The Nordic graduate school in mathematics education

Programme for 2008

The board of NoGSME had a meeting in October and made plans for the activities in 2008. NoGSME will offer a course on *Methodology in mathematics education* given at the University of Agder in Norway (15 ECTS). The course *Problemsolving* will also be offered (10 ETCS) there and run parallel to the other course in the same course weeks. If you are interested please contact Elna.Svege@uia.no and let us know about it. The courseweeks will be weeks 3, 7, 10, and 15/16. We will also offer a shorter course for doctoral students in Helsinki, 11–13 April on conceptions of mathematics organised by Erkki Pehkonen and with Fulvia Furinghetti as one of the course teachers. More information will be sent out by email.

The ninth seminar for supervisors will be in Tallin and Helsinki on April 10–11 (partly overlapping with the short course in Helsinki). In addition there will be a workshop for doctoral students and supervisors during the Norma08-conference, 22–25 April in Copenhagen. A seminar especially for the Baltic supervisors will be organised in connection to the Baltic conference, around May 16 in Vilnius, Lithuania.

An international seminar for supervisors together with our international contacts will take place in October, 8–11 outside Copenhagen with the theme: *Internationalism versus localism as a challenge in our field*.

As there are so many different activities going on during summer 2008, for example the ICME11-conference, we have decided to transform the traditional summer school into a winter school for doctoral students in week 48 or week 49. It is planned to take place in Sigtuna near Arlanda airport in Sweden. Please follow further information about the programme in our email letters and on the web at www.NoGSME.no

Report from the evaluation of NoGSME by NordForsk

The halfway evaluation of NoGSME done by the funders NordForsk has been reported back to us recently. The evaluation of NoGSME is very positive and we have been promised to get the funding for the final year 2008 according to our application, one million NOK. Here are some quotations of what the expert panel writes:

When comparing scientific quality and relevance in relation to programme guidelines and NoGSME's initial plan for objectives and strategy with the actual report, presented after a few years of cooperative work, the impression is overwhelming: It shows the success of strong, innovative, intensive and effective collaborative endeavour in creating a well functioning Nordic research community in mathematics education able to successfully implement various initiatives and working plans for capacity building in mathematics education research.

In another section the evaluation talks about what NoGSME has achieved in internationalisation:

International orientation

The International orientation is very strong and of high quality: When reading the names of international lecturers and seminar leaders, they make up a list of the most famous who's who on the world scene of mathematics education research and guidance around the world: From Paul Cobb (USA) – the recent winner of the Freudenthal-Award and leading cognitive scientist and mathematics educator starting social constructivism, to Hyman Bass (USA) and Michele Artigue (F), the former and the actual president of ICMI and both active mathematicians and mathematics educators, to philosophers and historians like Paul Ernest (UK), and Frank Lester (USA), teacher education and classroom researchers like Kathleen Hart, Simon Goodchild, Barbara Jaworski (all UK) to well known social cognitivists and epistemologists and critical researchers like Anna Sfard, Abraham Arcavi and Uri Leron (IS), Etienne Wenger (USA) and Marcello Borba (BR) and others. The support of such a fine selection of the international community is of very high quality. All of them named here as lecturer, seminar or workshop leaders or just consultant and reviewer are from the group of the world's best researchers in mathematics education, and were mostly paired with much appreciated colleagues from Nordic countries, a very good and often complementary mix in collaboration and view, all very well known and highly appreciated, leading people in ICME or PME and in their own home country.

The evaluating panel is also expressing some concern about the future of NoGSME after the funding period and here we all have a challenge to work with in coming years:

Plans for continuing the co-operation/activities after the end of the funding period

It was emphasized and clearly outlined that there is still a need for training researchers in the field of mathematics education research, and the success of the project in its obvious impact on research training within is taken as an argument to continue the successful collaborative work in the Nordic community at least. Concrete plans for continuing the co-operation/activities after the end of the funding period were not quite clear despite of the desire to be able to continue that which has been so successfully started. Some concrete measures mentioned were the idea to create a Nordic society to continue the work of the Board of NoGSME and to host the NOMAD journal and the regular Norma conferences. A planning group has been elected to investigate national societies, and will propose a Nordic umbrella organisation. A willingness to secure the openness of all activities to Nordic participation in the future was also expressed. Finally, an application had been put forward for a Nordic Master programme in mathematics education. It remained clear that these measures do not solve all and there was concern for how to secure the incentive for cooperation in the future without the Nordic frame grant.

Four new dissertations during autumn 2007

Eva Taflin at Dalarna University College defended her thesis at Umeå University in June. The title is *Matematikproblem i skolan: för att skapa lärande* (Mathematical problems in school: in order to create learning). The purpose of her work was to define and explore what mathematical problem solving entails. The first part of the dissertation explores a sketch of what mathematical problem solving can offer in the teaching and learning processes. The second part of her work presents and analyses two so called rich problems. With rich problem she means problems which are especially constructed for mathematics education in a school context. Rich problems enable pupils with different capacity for mathematics to work with the same problem and solve it with different mathematical ideas. A set of criteria for rich problems is presented. The methods used are video- and audio-recordings, stimulated recall with pupils and teachers, interviews and pupils' drawings. In the analysis indications are given of where concepts, procedures, conventions, strategies and formulae appear in the problem solving process. Examples from pupils' and teachers' work with problems are exposed.

Camilla Björklund at Åbo Akademi University has defended her thesis with the title *Critical conditions for learning – toddlers encountering mathematics*. The aim of her study is to discern how toddlers experience and learn mathematics in a day-care environment. Twenty-three children were observed and video-recorded during everyday activities. The methodology aims to describe and interpret human actions in natural settings. The analysis was based on phenomenography in order to discover how the children come to understand the different aspects of mathematics they encounter. The results show that toddlers encounter various mathematical concepts, similarities and differences and the relationship between part and whole. For a certain type of learning to occur, some critical conditions must exist. They are variation, simultaneity, reasonableness and fixed points. Adults working with young children play an important role for children's experiences and opportunities to explore mathematical concepts and phenomena.

Constanta Olteanu took part in the graduate school in pedagogical work in Umeå and defended her thesis at Kristianstad University in October. The title is *"Vad skulle x kunna vara?" Andragradsekvation och andragradsfunktion som objekt för lärande* ("What could x be?" Second degree equation and second degree function as objects of learning). The aim of the thesis is to analyse, understand and explain the relation between the handled and learnt content, which are second degree equations and quadratic functions. The study includes two teachers and 45 students in two different classes. The data consists of video-recordings of lessons, individual sessions, interviews and the teachers' and researcher's review of individual sessions. The students' tests were also an important part of the data collection. Variation theory was used for the analysis. The results imply that there is convergent variation leading the students to improve their learning. The variation leads students to make generalisations in each object of learning and between those objects (equations and functions).

Lisser Rye Ejersbo is situated at Denmark Pedagogical University in Copenhagen and her thesis, defended in December, has the title *Design and redesign of an in-service course: the interplay of theory and practice in learning to teach mathematics with open problems*. The question she asks is to what extent a meta-didactical transposition for mathematics educational research concepts can be incorporated into successive stages of redesigned courses and how effective are these redesigns measured by the participating teachers' reactions during the course. Four theoretical concepts were selected to assist in the redesign of the course: the interactive flowchart, the epistemological triangle, the virtual monologue and the socio-mathematical norms. Using design research methods she has gone

through several cycles of redesign of the course, each time sharpening her tools for working with teachers on the skills of communication and reflection. The careful interweaving of theory and practice in the study should be of value for both practitioners and researchers.

With the report of these four theses we have presented in all ten dissertations in mathematics education during 2007 compared to twenty-one in 2006, which was an exceptional year in mathematics education. There might be more, but these are the ones we have been told about. Please let us know if there are more to inform about. Are ten theses what we can expect in 2008 or will the normal level be higher in the future?

Nordic collaboration in math education after NoGSME-period

During 2008 steps must be taken to prepare for coming work when the funding of NoGSME is over in mid-2009. There are several opportunities to get funding from NordForsk, such as for Nordic networks, for Nordic doctoral courses, for competence development of supervisors and mobility stipends. But in each case an application must be written so we will have to work more for comparable funding to what we have had over recent years. Preparations are being made for the creation of a Nordic 'umbrella' society for research in mathematics education. More information about that will be available in 2008.

Barbro Grevholm
Director of NoGSME