Editorial NorDiNa 2/2016

Welcome to the second issue of NorDiNa this year. In this issue, we present six research articles and one contribution to the curriculum development section.

Barbara Sageidet's paper entitled "Norwegian early childhood teachers' stated use of subject-related activities with children, and their focus on science, technology, environmental issues and sustainability" presents Norwegian early childhood teachers' own evaluations of their practices, interests and attitudes, and of their kindergarten's learning culture, related to daily activities with children. Sageidet examines the focus and priority given to activities related to science, technology, environmental issues and sustainability, in comparison to other subjects. The results show that most of the early childhood teachers hold positive attitudes towards science, and are personally interested in science-related subjects. They state that their activities with the children mainly consist of nature- and outdoor-related subjects, followed by social competences, language stimulation and physical education. Activities related to chemistry, geology, physics, technology, gardening and sustainability are infrequent. Science is a natural part of many interdisciplinary themes. Sageidet argues that appropriate science competence among early childhood teachers is needed to increase children's opportunities to gain specific science-related experiences.

The article by Irmeli Palmberg and colleagues entitled "Student teachers' conceptions and understanding of basic knowledge in ecology in Denmark, Finland and Sweden" reports from a quantitative and qualitative study of student teachers' knowledge of core concepts and processes in ecology. The study confirms the low level of student teachers' understanding of these issues, although a majority consider these issues to be basic knowledge for their teacher competencies. Many of the student teachers did not know what biosphere or succession is. They also had difficulties in explaining what a seed contains and what its role is in the plant's lifecycle. Several student teachers also had difficulties to explain why photosynthesis is important and how it works. The increasing ecological and environmental illiteracy is discussed as one of the implications for teacher education.

Nanoscience and nanotechnology (NST) is a rapidly developing knowledge area and several actors have identified a need for incorporating NST in school science curricula. The many uncertainties on potential risk and benefits of NST also open up for using socio-scientific issues (SSI) in NST teaching. Margareta Enghag and Linda Schenk's article "Nanoteknik och riskbedömning som nytt kunskapsinnehåll i gymnasiets naturvetenskapliga kurser – en designstudie" present their two first iterations of developing a short, adaptable and easy to implement teaching sequence aimed for upper secondary school physics. The teaching sequence contains content knowledge both about NST and risk assessment and employs traditional classroom teaching, self-study and group discussions. The aims of their work is to explore 1) design-principles for such a teaching sequence, 2) how students present, reason and argument about NST as an SSI and 3) how a simplified risk assessment model will be of use for the students. Enghag and Schenk found that the NST content knowledge worked well together with the risk assessment content knowledge, stimulating student interest and discussion. Students were able to learn basic NST concepts and discuss the selected NST issues from various perspectives. Enghag and Schenk describe the teaching sequence and the design principles that were developed during these two iterations.

Sofie Areljung's contribution entitled "Science verbs as a tool for investigating scientific phenomena – a pedagogical idea emerging from practitioner-researcher collaboration" communicates the pedagogical idea of approaching scientific phenomena through verbs. The idea has sprung from a collaboration between preschool practitioners and a researcher, addressing science education in preschool (children aged 1-5 years). Drawing on a joint problem inventory, the project group aimed to create a teaching model that supports inquiry-oriented approaches to science, and teachers' ability of distinguishing chemical processes and physics phenomena in everyday practice. The core idea of the teaching model turned out to be a list of everyday verbs, connected to scientific phenomena. Starting from verbs appears to help teachers recognise the scientific phenomena involved in children's interplay with the physical world. The verbs guide the formulating of questions that can be answered by scientific inquiry.

The article by Eva Ärlemalm-Hagser and Bodil Sundberg entitled "Naturmöten och källsortering - En kvantitativ studie om lärande för hållbar utveckling i förskolan" studies how preschool teachers understand and work with education for sustainable development. Data was collected by using questionnaires distributed to 187 Swedish preschools. The questionnaires aimed at exploring how the preschool teachers interpret *education for sustainable development* and *environmental education* both as concepts and in practice. The data showed that both education for sustainable development and environmental education were mainly associated with experiences of nature, recycling and reuse of resources. Descriptions reflecting the economic and social aspects of sustainable development were to a large extent missing. The study also showed that these views were reflected in the types of activities the children were provided. According to the authors, the study suggests the need for support for providing children with quality education about sustainability issues.

The contribution by Tomas Persson, Åsa af Geijerstam and Caroline Lidberg, "Features and Functions of Scientific Language(s) in TIMSS 2011", examines differences in language use in different scientific subjects by analysing all grade 8 science items from TIMSS 2011. Four meaning dimensions were identified by the authors as central for analysing what functions different linguistic features fulfil in scientific language. These meaning dimensions concern the levels of *Packing*, *Precision* and *Presentation* of information, and the level of *Personification* in a text. The results showed that language use in TIMSS differs in some ways among the scientific subjects. Average physics language uses more words. Language use in biology shows higher *Packing* and lower *Precision*, while physics shows the opposite pattern. Although items are generally low in *Personification*, the language of physics has higher levels of *Personification*, especially compared to earth science. Language in chemistry often presents information in more complex ways. According to the authors, the study appears to challenge the notion that there is a single scientific language.

The potential of using augmented reality (AR) for educational purposes has drawn attention in recent years. The article by Birgitte Lund Nielsen, Harald Brandt and Håkon Swensen entitled "Augmented Reality in science education—affordances for student learning" presents findings addressing the issue of AR for educational purposes based on a survey distributed to 35 expert science teachers, ICT designers and science education researchers from four countries. The authors found that there was consensus among experts in relation to a focus on 'learning before technology', and that the experts in particular supplemented affordances identified in literature with perspectives related to interactivity, a creator perspective and inquiry based science. Expert reflections were condensed into innovative dimensions in a framework with nine continua. According to the authors, the framework can be used to illustrate how, and to what extent, an innovative educational perspective, such as that focusing on engaging learners in creating and/or inquiring can be addressed in a particular AR design.

We hope you enjoy your reading!

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