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Title

Combining a dynamic mathematics software and a computer-aided assessment system to encourage engineering students' mathematical thinking

Abstract

In this talk, we will present an ongoing research and development project performed in a mathematics course for first-year engineering students. A particular motivation for the project is the well-known challenge that many first-year engineering students experience when taking mathematics courses. As part of the course assignment, students are asked to perform two computer-based mandatory small-group activities designed for the combined use of a computer-aided assessment system and a dynamic mathematical software. The activities involve sequences of various types of task, for example, example-generating tasks. To encourage student collaboration and to promote productive interactions among students, the activities contain tasks that require a group agreed response. To ensure active participation in the group work, there are also tasks with individual elements for each member requiring an individual response. At the end of the course, there is an oral group examination based on the activities.

The project focuses on principles for the design of tasks and associated feedback to support the development of mathematical understanding, and has been running for three years. Experiences and analysis of student responses from each year have contributed to revisions of tasks and associated feedback as well as adjustments of the overall structure of the activities. In the talk, we will share experiences of both affordances and constraints and how the constraints have been tackled so far. Based on results from questionnaires, we will also share the students' perceptions of the activities.