

Title

Example-generating tasks in a computer-aided assessment system

Abstract

In this talk, we will report on an early stage of a design-based research project concerning the design of tasks and associated feedback utilizing the affordances provided by the combined use of GeoGebra and a computer-aided assessment (CAA) system. The talk will focus on 'example-generating tasks', in which students are asked to provide examples of functions satisfying specific conditions. Researchers suggest example-generating tasks as a way to engage students actively in their development of deeper mathematical understanding (Watson & Mason, 2005). Since there are no general methods for solving these types of task, students have to be creative and develop solution strategies building on conceptual understanding rather than factual recall. This pedagogical approach has been adopted by researchers in the creation of novel types of task appropriate for CAA systems since it allows for automatic assessment of higher-order mathematical skills (Sangwin, 2003).

We have used patterns of student responses on example-generating tasks to provide some tentative principles on how tasks and associated feedback can be designed to encourage active learning. For example, we found occasions where it might be instructive to start by asking students to provide two examples fulfilling certain conditions, followed by adapted feedback including a request for a third example. As a theoretical lens, the notions of 'dimensions of possible variation' and associated 'ranges of permissible change' have been used.

We will also discuss a specific type of example-generating task, adopted from Sangwin (2003), which consists of a sequence of prompts that progressively add more constraints.

References

- Sangwin, C. (2003). New opportunities for encouraging higher level mathematical learning by creative use of emerging computer aided assessment. *International Journal of Mathematical Education in Science and Technology*, 34(6), 813–829.
- Watson, A., & Mason, J. (2005). *Mathematics as a constructive activity: Learners generating examples*. Routledge.