

Activities for 2009 in the Nordic Graduate School in Mathematics Education

Seminar for supervisors

The 11th seminar for supervisors will take place in April 23–24 in Kristiansand in Norway, at University of Agder, the home institution of NoGSME. The theme of the seminar will be *Critical review of research methodologies in mathematics education*. The aim of this seminar, as for the 10 previous, is to offer competence development to current and prospective supervisors of doctoral students in mathematics education in the Nordic and Baltic countries. Many different themes have been on the agenda of the seminars before but it is the first time methodologies in mathematics education will be discussed. Experts in the area will contribute to the seminar.

Mobility stipends and travel support for students

As previously, students can apply to NoGSME for a mobility stipend to stay at another Nordic or Baltic university or for support for travel costs to doctoral courses at other universities. The budget for such costs is smaller in 2009 than before and several applications have already been accepted and support promised. Thus this opportunity may very soon come to an end as the funding from NordForsk will not be renewed for 2009. There will probably not be any chance to support applications after the spring semester.

Summer school for doctoral students in 2009

The NoGSME board is planning a summerschool for doctoral students to take place September 21–26, 2009 at Sømínestationen in Holbæk, Denmark. This summer school will be offered by Roskilde University in cooperation with NoGSME in the form of a doctoral course but with the same structure as earlier summer schools. The evaluation from the winter school in Sigtuna shows that the participants want NoGSME to keep the same format for the summer school as before. International scholars will be invited to function as group leaders during the summer school.

Preparations for a summer school in 2010

As the funding from NordForsk to NoGSME will end in 2009 the new organisation NoRME, *Nordic Society for Research in Mathematics Education*, has initiated work to prepare the NoGSME summer school in 2010. This means that mathematics educators at three different Nordic Universities will collaborate in preparing an application to NordForsk for a summer school. The didacticians at University of Agder will take the lead in this application and seek support from colleagues in Finland and Denmark.

New dissertations in the Nordic countries

Ingvald Erfjord defended his thesis at University of Agder in Norway on November 29, 2008. The title is *Teachers' implementation and orchestration of Cabri-use in mathematics teaching*. Ingvald Erfjord reports from a study of three teachers' first ever use of a particular software tool in teaching at two lower secondary schools in Norway and gives a characterisation of teachers' progression through a development process in which they implemented and orchestrated Cabri-use in their teaching. The study was situated within two developmental projects run by didacticians (including the author) at the University of Agder and the teachers in the study participated in these projects. Data were collected in sessions within this frame in many different ways. Teachers' motives and goals for implementation of Cabri were analysed by utilising activity theory. During the implementation process, the teachers worked in teams with other teachers and didacticians and raised many issues. Two teachers at one of the schools had a focus on institutional school related issues while the teacher at the other school had a focus on personal issues, indicating a difference between the schools. From an activity theory perspective, the kinds of issues and teachers' ways of coping with them are seen to illuminate teachers' motives and indicate their goals for implementation of Cabri. Although issues raised in the study were particular to these teachers, the issues are argued to be relevant to teachers and educators more widely. Analysis of teachers' orchestration of students' work with Cabri is also guided by the instrumental approach. The term *instrumental orchestration* accounts for the role of the teacher when software tools are used in mathematics teaching. Teachers' emphases and ways of accomplishing their Cabri-teaching as well as how they arranged these lessons are considered as being part of teachers' orchestration of Cabri-use. Two kinds of orchestration are illuminated and their consequences for students' work and achievements with Cabri are discussed.

The thesis suggests implications for mathematics teachers considering implementation and orchestration of software tool-use in teaching, indicating that the established and evolving collaboration among mathematics teachers in schools influences to a great extent teachers' implementation of new tools and the sustainability of development in teaching. Conclusions are presented indicating that implementation of a new computer software tool can offer teachers a medium to develop new styles of mathematics teaching. Implications are also suggested concerning future developmental projects aiming to support teachers' development in mathematics teaching.

On December 15 Sverker Lundin defended his thesis in educational sociology at Uppsala University in Sweden. The title is *The mathematics of schooling. A critical analysis of the prehistory, birth and development of Swedish mathematics education*. He claims that common beliefs about mathematics come from the practices of elementary mathematics instruction rather than science. In school pupils come to believe that mathematics has a set of properties in itself. For example, pupils believe that mathematics is useful in everyday life, even if it is not necessarily the case. He labels this object of belief *the mathematics of schooling* (skolans matematik), while the system of practices by which the belief is created is called *mathematics education* (skolmatematik). He uses terminology inspired by psychoanalytic theory to describe the specific properties of the mathematics of schooling and suggests that it can be understood as an object of an ideology spread by the system of education. He gives an overview of the history of mathematics education in Sweden, based on curricula, textbooks, discussions in teacher magazines, and other published material mainly from the eighteenth to the twentieth century. The story intertwines social factors determining the practices of mathematics education, the changing ideas about mathematics, and the interplay between external social factors and internal ideological meaning. His conclusion is that while elementary arithmetic is part of common knowledge, the mathematics of schooling is something different. Sverker Lundin claims that this object is thoroughly ideological and plays a central part in society mainly by making the social effects of mathematics education – keeping children away from production while sorting them – to appear as something else, namely as most often failed attempts to give children a necessary knowledge of mathematics.

Both of these theses are extensive monographs, the first one in English and the second one in Swedish with more the 300 and 400 pages, respectively. There is a clear tendency that theses in the form of monographs take up many more pages than the theses that are in the form of a selection of published papers. We can compare for example by the one

presented in NOMAD no 3, 2008, by Viholainen, containing 6 papers and 137 pages. Quality of scientific work can of course not be measured by the size of the theses. However, keeping in mind that the education to become a doctor of philosophy in mathematics education in Norway and Finland is a three year full time programme (mandated in all those countries that have signed the Bologna agreement), it is relevant to discuss what is reasonable and relevant for the size of such theses. Are some supervisors demanding too much of the doctoral students and are some of the doctoral candidates too ambitious? We certainly know and we are concerned that it is common that students do not finish their dissertation within the financed time for their doctoral studies.

The two theses presented here are different in the fact that one is produced within a programme for educational sociology (Lundin) and the other in a programme for mathematics education (Erfjord). The two theses not only have very different aims and foci, approaches, theoretical frameworks and kinds of empirical data used. They also present very diverging images of mathematics in school. Erfjord's thesis is situated inside a developmental research project, where the aim is collaboration between teachers and researchers to create opportunities for development of mathematics teaching. It represents a kind of optimistic view on mathematics in school with a hope that it can be improved. Lundin's thesis deals with old school mathematics documents, providing arguments to claim that mathematics in school has been used to keep the students away from production in society and to sort them and invite them to fail in their learning. In Lundin's thesis the image of school mathematics is presented as something very negative with highly despicable aims. This huge difference in perspectives between the theses points to the scope and complexity of mathematics education, and raises general issues on how to interpret, relate, and evaluate research in the field. These are difficult but important tasks challenging our scientific community.

A book about some of the recent doctoral studies in Sweden

The Swedish Graduate School in Mathematics with direction of subject didactics that existed between 2000 and 2006 has produced a book with contributions from nine of the doctors in that school (Brandell, Grevholm, Wallby & Wallin, 2009). This graduate school was financed by the Bank of Sweden Tercentenary Foundation and the Swedish Research Council over 5 years but has not yet received any continuation of the funding (Leder, Brandell & Grevholm, 2004). The school had in all 24 participating doctoral students and so far 12 of them have been awarded a doctoral degree and another 4 have finished with a licentiate degree. A

report of the outcome from the graduate school will soon be available. In the book, which has the title *Matematikdidaktiska frågor – resultat från en forskarskola* (Issues in the didactics of mathematics – results from a graduate school), each of the nine new doctors writes a chapter about her/his study. The book is published by SMDF, The Swedish Society for Research in Mathematics Education in cooperation with NCM, the National Center for Mathematics Education. The research areas that are dealt with in the chapters are diverse and presented in a way that should be inviting for student teachers, as well as teachers and teacher educators. The theses of the nine authors have been presented in earlier issues of NOMAD.

The studies reported in this book mainly concern teaching and learning mathematics at university level. That is the case for the studies about the function concept, the limit concept, about proofs and proving, about reading ability and the interplay between different aspects of conceptions. Some of these studies also touch upon learning at upper secondary school level. That is the case for the study about proof and proving and the study on reading ability. One study about assessment in mathematics concerns upper secondary school level. Two of the studies investigate teachers and pupils, respectively, in compulsory school. Those studies deal with the concept of probability and the use of mathematics textbooks, respectively. One study is historical and investigates geometry teaching in a form of schooling that no longer exists, the *realskola*. Thus the studies deal with teaching and learning mathematics for older pupils and students than has normally been the case in earlier research in Sweden.

Both the number of recent papers in NOMAD by new doctors in mathematics education and a book such as the one presented above show that the area of research in mathematics education in the Nordic countries is in good shape and very much alive. There is hope for a continuation of this situation.

Barbro Grevholm
Director of NoGSME
University of Agder, Norway

References

- Brandell, G., Grevholm, B., Wallby, K. & Wallin, H (red). (2009). *Matematikdidaktiska frågor – resultat från en forskarskola*. NCM, Göteborgs universitet.
- Leder, G. C., Brandell, G. & Grevholm, B. (2004). The Swedish graduate school in mathematics education: conception, birth and development of a new doctoral programme. *Nordic Studies in Mathematics Education*, 9(2), 165–182.

