

A COMPUTERGAME FOR MATHEMATICAL LEVEL RAISING

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Aim of this research project is to use ICT to attain level raising in the learning of mathematics. We define level raising as the transition from a visual or perceptual approach of a problem towards a conceptual approach. The assumption is that students attain level raising by executing the so-called key activities from the process model of Dekker and Elshout-Mohr (Dekker & Elshout-Mohr, 1998): to show, to explain, to justify and to reconstruct one's work. The expectation is that the use of computer simulations and working in pairs on investigations tasks will promote the occurrence of key activities.

A computer game is the starting-point for a couple of investigation tasks on the subject of probability theory in upper secondary education with 16-year-old students. Students are working in pairs on these tasks and the teacher is giving minimal help. The mathematical model underlying this game is the model for binomial chances. The research question of the first experimental study in this project is the question on which moment in the learning process working with investigation tasks is most effective. Executing mathematical investigation tasks can have different functions in the learning process. At first, they can activate prior knowledge and make students curious. Secondly, their function can be to give students the opportunity to apply and to process what they have learned. Thirdly, the investigations tasks can support the process of reinvention of the model for binomial chances. These three functions occur in this research project in three conditions. The question that we want to answer is in which condition the students attain most level raising. Besides, we want to know if there is an difference in the occurrence of key activities.

In January 2001 an experiment was executed in which 68 students were working on the investigation tasks in the three conditions. The data set consists of a pre- and posttest, audiotapes of 9 pairs, log files of all students and written tasks. These data will be analyzed on the occurrence of key activities and indications for level raising.

In the presentation we will make explicit the concept level raising and explain how in the process model of Dekker and Elshout-Mohr the occurrence of key activities involves level raising. We will show how this model is applied and the preliminary results of the experimental study will be presented.

Reference

Dekker, R. & Elshout-Mohr, M. (1998). A process model for interaction and mathematical level raising. *Educational Studies in Mathematics* 35, (3), 303-314.