

## Editorial

This monothematic issue focuses on mathematics and its teaching both from the point of view of pupils and (student) teachers. The title *Changing Teaching Mathematics in the Changing Society* reflects our belief that teaching mathematics must reflect the changes which occur in the society. The scope of mathematics education research is very wide. Rather than focusing on one particular issue we decided to provide the readers with glimpses at different corners of mathematics teaching research. Thus, the issue contains four theoretical papers focusing on theoretical framework underpinning research, on the goals of teaching mathematics and on the possible means to reach these goals. Next, four empirical papers are included, which focus on pupils, teachers and student teachers.

The issue is opened by two studies complementing to a certain extent each other. In the opening paper *Societal Mediation of Mathematical Cognition and Learning* Wolff-Michael Roth provides an outline of cultural-historical activity theory which could be used as an inclusive theoretical framework allowing us to understand the totality of levels that characterizes the participation in mathematical practices or in practices that use mathematics as a means of production.

On the other hand, Miroslav Rendl and Stanislav Štech in their paper *Should Learning (Mathematics) at School Aim at Knowledge or at Competences?* look critically at so called situated learning and the use of real life problems as THE answer to ineffective teaching. They also call into question the existence of transfer of knowledge gained in school mathematics into everyday life.

The overarching goal of research in mathematics education is the improvement of the teaching of mathematics so that it leads to good knowledge of mathematics by the majority of pupils and to their ability to use mathematics not only in their academic careers but also in their everyday life. Throughout the years, the objects of study were individuals and their learning, groups of pupils in their classrooms and also (student) teachers. Milan Hejný's paper *Cognitive Goals of the Teaching of Mathematics and Scheme-oriented Education* is based on views presented by H. Freudenthal, E. Fischbein and many others which postulate that the main way to improve the teaching of mathematics is the change of a teacher's educational style towards the development of pupils' creativity and intellectual autonomy. In M. Hejný's interpretation, it means towards scheme-oriented education based on the theory of generic models. Both concepts are explained in the paper and serve as

- 6 a theoretical background for the development of a diagnostic tool which can be used for the characterisation of a mathematics teacher's educational style described and illustrated by Darina Jirotková in her paper called *Tool for Diagnosing the Teacher's Educational Style in Mathematics*.

In their joint paper *Contribution of Geometry to the Goals of Education in Mathematics* Milan Hejný and Darina Jirotková show how through visualisation, geometry can mediate understanding of some demanding arithmetic and algebraic concepts, relationships, processes and situations for pupils. This thesis is explained by the method of genetic parallel and of a didactic analysis of two educationally interesting problem situations. Theoretical considerations are illustrated by several real experiences.

Next, our attention will shift towards student teachers and their professional knowledge. Nad'a Vondrová and Jana Žalská explore the question *Do Student Teachers Attend to Mathematics Specific Phenomena when Observing Mathematics Teaching on Video?* The empirical study of thirty student teachers brings insight not only in the participants' ability to notice but also in categories of content-related observable aspects of teaching. The results have implications for both teacher development design and effective teaching practice.

The following two papers focus on pupils. Andrea Gellert and Heinz Steinbring in their empirical research *Dispute in Mathematical Classroom Discourse – “No go” or Chance for Fundamental Learning?* look into the discourse based on disputed points which turned out to be a promising way of supporting mathematics oriented discussions, a deeper understanding of ambiguous learning situations and the chances for fundamental learning. Illustrations are given.

The concluding paper *Mathematical Perception of Pupils and Teachers* considers mathematics from the point of view of pupils and their teachers. The authors, Isabella Pavelková and Vladimír Hrabal, show the possibilities of increasing the teacher's professional competencies using focused self-reflection on the basis of confrontation of his or her own ideas, expectations and observations with data obtained mostly from the statements of pupils. The paper is quantitative in nature.

The issue is complemented by two contributions which present what is 'going on' in the field of mathematics education. Jarmila Novotná and Alena Hošpesová describe the project *The Learner's Perspective Study* and the resulting books published by Sense Publishers. They aim at international comparative research in mathematics education, namely at documenting, comparing and contrasting teaching practices in several countries. Finally, Jarmila Novotná describes international *Symposium on Elementary Maths Teaching (SEMT)* which is a biannual conference for researchers and teachers interested in elementary mathematics teaching organised since 1991 in the Czech Republic.

I hope that this special issue will bring some insight and inspiration not only to people in mathematics education but also to readers from other scientific fields interested in teaching and learning.