

Application of dynamic mathematics software in initial mathematics teaching (preschool education and primary school)

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ABSTRACT

This paper presents case study data from experimental classes held in previous two years in four different settings. Our survey is based on experiences and observations of children aged 5, 6, 7 and 8 years olds. We have used three learning modes: interactive lectures, screen-based technological tools, and combined modes. In order to present beautiful mathematics to kids, we have created Web-based educational material using MathJAX, GeoGebra, PHP and MySQL.

The importance of modeling and process demonstration in early childhood is described as “guided interaction” [1]. Our courses were held typically in weekly session over the several months in each year, involving approximately 220 children and 4 educators. Children have used dynamic mathematics (interactive software) and virtual pen to solve pattern-matching tasks (i.e. mathematical transformations placed in an experimental environment).

This research highlights initial ways of learning mathematics that can be enhanced through interactive techniques afforded by technology. The key ideas are explained by Taylor [2]. Computer may be used as tutor (i.e. computer assisted instruction in which the computer teaches the child), tool (i.e. computer enhances ability to address tasks) and tutee, (i.e. kids learn by programming/tutoring the computer).

Initial teaching of mathematics has to be experimental [3] i.e. some mathematical properties should be introduced via drawing, shading, coloring, cutting, matching...in GeoGebra [4]. The first mathematical concepts and relations are observational i.e. animal should open mouth on left or right in order to present relation "greater than". So, it is natural for kids to use dynamic mathematic software to understand mathematical structure of everyday life.

Our educational software suite comprises 58 activities for children aged 4 to 8...Those tasks join arithmetic and geometry (constructions with points and segments, object perception, memory, puzzles, clock problem, money...).

Categories and Subject Descriptors

K.3.1. [Computers and education]: Collaborative learning

General Terms

Design, Experimentation

Keywords

Dynamic mathematics software, preschool education, initial mathematics teaching in primary school

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