The Nordic graduate school in mathematics education

The summer school for doctoral students in Iceland took place in rather ice-cold weather with storm and rain but inside the temperature was good and everything happened in good mood and spirit. The campus at Laugarvatn showed to be excellent for our work and both students and group leaders were highly satisfied with the development that took place in the groups during the week. We were 47 participants in all including the two students from institutions outside the Nordic countries. One of the students has suggested that in 2008 the summer school should become a winter school. The argument is that so many activities are going on next year. And indeed there are many opportunities for doctoral students to present their work in 2008.

Already in January 30 the research seminar of the *Swedish society for research in mathematics education* welcomes doctoral students and supervisors to present research studies in an international context. Keynote speakers will be Eva Jablonka and Rosamund Sutherland and the theme of the seminar is *Mathematical knowledge*. Immediately after that we have Matematikbiennalen, where there is room for many presentations of different kinds. In April doctoral students and supervisors can take part in Norma08, the fifth *Nordic conference in mathematics education*, which takes place in Denmark in April 21–25 and has several interesting themes for the work. The themes are *Didactical design in mathematics education*, *Education and identity of mathematics teachers*, *Technology in mathematics education* and *Mathematics for all: Why? What? When?*

In March 2008 the centennial jubilee of ICMI is celebrated in Rome with a symposium, with investigations into how ICMI and the ICME-conferences have interrelated with the development of research in mathematics education.

In summer 2008 it is time again for the great international conference ICME and now it is the 11th in order. Number 10 took place in Denmark, organised by the Nordic countries together in 2004. Normally there is only one ICME-conference during one's doctoral study time so for those who experience this now it is time to go. For all these events there are excellent web pages to visit when you plan your participation. ICME-11 will be in Mexico from July 6 to 13. The scientific programme is as rich as ever.

The eighth NoGSME seminar for supervisors

In Lund 20 members of the NoGSME network will be gathered on October 11–12 for a seminar with the theme O*utcomes of research*. What is it we are producing with research in mathematics education? What are the results? Does the outcome have any implications? How is the new knowledge from research disseminated to mathematics teachers in school, to teacher educators, to academic teachers and to society in large? Where do the research questions come from? Are there significant areas where nothing is going on? Many questions can be raised and we want to open for a broad discussion about at least some of them in this seminar. Mogens Niss will start the seminar by discussing Outcome of research in mathematics education, followed by Ole Björkqvist who will present about evaluations of such research. Participant will give their view about where we stand currently in the areas they are specialised in.

Three NoGSME courses are going on in autumn 2007

The great interest from doctoral students in taking part in the courses offered via NoGSME is very encouraging. The course in University of Agder (new name since September 1, 2007) has more than ten participants from outside the university. This course named *Theories of teaching and learning mathematics* is now given for the fifth time and Simon Goodchild and Maria Luiza Cestari are teachers in the course together with some doctoral students, who have just finished writing their theses.

Another course is on *Research on assessment in mathematics education*, and it is given by Torulf Palm and Peter Nyström at Umeå University in collaboration with NoGSME. In the autumn we also offer in Denmark as alternatives a doctoral course/workshop on the theme *Justification of findings in mathematics and science education research, with particular regard to the role of theory in such justification*. It can be used as a course by doctoral students and as a workshop by the supervisors. The course runs already and it will end with the workshop in November 22–24 in Nyborg, Denmark. In the board meeting for NoGSME in October plans will be made for all the activities during 2008 and then announced in the next issue of Nomad.

New doctoral dissertations since June 2007

In June Anne Birgitte Fyhn defended her doctoral work *Angles as tool for grasping space: Teaching angles based on students' experiences with physical activities and body movement* at the University of Tromsö in Norway. Her work consists of four papers and two DVDs held together by a preamble, which includes the theoretical framework and the methodology chapter. She asks 'How can the teaching of angles be based on the students'

experiences with physical activity and body movement?' Another question dealt with is how students describe and explain angles in drawings and written text when they mathematise climbing with respect to angles. She also investigates how teachers do attain students' mathematising of climbing as approach to their teaching of angles. The papers illustrate tries to use compass and climbing as a tool together with analytical drawings as alternative ways for students to learn about geometry and angles. Teachers need to get acquainted with inductive enactive mathematics teaching before they are able to grasp the students' mathematising of climbing. In the papers and DVDs teachers can get new ideas about how to introduce pupils to different parts of geometry by using physical activities and body movement.

Johan Prytz at Uppsala University in Sweden defended his dissertation also in June 2007. The title is *Speaking of geometry: a study of geometry textbooks and literature on geometry instruction for elementary and lower secondary levels in Sweden, 1905–1962, with a special focus on professional debates*. His purpose is to investigate textbooks and literature, related to instruction of geometry, used by teachers in elementary schools (ES) and lower secondary schools (LSS) . Attention is given to debates about why a course should be taught and how the content should be communicated. In the period 1905–1962, the Swedish school system changed greatly but it is not really known how the teaching of mathematics changed in Sweden. The time before 1950 is often described as traditional, static or isolated. Geometry instruction in Sweden did change in the period 1905–1962 and geometry instruction in LSS was discussed. Two major issues were the axiomatic method and spatial intuition. Textbooks for LSS not following Euclid were produced also, but the axiomatic method was kept. By 1930, these alternative textbooks were the most popular. The textbooks in ES also changed. Visualizability was a central concept in the debate. Some features did not change. Throughout the period, the rationale for keeping axiomatic geometry in LSS was to offer training in reasoning. The axiomatic method was the dominating theme in ongoing discussions but not heuristics. Discussion on heuristics would have been relevant considering the final exams in the LSS. A skilled problem solver had better chances to succeed than a master of proof.

In August Tomas Højgaard Jensen discussed his thesis with the opponents at Roskilde University Centre. He wrote about *Utvikling af matematisk modelleringskompetence som matematikundervisningens omdrejningspunkt – hvorfor ikke?* (Developing mathematical modelling competency as the hub of mathematics education – why not?). He wants to investigate if he, based on analyses from the perspective of mathematics as a teaching subject and cognitive psychology, can argue for potentials of working with the analysis and construction of mathematical models in general education with a mathematical content. He also inquires into

what meaning he can ascribe to the concepts mathematical modelling, competency, technological competency and democratic competency to make them a constructive tool with respect to the identified potentials in relation to thinking about and plan, carry out and evaluate general education with a mathematical content. Further Tomas wants to reply to what organizational characteristics of the way mathematical modelling can potentially be integrated into the teaching he can defend as being central based on the theoretical analyses, if the goal is to develop pupils' mathematical modelling competence as much as possible. Finally a fourth question in the work is what the nature is of the hindrances that in a specific case stand in the way of the Utopia of a complete realization of the good practice in accordance with the central organizational characteristics. A number of potentials can be found but there are also hindrances in this work, such as when the examination conditions aren't fully in accordance with the teaching goals and methods used.

Still a couple of theses are coming up to defence during autumn 2007, but there will not be as many this year as last year when we had 21.

An American conference on doctoral programmes

In 1999 the first national conference on doctoral programmes in mathematics education was organised in the United States. In September 23–26 a follow-up conference was organised to investigate progress in the past decade. Bob Reys at university of Missouri Columbia was the main responsible for this event. A number of important questions were raised: What is happening with doctoral programs in mathematics education? What core knowledge do doctoral students in mathematics education need to know? Do we need accreditation of doctoral programs? What about program delivery, issues, challenges and opportunities? In the international panel visitors from Brazil, Japan, Spain and Norway were invited to present about the doctoral programs in their countries. I was invited to talk about the doctoral programs in the Nordic countries and the interest was great. Participants envy us for the collaboration we can have in the Nordic Graduate School and students' opportunities to take courses in other universities, to go to summer schools, to get mobility stipends and so on. I will try to return to the content of the conference later.

All kinds of suggestions for content of program for the Nordic Graduate School are welcome. Just contact any of us in the board. See www.NoGSME.no

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