

HOW ICT AFFORDS THE REINVENTION OF MATHEMATICS: TWO EXAMPLES

Pijls, M. H. J.

Graduate School of Teaching and Learning, University of Amsterdam, The Netherlands

Doorman, M.

Freudenthal Institute, Utrecht University, The Netherlands

In reform mathematics education in general, and in the case of realistic mathematics education (RME) especially, the constructing activity of students plays an important role. In contrast with the traditional view in which teaching mathematics was seen as a process of teaching partial skills according to a pre-designed hierarchy, mathematics teaching in the reform view is seen as guiding students to let them reinvent mathematical knowledge.

The Dutch research program ‘Mathematics and ICT’ is concerned with the question how ICT can be utilized to facilitate the learning of mathematics according to the principles of ‘guided reinvention’. This is elaborated in five projects with an emphasis on developmental research, a cyclical process of thought experiments, developing educational materials and classroom experiments.

In this working session we want to elucidate how ICT is used in experimental educational materials to both support a reinvention process by the students, and to ensure that formal mathematics is firmly rooted in the students' understanding of common sense knowledge. We like to discuss this usage of ICT and we want to discuss how we try to understand how ICT can be utilized for mathematics education.

The materials of two projects concerning upper secondary education, 16-year-old students will be presented. In one project a computer program is used as a tool in the process of modeling movement for the learning of calculus. It is expected that the affordances of the software elicit students to invent the concept of derivative. The other project concerns the learning of probability theory. Here the role of the software is to create an environment for explorations on the visual level that links up with students' experiences.

Participants of the working session get the opportunity to work with the learning materials of both research projects. Subsequently, student's answers will be analyzed on indications for reinvention. Finally, we will debate on the aims of the software, the experiments, the experiences and what we learnt from it.