Welcome to the fourth issue of NorDiNa in 2019, which is a special issue on sustainability and science education in early childhood. In this issue, we present six different papers on this theme.

Science-related activities and concepts are an essential part of Education for Sustainable Development (EfS/ESD) in general, and of Early Childhood Education for Sustainable Development (ECEfS) in particular. Yet, it is challenging to promote children’s understanding of complex topics and concepts and to integrate sustainability and science education. This special issue has a focus on science and interdisciplinary related subjects, and the importance of these subjects for ECEfS in kindergartens and preschools.

This volume is an initiative of the science and sustainability networks at the two Norwegian Research Centers on Early Childhood Education, ‘KINDknow Centre for Systemic Research on Diversity and Sustainable Futures’ at the Western Norway University of Applied Sciences (HVL), and ‘FILIORUM – Centre for Research in Early Childhood Education and Care’, at the University of Stavanger (UiS). At both centers, Early childhood education has a dedicated research group with a special focus on sustainability; ‘Utdanning for bærekraft’ at the HVL, led by Marianne Presthus Heggen, and ‘Sustainability, STEM and Physical education’ at the UiS, led by Barbara Maria Sageidet. These networks collaborate with, and are an integrated part of the international network “Transnational Dialogues in Research in Early Childhood Education for Sustainability (TND)”. The TND was established in 2010, by Julie M. Davis (Queensland University of Technology, Brisbane, Australia) in collaboration with Eva Johansson (UiS). The globally spread multi-disciplinary members of the TND meet on workshops and conferences and their changing subgroups have published a variety of international papers and books. While most of the contributors to this issue are members of the TND, some additional researchers were personally invited.

In Norway, a government’s white paper integrated the kindergarten into the ‘lifelong learning processes’ since 2006, and the government’s strategy for the promotion of science and mathematics education (‘Realfagssatsingen’) 2015-2019, also included the kindergarten. Today, the kindergarten’s role within EfS/ESD is increasingly better defined, and sustainability is one of the superordinate core values in the Norwegian Framework Plan for the content and tasks of kindergartens from 2017. The kindergarten is traditionally a part of Humanities. The Humanities and social sciences are essential parts of EfS/ESD/ECEfS. Yet, this issue will focus on the crucial role of science and related subjects within both the social, ecological, economic and political dimensions of education for sustainability, especially in the kindergarten. By using various methods and theories, this special issue will show how science can contribute to an interdisciplinary education for sustainability. Science education shall meet society’s need for special knowledge, as well as the individual human’s search for meaning and identity. Therefore, it is important to introduce even small children to (natural) interrelationships, providing them opportunities for influence and agency.
With this special issue, we want to offer new impetus to both the fields of research and practices, to further develop the connections between ECEfS and the sciences and related subjects. This special issue will also reach out to early childhood teachers and researchers to increase the national and international networks and to inspire transformative educational practices.

The contribution “World Environmental Education Congresses and the ’sciences’ role within education for sustainable development”, by Barbara Maria Sageidet, provides a look at the history of environmental education, and case studies of the World Environmental Education Congresses in 2015 and 2017. While both conferences had a rather limited focus on children’s learning related to scientific basic understandings, a new observation of indigenous perspectives underlined the importance of scientific knowledge. The study concludes that initial understandings of basic scientific concepts and interrelationships may inspire even small children to further develop understandings and creativity in all subjects, and enable them to become informed decision-makers and active participants in a sustainable society.

Bodil Sundberg, Christina Ottander, Sofie Areljung, and Karin Due investigated “Opportunities for Education for Sustainability through multidimensional preschool science”. They discuss how preschool science education may empower children’s critical thinking and acting for change. In fourteen preschools, they have previously identified examples of ‘multidimensional science teaching’, hence, teaching that intertwines children’s science learning with emotions, fantasy, play and aesthetic modes of expressions. They re-analysed these activities through an EfS lens. The results show how multidimensional science teaching with the teachers’ active participation and guidance, provides opportunities for children to develop agency, empowerment, creative problem solving, and connectedness with the environment and with key elements in EfS.

In their article “Between the global and the local – preschool teacher students meaning-making on Education for Sustainability in Swedish Early Childhood Education”, Eva Årlemalm-Hagsér and Jonna Larsson used critical text analysis to study early childhood teacher students’ essays on their understanding of how education for sustainable development in the kindergarten may look like. Analysis reveals how the students integrate global and local questions and various dimensions of sustainability, especially STEM-related themes, through different strategies for their work with the children. The results indicate that sustainable development can be used as a theoretical and didactical knowledge base that contributes and enables children to participate actively in understanding the world, developing their creativity, curiosity, critical thinking, and agency.

“Children as eco-citizens?” is the contribution by Marianne Presthus Heggen, Barbara M. Sageidet, Veronica Bergan, Nina Goga, Liv Torunn Grindheim, Inger Wallem Krempig, Anne Myklebust Lynngård, and Tove Aagnes Utsi. Interdisciplinary inquiry and a comprehensive literature review helped the researchers explore the concept of eco-citizenship and young children. They elucidate the relationships between child-sized eco-citizenship and discourses of early childhood like children’s connection with nature and science and children’s curiosity. They further explore the potential for a focus on eco-citizenship in early childhood education, related to gardening and harvesting activities, and investigate how children’s literature may contribute to position and empower children as being and becoming eco-citizens.

In her article, “The Blue Car in the Forest: Exploring Children’s Experiences of Sustainability in a Canadian Forest”, Debra Harwood examines different ways of thinking about young children and learning for sustainability by using a post-humanism conceptual framing. She explores Canadian nature-school children’s (3-4-year-old), and their two teachers’ critical engagement with a blue car, abandoned in the forest, over a year. The participatory approach combines ethnography and case study. Positioning children in their outdoor play space with the blue car, the study reveals new ways of noticing intra-actions between human and more-than-human matter, illuminates interrelationships and complexities of the dimensions of sustainability, and promotes critical and transformative pedagogies.
Denise Hodgins and Narda Nelson address the question of ‘better for whom?’ in their contribution “New Obligations and Shared Vulnerabilities: Reimagining Sustainability for Live-Able Worlds”. Emerged from their pedagogical narrations, they share three stories from their ongoing action research study on place-based inquiry with young children in Canada. Using Common World frameworks from more-than-human relational ontology, indigenous knowledge, and feminist environmental frameworks, they draw on moments from forest inquiries to explore the logics underpinning destructive patterns that children are learning. They propose a common worlding approach in early childhood education to shift anthropocentric and colonial understandings about ecologies and our place, and to encourage more connected and holistic thinking.

Barbara Maria Sageidet, Are Turmo & Carl-Johan Rundgren
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