

NorDiNa Editorial 2 2023

Welcome to the second issue of NorDiNa in 2023.

Karin Stolpe and Andreas Larsson's article "*Let's go look inside the folder*" – *A teaches way of structuring spatiality when teaching programming* investigates spatial ability by means of an analysis of verbs used by a teacher that indicate motion. The three most common verbs, surf, drive and go, were chosen for systematic identification of metaphors in scenes. The results indicate that "*kõra*" ('drive') has divergent meanings in the context of web server programming, compared to their most basic meaning. However, since "drive" has its specific meaning in the context of programming, the metaphor has been conventionalised. For the verbs "surf" and "go" the metaphoric use indicate a motion into a confound area. The motion has the direction "in" or "out", which gives some indications of spatiality. One of the conclusions from the study, also an implication, is that use of the verbs in programming is not in line with the students' colloquial way of using them.

The study *Fact-value discourses in 19 analyses of genetics in biology textbooks: A critical review* by Jostein Sæther make use of content analysis of previously conducted reviews. The general background for this review is an underlying interest in combining and integrating academic achievements and value(s) education in the context of science education in the field of genetics and human beings while, at the same time, realizing the challenges in practicing the principle of interdisciplinarity. The study falls into two parts: first, a qualitative interpretative content analysis and second, a quantitative approach by counting value-related words. Four discourses were identified on a continuum, from single-academic-discipline-oriented discourse (based on the natural sciences) to interdisciplinary value-oriented discourse involving the social sciences and/or the humanities with their related concepts and debates.

In the article *Crawly things – second graders drawings in science*, Charlotte Aksland analyses drawings of crawly things and their context from 7-8 years old pupils. In addition, focus group interviews with pupils about their drawings were conducted. The study shows that the students' personification of the small animals decreased considerably from drawing 1, which they drew before the science lesson, to drawing 2 which they drew after the lesson. The natural context of the drawings, on the other hand, increased after they had observed and examined the small crawlies in nature. In the interviews with the researcher the students expressed processes and stories that were found in their drawings.

Liisa Lavonen, Anni Loukomies, Jenni Vartiainen and Päivi Palojoiki's article *Promoting third grade pupils' learning of science knowledge through project-based learning in a Finnish primary school* investigates scientific practices during a Problem Based Learning (PBL) module. The topics selected were familiar to pupils, such as the dissolving of sugar and rising of dough with yeast. The study sheds light on the type of knowledge the pupils communicate with while they are involved in scientific practices and creation of digital artefacts. The qualitative content analysis revealed that the pupils engaged in factual, conceptual, procedural, and metacognitive knowledge in PBL collaborative activi-

ties. The analyses described pupils' interactions and actions when they employed these different types of knowledge. In conclusion, PBL modules based on familiar everyday contexts can support primary pupils learning of scientific practices and use of versatile types of knowledge.

In the article *Teacher use of questions when students plan an experiment* the authors investigate different forms of teacher questions. Anne Bergliot Øyehaug, Kristin Ebbesen, Lisa Lunde and Anne Marit Vesteraas Danbolt have made a case study and analysed how teachers scaffold student learning through both open, closed, influencing and orienting questions. The results demonstrate that different forms of questions have different purposes connected to the student's language and understanding of science.

Arne Stormo and Jorunn Grip's article is entitled *Can exploratory assignments with group dialogues lead to increased learning outcomes in practical work in upper secondary education?* Practical work has a significant place in physics teaching but is often performed according to a recipe and with little reflection among the students. The authors wanted to enhance the learning potential by letting students work with experiments in heterogeneous groups. They listened to the group dialogues when the students plan the experiment and when they work with the results. They find five prominent themes in the student dialogues: Students encourage each other, challenge each other academically, substantiate their claims, connect theory to the practical work they do, and interpret the meaning of formulas and units. These are qualities that have been shown to promote learning and illustrates how the students are able to use physics during their dialogues.

We hope you enjoy your reading,

Clas Olander, Mats Lundström & Are Turmo
Editors of NorDiNa

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