

Editorial

The NOMAD workshop for doctoral students has become a fine tradition. In the beginning of May the eight consecutive workshop took place in Gothenburg. Four doctoral students from Denmark and Sweden participated. As before, the students submit a complete article a couple of weeks ahead of the workshop. To prepare for the seminars each student conducts a review of one of the papers. All papers are discussed in small groups. The aim of the NOMAD workshops is to contribute to the students' education with regard to writing and reviewing papers, as well as providing an insight into the editorial process of a scientific journal.

The workshop is combined with an annual meeting of the editors. Among other things, changes in the editorial group are discussed. NOMAD follows the practice of replacing editors one at a time after some years of service, in order to maintain continuity in the editorial work. This time we would like to thank Ewa Bergqvist, who has been an editor since 2016, for all her good work. Ewa will continue to contribute to NOMAD as member of the editorial committee. Ewa is replaced by Yvonne Liljekvist, Karlstad university. We welcome Yvonne to the group of editors.

Thematic issues

This years thematic issue, *Teaching and learning of algebra*, is progressing well and we are looking forward to this double issue in the autumn. The thematic issues to come will be *Students in need of support in mathematics*, 2020, and *Practice-based research on mathematics teaching* in 2021. The deadline for submitting abstracts for the latter was June 15, 2019, and a substantial number of interesting proposals have reached the guest editors. For more information, see: http://ncm.gu.se/media/nomad/190211_TI_2021_call.pdf

In this issue

This issue contains four articles. In the first article, *Investigating the fit of a model for students' understanding of fractions in a Norwegian context*, Trond Stølen Gustavsen and Olav Gravir Imenes propose to use a model linking part-whole to the subconstructs ratio, operator, quotient and measure in order to capture the complexity of students' understanding of fractions.

They ask if this model is compatible with students' achievements in a Norwegian context. Responses from 638 students were analysed using structural equation modelling, and a good fit of the model was obtained after removing the ratio subconstruct. In particular, part-whole is seen to be important for operator, quotient and measure. Using qualitative analysis of interviews, Gustavsen and Imenes found reasoning associated with ratio; with a weak link to the part-whole subconstruct.

In the second article, *Authority in students' peer collaboration in statistics: an empirical study based on inferentialism*, Abdel Seidouvy, Ola Heleinius and Maike Schindler study the mechanisms of collaboration in the statistics classroom. Activities that involve students' peer collaboration are widely used to enhance learning and meaning making in mathematics classrooms. To better understand how meaning is constituted in collaborative activities, the authors focus on the role played by the concept of authority, and examine what types of authority can be identified in students' peer collaboration in a data generating activity. The empirical data consist of video recorded sessions where two groups of fifth grade students collaborate. In the analysis a framework, based on the philosophical theory of inferentialism, is used. Several types of authority are identified and described, of which some are scarcely addressed in previous research.

Svanhild Breive's article entitled *Engaging children in mathematical discourse: a kindergarten teacher's multimodal participation* reports from a case study which investigates a kindergarten teacher's multimodal participation in a teaching-learning activity involving addition and counting. By multimodal participation, the kindergarten teacher engages nine children in mathematical discourse and supports their opportunities for learning. Implications for practice are that kindergarten teachers can benefit from being consciously aware of the affects their bodily actions have on children's mathematical reasoning and how they can engage children in mathematical discourse without having to 'teach' children mathematical concepts and relations.

The fourth article *University students' general and specific beliefs about infinity, division by zero and denseness of the number line* by Kristina Juter reports on a study of university students' beliefs about infinity and related concepts. In addition to examining students' beliefs, there is an aim to compare two categories of students with different mathematical preparation at secondary education. A questionnaire with 14 items on the topics of "infinity/cardinality", "division by zero" and "the denseness of the number line" was used. The students' responses are analysed with respect to various aspects, such as mathematical

background (secondary education), local and global perspectives on infinity and beliefs from general and specific contexts. The results show incoherence with respect to general and specific representations of aspects concerning denseness of the number line, and that mathematical background is significant when it comes to validity of beliefs about division by zero.

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