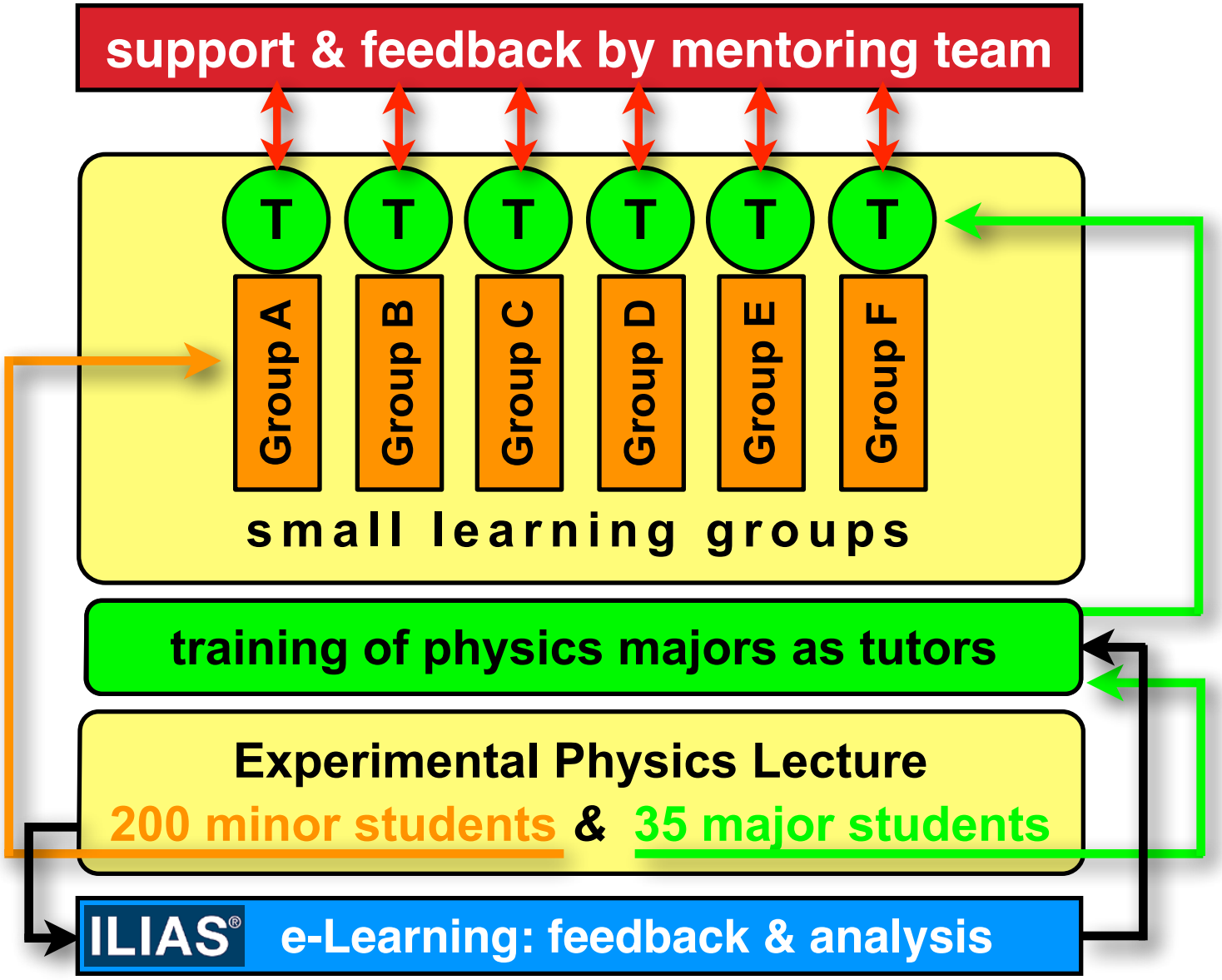

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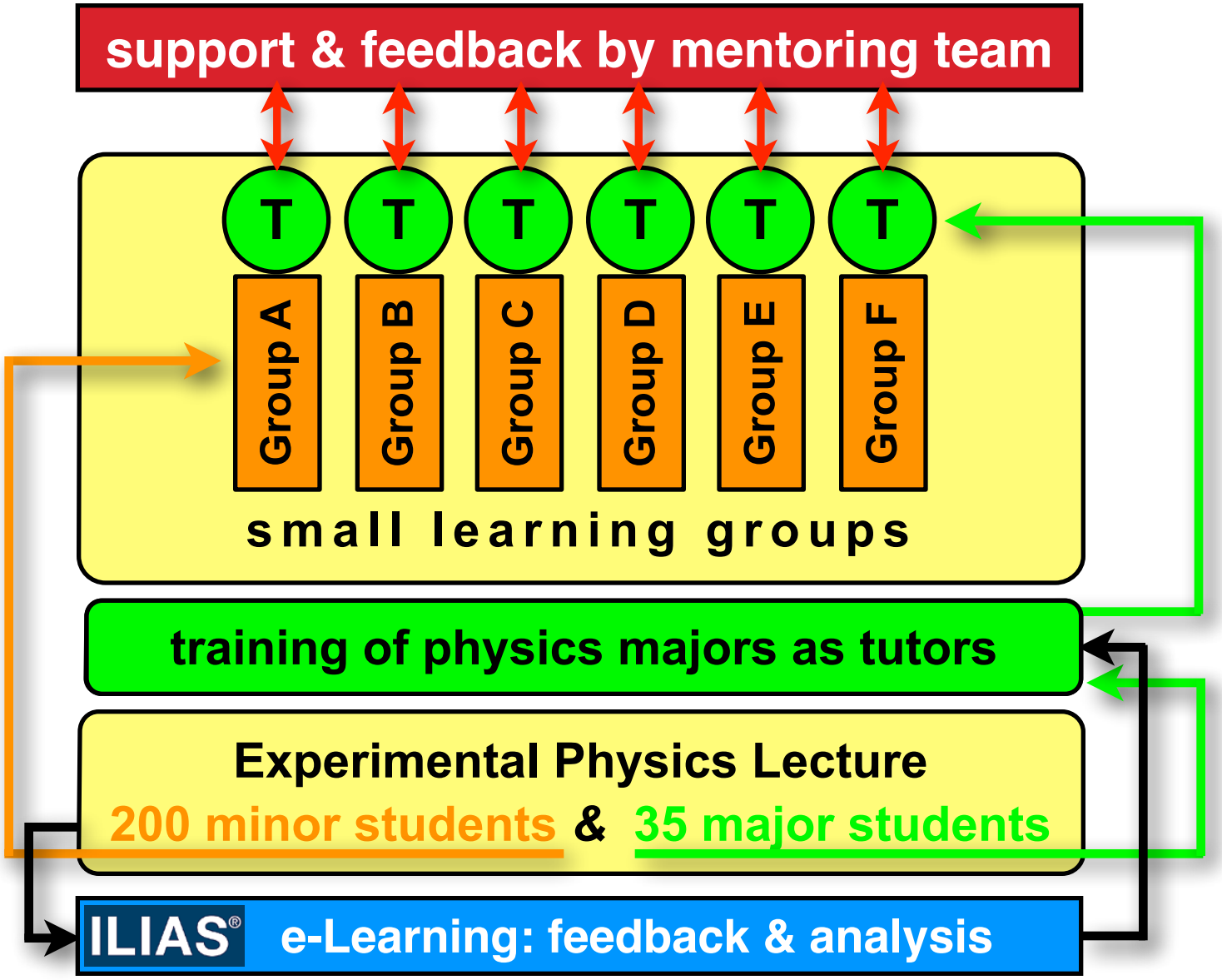


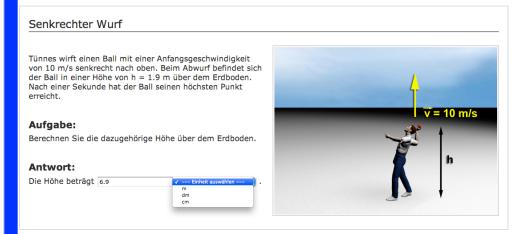
Learning by Teaching – the workflow

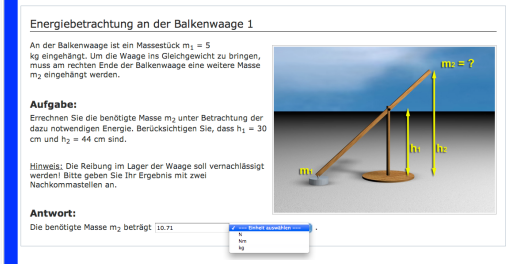
training of physics majors as tutors

Planning and Preparation:

ILIAS®

Learning tasks

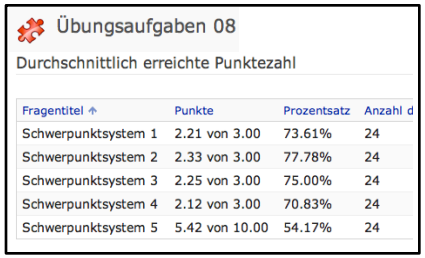




Supporting media

Course reader

Statistics

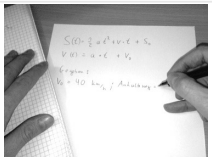


Übungsaufgaben 08

Durchschnittlich erreichte Punktezahl

Fragentitel	Punkte	Prozentsatz	Anzahl d
Schwerpunktsystem 1	2.21 von 3.00	73.61%	24
Schwerpunktsystem 2	2.33 von 3.00	77.78%	24
Schwerpunktsystem 3	2.25 von 3.00	75.00%	24
Schwerpunktsystem 4	2.12 von 3.00	70.83%	24
Schwerpunktsystem 5	5.42 von 10.00	54.17%	24

Discussing content



Lesson planning

Documentation

ILIAS®

E-Portfolio containing:

- Pre statistics
- Lesson planning
- Social forms
- Tools

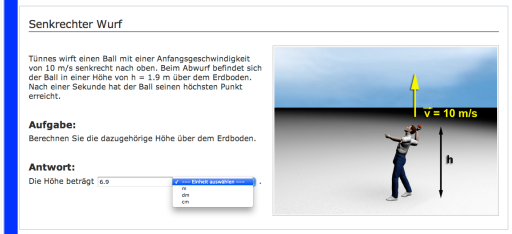
Learning by Teaching – the workflow

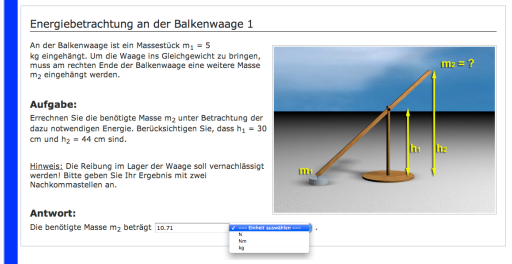
training of physics majors as tutors

Planning and Preparation:

ILIAS®

Learning tasks





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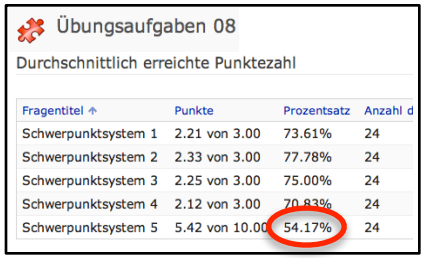
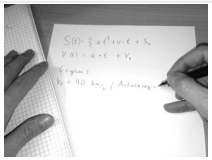


Discussing content



Lesson planning

ILIAS®

Documentation

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Learning by Teaching – the workflow

Conducting the tutorial

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

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

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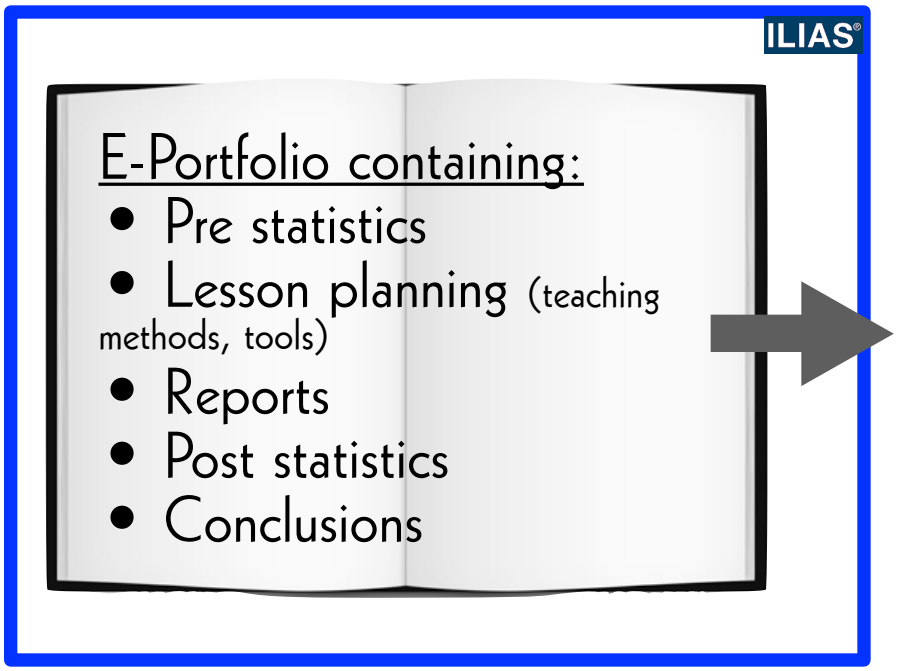
Learning by Teaching – the reflection

Final reflection



Learning by Teaching – the reflection

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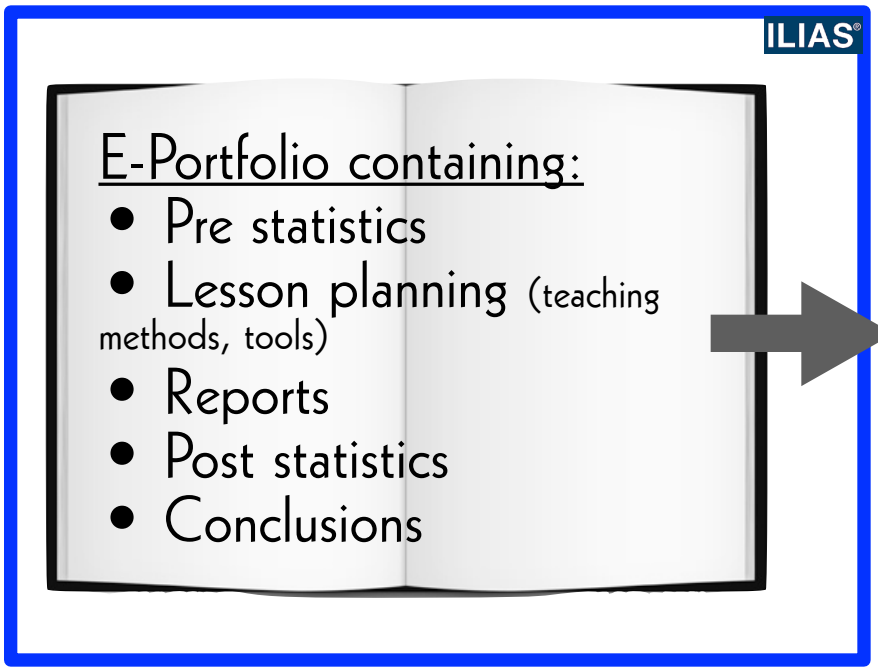

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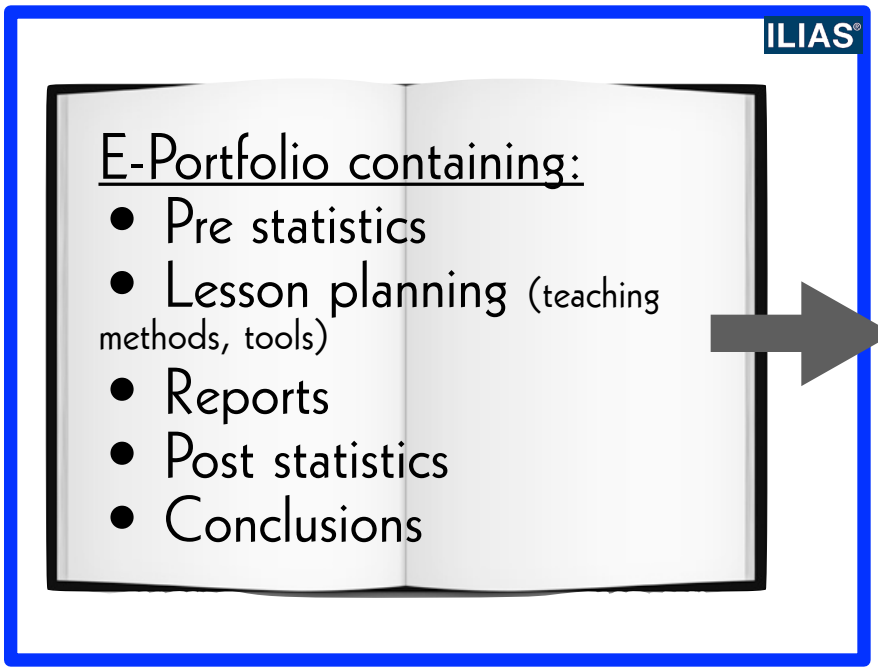
✓ Creating their own personal theory of teaching & learning.

Learning by Teaching – the macro reflection

Final reflection



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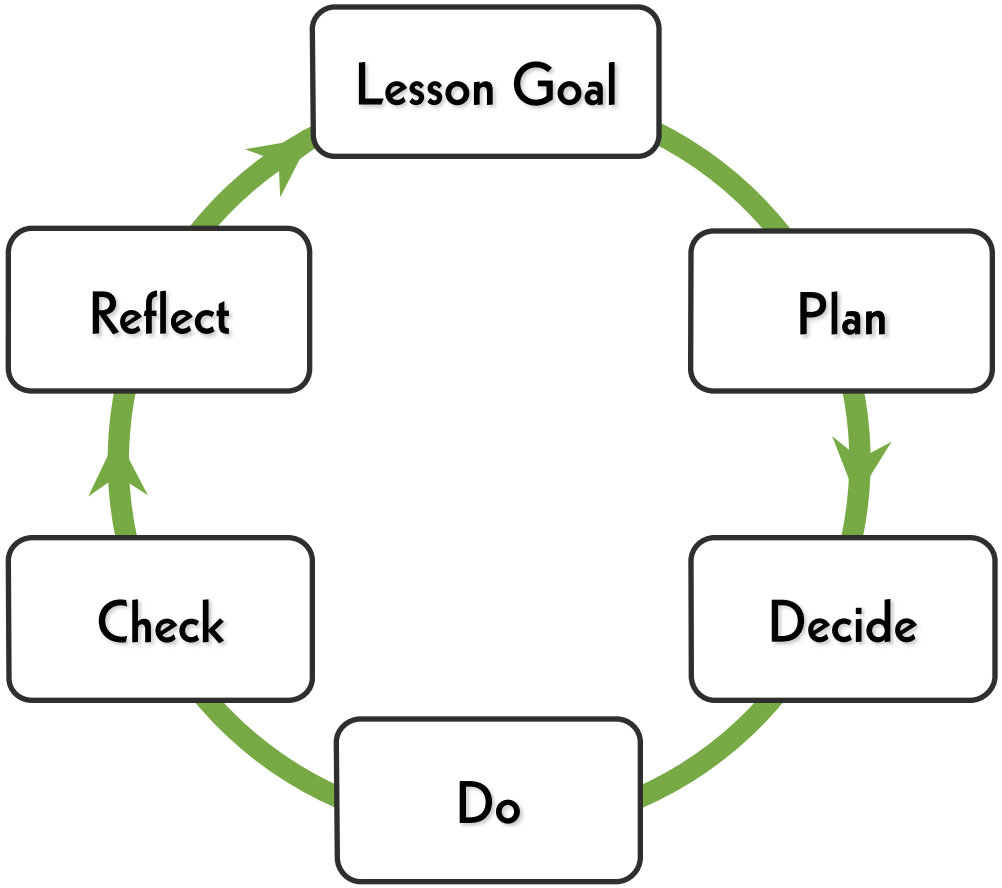

Learning by Teaching – the micro reflection

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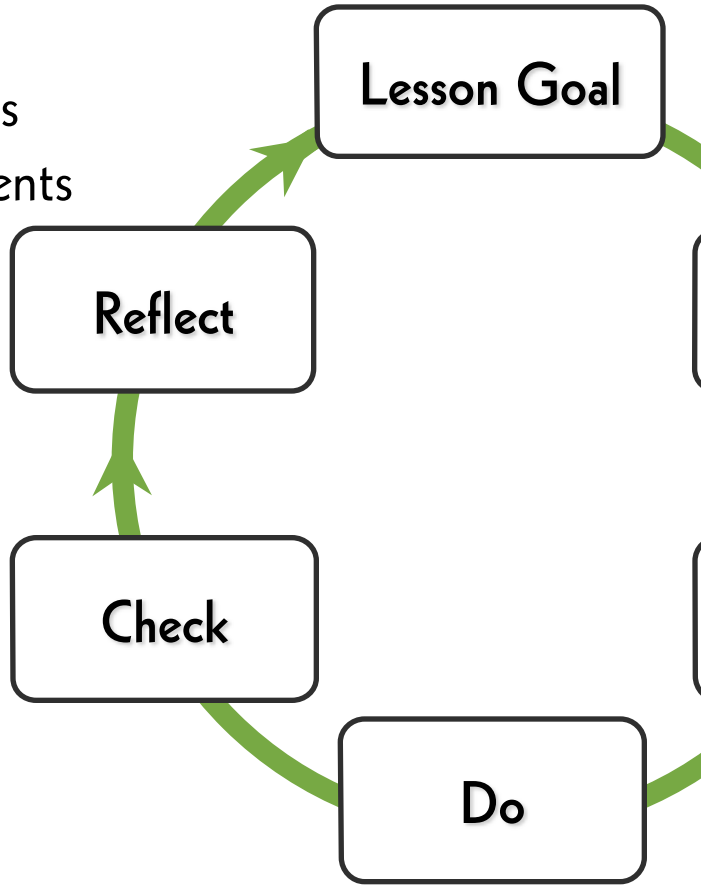

conclusion:
- ✓ suggestions
- ✓ improvements
- ✓ post-tests

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- ✓ tools
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- ✓ learning technique

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- ✓ documentation of data based decisions

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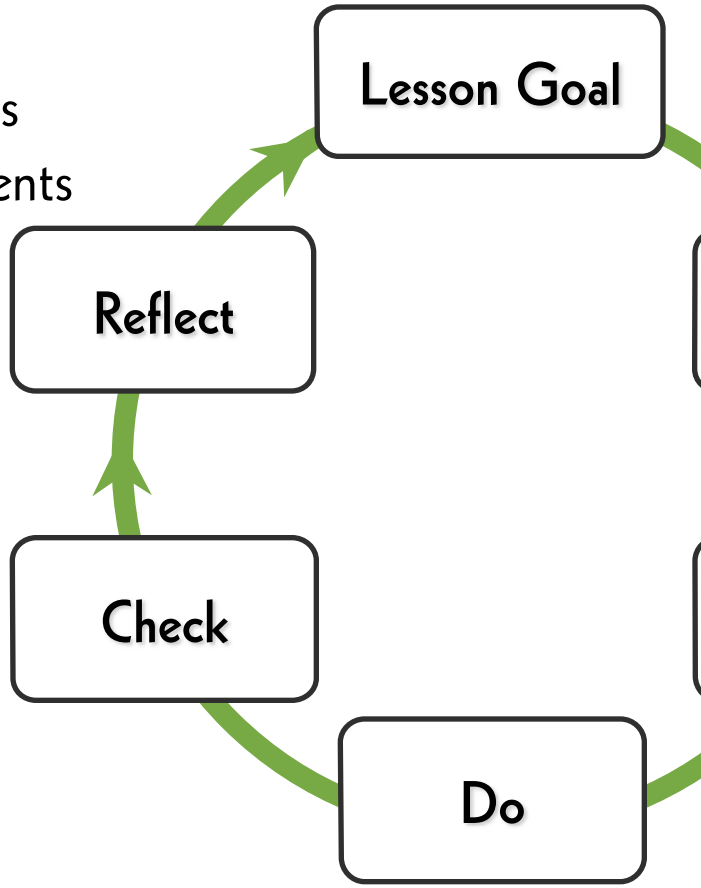

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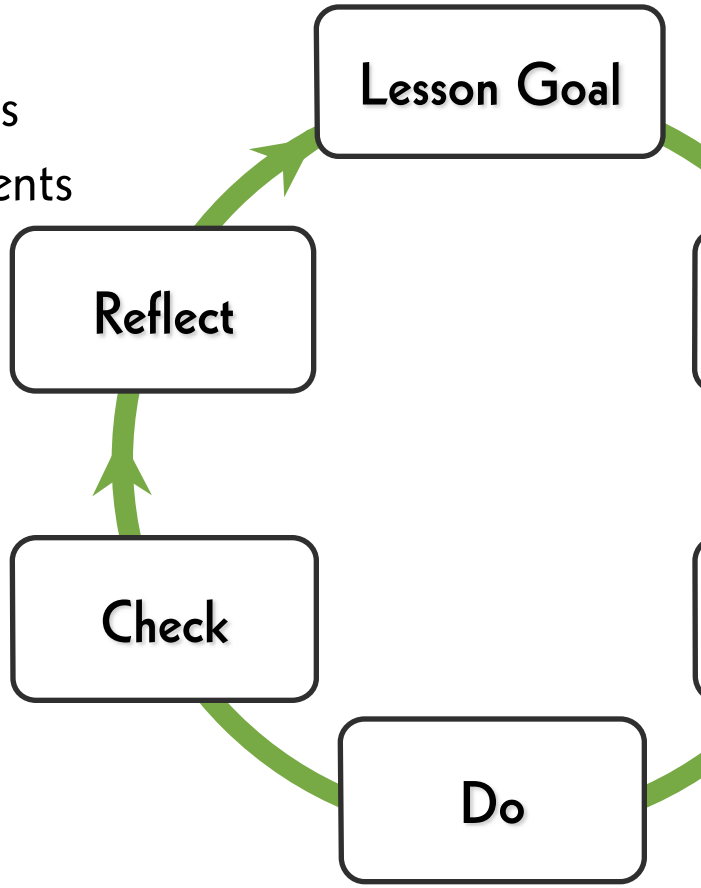

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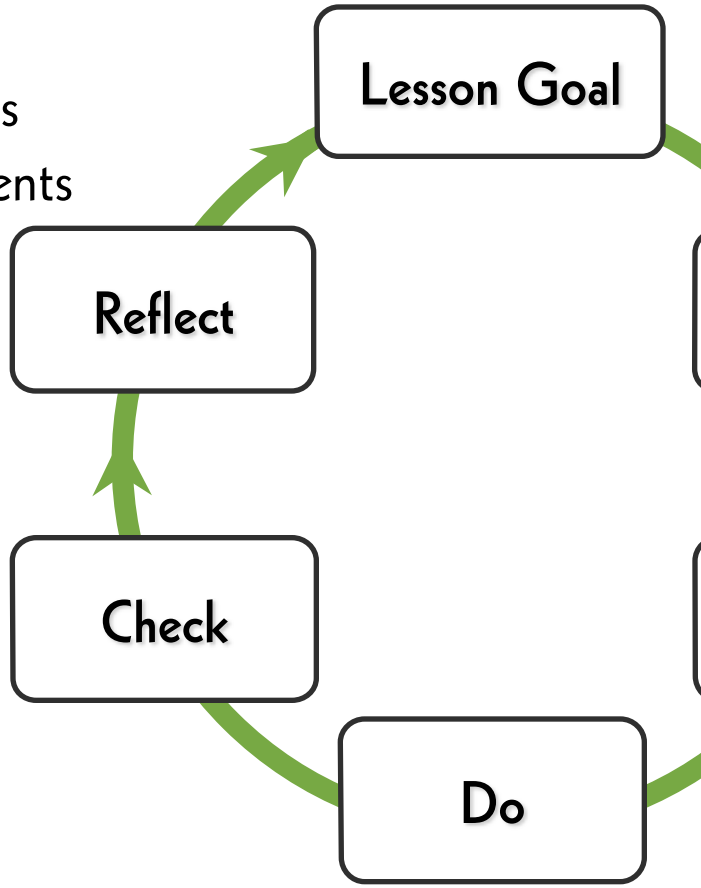

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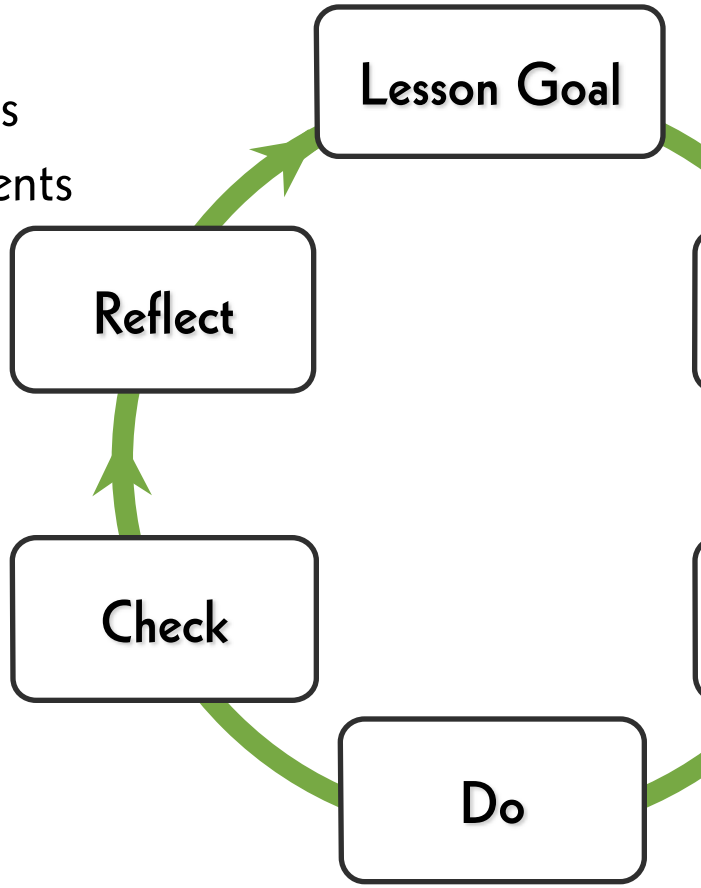

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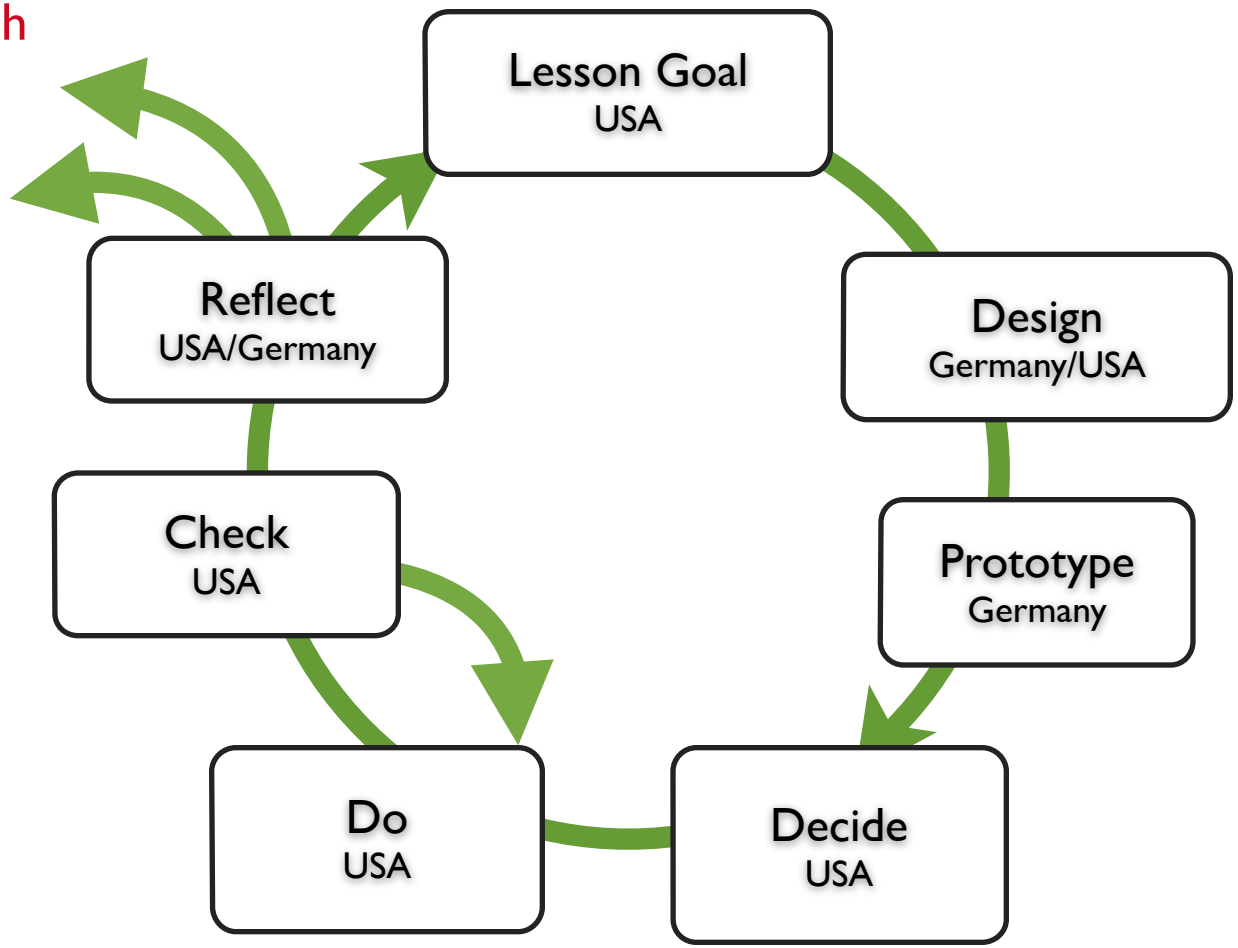
- ✓ conduct the lesson

Small Research Project

Publish

Derive Theories of Learning, related to cultural background



Universität zu Köln

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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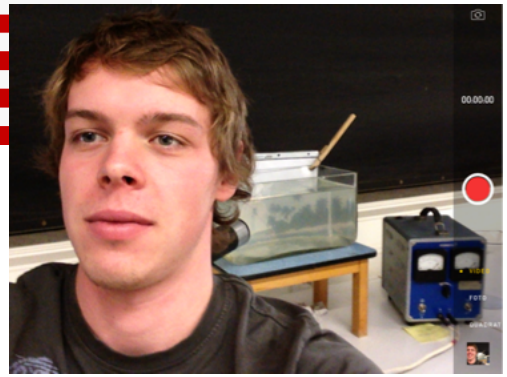
Universität zu Köln

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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Universität zu Köln

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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Universität zu Köln

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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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

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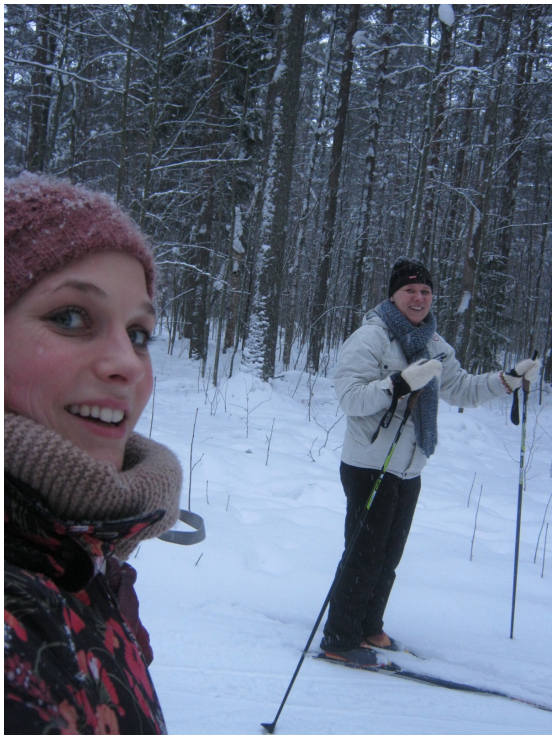
My portfolio



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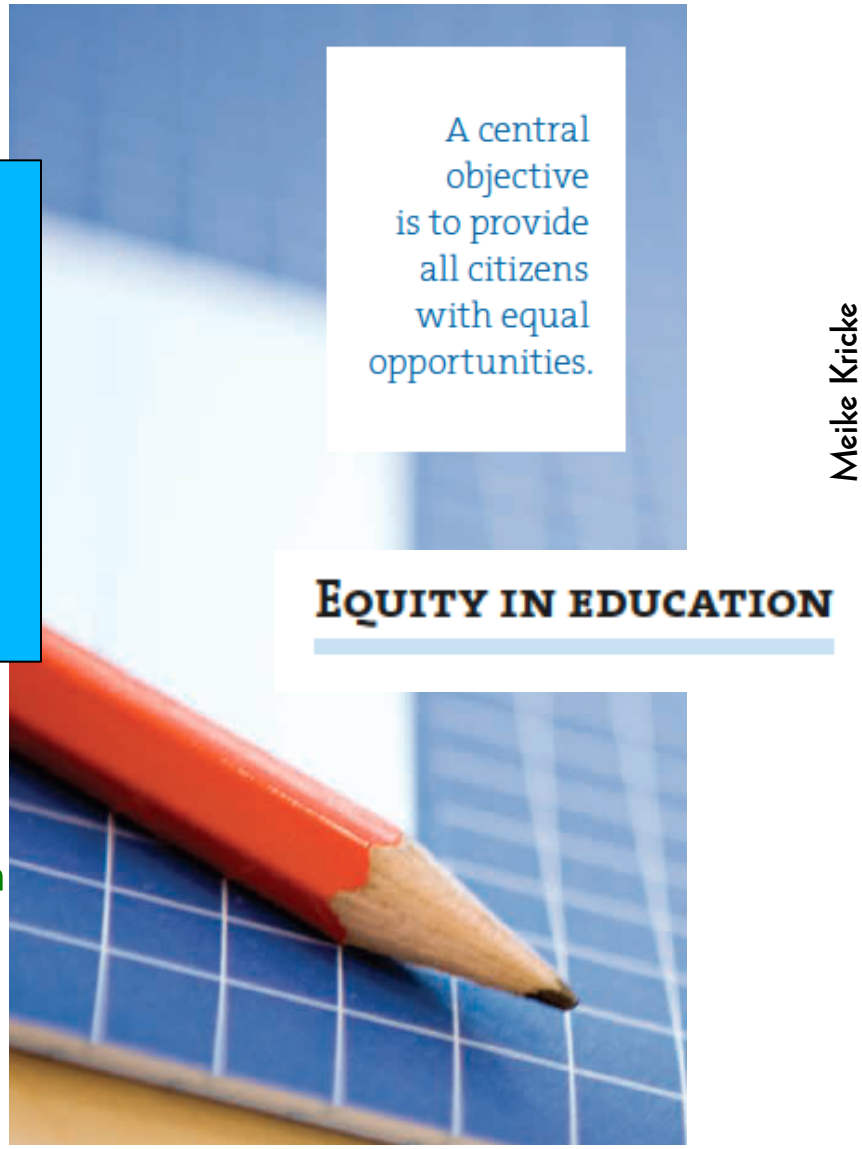
Introduction

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.



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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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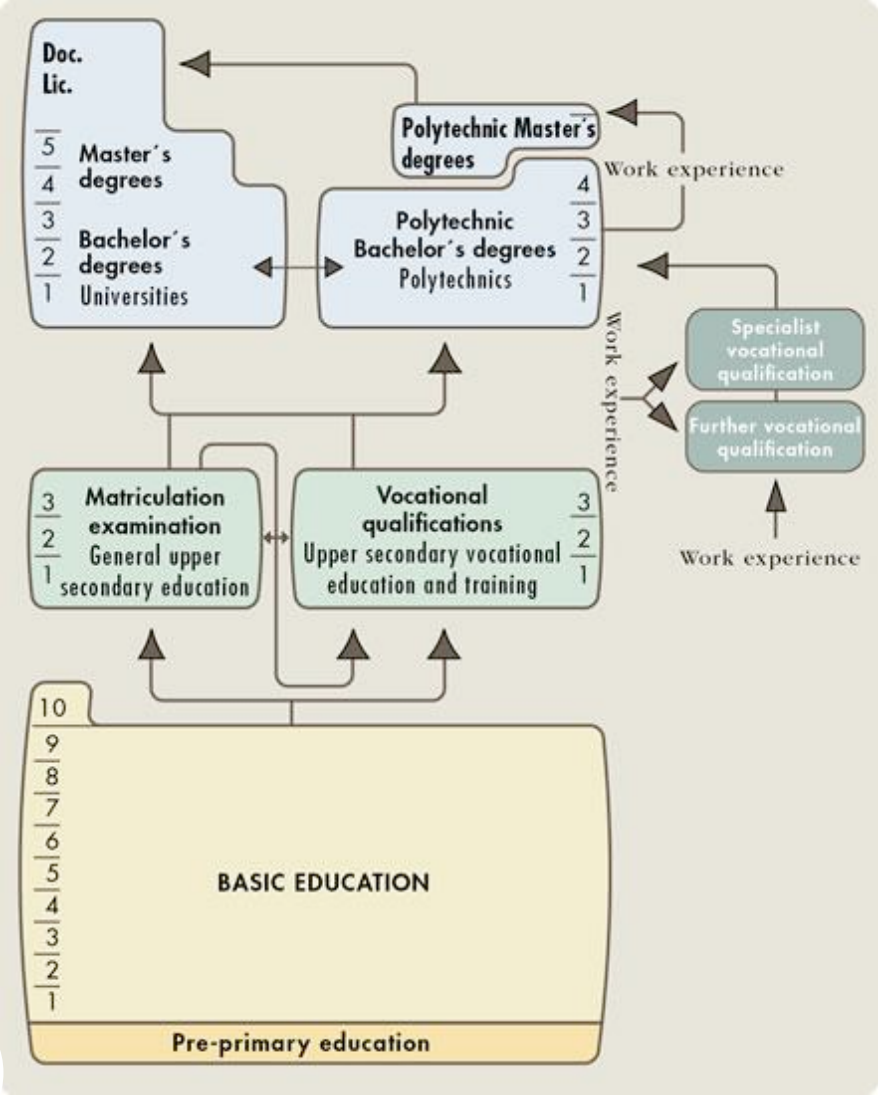
Introduction: Finnish school system



- 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

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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)

Meike Kricke

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High valued profession:

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

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Finnish teacher education

Selection process:

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

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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

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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)

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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)

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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"

Meike Kricke

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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…

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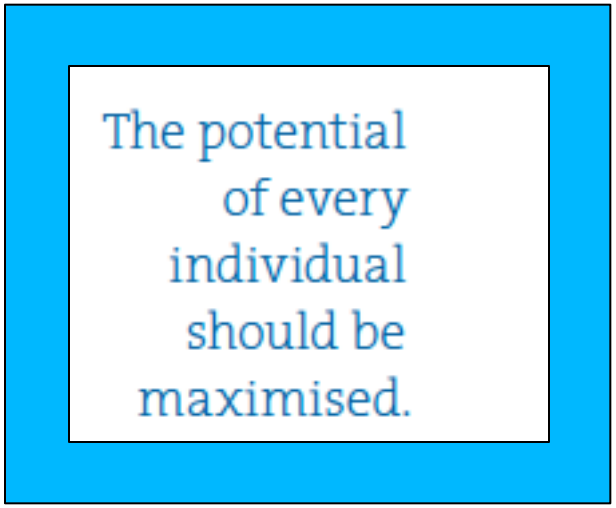
- Research based practice periods



PORTFOLIO WORK

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

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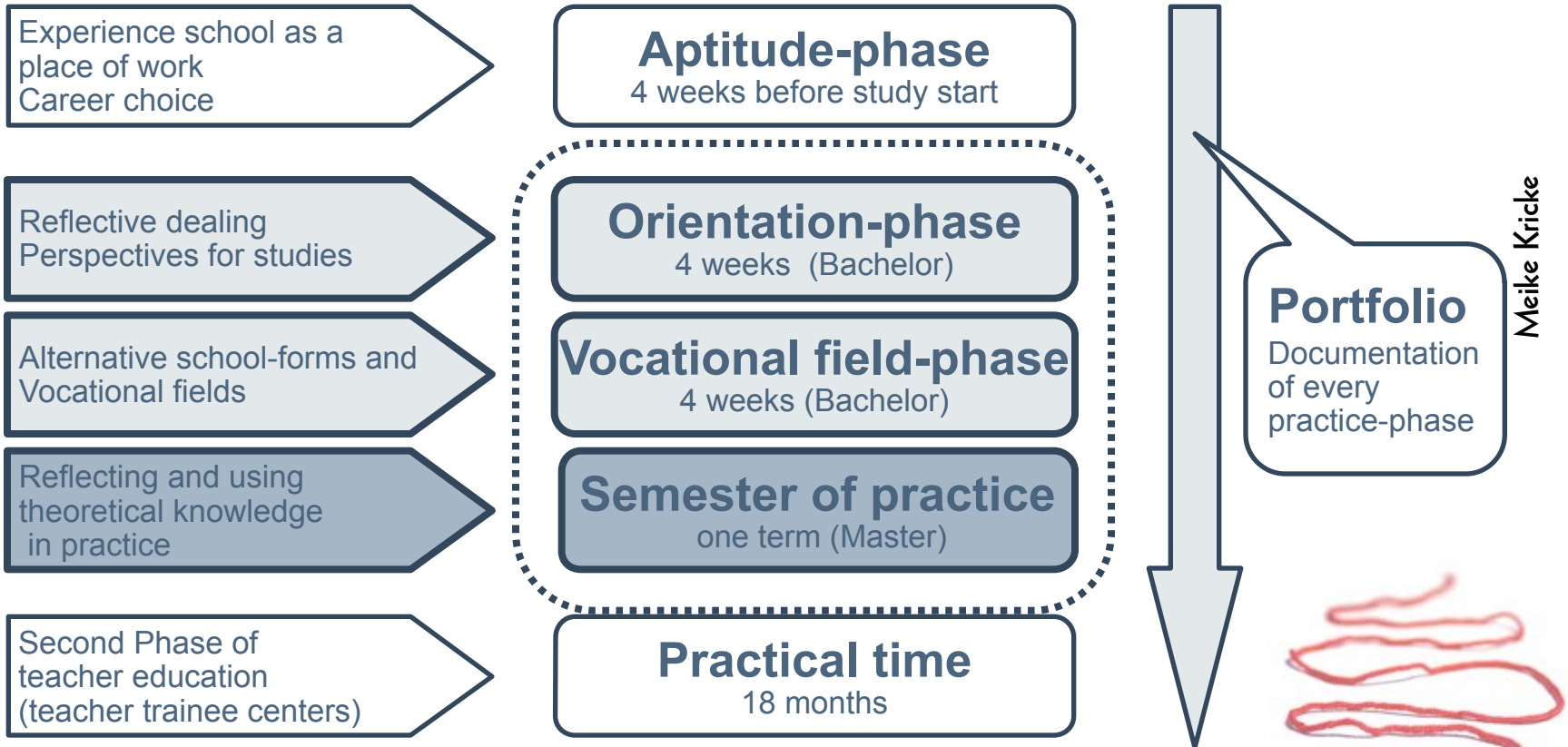
Portfolios in teacher education

… 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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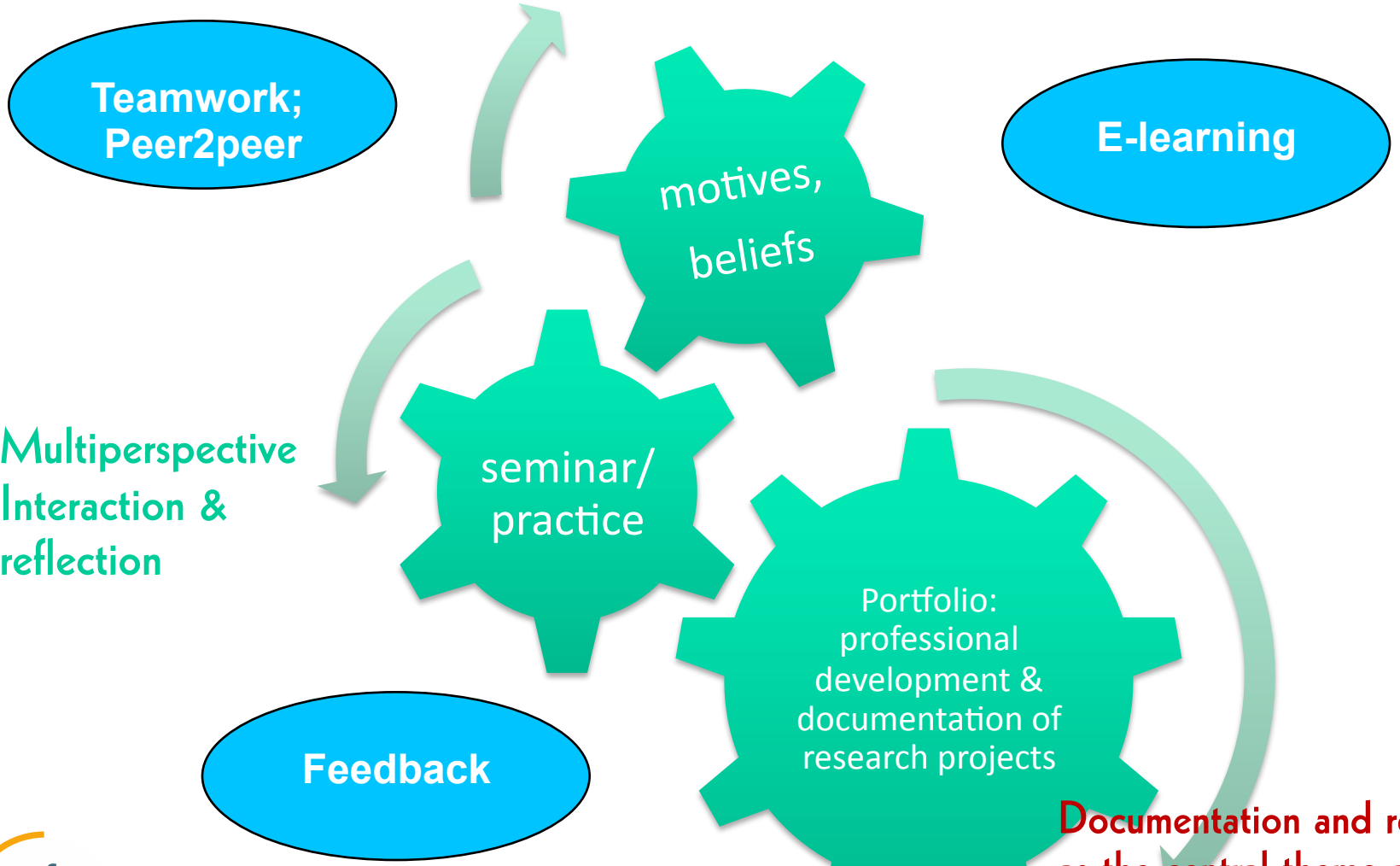
Portfolios in teacher education



Multiperspective
Interaction &
reflection

Documentation and reflection as the central theme according to teacher education

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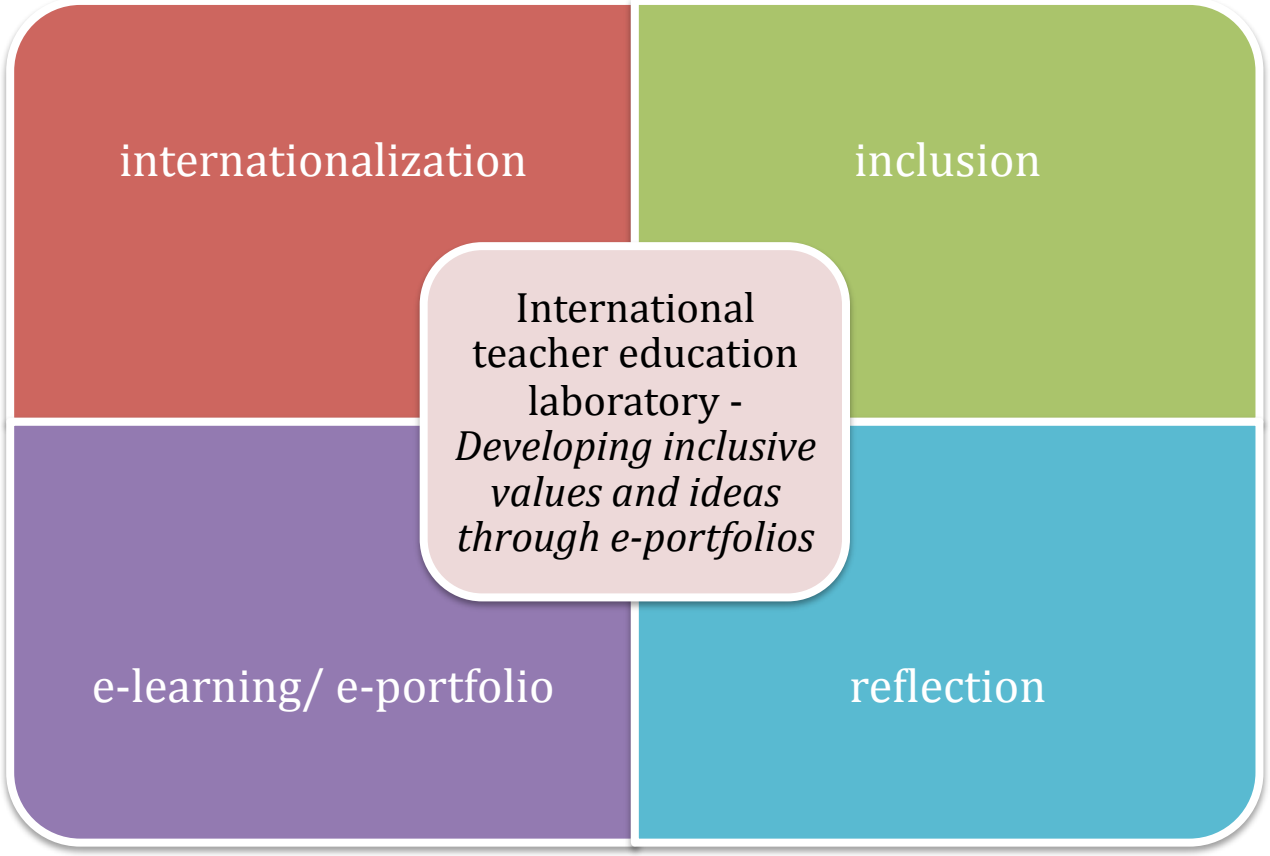
International teacher education laboratory

Developing inclusive values through e-portfolios:

Inclusion- new requests in teacher education programs



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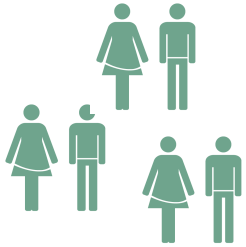
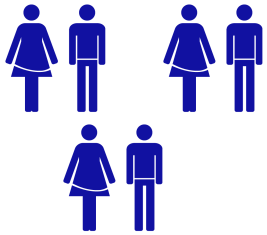
International teacher education laboratory

"Inclusive activities": cross-cultural reflection-process



Cologne students



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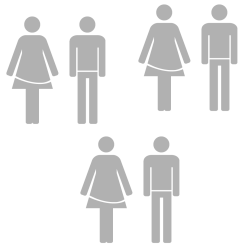

Canadian students

- (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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Amrhein/Kricke

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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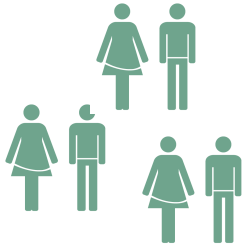
Amrhein/Kricke

International teacher education laboratory

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



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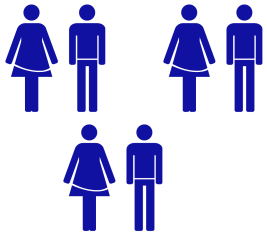
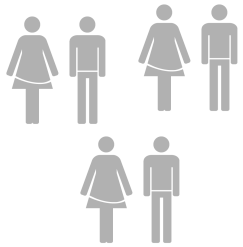


… students



… 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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