

ZMATH 2013d.00408

Zachariades, Theodossios; Christou, Constantinos; Pitta-Pantazi, Demetra
Reflective, systemic and analytic thinking in real numbers.

Educ. Stud. Math. 82, No. 1, 5-22 (2013).

Summary: The aim of this paper is to propose a theoretical model to analyze prospective teachers' reasoning and knowledge of real numbers, and to provide an empirical verification of it. The model is based on Sierpiska's theory of theoretical thinking. Data were collected from 59 prospective teachers through a written test and interviews. The data indicated that mathematical tasks on real numbers, based on Sierpiska's theory, could be categorized according to whether they require reflective, systemic or analytic thinking. Analysis of the data identified three different groups of prospective teachers reflecting different types of theoretical thinking about real numbers. The interviews confirmed the empirical data from the written test, and provided a better insight into the thinking and characteristic features of the prospective teachers in each group. The analysis also indicated that the participants were more successful in tasks requiring systemic and analytic thinking, and only when this was achieved were they able to solve problems which required reflective thinking. Implications for teaching related to the findings of the study are discussed.

Classification: F50 C30

Keywords: real numbers; theoretical thinking; reflective thinking; systemic thinking; analytic thinking
doi:10.1007/s10649-012-9413-y