Welcome to NorDiNa 2/2014

Welcome to the second issue of NorDiNa in 2014! As a result of the fruitful discussions during the NorDiNa seminar at the NFSUN conference in Helsinki in June, we have now extended the word limit for descriptive contributions to the curriculum development section in NorDiNa from 2000 to 5000 words. All submissions to the curriculum development section are peer reviewed. In this issue we present two contributions to this section (both from Finland): Markku Käpylä presents a phenomenological view of pictures in teaching, and Jari Lavonen and Heidi Krzywacki present an overview of the development of PhD education in mathematics and science education in Finland.

In Markku Käpylä's contribution, a four-field method based on phenomenological thoughts about human experience and combining factual knowledge with emotions and personal and social meanings is presented, and an example is given from biology. A course unit for using pictures in science teaching was developed from this idea and used in the training of both primary and secondary level teachers. A classification of the teaching functions of pictures is also presented.

Jari Lavonen and Heidi Krzywacki discuss the development of Finnish PhD education in science and mathematics education research over the past 20 years. Doctoral studies seek to develop research knowledge and skills as well as the capability to produce novel scientific knowledge. For the past 20 years, there has been a special focus on improving PhD education through national-level graduate schools and international collaboration. The recent changes in PhD education, such as the replacement of doctoral programmes at local universities, are discussed by the authors based on the case of the University of Helsinki.

Jørgen Sjaastad's article entitled "Enhancing measurement in science and mathematics education research through Rasch analysis: Rationale and properties" presents the basic rationale of Rasch theory and seven core properties of Rasch modelling. Examples are provided, drawing on Rasch analysis of data from a survey where students in the 9th grade responded to questions regarding their mathematics competence. The relationship between Rasch theory and classical test theory is commented on. Sjaastad argues that Rasch theory provides science and mathematics education researchers with valuable tools to evaluate the psychometric quality of tests and questionnaires and support the development of these.

The article "Inquiry based dialogue in science classroom" by Ragnhild Löfgren, Klas Johnsson, Jan Schoultz and Lars Domino Østergaard focuses on classroom communication within an inquiry-based science education (IBSE) program. The overall aim of their study was to highlight the ways in which productive and engaging conversations are conducted in the classroom. The authors have analysed

the work within the unit “The Chemistry of food” and the theme testing of fat in food in grade five and six in a Swedish and a Danish science classroom. Löfgren and colleagues used one video camera and one mp3-player to follow the classroom interaction. The findings indicate that the classroom communication was focused on everyday science content and that the introduction and the summary of the theme were very important for the pupils’ possibilities to productive disciplinary engagement.

Mette Nordby and Erik Knain present a study called “Students’ dealing with complex issues in video gaming in school science”. In this design-based study the authors have investigated students’ encounter with a computer game, *Energispillet.no*, in school. The study was conducted in a vocational class. In the game the students encounter “texts” that do not convey facts or certain knowledge, but on the contrary entrusts the players to do their own considerations. Based on their own values and attitudes students must jointly make use of knowledge from different disciplines such as natural science, social studies, economics and ethics to make ongoing assessments, argue points of view, and make informed choices during gameplay.

It is increasingly recognised that education plays a key role in addressing human-induced climate change. The ultimate goal of climate change education (CCE) is positive impacts on the climate through both individual and collective actions. The aim of the article “Climate change education: Geography teachers’ and ninth-graders’ views” by Mikaela Hermans is to investigate geography teachers’ and their ninth-graders’ views about CCE. Hermans collected data using semi-structured interviews with geography teachers (N = 13) and questionnaires for ninth-graders (N = 549) at eleven secondary schools from all parts of Swedish-speaking Finland. The results show that although the students’ attitudes to CCE are positive, it does not supply them with action competence. The geography teachers in this study largely miss the ultimate goal of CCE, pointing at the need for more effort to be made in the process of developing CCE at secondary school.

Birgitte Lund Nielsen presents a study with the title “Students’ annotated drawings as a mediating artefact in science teachers’ professional development”. The study investigates a case study of a teacher examining her 4th graders’ conceptual understanding related to factors causing day and night, seasons, and the phases of the Moon both pre- and post-teaching, as a part of participating in the continuous professional development (CPD) project QUEST. The findings pertain to both the 4th graders’ conceptual understanding and the teacher’s meaning-making when examining the students’ annotated drawings and discussing them with colleagues. The spreading of ideas to colleagues is discussed referring to this inquiry as supporting individual but probably not collaborative agency.

In their article entitled “Framing student dialogue and argumentation: Content knowledge development and procedural knowing in SSI inquiry group work”, Anne Kristine Byhring and Erik Knain discuss the negotiation of the situated *common ground* in classroom conversations. Two teacher–student dialogue sequences with 11th grade students from the Norwegian research project *ElevForsk* exemplify the negotiation of the situated common ground and the students’ deliberation. The analysis examines what goes on in the thematic content, as well as at the interpersonal level of language use. It is suggested by the authors that different framings may complement each other and provide a space for the students’ emerging scientific conceptual development as well as for deliberation as a form of emerging procedural knowing.

We would also like to take the opportunity to thank the following colleagues for the excellent work they have done as reviewers for NorDiNa during 2013 and 2014. The work done by our reviewers is essential to ensure the quality of the journal. In fact, without them there would be no journal.

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We hope you enjoy your reading!

Carl-Johan Rundgren and Are Turmo