EFFECTIVENESS OF WHITEBOARDS AS A COLLABORATION TOOL IN UNIVERSITY PHYSICS TEACHING: INVESTIGATIONS BASED ON THE ICAP FRAMEWORK

SILKE STANZEL, CHRISTINE LUX AND CLAUDIA SCHÄFLE
Rosenheim Technical University of Applied Sciences, Germany
E-mail: silke.stanzel@th-rosenheim.de

The widespread use of generative AI makes active and collaborative learning in class all the more important for acquiring a deep understanding of physical concepts. Analog whiteboards are a central element of the teaching methods used in physics education research. In physics courses at the Technical University of Applied Sciences in Rosenheim, students work on tasks in groups of two or three using DIN A2-sized whiteboards. These serve as a "public thinking space" that facilitates the recording and revision of ideas, promotes collaboration, and enables the teacher to quickly assess the work and provide feedback.

The study examines whether and how whiteboards support constructive and interactive learning in line with the ICAP framework [1]. Through classroom observations, the activities of the students and the teacher are recorded at two-minute intervals and assigned to the ICAP modes. In addition, the extent to which the teacher can contribute to reaching the interactive mode is analyzed.

The results show that the usage of whiteboards with groups of two to three people, and round tables in the SCALE-UP room creates favorable conditions for constructive and interactive learning processes. Students worked constructively (C) and interactively (I) at the high ICAP modes for around 80% of the time. There are also indications that whiteboard tasks of at least ten minutes duration increase the likelihood of students reaching the higher ICAP modes.

[1] M.T.H. Chi, 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