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Design forms of academic teaching and learning
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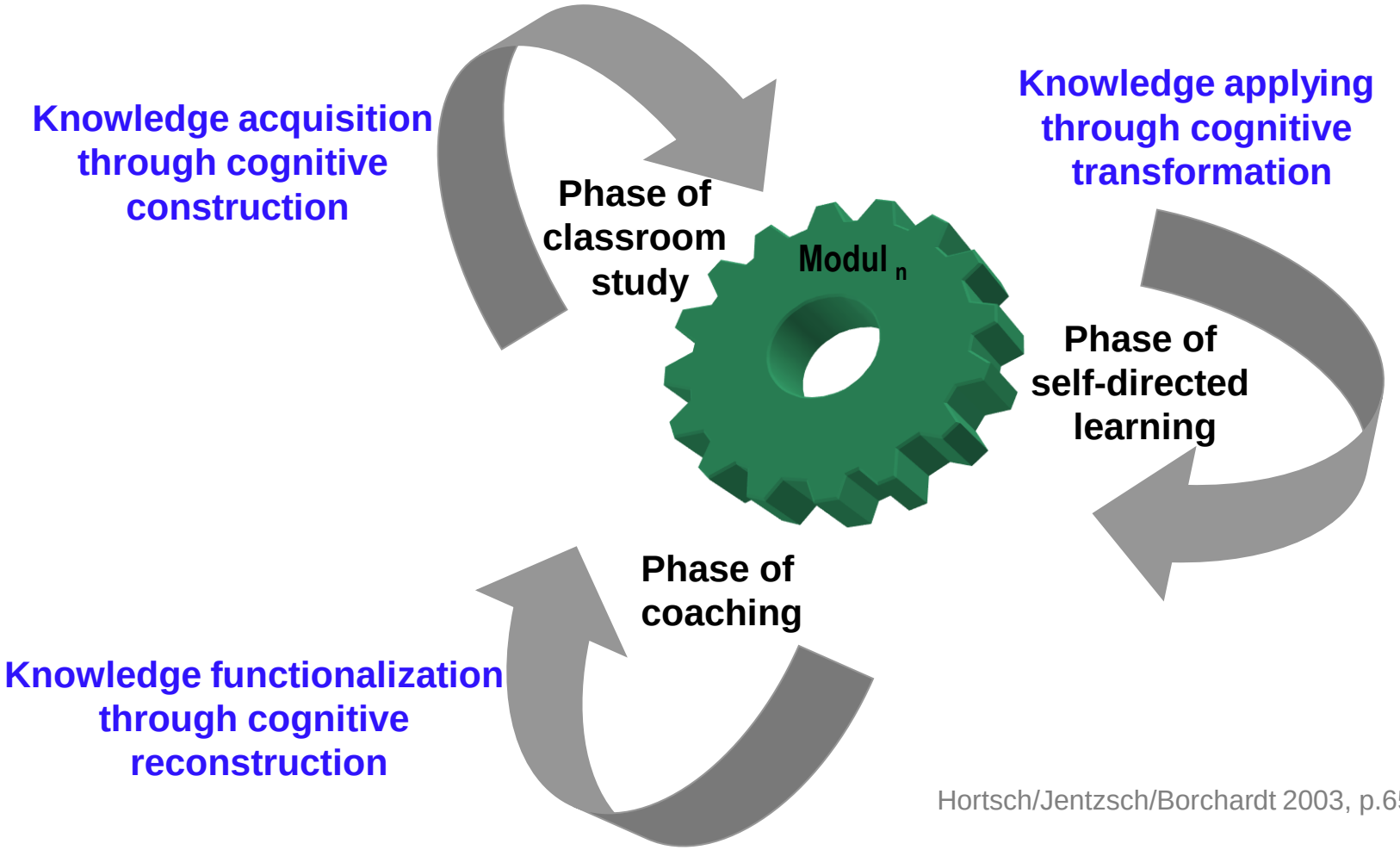
Laboratory didactics

Engineering Didactics

Structure of a learning and teaching arrangement

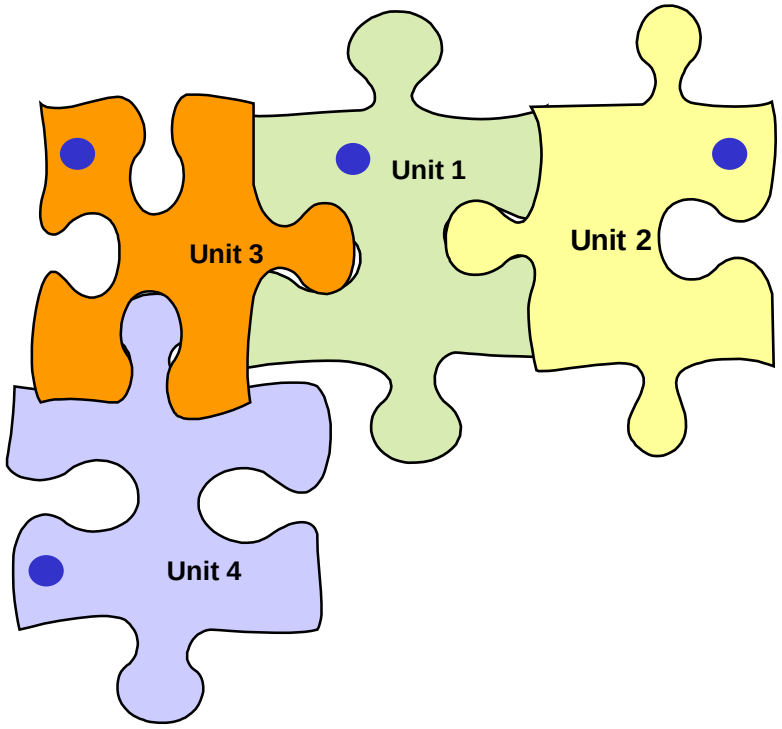


Hortsch/Jentzsch/Borchardt 2003, p.65

Structure of the module

Basics of design of laboratory training

Functions of experiments in teaching-learning processes



Experiments in knowledge discovery

Design of learning and teaching processes in complex teaching methods

Unit 1 – Basics of Design of Laboratory Training

Students know basic condition and decision fields for the didactic planning of laboratory work. They are able to classify experiments under different aspects and they know essential requirements on experiments in teaching/learning processes.

The classification of experiments as cognition supportive means:

- natural scientific experiment
- technical experiment
- experiments as a simulation of working tasks
- Experiments in teaching/learning process

Planning levels of laboratory didactic learning - condition fields and didactic decision fields when planning laboratory practicals

Learning Objectives / learning content / methodological design / media selection

Unit 2 – Experiments in knowledge discovery

Students know basic methods of knowledge discovery. They are able to situate functional experiments in these methods and thus to structure the laboratory practical work from an epistemological perspective.

- Term "method" and classifications of methods
- Ways of cognition:
  - Inductive and deductive knowledge discovery
  - Analytic and synthetic knowledge discovery
  - Reductive (progressive und regressive) und deductive II knowledge discovery
- Functions of experiments in the different ways of cognition
- Requirements on experiments

Unit 3 – Functions of experiments in teaching/learning processes

The students know the different functions of experiments in teaching/learning processes and the ensuing requirements for the design of laboratory work.
They are able to structure the laboratory work under didactic aspects and to create support systems for the laboratory practical acts of the learners.

- Experiments in different didactical function´s
  - Orientation
  - Working with new content
  - Working with known content
  - Control and evaluation
- Experiments for the realization of selected didactic principles
- Experiments for illustration of the matters of acquisition
- Experiments for didactic simplification of matters of acquisition
- Laboratory practice in the light of educational leadership and independent learning
- → e.g. Working with guide texts

Unit 4 – Design of teaching/learning processes in complex teaching methods

Students are able to design teaching/learning processes targeted and demand-oriented by using complex teaching method

- Basics of problem based learning
- Working with projects
- Working with case studies
- Business games
- Role playing

Thank you for attention