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Constructive and problem-based learning using blended learning anchored instruction approaches

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Based on an anchored instruction approach, an enriched blended learning lecture course ("Introduction into GNSS positioning") was established in order to enable constructive and problem-based learning. The lecture course "Introduction into GNSS positioning" is a compulsory part of the Bachelor study course "Geodesy and Geoinformatics" and also a supplementary module of the Bachelor study course "Geophysics". Within the lecture course, basic knowledge and basic principles of Global Navigation Satellite Systems, like GPS, are imparted.

The presented higher education technique "anchored instruction" uses a real and up-to-date and therefore authentic scientific paper dealing with a recent large-scale geodetic project (Fehmarn Belt Fixed Link) in order to introduce the topic of GNSS-based positioning to the students. In the beginning of the semester, the students have to read the paper individually and carefully. This enables them to realize a lot of not-known GNSS-related facts. Therefore, questions can be formulated focusing on new, unclear or not-understood aspects of the paper. The lecture course deals with these questions, in order to answer them throughout the semester. During the lecture course this paper is referred, e.g., in the middle of the semester, the paper has to be read again in order to check which questions have been answered; in addition, new question arise. At the end of the lecture course, the author of the scientific paper gave a concluding lecture.

The framing anchor technique enables the students to anchor their GNSS knowledge. The presented case study uses a teaching resp. learning setting consisting of classroom lectures (given by teachers and learners), practical trainings (e.g., field exercises, students select topics individually), and online lectures (learning management system ILIAS is used as data, result, and asynchronous communication platform).

The implementation and the elements of the anchoring technique, which enables student-centered, cooperative, and individual learning, are going to be discussed in detail. A special focus of the presentation is on work assignments, time schedule, and work load. The anchor technique is applied within a blended learning teaching concept, therefore the role of the learning management system ILIAS will be treated as well.