

Preface

This book presents a selection of the papers presented at the 22nd international conference on affect in mathematics education, MAVI 22 (Mathematical Views). The conference was held at Linnaeus University, Växjö, Sweden, in September 2016.

The teaching and learning of mathematics is highly dependent on students' and teachers' values, attitudes, feelings, beliefs and motivations towards mathematics and mathematics education. The annual MAVI conference is an important venue for researchers interested in these affective issues, and at the conference in 2016, they were discussed by scholars from Sweden, Denmark, Finland, Germany, Canada, Switzerland and Israel.

The first MAVI conference was initiated by Erkki Pekkonen, University of Helsinki, and Günter Törner, University of Duisburg-Essen, and held in Germany in 1995. Ever since, it has been an important feature of the conference to provide opportunity for the participants to discuss their research for a fairly long period of time with colleagues in the field, as the same group of researchers work together for 2 or 3 days. This contributes significantly to take the field of affect in mathematics education forward and is an opportunity for researchers to make new national and international contacts.

While affect in mathematics education is a common interest for all participants in MAVI, the papers presented adopt a variety of theoretical perspectives, use a range of different methodologies and deal with different levels of education and mathematical contents. This variation is also represented by the papers selected for this volume. Between them, the papers discuss affect in mathematics in primary and secondary school as well as in programmes for teacher education and professional development; they deal with assessment issues, entrepreneurial competences and reasoning and proof; and they use frameworks that are relatively mainstream in the belief literature and others that adopt a more social stance. The selected papers have been peer reviewed and revised on the basis of the reviews and the feedback received during the conference.

The first three papers in this volume present studies of teachers in different kinds of professional development programmes. Liljedahl compares teachers' beliefs of proxies for learning (e.g. pretend to do a task) to their beliefs of what it means to

teach and learn mathematics. The results indicate that teachers' views of mathematics (problem-solving view or toolbox view) influence if they see proxies for learning as their responsibility or as the responsibility of the students.

Palmér, Johansson and Karlsson report on changes in the teachers' role when entrepreneurial and mathematical competences are to be combined in teaching. These changes are explored in relation to how they seem to influence teachers' teaching of mathematics as well as students' possibilities to learn mathematics. The results show that increased emphasis on the entrepreneurial part of the combination may contribute to a more reform-oriented approach to teaching.

In the third paper, Rouleau and Liljedahl present a study where they deliberately introduce a tension in pre-service teachers' conception of timed drills and examine changes in their subsequent approach to teaching. Their findings suggest that the introduced tension provided the means for reflection on intent and resulted in a subsequent change in action.

In the next paper, Oksanen, Lahdenperä and Rämö present a study of Finnish university teaching assistants' professional identities. In the study, they use a questionnaire to categorise the metaphors with which the TAs describe themselves as professionals and find that most of the research participants use what the authors refer to as metaphors for being a *didactical expert*.

The succeeding papers focus on students in teacher education. Kihlblom Landtblom analyses Swedish prospective middle school teachers' conceptions of the mean, mode, and median. Based on a survey that asks how the teachers would explain these concepts to students, she finds that they generally rely on formal definitions and descriptions of procedures.

Larsen, Østergaard and Skott present a study of prospective teachers' understandings of and approaches to reasoning and proof (R&P). In a qualitative questionnaire, the research participants claim to find R&P important, but the results also suggest that they face considerable problems with these mathematical processes, almost irrespectively of their affective commitment to them.

Tsamir, Tirosh, Levenson and Barkai investigate secondary school prospective mathematics teachers' views of cases as a tool in teacher education. In general, the participants felt that the use of cases had an impact on their understanding of common mathematical errors and that cases based on mistakes they had themselves made during homework assignments were the most meaningful.

The next two papers mainly focus on the methods used to measure students' and prospective teachers' mathematics-related beliefs and self-efficacy. Sayers and Andrews report on the development and trial of an online survey instrument focused on uncovering prospective teachers' mathematics-related beliefs. The instrument was found to be reliable, and an exploratory factor analysis yielded seven interpretable belief dimensions. The interactions of these dimensions allude to groups of students likely to prove problematic during their programme.

Girnat takes his point of departure in the self-efficacy scale from PISA 2012. The scale was later used with Swiss 15-year-olds, and Girnat builds on the Swiss results to argue that (1) the scale is not unidimensional and (2) a more fine-grained analysis is needed that allows for different self-assessment in different mathematical subdomains.

Finally, four papers adopt different perspectives on students. In her paper, Roos discusses the experiences with assessment of Swedish lower secondary students, who are in need of some form of special assistance in mathematics, either because they perform much below or much above what is expected. In a small-scale qualitative study, she finds that current assessment practices significantly impact the students' experiences with school mathematics but that it does not support their mathematical learning.

Andrews and Nosrati compare the beliefs held by students in the Norwegian and Swedish secondary schools about a form of whole-class presentation performed by their teachers. One significant difference seems to be related to whether the students are in vocational or academic tracks.

In a second paper on Swedish and Norwegian secondary students, Nosrati and Andrews present the research participants' view(s) of a *typical mathematics lesson*. Based on a large interview study, they argue that there is much uniformity in how class time is spent and that in spite of curricular intentions to the contrary time use is highly structured.

Finally, Sumpter presents a study on secondary school students' mathematical reasoning when solving tasks about fractions. The results suggest that a focus on reasoning provides additional information about students' knowledge about fractions beyond standard error analysis.

We believe that the diversity of fields of interest and the multiplicity of theoretical and methodological approaches in these selected papers illustrate the innovative and inclusive spirit of the MAVI conference. Also, they reflect the constant development of research and knowledge within the community.

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Students' and Teachers' Values, Attitudes, Feelings
and Beliefs in Mathematics Classrooms

Selected Papers from the 22nd MAVI Conference

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2018, XIV, 148 p. 9 illus., 3 illus. in color., Hardcover

ISBN: 978-3-319-70243-8