News from Nordic mathematics education

The NoRME column in this issue of Nomad reports on a wide range of activities that have taken place in the Nordic region recently. First, it is important to note that the book of proceedings from the NORMA11 conference that took place in Reykjavík in 2011 now has been published. In April 2012 a Nordic Symposium in honour of Barbro Grevholm at the University of Agder was arranged in Kristiansand and as this text is being written a book with contributions from participants at this seminar is in the process of being published. Since most of the institutions in the Nordic/Baltic countries with doctoral programmes in mathematics education have very small research environments, it has been very important for the development of the field in our part of the world that several courses have been announced for participants from all Nordic/Baltic countries over the last ten years, especially within the NoGSME graduate school. This tradition continues and a Nordic summer school took place in Tallinn in June 2012, and in October a course was organised in Copenhagen about the recent developments within the Anthropological Theory of Didactics. Finally, in November 2012 the joint meeting with the British Society for Research into Learning Mathematics (BSRLM) was organised in Cambridge in November 2012. All the above mentioned events will be reported on in this column, listed chronologically.

As usual the column also includes a summary of recent doctoral dissertations with a focus on mathematics education written within the Nordic/Baltic countries. Also as usual, readers having information that you think to be relevant for this column, and for the NoRME web page (norme.me), are requested to contact Christer Bergsten, the Chair of NoRME, by e-mail, christer.bergsten@liu.se.

As a final comment, the year 2012 was not only a Summer Olympics year but also an ICME year, the International Congress on Mathematical Education. For a full picture of the Nordic representation at ICME-12 in Seoul, Korea, we must wait for the statistics of participation to be

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published but already one can see a considerable number of people from the Nordic/Baltic countries in the programme. According to a quick count on the ICME-12 web page there were 23 persons engaged in the organisation teams and regular lectures, 48 papers in the topic study groups and 18 posters.

For this issue of the Norme news I am very grateful for the contributions provided by Simon Goodchild, Kristina Juter, Linda Opheim, Jöran Petersson, Kristina Raen, Frode Rønning and Trude Sundtjønn.

Proceedings from the NORMA11 conference

An important event for the Nordic community of mathematics education researchers is the (more or less) regular NORMA conference, i.e. the Nordic Conference on Mathematics Education. Since its initiation in September 1994 in Lahti, Finland, the conference moved to Kristiansand in Norway in June 1998, then to Kristianstad in Sweden in June 2001, to Trondheim, again in Norway, in September 2005, to Copenhagen in Denmark in May 2008, and most recently to Reykjavík in Iceland in May 2011. These conferences have all been documented by books of proceedings, listed on the NoRME web page at norme.me (click on Publications). Most recently, the book of proceedings from NORMA11 in Reykjavík has been published by the University of Iceland Press and sent to the participants of the conference. As NORMA11 was the biggest conference in this series so far with its 150 participants, the volume is very impressive with 714 pages including the papers from the four plenary talks and one plenary panel, 53 regular papers, two reports from working groups, and 26 papers based on short communications. The huge editing work has been done by the Icelandic conference organisers and programme committee members Guðný Helga Gunnarsdóttir, Freyja Hreinsdóttir and Guðbjörg Pálsdóttir, along with the programme committee members Markku Hannula, Minna Hannula-Sormunen, Eva Jablonka, Uffe Thomas Jankvist, Andreas Ryve, Paola Valero, and Kjersti Wæge. The book is very important for the NoRME community, as well as externally, as it provides a comprehensive and condensed overview of many of the on-going research activities in the Nordic/Baltic region. The next NORMA conference is planned to take place in Finland in 2014.

The symposium for Barbro Grevholm in Agder, April 2012

Professor Barbro Grevholm is certainly well known to most of the readers of Nomad. She was one of the first professors of Mathematics Education to be appointed at the University of Adger, Kristiansand, Norway,

where she became instrumental in building up the Doctoral Programme in Mathematics Education that was started in 2003. From 2004 to 2010 she was leader of the Nordic Graduate School in Mathematics Education (NoGSME) from which she regularly reported in Nomad. She has authored or edited a large number of books as well as scientific articles and she has supervised many PhD students both in Norway and Sweden. Always eager to promote Nordic collaboration she took the initiative to the creation of NoRME already while the network around NoGSME was still active. She is or has been on the editorial board of many well known journals in mathematics education, including Nomad. Her great enthusiasm for Nordic collaboration has also been extended to include the Baltic countries into the Nordic community. In particular she has worked closely with colleagues in Estonia. As an appreciation of her valuable work for and with the mathematics education community in Estonia she was awarded an Honorary Doctorate from the University of Tallinn, Estonia in October 2012.

Earlier in the year, on 19–20 April 2012 a symposium was arranged at the University of Agder to celebrate Barbro's career in the field of mathematics education. At the time of the symposium she had been a mathematics teacher for 50 years and a professor in mathematics education for 11 years. The theme was *Nordic research in didactics of mathematics, past, present and future*. Four of Barbro's former doctoral students were organising the symposium with Barbro; Per Sigurd Hundeland, Kristina Juter, Kirsti Kislenko and Per Eskil Persson. The symposium attracted about 55 persons. The invited plenary speakers were Mogens Niss, Anna Sierpinska, Liv Sissel Grønmo, Lisen Häggblom, Madis Lepik and Ole Björkqvist. Plenary lecturers, invited guests and others were encouraged to contribute with papers to a scientific anthology which will be published in the beginning of 2013. This book on Nordic research in didactics of mathematics is intended to give a selection of papers indicating what is going on in mathematics education research in the Nordic and Baltic countries. The chapters have been peer-review by two authors, revised and finally edited by the editorial group and by the publisher Cappelen Damm. The 27 chapters in the book all reflect mathematics education research in the Nordic countries. A number of mathematical topics appear in the chapters, such as fractions, arithmetic, algebra, limits and infinity. More general aspects of mathematics learning are also discussed, such as the use of ICT, textbooks, mathematical reasoning, use of language and communication, feedback, pupils' attitudes and beliefs, and vocational mathematics. Several authors are focusing on theory and theoretical issues and some on research education. International research projects are presented and mathematics teacher development is discussed

in several chapters. The chapters give an overview of what is going on in mathematics education research in the Nordic countries and indicate some of the possible future actions and activities.

Nordic/Baltic doctoral summer course 2012

In this column in Nomad 16(4) a Nordic mathematics education summer school was announced to take place in Tallinn in June 2012. Here is a brief report from this event.

The Nordic/Baltic summer school 2012, funded by NordForsk, was held at Tallinn University 11 to 15 June. 36 doctoral fellows attended. Participants came from Iceland (3), Finland (3), Sweden (23), Norway (6) and Latvia (1). The scientific programme was led by a strong team of internationally recognised researchers experienced in doctoral education: Professors Eva Jablonka (Luleå University of Technology, Sweden), Barbara Jaworski (Loughborough University, UK), Despina Potari (Athens University, Greece), João Pedro da Ponte (Lisbon University, Portugal), Jeppe Skott (Linnaeus University, Sweden & Aarhus University, Denmark), and (also representing the NoRME community) Christer Bergsten (Chair of NoRME, Linköping University, Sweden), Anne Berit Fuglestad and Simon Goodchild (University of Agder, Kristiansand, Norway). The local organizers Professor Madis Lepik and Associate Professor Kirsti Kislenko had provided excellent conditions for the work and much appreciated social arrangements. The initiative and main work with the successful application for the funding, as well as the overall planning of the summer school, was done by Simon Goodchild.

The summer school had a busy programme that kept all participants occupied from 09:00 to 18:00 with plenary lectures, four working groups for participants' presentations and discussions (each group led by two researchers), individual supervision and workshops. Lectures were given by João Pedro da Ponte (Researching mathematics teachers' professional practices), Eva Jablonka (Attempts of characterising mathematical reasoning in classrooms from Germany, Hong Kong and the USA), Jeppe Skott (Understanding the role of the teacher: looking for patterns of participation) and Barbara Jaworski (Developmental research in inquiry-based mathematics teaching). Workshops were led by Despina Potari (Qualitative data analysis in mathematics education research (MER)), Christer Bergsten and Eva Jablonka (Theories in MER), Anne Berit Fuglestad (ICT and MER) and Simon Goodchild (Quantitative data analysis in MER). On the final day, a plenary panel (with Jablonka, Jaworski, da Ponte, and Skott) chaired by Bergsten provided an opportunity for participants to put their questions to the panel, questions that were

partly inspired by the lectures and touched on critical issues such as paradigms and frameworks, methodology, and the quality of and future of mathematics education research.

This summer school was organised in cooperation with NoRME to continue the tradition from the NoGSME Summer Schools that were introduced and led by Professor Barbro Grevholm. As in previous years the summer school provided opportunities for participants to present and discuss their own research in a critical but secure setting, informed by highly experienced researchers and scholars. The summer schools are intended to offer a valuable complement to the regular guidance and support that fellows have in their own universities. The quality of the summer schools depend not only on the leadership but also on the active engagement of every participant, and the outcome is measured not only in terms of progress in one's own research but also in the networking that takes place and will enrich professional life for many years. In the evaluation that was done by the participating PhD students the last day of the course week there was a strong impetus that the tradition with this kind of summer school would continue also next year.

The remainder of this report from the summer school comprises two sections with reflections from some of the participating doctoral students. First follows a report from Linda Opheim, Kristina Raen and Trude Sundtjønn, all working at the University of Agder, followed by another report from Jöran Petersson, a PhD fellow at Stockholm University, reflecting on what the Summer School meant for him.

Linda Opheim, *Kristina Raen* and *Trude Sundtjønn*: We are three PhD fellows from the University of Agder who started on our research work less than a year ago. Two of us had never been to a summer school like this before. Even if we did not know exactly what to expect when we applied for the summer school, we had great expectations and we are glad to say that our expectations were met. In the spirit of the summer school, this report is written as a joint effort.

The summer school was placed in Tallinn, which provided a beautiful setting for lots of hard work. During the summer school we met PhD researchers from all the Nordic countries, and made new friends and possible future collaborators. The schedule made the week demanding, but rewarding, and we were surrounded by ideas and discussions about mathematics education around the clock!

To prepare for the summer school we wrote a paper about our own research and what we are working on now. This and the presentation of our research focus proved to be a good learning experience. What seems clear and logical to oneself while writing, can sometimes be misunderstood by people with a different background. Presenting one's work in a

setting like this is thus a great help to realise where and how one needs to be more explicit.

The plenaries were varied and interesting, and we think everyone developed some good ideas and new input to consider while listening. The plenary speakers focused on involving all of us, and showed us steps of the journey from research ideas to finished research. It was also good to hear people from different paradigms and backgrounds so that we were able to form a sense of the width of the field.

In the working groups we had the opportunity to get to know the other group participants and their research even better. We discussed everyone's work, and received input from both the group leaders and the other PhD fellows. This proved very useful, and even though one cannot expect all one's problems to be solved, the discussions might bring new ideas and open up for new thoughts and reflections. We also each reviewed two papers written by other participants more closely, and this was very useful. Here we quote a new Swedish friend: "Reviews of others meant that you had to read those papers very carefully. I think that implied that I read ALL papers differently and I definitely learned a lot from it".

We were in a workshop group that focused on qualitative methods, and we learned how Despina Potari and Barbara Jaworski worked with qualitative data and how they described their analysing process. After discussing their work, we had the opportunity to work with data from other PhD fellows. It was really good to collaborate like this and reflect on what we saw in the data, discuss our viewpoints, and argue for our point of view.

The summer school provides a rather different setting than conferences. This is not the place to show how brilliant one is, but a place where one can lower one's guard and expose one's half shaped ideas and difficulties. Everyone in the summer school worked together trying to learn and improve, and that required us to be open and honest about the problems we faced. This might seem a bit intimidating, but we were surprisingly quick in becoming a community where this felt secure.

Jöran Petersson: The first summer course I attended was in 2010, there was no question in my mind about whether or not to participate. As a beginning researcher it was a good training to formulate research questions and to write. When in autumn 2011 I saw the advertisement for the 2012 summer school in Tallinn, I did not question why I should go for a summer school a second time. Instead I first remembered the interesting exchange of, dissecting and wrestling with ideas we had in study groups and personal talks and walks with lecturers and other PhD students during the summer school in 2010. I did not want to resist the temptation of having another intensive week of discussing mathematics education and decided to write an application.

One thing I like in a summer school is the possibility to test an idea outside my own community: Would persons from another community of methodological or theoretical practice have well-founded critique that could inform or sharpen my ideas? If so, maybe I can get advice on how to strengthen the argumentation or improve method or theory? This time in the middle of my PhD-studies I still needed to formulate a more precise research question, but even more I used this summer school to discuss details in the method for interpreting data in a theme for an article. I needed and wanted well-founded critique on my ideas and advice to go further. And I received both!

What was best with the summer school(s)? What a silly question! It is as relevant as asking if hydrogen or oxygen is the most important element in water. Without both there would be no water! A work day would start either the evening before or in the morning the same day with re-reading the topics for the day and this goes on at the breakfast table with other course participants talking about someone's research questions, method, framework, relevant articles or how to understand some pieces of advice from supervisor or colleague. The same holds for lunches and dinners and "after work". My research is about multiculturalism, so I also especially appreciate the possibility of meeting colleagues from other countries that can give information about the school systems where they come from.

If I were to pick out just one thing that is special about the summer schools, it would be the accessibility of the supervisors. At "home" a meeting with supervisors mostly has to be booked long in advance. In a summer school it is just to ask them for a walk to the lunch together and – then one gets an interesting conversation in the lunch queue. Quite opposite to ordinary lunches, this is a situation when you don't mind and even appreciate a long queue!

But what about the course lectures, workshops and working groups? They are of course the indispensable fuel for the conversations during the breaks!

Doctoral course in Copenhagen 29–31 October 2012

At the University of Copenhagen a doctoral course with the title *Anthropological theory of didactics: recent advances* was held in the period 29–31 October 2012. The course was organised by Carl Winsløw and Marianne Achiam and was taught by Marianna Bosch, Universitat Ramon Llull, Spain, and Carl Winsløw. Originally it was planned that the founder of the ATD, Yves Chevallard, Université d'Aix-Marseille, France, would be one of the teachers at the course but for health reasons he was unfortunately not able to come to Denmark. However, he participated in one session via Skype and he also offered the participants to submit

questions to him that he would respond to. The course was a follow up of a course on ATD in March 2012, also held at the University of Copenhagen. The course in October was attended by nine PhD students, four from Denmark, three from Sweden, one from Poland, and one from The Philippines. In addition there were three participants, two from Denmark and one from Norway, attending the course out of their own interest. For the PhD students the course was credited with 5 ECTS based on submitting a 10 page paper.

Joint meeting with BSRLM and NoRME

In Nomad, 16(4), a pre-announcement was made for the unique joint meeting with the British Society for Research into Learning Mathematics (BSRLM) and the Nordic Society for Research in Mathematics Education (NoRME). The meeting took place 16–17 November 2012 in Cambridge, UK. On the first day the plenary speakers Kenneth Ruthven (University of Cambridge, UK) and Jeppe Skott (Linnaeus University, Sweden and Aarhus University, Denmark) gave talks addressing the relation between research in mathematics education and practical innovations in mathematics teaching. Ruthven's talk was entitled *What role can research play in practical innovations in mathematics education?* Starting by identifying some significant ideals for the ways in which educational research can make distinctive contributions to practical innovations in mathematics teaching, he went on to examine key reasons why such contributions may prove less fruitful than imagined. As examples Ruthven used two significant initiatives in English school mathematics teaching: the National Numeracy Strategy, and "research-involved" continuing professional development for teachers. Jeppe Skott's talk was entitled *Revisiting theory-practice relationships: a cautionary note on the expectation of impact*. Skott recognised mathematics education research as being expected to serve the dual purposes of understanding and further developing the practices of mathematics teaching and learning. However, he also recognised that these two intentions may not be fully compatible and mutually supportive. He suggested that increasing attention to the social aspects of the mathematics classroom has been important for progress with respect to both intentions. He also suggested that one should not be too optimistic of the impact of research on practice.

After the talks the conference participants were organised in discussion groups where questions that the speakers had prepared were discussed. One challenge that was given to the groups was to come up with good recent examples of successful research-informed practical innovation in mathematics education. In pursuing research-informed

practical innovation one may speak of a top-down or a bottom-up approach. The groups were asked to discuss a good balance between these two approaches and maybe suggest a "third way". Many research projects have been set up where the idea has been to do research *with* teachers. It was raised as an issue for the groups to discuss that it might be the case that most teachers did not enter the teaching profession to do research but to spend valuable time with children. Could this be a source of conflict? The group discussions were lively, and as often is the case, they did not always stick to the topics that were suggested. The first day ended with brief reports back to the whole audience from each group. The second day was organised after the standard pattern of a BSRLM day conference with 30 and 60 minutes talks in parallel sessions. There were close to 20 persons from the Nordic and Baltic region giving presentations and in addition there were a few Nordic participants not giving talks. In total there were around 60 presentations. All the speakers have been invited to submit a six-page paper to be published in the BSRLM informal proceedings (IP) and also a two-page Current Report to be published in Research in Mathematics Education. The IP is published on the BSRLM webpage.

We are very grateful for all the efforts made by the BSRLM representatives to arrange this exciting event, and we are happy that so many colleagues from our region took the opportunity to come to Cambridge on this occasion. Informal conversations during the meeting indicated that the event was appreciated both by the guests and the hosts. We hope to continue the collaboration and we wish our British colleagues warmly welcome to the next NORMA conference in 2014.

New doctoral dissertations

In this issue of the NoRME news column eight recent doctoral dissertations will be briefly presented, three from Norway, four from Sweden and one from Denmark. They represent different theoretical and methodological approaches, dealing with very different kinds of research issues. As such, they illustrate both the width and the complexity of the field studied.

Catarina Player-Koro defended her thesis *Reproducing traditional discourses of teaching and learning: studies of mathematics and ICT in teaching and teacher education* at the University of Gothenburg on 4 May 2012. The dissertation has its theoretical base in the work of Basil Bernstein on pedagogic discourse, employing its key concepts recontextualisation, horizontal and vertical discourses and knowledge structures, as well as classification and framing, to study the Swedish public discourse

on teacher education and its practice in a critical way, with a focus on mathematics education and the use of ICT. The study aims to understand how mathematical discourses are produced and reproduced in teacher education and how these discourses affect student teachers' views on mathematics as well as their professional identity. A background for the study was the education debate and policy reform taking place in Sweden. Two discourses that, according to the author, heavily shape mathematics education, a "general ICT impact"-discourse and a "general subject study"-discourse, are critically analysed. Four published journal articles and a preamble make up the thesis, providing an ethnographic study of educational contexts in mathematics teacher education with a focus on the role of lectures, ICT, examinations and textbooks for the education of mathematics teachers.

The study shows that through the ways mathematics is taught and learned, traditional ways of teaching and learning are reproduced in teacher education practice. Mathematics instruction is built around a ritualised practice, based on the ability to solve tasks related to a textbook based content. The use of ICT in this context, contrary to the intentions, does not transform practice but rather operates as a relay in the reproduction of traditional forms of teaching practice. There is thus a need to critically analyse how new technology is formulated in public discourses and used in education. In the recent education reform in Sweden there is a re-emphasis on formal subject content studies as the most important component for the professional knowledge base of teachers. The outcomes of this thesis suggest that the logic of the reform can be questioned.

At the University of Oslo, Margrethe Naalsund defended her thesis *Why is algebra so difficult? A study of Norwegian lower secondary students' algebraic proficiency* on 16 May 2012. The question in the title refers to the performance of Norwegian students on international comparative achievement studies such as TIMSS. Using a cognitive approach, the study is theoretically based on a competency framework where students' mathematical proficiency is conceptualised through conceptual understanding, procedural fluency, adaptive reasoning, and strategic competence. The cognitive processes of a total of 829 Norwegian students in grades 8 and 10 are investigated through test responses on algebraic tasks and through additional interviews of a selection of these students. In the interviews students were asked to explain and justify their solutions to the tasks. The analyses focus on students' strategy choices, types of errors, explanations, and justifications. The findings indicate that there is a cognitive gap between informal and formal reasoning among the grade 8 students, and highlight some differences and similarities of formal proficiency in grades 8 and 10, respectively. The use of formal procedures

seems to be strongly algorithmic rather than being based on deeper conceptual understanding. Challenges such as misconceptions linked to students' limited knowledge of arithmetic, and problems in the process to generalise arithmetic knowledge to algebra were observed in both grade 8 and 10. It was also observed that most of the students had problems to explain and justify their reasoning. As an implication of the study, the author suggests that the teaching of algebra could benefit from moving away from a focus on "skills versus understanding" towards an increased attention to the different and developmentally strongly intertwined aspects that constitute algebraic proficiency.

On 19 June 2012 Rune Herheim defended his thesis *Pupils collaborating in pairs at a computer in mathematics learning: investigating verbal communication patterns and qualities* at the University of Bergen. The thesis is composed of three articles (out of which two are published and one submitted) and a synopsis. The research focus is verbal communication in mathematics learning when students in grade 9 (in Norway) work in pairs at a computer. The first article presents a research literature overview addressing the question *What are the important aspects in promoting pupils' talk and reflections in small group settings using a computer*? The second article reports on an empirical study, investigating the research question *What characterises pupils' verbal communication at a stand-alone computer in a mathematics lesson*? The question addressed in the third article is *What characterises communication qualities, if any, that can develop a pair of pupils' communication and mathematics learning at a computer*? This is also investigated through an empirical study. The students and the teachers were included in the research process as genuine co-researchers, influencing and operationalising the research questions and participating in joint research reflections with students and the researcher ("watch-and-talk" sessions). The empirical studies, theoretically situated within a dialogical approach, employed a methodology of design-based research, using iterative cycles of design-interventions-analysis-redesign, and the intertwining of designing learning environments and developing theory. The data material consisted of video and screen recordings and observations. In the literature overview four focus areas in the research of communication and learning at a computer are identified: to establish and develop a common ground; communication characteristics; roles of students, teachers, and computers in the context; and software design/task structure. Several distinct communication patterns within the two main aspects *thinking aloud* and *building a mutual language* were identified in the first empirical study: To address each other, speak in chorus, and use the same linguistic turns contribute to taking each other's perspectives. Another constructive communication pattern is when students compose

sentences together by alternatively making short contributions. These patterns help the pupils build a mutual language and a communicative common ground. The second empirical study investigated the connections between communication qualities and the ability to manage differences. The students develop communication qualities that make the collaboration possible despite their individual differences. It is suggested that knowledge about such constructive communication patterns and of collaboration between students with different approaches is valuable for teachers.

Jorryt van Bommel defended her thesis entitled *Improving teaching, improving learning, improving as a teacher: mathematical knowledge for teaching as an object of learning* at the University of Karlstad on 10 September 2012. The work of van Bommel concerns teaching in mathematics teacher education and can be characterised as design research based on variation theory, conducted as a learning study where the overall purpose has been to investigate in what way teacher training could facilitate and improve student teachers' Mathematical Knowledge for Teaching (MKT). She has formulated the following research question to guide her work: "In what way would it be possible to address mathematical knowledge for teaching during a teacher-training course so that student teachers would more systematically consider elements of MKT in planning their future teaching?"

It has also been a goal of the study to design an intervention to see if the process of trying to improve the teaching was fruitful and to see whether it could be applied in other but similar situations. Van Bommel has based her work with MKT on the concept pedagogical content knowledge as developed by Shulman and further developed by Deborah Ball and her collaborators.

The theory is used in order to describe and give an account for differences in learning. It tries to depict the conditions necessary for learning to take place and from this perspective, learning is seen as a change in understanding or experiencing a phenomenon through an awareness of the critical features of that particular phenomenon. The implication for teaching is to make the critical features visible and *learnable*, the learner should get the possibility to discern and simultaneously focus on the critical features.

The learning study has been conducted in a group consisting of five teacher educators and one researcher. In total 101 student teachers were involved, divided over two terms (two groups). The two groups are referred to as *control group* (the group taught a term before the learning study started) and *learning study group* (the group participating in the learning study). Data were collected at three different stages of the study and consists of both qualitative and quantitative data.

Four critical features of the object of learning were found. Student teachers had to be able to formulate proper aims for a lesson, and to give detailed descriptions of elements of MKT for coherence in their MKT to occur. A focus on student teachers' role as mathematics teachers had to be established and finally, sufficient mathematical knowledge was found to be a prerequisite for their MKT to develop.

Balbina Mutemba defended her thesis entitled *Pedagogic practice between tradition and renewal: a study of the New Mathematics Curriculum in Mozambique* at Luleå University of Technology on 23 October 2012. The background for this thesis is the introduction of a new mathematics curriculum for the school in Mozambique in 2008. This curriculum advocates a more student centred pedagogy with emphasis on students' reasoning skills and the use of inductive methods promoting meaningful student participation. In the study Mutemba investigates the new curriculum on three levels; the official curriculum document, its implementation through two commonly used textbooks, and its implementation in the practice of five teachers working in schools in different parts of Mozambique. The general aim of the study was to see to what extent the innovative aspects can be found both in the curriculum and in the textbooks as well as in the classroom practice. Mutemba poses the following research questions:

- What does the official curriculum valorize concerning mathematical reasoning and how are the power and control relation between the Ministry of Education and the teachers as intended readers established?
- How is the official curriculum recontextualised in textbooks and classroom practice?
- What are the possible factors influencing the ways of the curriculum recontextualisation by teachers and students?

The data for the study come from official curriculum documents, textbooks and classroom practice. The latter comprise video recordings and field notes from classrooms as well as teacher interviews.

The analysis, which takes a discursive approach drawing on some key notions from Bernstein's theory of pedagogic practice, of the curriculum document reveals that the innovative aspects fade away in the detailed suggestions for approaching the mathematical topics. There is a tension between the high degree of the explicitness of the syllabus and the possible space for teacher interpretation, which might bring with it a reduction of the teacher's initiative in the classroom. The two textbooks that were analysed in the study recontextualise the main innovative aspects

of the curriculum in restricted ways. Both books introduce a formal type of mathematics in most of the topics, and the tasks include mostly closed questions, with little opportunities for comparing different solution strategies and justification of the choices made.

The observed lessons were generally strongly framed in terms of interaction, and the mathematics appeared quite formal. But in all lessons situations could be observed where students' contributions were valued and incorporated into the teacher's lesson plan. Such more inclusive moments often arose when the students' everyday knowledge was involved. Another aspect of the observed lessons was a focus on or a quick switch towards presenting mathematics at a high degree of formalisation after phases of student involvement.

On 25 October 2012 Suela Kacerja defended her thesis with the title *Real-life contexts in mathematics and students' interests. An Albanian study* at the University of Agder. Kacerja has worked as a mathematics teacher and teacher educator in Albania before coming to Norway to do her doctoral work. In her study she has asked students from grades 8–10 about what they consider to be the most interesting real-life contexts about which they would like to learn in mathematics. Kacerja has used a mixture of quantitative methods, such as Rasch analysis, and qualitative methods, such as interviews with students.

The study shows that students in Albania are interested in learning topics from mathematics that are used in contexts they perceive as relevant and useful for their future studies and work career. The students mention modern technologies, measuring the development of their country, health issues, as well as sports and recreation. On the other hand they have a moderate interest in issues which seem not to be so clearly relevant for them, such as environment, crime fighting, or politics. And they show low interest for issues perceived as unprofitable, such as agriculture, cultural products or lotteries and gambling. The study reveals that to some extent boys and girls have different preferences.

The analysis rests on the theory of Bourdieu which is used to explain students' rationales for their preferences.

The author claims that the study can contribute to the development of policy and curriculum in mathematics education in Albania, and that the results can be used in connection with information coming from teachers, parents, textbook writers and curriculum makers.

Levi Esteban Elipane defended his thesis *Integrating the essential elements of lesson study in pre-service mathematics teacher education* at the Department of Science Education, University of Copenhagen on 1 November 2012. In his study Elipane has explored how integrating the essential elements of Lesson Study as an intervention in pre-service

mathematics teacher education could contribute to prospective teachers' facility to transform their theoretical knowledge into the teaching practice.

The main research question for the study is "How are the essential elements of Lesson Study integrated in pre-service teacher education in Japan?" This has been split into two sub-questions, *What skills, competencies, or habits of mind are needed to be cultivated in pre-service mathematics teacher education in order for prospective teachers to optimize their experiences in student teaching programs, and, eventually, successfully participate in Lesson Study as they step into the actual teaching profession?* Second: *In incorporating the elements of Lesson Study in pre-service teacher education, what mechanisms facilitate towards comprehensive reforms of mathematics teaching?*

The study is characterised as a phenomenological case study and has been carried out studying student teachers' practice in a Japanese *Fuzoku* School, a laboratory school connected to a national university, with the aim to understand the underlying principles behind using Lesson Study in pre-service mathematics teacher education. A pre-service teacher was observed daily in his activities as a student teacher over a period of four weeks.

Five interconnected themes that pertain to skills, competencies, and habits of mind grew out of the investigation: (1) acclimatising to the school contexts and classroom (socio-mathematical) norms; (2) making sense of powerful resources for classroom instruction; (3) utilising the school and classroom contexts as venues of inquiry; (4) engaging in critical reflections; and (5) forging the spirit of collaboration.

Furthermore, four mechanisms that facilitated towards change were extracted from the analysis of the student teacher's journals and other sources of data: (1) sensitisation to images of reform; (2) forged reifications of learning experiences; (3) student feedback and communications; and (4) immersion in communities of practice.

The concept of Lesson Study has a long tradition in Japan, and in particular in the Fuzoku schools where the teachers are expected to engage in inquiries on classroom practices, usually implemented using Lesson Study. At the end of his thesis Elipane raises the interesting question to what extent the principle of Lesson Study may be transferable to other cultures. Elipane suggests using the Anthropological Theory of the Didactic (ATD) as a framework to do research into questions of transferability of Lesson Study outside Japan.

The last PhD dissertation to be mentioned here is written by Andreia Balan and has the title *Assessment for learning: a case study in mathematics education*. Balan defended her thesis at Malmö University on 14 December 2012.

The aim of the study was to introduce a formative assessment practice in a mathematics classroom, by implementing the five strategies of the formative-assessment framework proposed by Wiliam and Thompson in order to investigate the following issues: Would the change in assessment practices have a positive influence on students' mathematical learning and, if so what were these changes, and finally, how did the teacher and students perceive the changes in relation to the new teaching-learning environment?

The study was conducted with students in their first year of upper-secondary school. A quasi experimental design was chosen for the study, involving pre- and post-tests, as well as an intervention group and a control group. The intervention was characterised by making goals and criteria explicit by a systematic use of a scoring rubric; making students' learning visible by use of problem-solving tasks and working in small groups; providing students with nuanced information about their performance, including ways to move forward in their learning; activating students as resources for each other through peer-assessment and peer-feedback activities; and creating a forum for communication about assessment, involving both the students and the teacher.

The findings indicate an improvement in problem solving performance for the students in the intervention group, and also the students show improvements in how to reason about mathematical solutions, how to present a solution in a clear and accessible manner, and how to use mathematical symbols, terminology, and conventions in an appropriate way. The findings also indicate a change in students' mathematically related beliefs towards beliefs that are more productive for supporting learning in mathematics. During interviews, the students expressed how they perceived the new teaching-learning environment. Students' responses indicate that they recognised and appreciated the different components of the formative assessment practice as resources for their learning. According to the author the findings deepen our understanding of how the components of a formative assessment practice may influence students and their learning in mathematics, but also how these components co-exist in an authentic classroom situation and influence each other.