From the editors

Welcome to the fourth issue of NorDiNa in 2018. This issue consists of seven scientific articles, an abstract of a recent PhD dissertation, and furthermore an In memoriam.

In the article entitled "Local environment as learning arena for teaching sustainable development", Anja Gabrielsen and Majken Korsager argue that many teachers still report insecurity in how to implement ESD in their practice. Their study examined teachers’ reflections from using the local environment as a learning arena in ESD (6th-9th grade). Results from analysis of semi-structured interviews showed that the teachers experience challenges with the complexity of sustainable development, the ambiguities in the curriculum and time spent if the learning arena is some distance from school. However, the teachers strongly argue for using the local environment as a learning arena in ESD, and their arguments were mainly within four categories: 1) exemplification of various perspectives of sustainable development, 2) authentic and concrete learning, 3) opportunity for action, and 4) affective influences. The results from the study, emphasizing the teachers’ perspective, can contribute to a shift in focus from abstract education policy on what ESD should be, to a focus on contextualized practice.

In their article “Science teacher education for sustainable development: from intensions to realisation” Kristi Marie Jegstad, Astrid Tonette Sinnes, and Sigrid Marie Gjøtterud investigate the role of teacher education programs in the realisation of education for sustainable development (ESD). The authors present findings from a case study in a Norwegian teacher education institution that has the overall aim of educating teachers who can contribute to sustainable development. Data was collected through participant observations and interviews, and, together with instructional artefacts and student assignments, analysed using a model for science ESD. The paper provides an example of how ESD can be realised through a model where ESD is founded on the existing teaching practices. The results indicate that an emphasis on experiential learning and sociocultural learning theory can build a solid foundation for ESD. The authors conclude, however, that the teaching has to be explicit in order to reach all student teachers.

Marianne Løken and Siri Øyslebø Sørensen’s article “Material practices and experiences “kick back”. A socio-material analysis of gendered educational choice” deals with gender and educational choices through analyses of four reports from women choosing technology and science. Personal interest in the subject is an established understanding of what governs the educational choices. Strategies and campaigns to recruit women to science have thus been geared towards waking womens’ interest. In this article, the authors move away from gender as the background variable to explain interest in science, and with empirical examples they show how educational choices can be understood as material practices. The article contributes to an extended understanding of which components are part of
an educational choice, and how these components relate to each other. This may provide opportunities for understanding how educational choices can be influenced through material experiences and practices, both outside and within educational institutions.

Per-Ivar Kvammen and Eli Munkebye present the article "Knowledge about species and field work – evaluation of a teaching program", in which they conclude that the level of knowledge about species has significantly decreased, and that teaching biology outside the classroom has become less common. The authors want to counteract these trends. Their article aims to evaluate a teaching sequence in teacher education where a field course and the collection of organisms were central components. Seventeen months after the teaching sequence, fifteen students took a species identification test and responded to a questionnaire, and four of them were interviewed. Their level of knowledge about species had decreased by 39.1% since they had finished the course. However, the teaching was perceived as relevant for their own future work as science teachers and had positively influenced their interest in nature; the study shows that the teacher students want to emphasize outdoor activities in their future teaching activities. The article discusses the extent to which the elements of outdoor biology and knowledge of species should be afforded greater room in science teacher education in the future. The authors suggest that a bottom-up perspective, where the students start their science course with outdoor practical activities that promote knowledge of common plant species, animal species and biotopes, would be beneficial.

In her article “Primary and secondary school teachers’ views of World Heritage Education and the Kvarken Archipelago as a learning environment“, Ida Berg studies aspects of World Heritage Education (WHE). In World Heritage Education students are expected to know, to cherish and to act in favor of World Heritage sites and communities. The aim of the study, which combines quantitative and qualitative methods, was to investigate teachers’ views of WHE and the Kvarken Archipelago as a learning environment. A total of 105 teachers within Finnish primary and secondary education answered a questionnaire. The results indicate that teachers struggle to meet UNESCO’s aims of WHE. The respondents primarily emphasize students’ knowledge of world heritage sites. A few respondents highlight the skills and experiences needed to reinforce young students’ commitment to preserve world heritage sites, and to help close the gap between school and society. A more distinct connection to Problem-Based Learning (PBL) and Education for Sustainable Development (ESD) is discussed in the article as one of the pedagogical implications for the development of WHE.

The article “Preschool teachers talk about science – Positioning themselves and positioning science” by Karin Elisabet Due, Britt Tellgren, Sofie Areljung, Christina Ottander and Bodil Sundberg discusses how preschool teachers, who include a scientific content in their practice, describe their practice and their view of science in preschool. The study is based on 20 interviews in nine Swedish preschools. The stories reveal a strong position for the pre-school curriculum and traditions. A prominent storyline is that Science in preschool is something different from science in school. This includes an anti-authoritarian view with a focus on “the competent child”. The preschool teachers affirm fantasy, creativity and intuition as a part of science and they position science as easy to access. They also position themselves as pedagogues competent to manage science in preschool. One of the dilemmas is about letting children’s interests and initiatives drive the activities while educators’ curriculum-based goals have certain intentions to fulfill.

In their article “Technology, system boundary, and human: Technology teachers’ conceptions of what technological systems are”, Patrick Schooner, Claes Klasander, and Jonas Hallström study teachers’ conceptions of technological systems. The subject matter of technological systems is central in compulsory school technology education in Sweden. The authors claim that technology teachers would need more support in their endeavors to interpret the curriculum, as both educational and philosophical research lack a clear answer to the question of what technological systems are. A better conceptualization of technological systems could also facilitate communication between teachers and
students, and even improve learning about systems. The aim of the study was to investigate Swedish technology teachers’ conceptions about technological systems. In the study, 11 technology teachers in compulsory education from various parts of Sweden were interviewed. The results showed that in the teachers’ collective depictions of technological systems, the first two system properties focused on the technological core of the system, closely related to a philosophical conception of technology as objects. In contrast, the last two system properties illustrated the teachers’ descriptions of technological systems as something that is closely connected to a socio-technical understanding of systems where humans play a significant role for their evolution. There was one exception to this, namely how the systems are controlled, and here the teachers were ambivalent as to how much humans can intervene. The authors conclude that the teachers’ conception of technological systems as objects and the uncertainty about human control over these systems, are two obstacles to well-designed systems teaching that will lead to technological literacy for students.

Following the sad news of the passing of Staffan Andersson, his colleagues from Uppsala University and other universities have written an In memoriam article about Staffan and his contribution to science education.

We hope you enjoy your reading!

Are Turmo & Carl-Johan Rundgren
NorDiNa – Nordic Studies in Science Education

NorDiNa is a Nordic journal of science education publishing scientific articles in the field of science education; both research based and reflective perspectives. Articles on related topics such as technology and geography are also welcome. In addition to scientific articles we publish descriptions of curriculum development and ongoing projects and short abstracts of dissertations in the field. Contributions are in English as well as in Swedish, Danish and Norwegian. All articles have an English abstract regardless of the article’s language.

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