

# Strengthening NOMAD as a means of research communication in the Nordic region

One of the aims of NOMAD is to contribute to the consolidation of a community of research in mathematics education in the Nordic region. As editors of the journal we have not only been engaged in establishing the publication in terms of its regularity, its contents and quality, and its visibility among researchers, students and practitioners in mathematics education. We have also tried to come closer to many of those people who can contribute with submitting papers for publication in the journal. In this editorial we have decided to highlight some important points that emerged from a special workshop session run at Norma08. We hope that some of these comments can be of help for those readers who would like to send a contribution to the journal. We also present the contents of this issue with some of the reflections that the papers have inspired in us.

## NOMAD in Norma08

The Nordic conference on mathematics education research (Norma) was held in Copenhagen, from the 21st to the 25th of April 2008. This conference was a meeting space for discussion about current research in mathematics education in the region, but also for connection with other research groups in countries such as France, Hong Kong, the Netherlands and Spain. The conference was organised around four key topics, each one of which was explored by a plenary talk and by a series of papers, short presentations and discussion groups:

- Didactical design in mathematics education: This includes all types of 'controlled intervention' research into the processes of planning, delivering and evaluating concrete mathematics education. It also includes the problem of reproducibility of results from such interventions.
- Education and identity of mathematics teachers: This includes research into teacher education programmes, teacher educators'

practices, and the relation between teacher education and the formation of teachers' professional identity and competence as mathematics teachers.

- Technology in mathematics education: This includes studies of the rationales, modes and effects of technology use in mathematics teaching and learning at all levels.
- Mathematics for all: why?, what? and when?: This includes studies of mathematical literacy, rationales for 'general' mathematics education, and the challenges of socio-cultural diversity in mathematics education.

A full version of the programme and most contributions are posted in the conference website and will also be available soon in printed proceedings. For further details about this event we suggest consulting the homepage: <http://www.dpu.dk/site.aspx?p=10797>.

One special activity at Norma08 was a workshop entitled *Publishing in Nordic Studies in Mathematics Education (NOMAD)*. We proposed this workshop as an activity that could inform Norma08 participants about the journal, its aims and purposes, and about the review and publication process. We considered that many of the contributions to Norma could be a very good basis for the elaboration of a journal paper presenting research results of current projects being carried out in the region.

The workshop had a good attendance. Around twenty-five participants – mostly novice researchers engaged in doctoral studies or researchers that have defended their doctoral thesis recently, but also some more experienced researchers – were present in the session. At the workshop we discussed a few important points that we also would like to address here, since we consider them to be useful for the NOMAD audience and, in particular, for potential authors.

### *What types of papers are appropriate for NOMAD?*

NOMAD publishes research papers. Many people interpret this statement focusing on the report of empirical studies. However, we do not limit our understanding of 'research' to empirical studies. For NOMAD the term also encompasses theoretical research where notions are developed, literature review papers where an overview of an topic of relevance for Nordic research is explored through a critically organised discussion of existing research results in a particular area, methodological papers exploring issues of the research process, and research-based essays discussing critical issues in a particular topic. Independently of the type of research,

texts will have to follow standard criteria of quality for communicating academic work.

### *Does a paper need to be original?*

In many journals there is a demand that submitted papers have not been published in any form before, and that the material presented, therefore, needs to be original. In NOMAD, we interpret this demand on originality in the following terms: the paper submitted should not be published previously in its present or similar form. However, we think that it is consistent with one of the purposes of the journal – namely, contributing to strengthening research in mathematics education in the region – to accept that the papers are substantial elaborations of previous conference papers, and that previous background material is acknowledged.

A slightly different aspect of the discussion about originality is whether the paper presents new findings or insights to the regional and/or international field of mathematics education. In this respect we are modest and demand authors to relate their paper to existing research, emphasise what they consider to be new, and declare how they think their research contributes to existing knowledge in the region.

### *In what language do papers need to be written?*

Although NOMAD's policy had been to publish papers in Danish, Norwegian, Swedish and English, the dominant practice in the recent years has been the preference of English as a language of publication. In fact, few papers have been published in one of the three Nordic languages. We encourage authors to submit papers in the language that they feel most comfortable with, to express efficiently their ideas.

We can see that this activity in fact had an impact: We have already received two submissions based on Norma08 papers. In general, the situation concerning the number of submissions for publication has improved and we look forwards to keep on receiving new interesting papers.

### **About this number**

In this issue we present two papers that are addressing research questions related to the reform of mathematics teaching and the assessment of oral mathematics communication at the upper secondary level.

Uffe Jankvist's paper *Matematikopfattelser hos 2g'ere: fokus på de 'tre aspekter'* is addressing problems with implementing curriculum reforms

in the Danish gymnasium (a three year programme aiming at preparing the students for further theoretical studies). The Danish high school has, since the late eighties, strived to broaden the view on and the beliefs about mathematics communicated through the mathematics teaching. These changes have been included in the curriculum through the formulation of three essential aspects of mathematics that should be communicated and discussed with the students as an integrated part of the teaching of mathematics. The three aspects are the historical evolution of mathematics, the application of mathematics in society, and the inner structures and nature of mathematics as a scientific discipline. In the paper Uffe Jankvist relates the three aspects and their role and placement in the curriculum, to the Danish Competence Project and in the newly launched mathematics programme from 2007. The paper also reports results from a qualitative investigation of the students' compliance with the intentions of the three aspects in a particular 2.g class. These results are compared with results from a similar investigation from 1980, before the first reform introducing the three aspects. The author concludes that the students' beliefs about mathematics in the relation to the three aspects are very similar in the two samples and that the implementation of the three aspects in the matter taught and learned still have a long way to go. The paper ends with a discussion of the possible reasons for the difficulties with the realisation of the curriculum intentions connected to the three aspects. The treatment of the three aspects in the mathematics textbooks, the teachers' educational background and beliefs about the importance of the three aspects, and the role of the aspects in the final written and oral examinations are pinpointed as crucial for the advancement of the implementation process.

The current regulations from 2007 for mathematics in the Danish gymnasium allow a form of oral examinations where the individual student is examined for 25 minutes with point of departure in a report written by the student on a project or a theme that he or she has made as an integrated part of his or her mathematics classes. In our opinion, this form of assessment provides a unique opportunity for assessing more advanced competencies and reflections such as those connected to the three aspects investigated by Uffe Jankvist. One of the recent changes in examinations allowed teachers the possibility to choose between this new particular form of examination and an oral examination with randomly chosen questions referring to well defined elements of the mathematical curriculum, which has been a dominant practice in Denmark. So far, less than two percent of the oral examinations have had the new form. Many teachers argue that this form of examination is too demanding for many students, and that it requires quite dramatic changes in

the normal teaching to prepare the students for such an examination. A recent evaluation of the mathematics B level curriculum in the 2007 reform has analysed the situation and recommended that there should only be one form of oral examination including both questions of the traditional form and questions that relates to projects covering the three aspects (Danmarks Evalueringsinstitut, 2008, p. 35). This story illustrates very clearly the crucial importance of assessment in the implementation of reforms in mathematics.

This connects to the theme of the second paper in this issue, *Interrater reliability in a national assessment of oral mathematical communication* where Torulf Palm reports on an investigation of the reliability of the assessment of oral mathematical communication in a Swedish national test for the upper secondary level. Attempts to assess oral communication in mathematics are often met with scepticism concerning their reliability. Therefore, oral communication competence is often not assessed formally in mathematics programmes. A first concern assessing oral mathematical communication is the extent to which it is possible for different assessors (raters) to agree on the assessment of an oral mathematical performance – this is called the interrater reliability. Palm's investigation shows that the assessment of oral mathematical communication in term of the two constructs "Line of thought" and "Mathematical terminology" in the Swedish national test is suffering from very low interrater reliability, even though the grading system only operates with four grade levels. This very distinctive result is argued by the author to have more to do deficits of the assessment model employed than with the communication of mathematics in itself. The main deficits seem to be related to the ambiguity of the two constructs assessed and the practical organisation of the assessment. The duration of the students oral performance assessed (only 5 minutes), and the limited resources for educating the teachers for the intended assessment are pinpointed as two important organisational constraints.

Together the two papers indicate a need for developing and researching the reliability and validity of oral assessment of high level mathematical competencies such as mathematical modelling and communication, as well as of higher order reflections connected to the three aspects included in the curriculum for the Danish gymnasium.

The third paper in this issue addresses teacher students' informal and formal reasoning. The paper is based on a comprehensive empirical material consisting of the test results of 146 Finnish subject-teacher students reacting to informal and formal arguments concerning the derivative concept. The results indicate that the students' formal and informal reasoning are dependent, and that the students' ability to argue informally

about the derivative does not follow automatically from being able to argue formally with this concept. The amount of mathematics training is shown to have a stronger effect on the teacher students' formal reasoning than on their informal reasoning. Since, for coming teachers it is very important to be able to support and challenge the students' formal reasoning as well as their informal reasoning, these findings emphasise the need for addressing students' informal reasoning explicitly in teacher education and maybe especially to include the nature of and the relation between these two forms of reasoning in the education of coming mathematics teachers.

The editors

### *References*

Danmarks Evalueringsinstitut (2008). *Matematik B på hhx og stx. Fagevalueringer 2007*. København: Danmarks Evalueringsinstitut.