DESIGNING EFFECTIVE LEARNING PROCESSES IN PHYSICS WITH THE ICAP-MODEL FOR ACTIVE LEARNING

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Do you know this situation? The learning objective is clearly defined, but when it comes to designing the lesson, it is unclear with which learning activity students can achieve it most effectively. What should students actually do to achieve successful learning?

This is exactly where the ICAP model [1,2] can help. It is easy to understand and can be applied immediately and practically to the design of your teaching. This model provides a four-level taxonomy – Interactive, Constructive, Active, and Passive – that classifies student learning activities in terms of cognitive engagement. Each level is associated with a different expected depth of learning outcomes.

With this knowledge, even small adjustments to tasks and questions can guide students toward deeper learning and understanding. This is particularly valuable in physics when student should develop a deeper conceptual knowledge rather than memorizing content.

In this workshop, you will first learn how the ICAP model can be applied to the planning and designing in physics teaching practice by different learning activities. In a second step you will use the model to upgrade your own learning activities and tasks. Please bring short examples from your own class (e.g., a short lecture with a follow-up question, a problem-solving activity, a review task, an exercise, or simply specific questions you ask during your lecture).

By the end of the workshop, you will be able to design and upgrade learning activities to enhance student learning.

Learning objectives:

The participants of the workshop …

- understand and apply the ICAP model to describe active learning.
- classify different learning activities according to the ICAP model.
- develop or upgrade learning tasks that promote deeper learning.
- understand how small changes can have a significant impact on the depth of learning, particularly when shifting from active to constructive learning activities.
- plan courses with the perspective to selecting learning tasks that align with the learning objectives.

[1] M.T.H. Chi and R. Wylie (2014). The ICAP Framework: Linking Cognitive Engagement to Active Learning Outcomes. Educational Psychologist, 49(4), 219-243. https://doi.org/10.1080/00461520.2014.965823

[2] M. T. H. Chi, J. Adams, E. B. Bogusch, C. Bruchok, S. Kang, M. Lancaster, R. Levy, N. Li, K. L. McEldoon, G. S. Stump, R. Wylie, D. Xu, & D. L. Yaghmourian (2018). Translating the ICAP Theory of Cognitive Engagement Into Practice, Cognitive science, 42(6), 1777-1832. https://doi.org/10.1111/cogs.1262