



◀ **Figure 1.** The sheep, the wool and hand spinning of yarn. Photo: Mette Gårdvik, 2023.

Art-science Integrated Sustainability Education in the Arctic Region

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Climate change, industrialisation and the extraction of natural resources change the social and cultural life in Arctic communities. The urgency of radical social transformation to sustainability underscores the necessity of alternative approaches which communities can learn about, relate to, and collaboratively act for sustainability in a local context (Trott et al., 2020). This requires the agency of education to address ecological, social, and cultural challenges in the North and the Arctic. Art has shown to be a way of expressing feelings and understandings of the changes and a way of building socially and culturally sustainable communities, both in

Indigenous and multi-cultural communities. It may also link and bridge various groups and segments to secure freedom of expression, democratic participation, and access to art and culture for all people living in the Arctic (Jokela et al., 2021).

In this article, we want to share experiences from two AAE workshops to reflect how art-science integrated sustainability education can engage participants in transformative learning processes contextualized in real-world problems supporting social justice and well-being for young people in local communities in the Arctic.

Theoretical grounding

Despite an increased focus on the importance of place-based, emotionally engaging and interdisciplinary teaching in Education for Sustainable Development (ESD) (Ojala, 2017; Stoll et al., 2022), the interconnection between cultural and ecological aspects is barely emphasized. Much of prevailing sustainability education is perspective rather than participatory. The learners are more often taught 'what is' than invited to imagine 'what if'. New methods are needed that allow community members to critically engage with the present, imagine a better future and act for sustainability today, using the transformative potential of the arts for social change (Trott et al., 2020).

The concept of ecocultural sustainability focuses on the connection of the local communities to the place (Jokela & Huhmarniemi, 2021) and can motivate students to engage in sustainability issues in their local environment. ESD projects related to local ecosystems, cultural identity and cultural heritage require different forms of knowledge, especially from Science and Arts and Crafts (Stoll et al., 2022). Science and Arts and Crafts are often considered opposites despite both subjects being used to work practically, and exploratively and relate to both nature and the empirical. Knowledge of science is fact-based and keen 'to know'. It is at once inductive, abstract, and intersubjective.

Admittedly, basic science knowledge plays a key role in environmental education, but when the task is to facilitate students connecting with the world, more than this type of knowledge is needed. What we need is an education that meets the world, that facilitates rich, aesthetic experiences, and that enables and develops the diverse relationships we have with the

world. To achieve this goal, both the natural sciences and the arts in the school, however different they may be, must move in the same direction (Østergaard, 2013).

The Arts and Crafts subject is based on developing knowledge of 'know-how', it is specific, subjective-intuitive, bodily-sensitive and connected to feelings. Art education allows us to speculate ways and means for relating, knowing, and doing differently in the long now (Trott et al., 2020). The opportunities afforded to learn through art opens for speculating about what if and what might and explores ways of de-colonising Euro-centric positions within the construction of knowledges. Social Art Practice and Community Art are about empowering and liberating individuals and communities to achieve personal, social, cultural, or political change. The purpose is to arouse emotions create awareness and commitment in individuals and stimulate dialogue between people to change their behaviour to increase quality of life (Permar, 2019; Hiltunen, 2008; Austin, 2008).

This is directly linked to the concept of the 'cultural dimension of sustainability', which is about increased social interaction and a sense of belonging within the local community, through collaboration (Illeris, 2017; Jónsdóttir, 2017). Mantere (1995) defined art-based environmental education as a form of learning, to develop understanding and responsibility for the environment, where the relationship between the individual and their environment is central. Her research shows that sensitivity to the environment can be developed through artistic activities. Innovative people with the ability to work interdisciplinary prove to be adaptable and creative problem solvers. Students



Figures 2–3. Participants explore marine organisms through a scientific and artistic approach where the in-depth learning occurs in the movement between the subjects. Photos: Mette Gårdvik, 2018.

must get the opportunity to practice these skills through education (Coutts, 2013; Eisner, 2002). Community and eco-art are creative learning arenas that generate new insight into their environment and provide knowledge and experience about local materials and culture (Gårdvik, 2011; van Boeckel, 2014).

Experiences from the AAE workshops

In the art–science integrated workshop *Sámi starry sky*, we invited participants to engage in the Sámi mythology. A story about a cosmic hunt set in the starry sky is conveyed in authentic settings. Unlike the known Greek mythology, the Sámi story is closely rooted in our northern way of living. The activity seems to engage pupils,

students, and teachers, especially in the outdoor activities when participants are challenged to project the hunting scene from a star map onto the ground. A holistic and authentic setting and being outdoors were important for the activity to engage and to be remembered. The participants get the opportunity to reconnect to this part of our common cultural identity through artistic expression. The artistic exploratory methods could contribute to bringing different Arctic populations together, talking about their myths under our common Arctic starry sky.

In the workshop *Sustainable portraits of plankton*, we used art–science integration to facilitate collaborative sustainability action in local settings with the spotlight on plankton.

Planktonic organisms are invisible to us and are therefore abstract. The goal of this community art workshop was to learn about the importance of planktonic organisms in the Arctic Sea, which have a huge importance for human settlements in Arctic coastal communities. We wanted the participants to become familiarized with plankton by studying them in microscopes, then drawing them and creating large examples on the beach using community art.

The participants' creative work showed how learning took place in the movement between the subjects. The working methods promoted transformative learning not only cognitively but with the entire sensory apparatus. Using exploratory and practical aesthetic methods, participants became acquainted with plankton from their regions and developed positive attitudes to the ocean and a better understanding of its eco-cultural importance.

Conclusion

Our experiences from the workshop showed that artistic expression appears as an active contribution to society and gives students insight into the local community's various issues, like colonialization with Western worldview and marine exploitation.

Artistic ways of expression can help to raise issues related to sustainability in the Arctic, both of a cultural and ecological nature. In this way, an artistic expression about these issues reaches a different and wider audience than a scientific inquiry. The expression can have a greater role as a carrier of both scientific knowledge and culture. They are important contributions since they describe the impacts when nature is viewed through cultural and art-based aspects. Sensory situated understanding and knowledge communication through organisms, materials and cultures emerge in artistic expressions. ●

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