

Development of Metacognitive and Discursive Activities in Indonesian Maths Teaching

A theory based design and test of a learning environment.

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Abstract

We report on a German-Indonesian design research project, which aims to significantly increase the mathematical skills of secondary school students. Since results of international comparative studies have shown that there exists a relationship between metacognition and learning success, a learning environment for the beginning with secondary school mathematics in class seven has been developed, in order to significantly enhance metacognitive and discursive activities of students and teachers. The effectiveness of the approach has been tested in a secondary school several times.

In this paper the theoretical background for the design of the learning environment is described, some sample exercises are presented and student productions from the project lessons analysed.

Keywords: Metacognition, Microworlds, Mental models, Metaphors, Integers

Abstrak

Dalam artikel ini kami melaporkan proyek penelitian desain Jerman-Indonesia yang bertujuan untuk meningkatkan kemampuan matematika siswa di sekolah menengah secara signifikan. Karena hasil dari studi banding internasional menunjukkan bahwa ada hubungan antara metakognisi dan keberhasilan proses belajar, maka dirancang sebuah lingkungan belajar untuk siswa kelas 7, yang bertujuan untuk meningkatkan kegiatan metakognitif dan diskurs bagi siswa dan guru. Efektivitas pendekatan ini diuji beberapa kali di sekolah menengah.

Dalam artikel ini disajikan latar belakang teoritis yang digunakan untuk pengembangan lingkungan pembelajaran, beberapa contoh tugas yang diberikan kepada siswa dan analisis hasil kerja siswa.

Keywords: Metacognition, Microworlds, Mental models, Metaphors, Integers

Introduction

Researchers from the Universitas Sanata Dharma (Yogyakarta) and the University of Osnabrück, have been closely cooperated since 1982. From the first of October 2009 until the last of December 2010 we jointly conducted the feasibility study