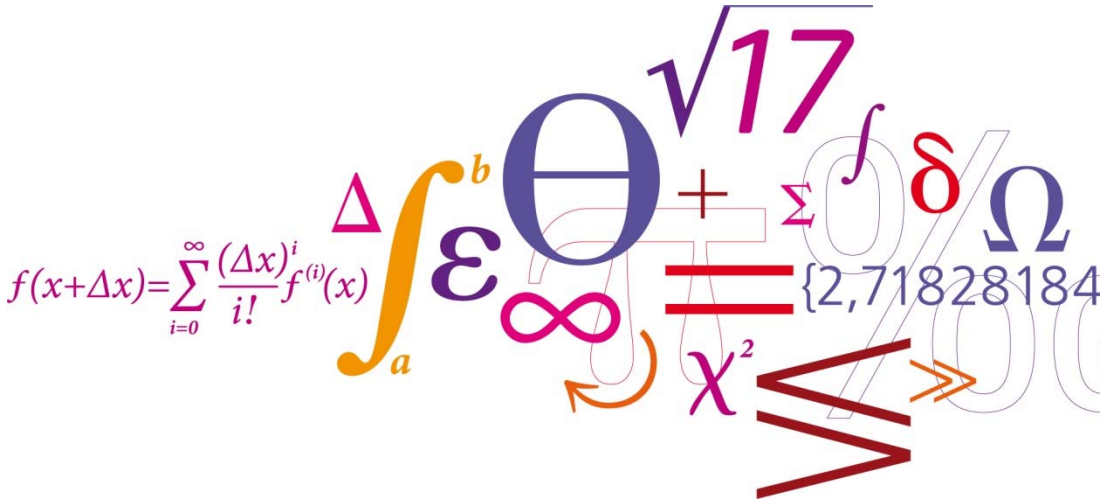
Mandatory teacher training programme – underlying ideas and structure in ”Education in University Teaching at DTU” (UDTU)

Chefskonsulent Pernille H Andersson, LearningLab DTU



LearningLab DTU
Danmarks Tekniske Universitet

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Pedagogical competence development at DTU

Scholarship of Teaching & Learning
- as a methodological framework

Advanced courses:

- E-learning & Blended Learning
- Assess-ment forms
- Innovation Pedagogics - teach you students to innovate *(Uni of Cph)*

Other courses:

- The PhD Supervision Process
- Get the best out of LMS in your teaching
- Supervision of Larger Projects

Basic courses:

UDTU Module 2- 4
- for new teachers

Module 1 = ”Teaching & Learning”

UP
- for experienced teachers

- Extensive teaching experience

Seminars:

- DTU Teaching Biennial
- Department seminars
- DTU Seminars for Teaching & Learning

General principles and content Teacher Training DTU

Strategies for teacher development in Higher Education

1. **Attending courses**

   Advantage: Structured knowledge base for a field of subject
   Problem: Transfer of new knowledge into practice. Knowledge is context depended.

2. **Learning in practice**

   Advantage: New understanding is obtained in practise were it is to be used. No transfer problem.

   Problem: Risk of only using existing knowledge and understanding.

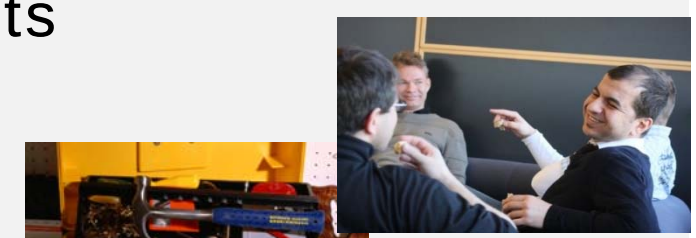
➢ **Most effective is a combination!**

- UDTU is linked to teaching practice at DTU departments and to supervision in that context

- Overall philosophy in DTU Teacher Training

Principles underlying UDTU

- Give you teaching tools based on current research in Higher Education and Engineering Education
- Use your own teaching practices and experience
- Use peer-coaching groups and collaborative learning involving departments
- Develop a teaching toolbox



Develop a critical eye: Observe your students' learning + Be able to take action + Know what to do!

Develop an extended teaching toolbox

UDTU

Education in University Teaching at DTU

(Faculty new in the role as a university teachers)

Aims – UDTU

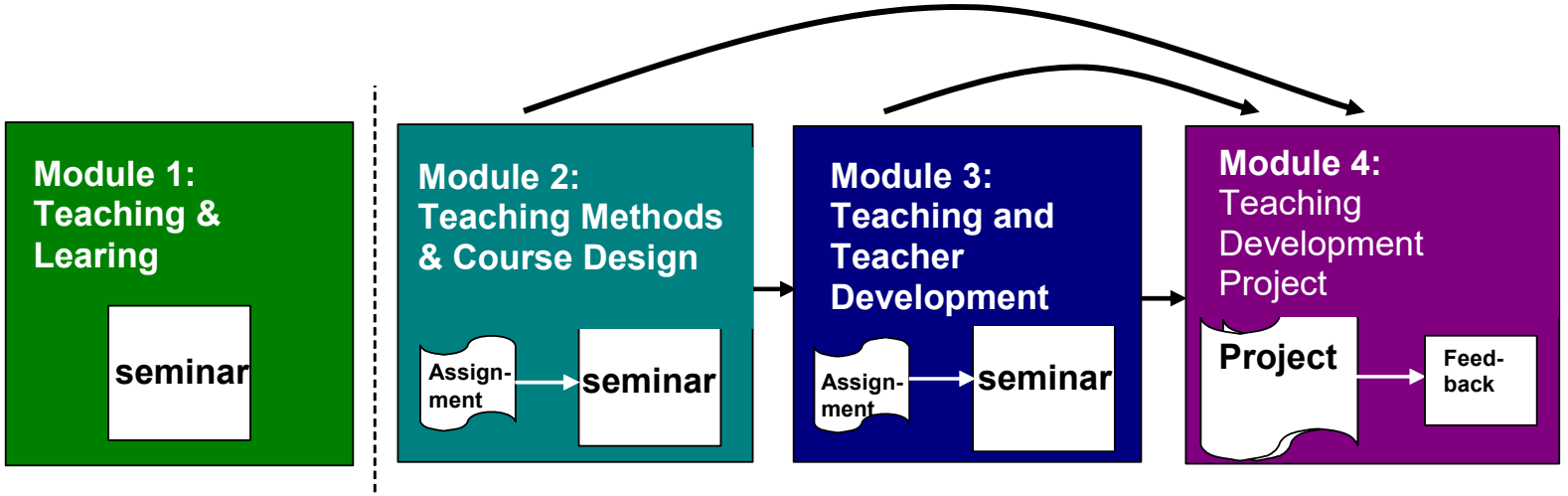
- UDTU is an introductory education in university teaching and learning. In focus is how to educate engineers. UDTU is mandatory for you who are going to be an Associate Professor and/or will be course responsible at DTU.

- The overall objective of UDTU is that you acquire knowledge, methods, and tools that enable you to teach with proficiency at university level.

- UDTU also provides you with tools to continually develop your teaching practice and to enhance your understanding of student learning and its prerequisites.

- UDTU trains you to be able to have full responsibility for DTU courses and take the leadership in teaching and learning processes.

Structure UDTU



4 + 2½ + 3 = 9½ days seminars

+ 3 pre-assignments

+ 1 larger project + ½ day feedback

+ 1 Supplemental activity about T&L

~ 250 hours total work

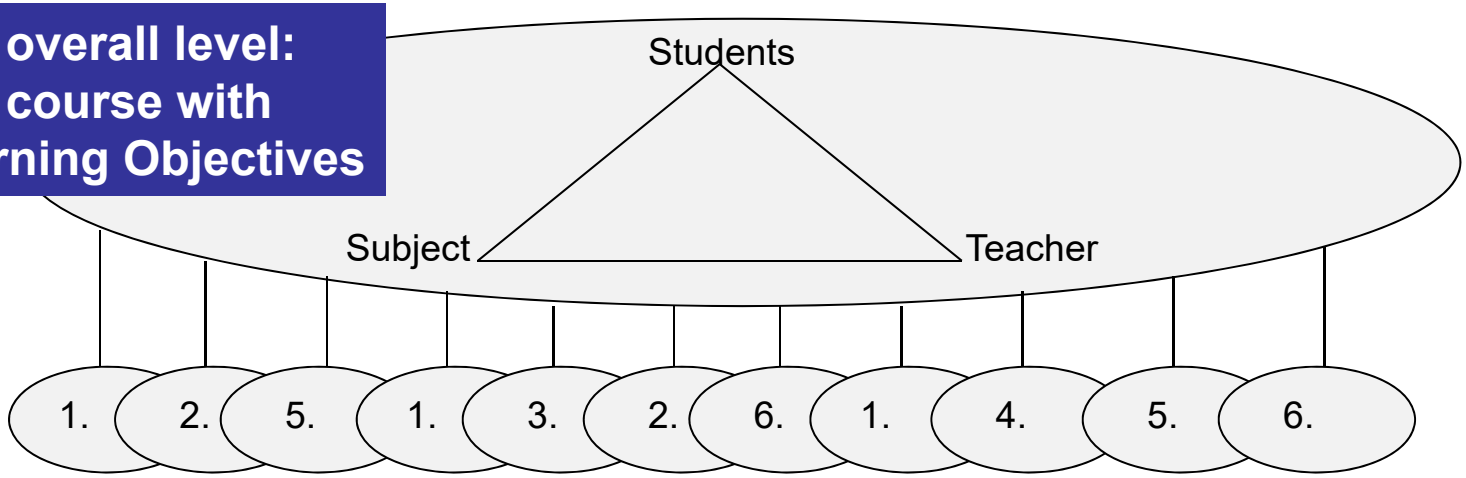
Learning Objectives

After UDTU you will be able to

- **Explain** the most important prerequisites for student learning in Higher Education
- **Set up** learning objectives for a course in order to support the development of engineering disciplinary knowledge and competencies
- **Identify** core elements in a course curriculum related to the learning objectives
- **Design** a course with teaching and assessment methods that support students' **deep approach to learning** and match the level of the learning objectives
- **Test** students' pre-knowledge and learning outcome in a course
- **Analyse and critically evaluate** the impact of a course design on student learning
- **Generate new ideas** of how to develop and improve teaching by using evaluations of own teaching practice
- **Use methods to continually develop** your understanding of teaching and learning

Focus: Course Design!
A course is more than some teaching sessions (2+2=5)

The overall level:
The course with Learning Objectives



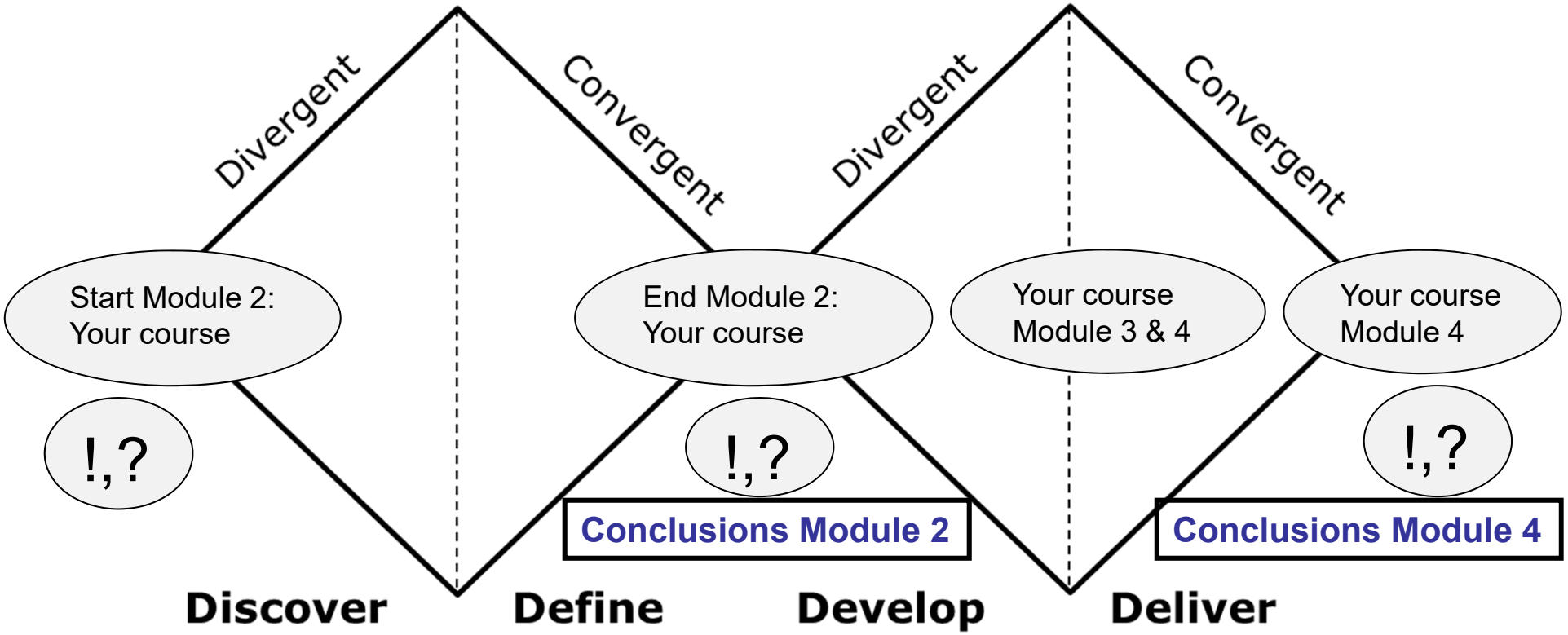
Learning activities and teaching sessions supporting students to obtain the overall Learning Objectives:

1. Lectures; Dialogue, Inductive form
2. Group work
3. Laboratory exercise
4. Exercises
5. Reading
6. Assessment

Your task:
Course planning with focus on ”Deep approach” to learning

The Course Design process in UDTU: "Double Diamond Design Model"

An iterativ process



British Design Council (2008) Eleven lessons: managing design in eleven global brands – A study of the design process. London, UK

Module 2 Pre-assignment 2 + Seminar 2: "Teaching Methods & Course Design"

Focus: Course Design and Student Learning

- How does my course design and teaching support student learning and contribute to develop engineering competences?
- How can I assess learning and what impact has this on the students?
- What ***structured*** teaching methods can I use and how?

Teaching Methods & Course Design

- Deep approach as a learning strategy
- Engineering competences
- Learning Objectives, structure the course content
- Assessment
- Structured teaching methods

<u>Pre-assignment 2</u> "What the students must learn", Mandatory part of UDTU :

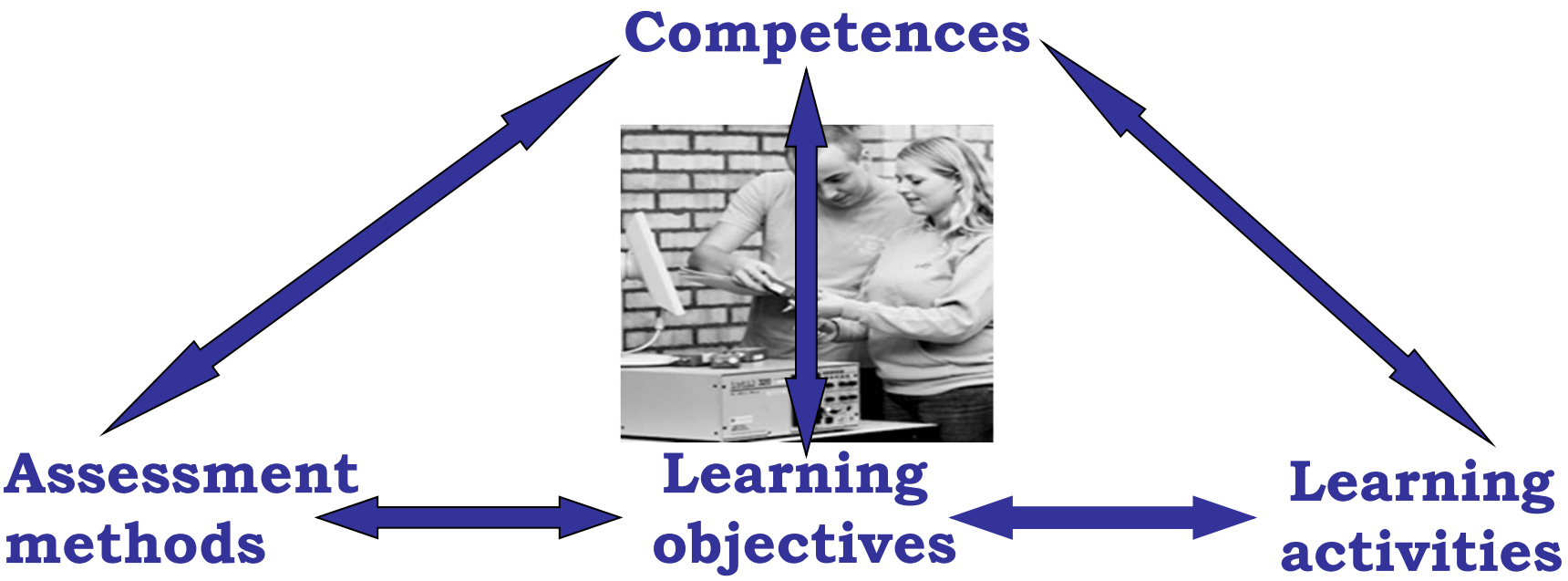
- Find your **pedagogical supervisor**

- Read chapter 1, 2, 6 & 10 Biggs & Tang

- Describe a course and analyse the learning objectives in it

- Consider relevant teaching methods

Principle 1:
Constructive Alignment as a tool in university teaching and course design



All activities at the same level as the learning objectives. All activities aligned.

J Biggs & C Tang, 2007

Revised Bloom's taxonomy: Knowledge dimension

A Factual knowledge	**The basic elements that the students must know to be acquainted with a discipline or solve problems in it** Aa. Knowledge of terminology Ab. Knowledge of specific details and elements
B. Conceptual knowledge	**The interrelationships among the basic elements within a lager structure that enable them to function together** Ba. Knowledge of classifications & categories Bb. Knowledge of principles & generalisations Bc. Knowledge of theories, models & structures
C. Procedural Knowledge	**How to do something, methods of inquiry & criteria for Using skills, algorithms, techniques & methods** Ca. Knowledge of subject-specific skills & algorithms Cb. Knowledge of subject-specific techniques & methods Cc. Knowledge of criteria for determining when to use appropriate procedures
D. Metacognitive Knowledge	**Knowledge of cognition in general as well as awareness & knowledge of own cognition** Da. Strategic knowledge Db. Knowledge about cognitive tasks, appropriate contextual knowledge & conditional knowledge Dc. Self-knowledge

Principle 2:
Students as active participants in learning

- Motivate the students to learn
- Motivate the students to take responsibility for their education and competence development
- The students' learning in focus

<u>The teacher has many roles:</u>
Expert
Facilitaitor
Supervisor…

<u>Students:</u>
Actively engaging in their learning

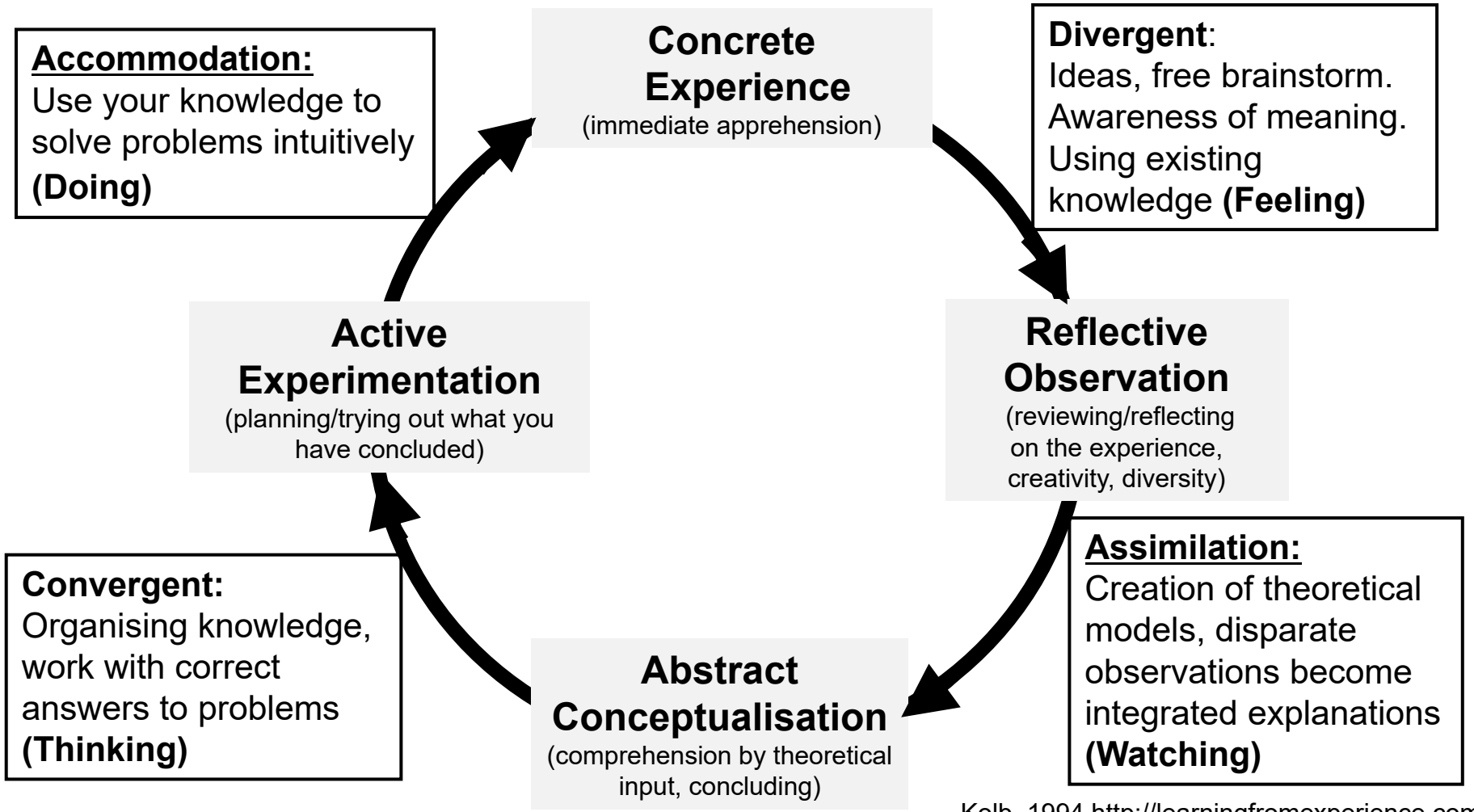
Work actively with the course content

J Bowden & F Marton **"The University of Learning"** 1998

Principle 3: Experiential Learning

- Students as active – Inductive approach

Students should be activated in their learning in order to induce accommodation based learning.



Kolb, 1994 http://learningfromexperience.com/

Structured Teaching methods Course Design: Active learning methods towards deep approach to learning

- Problem-Based Learning (PBL)
- Project Based Learning
- Learning by Inquiry
- Spiral Learning
- Flexible Learning and digitalised tools
- Learning with Cases

Module 3 Pre-assignment 3 A&B + Seminar 3 "Teaching & Teacher Development"

Focus: Teacher development and students' learning processes

- How to create a good learning environment?
- How to test student learning and understanding?
- What tools can I use to develop as a teacher?

Teaching & Teacher Development

- Test of conceptual understanding
- The teacher as facilitator
- Teaching Portfolio
- Peer coaching
- Teaching for creativity and Innovation

Pre-assignment 3, Mandatory part of UDTU!:

- 3A: Start your Teaching Portfolio

- 3B: Prepare peer-coaching: Describe challenges in my teaching

- Read chapter 3, 4, 13 Biggs & Tang

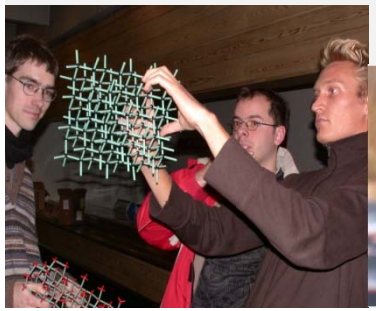
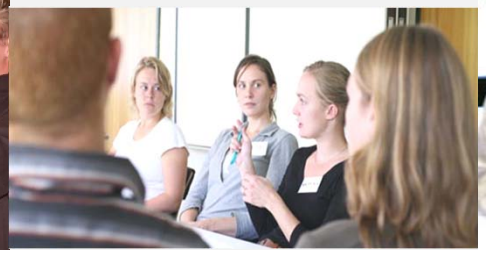
The story in Module 3: We are moving on…

The development continues through learning as an active process and focus on student learning…

…towards teaching for creativity, innovation, multidisciplinary and sustainability in a global world…

We want the students to be innovative
(Session on Engineering Competences, Module 2)

- To learn
- To be able to engineer
- To be able solve problems
- To be able to design solutions
- To be creative - generate new ideas and implement them
- To create new possibilities for employment

Teacher as a process facilitator

- Motivate the students to learn
- Motivate the students to take responsibility for their education and competence development
- The students' learning in focus

<u>The teacher has many roles:</u>
Expert
Facilitaitor
Supervisor…

J Bowden & F Marton **"The University of Learning"** 1998

Module 4:
”Practical Teaching Development Project”

- How does my teaching work?
- What do the students learn?
- My core question about teaching and learning.

Project:
Plan, implement and evaluate teaching and assessment with focus on student deep approach to learning, suggest improvements for the future

Focus:
Student learning



Action Research in Module 4: Gathering data about learning progress in courses, make analyses and develop

Course starts: Pre-test
"What do the students know?" "Do we have coherence?"

Report 4 A + Feedback: UDTU consultant

Teaching & Learning according to your design

During the course:
Formative assessment
"Are we on the right track towards LOs?"
"Do they learn?"
"Is my design for learning working?"

Teaching & Learning according to your design

Course is ending:
Summative course evaluation
"Course Experience Questionnaire"
"How did the students experience my teaching and course planning?"
Different course evaluations DTU Inside

Course ends:
Summative assessment
Examination done in many ways. Grading.
"Did they reached the ILO?"
What can I do to improve?

Report 4 B + Feedback: UDTU Cons.

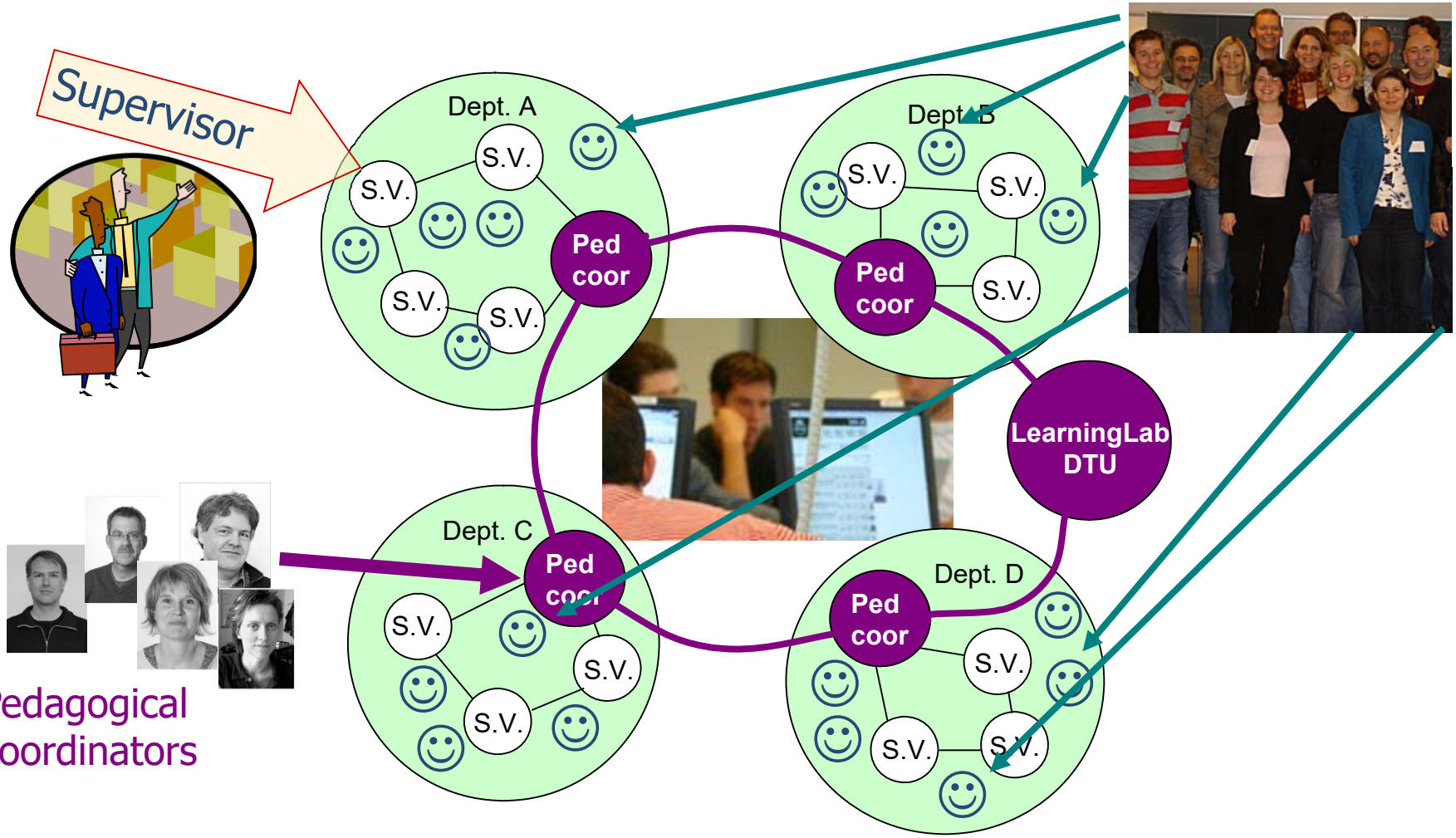
Prerequisites Module 4:
The pedagogical supervisors must be aware

1. Must be responsibly for a course or a lager part of a course were you can decide

2. Try out some new teaching and assessment methods in your course based on UDTU theories and methods

3. Reduction in teaching obligations while following UDTU (the project in Module 4 need some space)

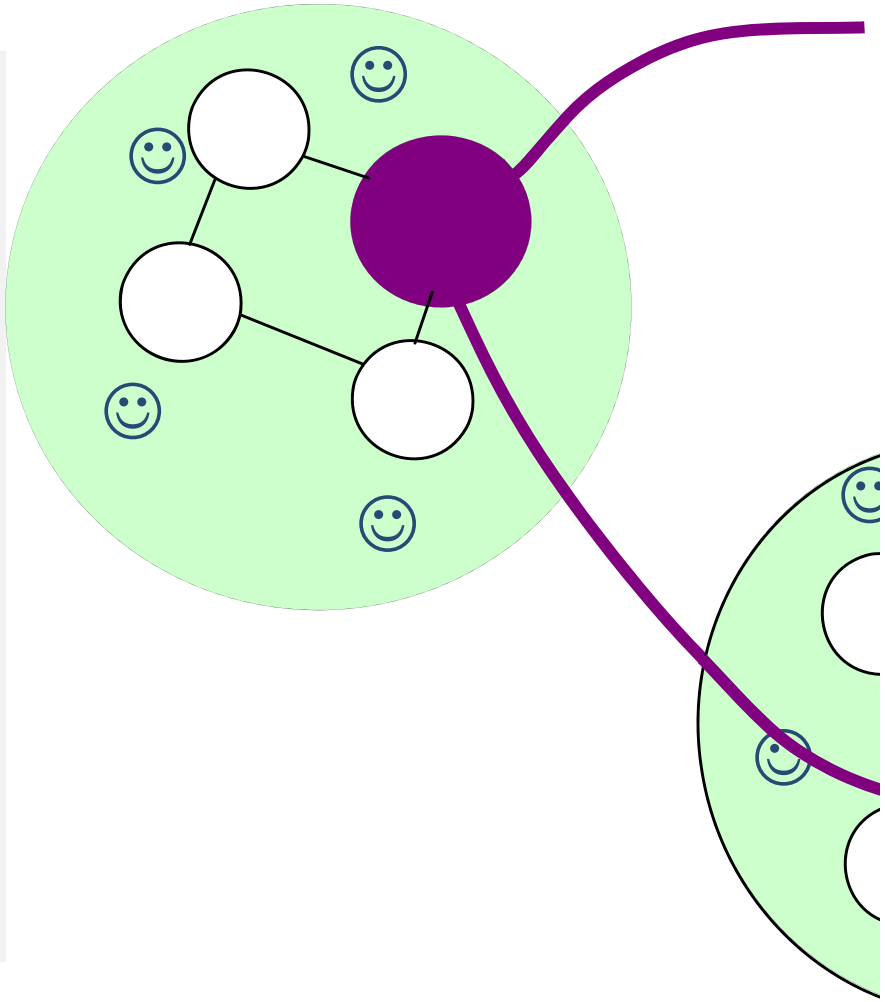
Teacher-training organisation DTU



The content in UDTU goes into the Profesional Learning Communities at the DTU departments

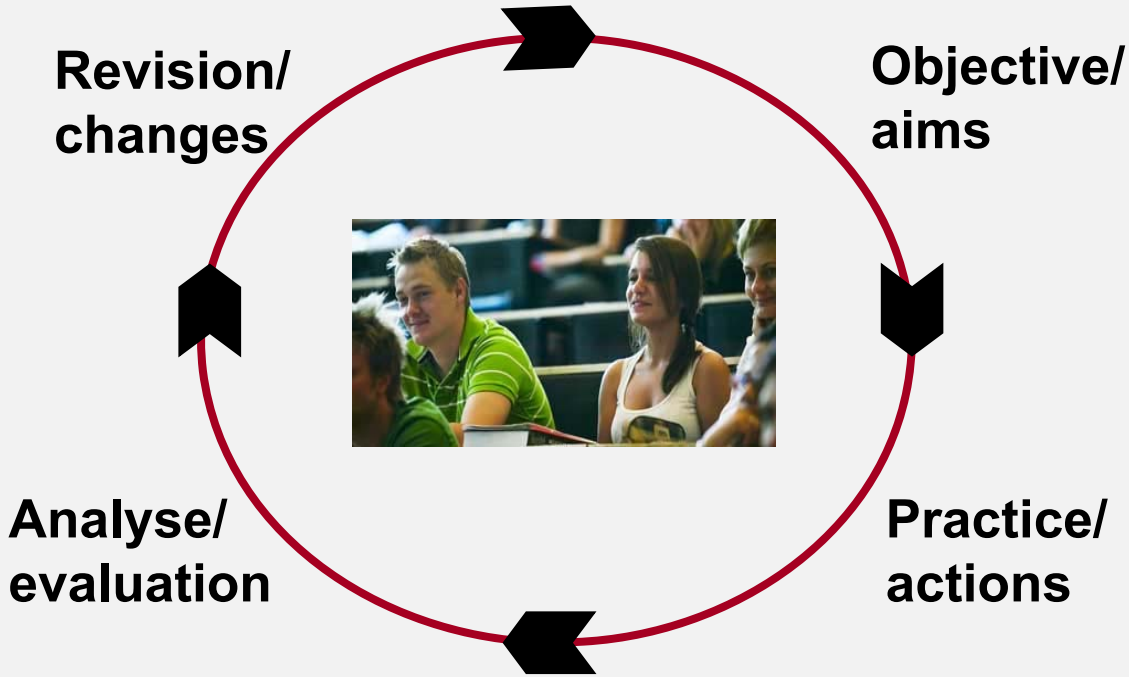
- 1-2 Pedagogical coordinators
- 3-5 Supervisors at each department (or more)

=The ’back bone’ in the Professional Learning Community (PLC) about teaching at the department



Overall objective:
Quality Assurance in courses is to make sure that the students LEARN what is intended

Work with continues improvements:



Deming/Shewhart cycle (Shewhart:1939)