Impact of Teaching Methods on Heterogeneity

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1. Measuring Heterogeneity of Beginners

| Gymnasium-AG29 | physics: 1.2 yrs | #2 | #5 |
| Tech. Sch. 5, AG4 | physics: 1.2 yrs, AG8 |
| Tech. Sch. 4, AG5 | physics: 1.6 yrs, AG8 |
| Tech. Sch. 5, AG6 | physics: 2.3 yrs, AG8 |


Large heterogeneity of beginners: First-week FCI protest results are shown depending on high school grading (German Gymnasium, Technical Secondary School, Economic and Social Secondary School types) and number of hours of physics per week within the last two school years.

Summary

1. Heterogeneity
   - Previous knowledge depends strongly on the type of school grading and the number of hours of physics in the last two school years.

2. Effect
   - a) The learning gains with JITT/PI: Tutorials-method are significantly higher than with traditional lecture
   - b) Students appreciate active learning methods and spend more time on the subject

3. Heterogeneity
   - BUT: Even with active learning methods heterogeneity couldn't be resolved after one year of study!

Outlook
- Adapt thermodynamic concept test
- Spread methods and experiences by workshops to colleagues, also in other fields and other universities
- Share Moodle-questions for JITT with other universities
- To do so, build a Moodle-server for Moodle-questions

Reference:

Poster on AAPT-Conference July 2018 in Washington DC / USA. Details: https://www.aapt.org/Conferences/sm2018/