NorDiNa Issue 3 2015 Editorial

Welcome to the third issue of NorDiNa this year! In this issue of NorDiNa, we present five research articles, two contributions to the curriculum development section, as well as three recent PhD dissertations from the Nordic science education community.

In their article entitled *Scaffolding open inquiry: How a teacher provides students with structure and space*, Birgitte Bjønness and Stein Dankert Kolstø study a teacher's scaffolding strategies to support his students during a twelve-week open inquiry project at an upper secondary school. The authors use interaction analysis to identify how the teacher provided *structure* and *space* in the different phases of open inquiry. The study revealed that the teacher scaffolded this open inquiry in two opposing ways; he created *space* for the students to make their own experiences and ideas, which eventually set up the need for more directed scaffolding to discuss the challenges students experienced, and directing students' ideas in certain directions in phases with *structure*. It is suggested by the authors that the interplay between structure and space creates what can be seen as a driving force providing both exploration and direction for open inquiry. Moreover, the authors propose that the dual concept of 'structure and space' can work as a thinking tool to promote teachers' competence on how to scaffold more authentic versions of scientific inquiry in schools.

In the article *Quiet pupils can learn more than pupils who participate in classroom discussion*, Gunnhildur Óskarsdóttir and Jón Torfi Jónasson investigate the relation between pupils' participation in class discussion and their learning about the human skeletal system and other organs in a class of six year-old pupils. To determine what they had learned, the pupils were asked to produce drawings before and after the teaching. The pupils' participation in the class discussion during the course of teaching was given values on a scale from 1–8, the most talkative receiving the value 1 and the least talkative (or most quiet) the value 8. The study showed that the less talkative the pupils were in the discussion, the more they actually gained from the teaching. The study suggests that it cannot be assumed that participating in classroom discussion during the learning process is a necessary precondition for learning.

In their article *Researching science learning from students' view – the potential of headcam*, Merethe Frøyland, Kari Beate Remmen, Sonja Mork, Marianne Ødegaard, and Torgeir Christiansen discuss the potential of small head mounted camera (headcam) to collect video data indicating student learning processes in science across time and settings (classroom and field). Empirical examples were given from two Norwegian research projects: one on integrating science inquiry and literacy in elementary school and the other on learning geoscience through fieldwork in upper secondary school. These examples were used to demonstrate the potential contribution of headcam to science education research. The authors propose that headcam videos provide opportunities for observing features of science teaching and learning from new angles: following students during movement, connecting students' verbal interactions and interaction with physical objects, students' written products in the making, and students' development of understanding over time. However, the authors also experienced that headcam videos exposed some unwanted observations. In the discussion of implications, the

authors address the advantages and limitations of using headcams, including concerns arising from unwanted observations.

The article *Scientific literacy as social practice: Implications for reading and writing in science classrooms* by Gard Ove Sørvik and Sonja Mork provide an introduction to a view of literacy as social practice for science education. This view of literacy builds on the idea that reading and writing are best regarded as situated social practices involving text, rather than as a set of decontextualized and universally applicable skills. The authors draw on sociocultural perspectives on literacy to show how these perspectives inform our understanding of literacy in the context of school science. The authors use research literature, mainly concerning the role of text in science education, to present a framework for approaching literacy in science classrooms from a sociocultural perspective. Finally, there is a discussion about how a social view of literacy enables us to consider how literacy occurs in contexts relevant to a transcending science subject for scientific literacy.

The aim of the paper by Eva Kellner and Iris Attorps, entitled *Primary school teachers' concerns and needs in biology and mathematics teaching*, is to provide insights into nine primary school teachers' concerns and instructional needs in biology and mathematics, grades 1 to 6. By using Content Representation, combined with Learning Study in an action research project, teachers were encouraged to reflect on their conceptions, processes of instructing and pupil learning. From concerns articulated by teachers three instructional needs emerged: to make subject progression, especially in biology, and pupil learning more visible; to develop mathematics teaching in order to change pupils' views of the subject; and to develop teachers' subject matter knowledge and teaching in an ongoing collaborative process. The authors argue that in order to stimulate teacher professional development it is important to make teacher concerns and thereby needs explicit.

In the curriculum development section, the article *Norwegian master educations in natural science for lower secondary school – large differences in courses offered and size of master thesis* by Magne Olufsen, Solveig Karlsen, Monica Andreassen, and Andy Sortland focuses on the masters level in science education in Norway. Currently, the majority of lower secondary school teacher education students take a four-year education in Norway. This education will be extended to a five-year master education from 2017. There is an ongoing debate in Norway about the content of the new teacher education programs. In 2010, the Arctic University of Norway (UiT) began the first integrated five-year master education for lower secondary teacher education students in Norway. This program is described in the article, with a focus on the subject natural science in the 5–10 level education. UiT has made progress regarding the difficult link between the student's school practice and their education at the University. There are four teacher education colleges/universities in Norwegian offering a master degree in natural science/pedagogical content knowledge for teachers in lower secondary school. These master educations are relatively different in structure, and especially the subjects offered and the size of the master thesis is considerably different.

The contribution by Claas Wegner and Friederike Strehlke to the curriculum development section is entitled *The Benefits of the German Science Project 'Biology Up Close'*. During workshops at university, participating pupils aged between 10 and 18 years had the opportunity to 'grasp' scientific phenomena through conducting experiments in a motivating way. The article describes the project and also its beneficial aspects enabling pupils from regional schools to experience biology in a vivid way at university laboratories. The workshops were planned, organized and held by teacher students. This in turn helped them to improve and reflect on their teaching skills. Finally, the article presents how the project promotes the pupils' interest in science in a conclusion.

We hope you enjoy your reading!

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