

Bottom-up implementation of learning goals in physics lab courses by a hands-on didactic training of instructors:

How to make a change if nobody else cares for the lab course...

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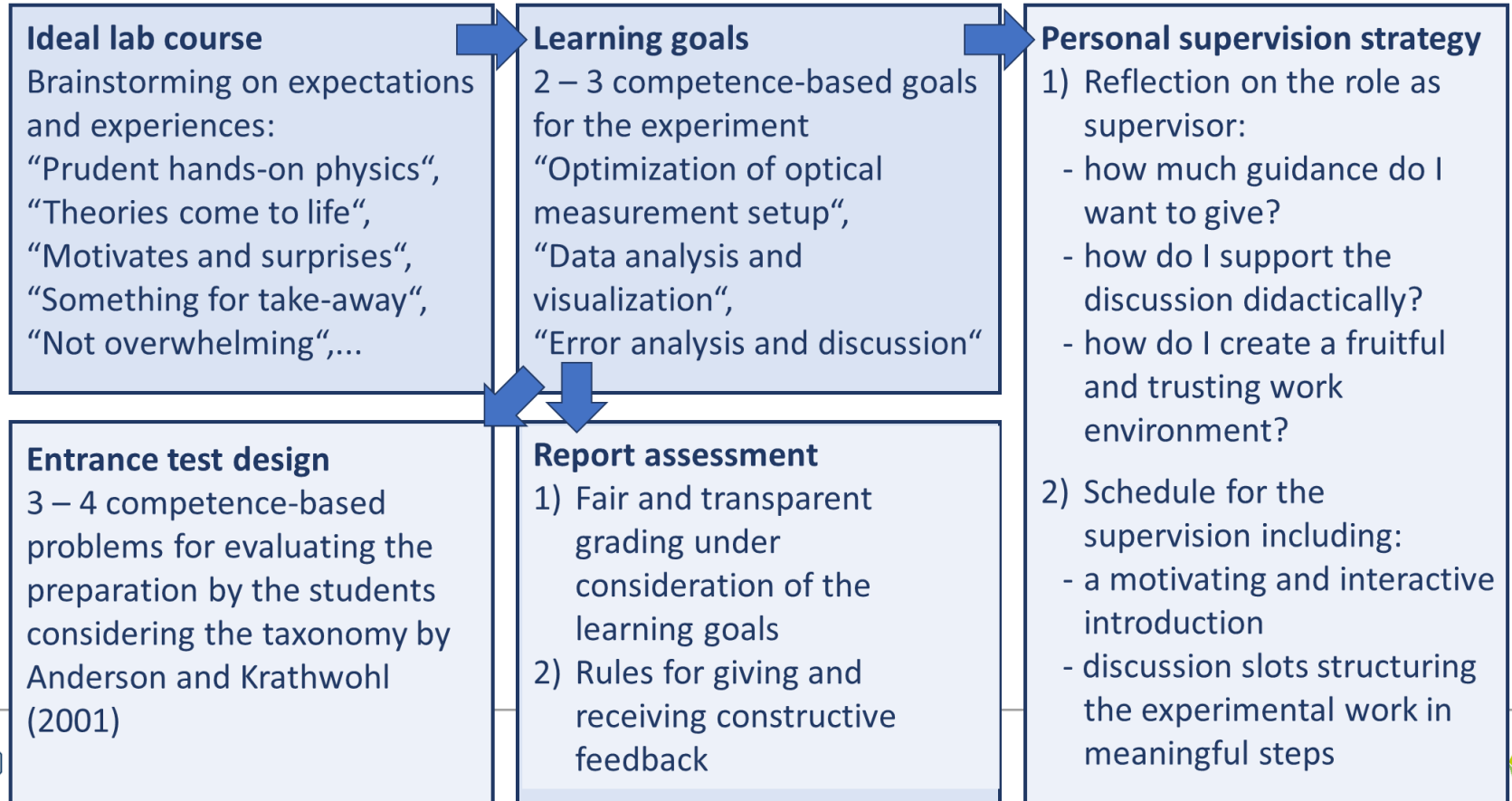
Physics lab courses at TU Dresden

- Cookbook-style lab course:
Physics concepts instead of competences for experimental research,
Highly instructed experiments,
Neither defined competences nor learning goals
- Many lab courses, many participants (455):
3 fundamental physics lab courses, 1 advanced physics lab course
Lab course for teacher students,
Lab courses for chemistry, electrical engineering, materials science,... students
- Almost all instructors without experience in teaching:
PhD students & student assistants,
High throughput of staff members, but no exchange of experiences

Hands-on didactic training

- Since 2019 almost every semester before the start of the semester
- Participation is voluntary
- Time-efficient approach (max. 3.5 h):
After short didactic inputs, the instructors develop their strategy for supervision together
- Preparation by instructors:
 - Did the experiment themselves at least once
 - Created a report that is evaluated by the organizers of the lab course
- Learning goals as center piece of the workshop

Concept of the workshop



Development of a supervision strategy

Work schedule for the experiment: _____

Time	Aim	What you do	What your students do	What to prepare

Lessons learned: The positives

- Very positive feedback by instructors over the years
 - > some participated several times and still appreciate it for their work
 - > survey planned for October for more profound insights
- Efficient empowerment of instructors
 - > feel prepared for the supervision of their experiment
 - > more objectivity with respect to assessment
 - > more feedback on reports for students
- Instructors take ownership for their experiment
 - > adjust tasks, workflow, setup, ...
 - > implement new learning goals
- Strengthens communication & exchange of experiences between the instructors

Lessons learned: The negatives

- Mostly motivated instructors participate in the workshop
-> approx. 66 % of all instructors
- Follow-up workshop during the semester never happened
-> no need? Challenges directly discussed with peers?
- Rebuilding competences every semester
-> no implementation of developed learning goals, ...
- Scientific shortcomings on top of missing didactic experience
- Language barrier: one workshop in German, one in English
-> still hard to get people talking (esp. in English)

Conclusions

- The hands-on course provides
 - ... an effective didactic training of instructors
 - ... a place for networking between instructors
 - ... a bottom-up implementation of learning goals
- Still fully based on my personal willingness to offer the workshop for free
- Next steps
 - ... implementation of rubrics as assessment tool
 - = systematic implementation of learning goals
 - > survey starts this week

 - ... implementation of experiments beyond the cookbook approach