

III.4 REVIEW OF NoGSME (Nordic Graduate School of Mathematics Education)

Objectives and strategy of the research school

The goals stated in the application were:

- (1) To support and develop the education of researchers in mathematics education in the Nordic and Baltic countries,*
- (2) Create constructive cooperation in order to raise the scientific quality of research in mathematics education*
- (3) Give all doctoral students in mathematic education access to the activities of the Research School*
- (4) Create cooperation among a greater group of doctoral students and supervisors in order to share experiences and opportunities to improve the education of researchers*
- (5) The ultimate aim is to create a network of cooperating partners, which can continue to collaborate after the five years of the Research School.*

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.

Innovation and creativity aimed at strengthening Nordic research training

A strong and growing group of Nordic researchers in mathematics education combined their efforts to create a unique creative and ambitious project with national experts. Along the way they gained acknowledgement, support and guidance from the strong relationship created with the international community of mathematics educators. They had two main and explicitly stated goals:

- to strengthen collaboration among mathematics educators in Nordic countries and within the international community
- to lead, encourage and critically accompany young, promising and equally ambitious researchers into their first research projects documented by either a successfully defended doctoral thesis or/and a bundle of qualified publications.

In other words, a great success for the research school in relation to the goals set in the original proposal.

The stated objectives in the application were successfully reached: The project as a whole and its various activities and results were innovative and creative. They can strengthen and support further Nordic research training and capacity building, plus mutual scientific support and fruitful competition.

Research school activities (hereunder the extent and composition of relevant activities) and organisation of activities

The described activities of the Research school, in particular the variety, quality, extent and composition of research-related relevant activities, is very impressive; obviously the long-standing exchange and collaboration which already existed - at least for the successful planning, preparing and executing of various Nordic seminars and conferences including the famous world-wide ICME 10-conference in Copenhagen in 2004 - were good training areas for this specific endeavour.

The greatest organisational challenge for NoGSME is a very big network, which requires an enormous amount of coordination, but it lacks the necessary administration. This leads to some lack of structure in the activities, where everything is included at the cost of a clearer curriculum design, although there are signs of developing methodology of graduate education going in the direction of developing joint approaches. One of the greatest achievements of NoGSME has been bringing new disciplinary views on mathematics education in to the Nordic region, lifting the field to a new academic level and bringing in new aspects within e.g., educating teachers. NoGSME is recommended in the future to put even more focus on such development of research expertise, which is extremely important for a developing academic field.

The Nordic partnership (hereunder the extent of participation of relevant Nordic research environments)

The Nordic partnership, in particular the extent of participation of relevant Nordic research environments has very much grown thanks to these common activities and their critical evaluation among working groups. The challenge here is to find the balance between the inclusion of all relevant institutions and the developing of a clear academic profile. The level of some courses seems to be rather basic and more could maybe have been gained by greater specialisation.

The Nordic synergy effects of the collaboration

The funding has been an investment for mobilising a research community, which reaches beyond the funding period and shows a good example of networks as a way to achieve much with scarce resources. Collaboration with colleagues in the Nordic countries, among the various universities and research groups and individual researchers, has created obvious synergy effects and one of the greatest achievements of NoGSME is that it has succeeded in bringing groups together, which would not otherwise necessarily collaborate.

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 variety of research direction and orientations this (international and Nordic) teams offer in the described work covers nearly all major promising trends and new theories and insights, thus representing major international trends and new, promising directions for discussion and critique. Very convincing is the explicit inclusion of recent paradigms and directions for focusing more on broader issues in mathematics education research recently discussed and not yet general standard: here in particular the special quality of

this program is the confrontation of various approaches integrating historical discussions about mathematics with its social role and with values, social and political goals in mathematics education, conflicting theoretical orientations or foci with inclusive and comparative discussions that widen the often narrow view in mathematics education: to show young academics the wider range of mathematics education philosophies, theories and normative views, to outline a broad range of related research methodologies and to question their applicability for various goals is a very well designed approach, not so well applied in other programs for doctoral students to our knowledge. Therefore it is no wonder that reactions provided by successful students are very much positive in evaluating the program they had experienced and successfully passed.

The outline of the themes and the organisation of the various lectures with courses, seminars with workshops, regional or international meetings, local summer schools participation in European or international research conferences are rich in variety, very important and innovative in guidance and directions offered, and obviously were very well designed means for different ends. The richness offered to the young researcher is remarkable and may be even unique.

Academic qualifications of the coordinator and partners, the quality of leadership, the supervisory competence and resources

To evaluate the academic qualifications of coordinator and partners, plus the quality of leadership and supervisory competence and resources directly follows from the above remarks: The organisational plan, the continuous evaluation and monitoring, the organisation and administration have obviously reached a high standard given the success of the whole program, directly measurable and visible in the high number of 21 doctoral students who passed their defence in such a short time. The cost-effectiveness of organisation and administration in relation to the quality is remarkable.

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.