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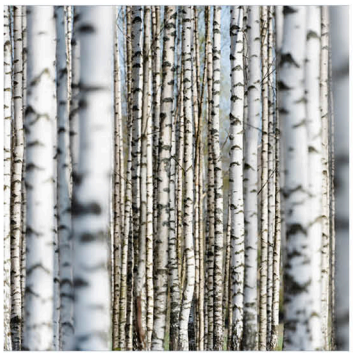
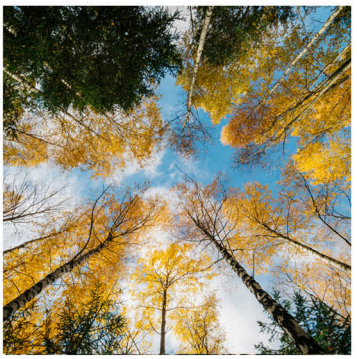
Sustainability Education in the Nordic Countries

SUSTAINABLE LIVING



#sustainableliving



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This publication is also available online in a web-accessible version at:
https://pub.norden.org/nord2024-038

1. Introduction

The Nordic countries aim to rank among the most sustainable countries in the world, according to various vision statements and policy documents, many of which highlight the importance of education for reaching this goal (Nordic Council of Ministers, 2019; 2022). However, the Nordic countries approach sustainability differently, and educators understand the concepts of sustainability and sustainable education in diverse ways. Within the Nordic region aspects related to policy and teacher education have already been documented (Jónsson et al., 2021), and various local studies on sustainability education have been conducted. However, there is still limited knowledge about the bigger picture of actual practices within schools and other educational settings, as well as at various administrative levels.

In the introduction to the document *Education for Sustainable Development Goals: Learning Objectives* published by the UN in 2017 the authors write:

> **People must learn to understand the complex world in which they live. They need to be able to collaborate, speak up and act for positive change (UNESCO, 2015). We can call these people "sustainability citizens". (UN, 2017, p. 10)**

Yet, despite extensive work, both locally within individual countries and globally, the climate continues to deteriorate, democracy and human rights are threatened, inequalities continue to increase, and the number of refugees worldwide is on the rise and those most vulnerable are often met by punitive systems rather than humanitarian empathy. The challenge for those working in the educational sector is to make change towards sustainability possible. The challenge is not to merely *improve* the current educational paradigm but to *thoroughly change* it with the aim of changing society. Therefore, the change we are talking about is more than a change of teaching methods or the introduction of a new subject. While 'whole school approach' sounds right in this context, since the change must be holistic and not just a limited aspect of the school, nothing short of 'whole society approach' is needed.

Education has always been the backbone of society; it is interwoven into the culture and shapes the way individuals and nations think, feel and act. Through the ages, education has answered the demands of the present to draw on experience for past challenges and problems, making headway toward future solutions. At present, however, past experiences may not be sufficient to pave the way. Past

solutions along with current cultural values have resulted in the detrimental situation in which humanity finds itself right now. What is needed is a new vision, new imagination, perhaps new hope. Nobody has ever experienced what a sustainable society at the beginning of the 21st century might look like (Iyengar & Kwauk, 2021).

To encompass sustainability, it will not suffice to tell educators, students, and academia what to do. Education must be embodied with the understanding of sustainability through the head, heart, and hand ideology (Olsen et al., 2024) so that people may become true sustainability citizens. In addition, now living individuals cannot alone be blamed for the unsustainability situation. Nobody can fix this without joint efforts. The crises the world faces today is a result of human practice for centuries and depend on deeply rooted norms and mistreatment of human beings and other forms of nature for a long time.

1.1 A Paradoxical Situation

Within the Nordic countries, the situation concerning sustainability is somewhat paradoxical. According to various scales, the Nordic countries are leading the way, and the politicians are proud to present the Nordic region as performing well. In this spirit is the vision for 2030 presented by the Nordic prime ministers and the Ministers for Nordic Co-operation in autumn 2019:

> **We in the Nordic countries – Denmark, Finland, Iceland, Norway, Sweden, the Faroe Islands, Greenland and Åland – are determined to lead the way and find good solutions for the future. We listen to our young people, and we agree with them that the time has come for concrete climate action.**
>
> **The good news is that it is possible. We can change our lifestyles, production methods and patterns of consumption, balance out the use and protection of natural resources on land and at sea, and achieve sustainable development for the future. We can safeguard democracy, inclusion, integration and mobility. This sends a clear signal to the rest of the world that real and positive development is possible and that we are turning words into action. (Nordic Co-operation, 2019)**

The tone here is proud and optimistic, there is a conviction that the Nordic countries can send the rest of the world a positive message that sustainability is an achievable goal. The tone is similar in another publication from 2019, *A Good Life in A Sustainable Nordic Region: Nordic Strategy for Sustainable Development 2013-2025*. The following quote from the introductory chapter shows this:

> The Nordic countries took a position in sustainable development of society from an early stage. The Nordic welfare model is based on all people having equal value, respect for human rights, justice, equality, good administration, low level of corruption, democracy, and promotion of health and wellbeing. Gender equality, openness and commitment are other important pillars. The success of the Nordic countries is also a result of affirming, from an early stage, economic openness and free trade. Decades of targeted environmental initiatives have improved the status of the environment in many areas. The Nordic region is rich in natural resources and environment-based sectors such as forestry, agriculture, fisheries, and mining. This is important for ensuring vibrant rural areas. To strengthen the economy and sustainable development, it is important that these resources are used but not depleted. Sustainable administration strengthens the economies of the Nordic countries. (p. 7)

Our report does not question that many positive things are carried out in the Nordic countries – it is a good place to live, and the region is progressive in many ways. However, the quality of life in the Nordic Countries is excessively carbon and resource intensive and far from being sustainable.

Various measures calculated both globally and for individual countries make this evident, such as the Environmental Footprint or the Earth Overshoot Day. The global measure is defined in the following way:

> Earth Overshoot Day marks the date when humanity's demand for ecological resources and services in a given year exceeds what Earth can regenerate in that year. (Earth Overshoot Day, n.d.)

This is not a precise measure but can illustrate that real change is urgently needed. In 2024 Earth Overshoot Day fell on August 1st and has, with minor exceptions, been moving backward since 1970 as shown in Figure 1. The figure illustrates the global situation, or rather the accumulated situation where the impact of people from across the globe is combined.

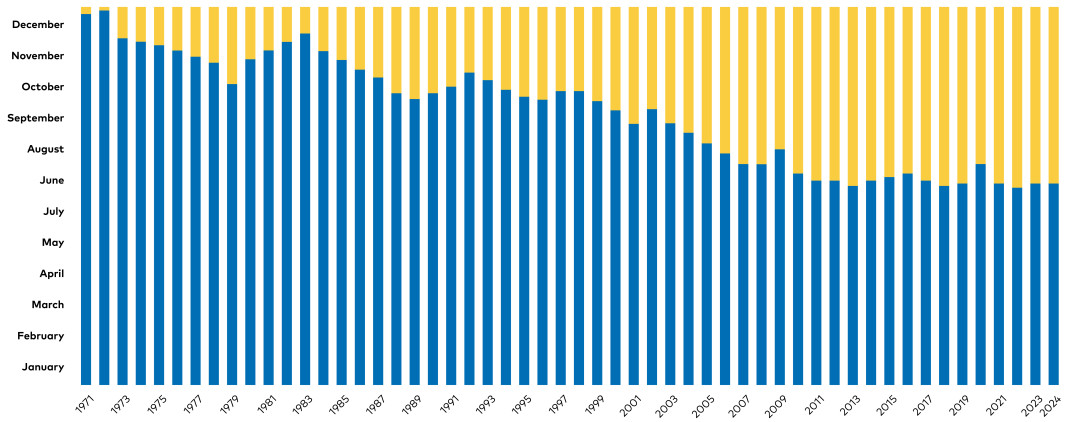

Figure 1: *Earth Overshoot day from 1971 to 2024.*

Earth Overshoot Day has also been calculated for each country with Country Overshoot Day defined in the following way:

> **A country's overshoot day is the date on which Earth Overshoot Day would fall if all of humanity consumed like the people in that country. (Earth Overshoot Day, n.d.2)**

Considering how the Nordic countries are doing according to this measure, provides a picture that is far from the proud – even if a little concerned – message from the Nordic Ministers and the Nordic Council's sustainability policy documents, as evident in Table 1.

Table 1: Country overshoot days for the Nordic countries from 2018 to 2024. (Earth Overshoot Day, n.d.1)

	2018	2019	2020	2021	2022	2023	2024
Denmark	Mar 28	Mar 28	Mar 28	Mar 26	Mar 28	Mar 28	Mar 16
Finland	Apr 8	Apr 8	Apr 5	Apr 10	Mar 31	Mar 31	Apr 12
Iceland*	Feb 28	Feb 28	Feb 28	Feb 28	Feb 28	Feb 28	Feb 28
Norway		Apr 18	Apr 18	Apr 12	Apr 12	Apr 12	Apr 12
Sweden	Apr 4	Apr 4	Apr 2	Apr 6	Apr 3	Apr 6	Apr 21

* The Global Footprint Network does not publish comparable data for Iceland. Estimates for Iceland vary greatly, but most calculations locate the Overshoot Day for Iceland no later than the end of February (Jóhannesson et al., 2018).

The Nordic countries' Earth Overshoot Days for the last six years are compared with the Global Earth Overshoot Days in Figure 2. What might be called the sustainability line, December 31, which is the time when the overshoot day must be if people want to live sustainably. Figure 2 indicates that the Nordic countries are among the least sustainable in the world, with only a handful of countries performing worse. From a European perspective, the Nordic countries radically fail, with only Luxembourg, Belgium, the Netherlands, and Austria performing worse in 2024.

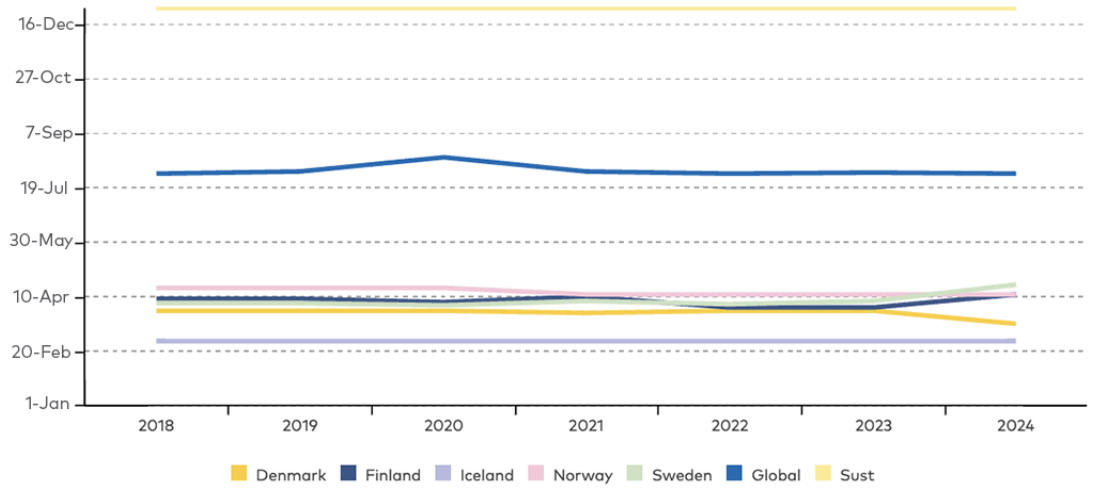

Figure 2: Earth overshoot days for the Nordic Countries compared to the global earth overshoot day (beginning of August) and the sustainability line (December 31).

The Nordic countries have also failed when it comes to biodiversity protection. In December 2022, the Global Biodiversity Framework (GBF) was adopted during the 15th COP meeting in Montreal (Convention on Biological Diversity, 2024, Feb 14). The members adopting the framework were "alarmed by the continued loss of biodiversity and the threat that this poses to nature and human well-being" and suggested urgent action to preserve and restore biodiversity. Although the Nordic Countries have a long tradition of environmental politics and environmental education, some having entrenched policies on public access to nature and outdoor life or "friluftsliv" (Gelter, 2000), they have also failed in this respect as Ulla Agerskov observes in her blog "Biodiversity Crisis in the Nordics":

> **The Nordic countries, although prosperous, environmentally conscious and relatively rural, are a part of the sad statistics of declining biodiversity. Recent trends in farmland bird populations, a key indicator of biodiversity health, reveal troubling declines across the Nordic region. This stark reality underscores the urgency for Denmark, Finland, Norway, and Sweden to intensify their conservation efforts and lead by example. (Agerskov, 2024)**

These Earth Overshoot Day measurements show the Nordic paradox of sustainability. While the Nordic countries have, in many ways, taken a leading role in sustainability and sustainability education, they remain among the most unsustainable countries in the world.

1.2 Young People's Worries about the Future

Environmental issues, not least the unfolding climate changes, are challenges that young people in the Nordics and other countries constantly encounter. Through the media horrible consequences for people's ways of life are daily on display. Such reports might be about drought in southern Europe, forest fires in California, massive floods in Pakistan, or rising sea levels in the Maldives. But young people around the globe respond differently to such reports.

Hickman et al. (2021) conducted a large-scale survey concerning climate anxiety among 10.000 young people, age 16–25, from ten countries, with Finland as the only Nordic country represented. Figure 3 below shows that young people from affluent countries such as Finland, the USA and the UK are not as worried about climate changes compared to young people from other less affluent countries such as Brazil, India, and the Philippines.

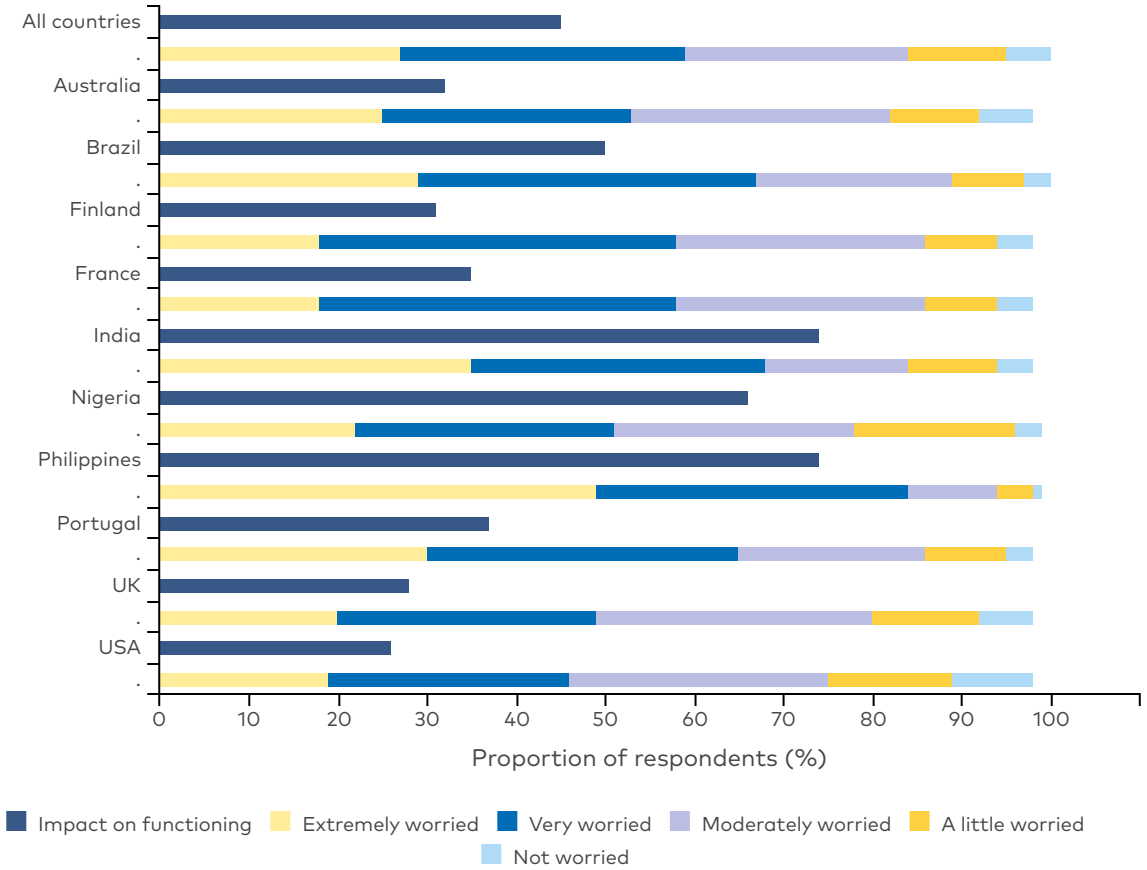

Figure 3: Worries about climate change and impact on functioning. Data are shown for the whole sample (n = 10.000 age 16-25, n pr. country = 1.000) (Hickman et al., 2021, p. e866).

As previously indicated in Table 1, the Nordic countries reached their overshoot day already around the beginning of April 2024. The people of the Nordic countries are, thus, among those with the highest impact on the environment while, at the same time, the young people from Finland — and supposedly also the other Nordic countries — are less worried about climate changes than many others. This is a concern for education. If education is supposed to be the means to meet challenges to sustainability and lead the way out of current climate crisis, one would expect young and "well educated" people to be worried about the situation with their feelings having a significant impact on their functioning. Given the presence of challenges to sustainability in curricula and media Heinrich Pestalozzi's head-heart-hand metaphor may prove useful to unpacking this disconnect. Although young people have some knowledge about the climate crisis and other sustainability challenges (head, cognitive aspect), the numbers indicate that the knowledge has not reached the heart (emotions), or the hand (action) (Jordan, 2022; Singleton, 2015).

Young people have been bombarded with information on climate change through mainstream media, social media, and the school system their whole lives. For some, this flow of information has resulted in climate anxiety, as well as feelings of anger, guilt and helplessness (Hickman et al., 2021, p. e867). In the paper "Climate Change and Culture: Apocalypse and Catharsis", Carien Smith argues that catastrophes have become a consumer product through the media leading to responses where people often release anxiety — and experience catharsis — through superficial responses without engaging significantly with the issues. Smith puts forward an empirical case that supports the argument:

> **It is not only through fiction that the catharsis is produced but also through spreading information on climate change in the media and social media. We release anxiety about the issue—we purge ourselves—superficially, and we believe that we have taken some significant action without it truly being the case. When we interact with the issue superficially and are exposed to apocalyptic narratives, we sometimes have a false sense of salvation and mostly have a cathartic release. This catharsis furthermore cuts off our rational engagement with the issue. In the case of climate change, a cathartic moment is not what we need. It releases the fear and anxiety that we should have about a very real threat that should drive us to take action. (2022, p. 4)**

Educators around the globe, not least in countries such as those in the Nordic region, need to find a balance between raising awareness of challenging issues such as climate change, communicate the urgency to students, and giving them a chance to respond without such responses being a mere catharsis in the sense of Smith. A comparison between fifth-grade students in Tanzania and Finland on the topic of climate change is indicative of this challenge (Sjöblom et al., 2022). Among the Tanzanian students their own roles as change makers were more obvious, since they had already experienced climate-change challenges like soil erosion, widespread disease, and problems with food availability. The Finnish students, who had not experienced similar challenges, felt less urgency to lead any change.

Another concern in the Nordic countries could be rooted in misconceptions that climate change is not real due to fake news and misguiding online influencers. Climate change denial is related to populist politics (Huber, 2020) and is popular among right wing males in Norway (Krange et al., 2019). Therefore, the teachers as well as teacher trainers need to both present knowledge about climate change, and thoroughly discuss the issue with the students from various perspectives, not least political and economic.

1.3 The Need for Sustainability Education

To sum up what is said in the Introduction. Undoubtedly, the world situation is critical, and all but sustainable. Therefore, sustainability is an aim that is most urgent, including the implementation of sustainability through education. Human actions and activities need to change, and real change goes deeper than words. Even if there are numerous strategies and fine arguments, they are not enough. The statistics show another side of the coin, also in the Nordic countries, which perhaps have more to learn from other countries than they can teach.

In The *Climate Book*, created by Greta Thunberg and authored by over 100 people, Thunberg opens the last section "What we just do now" with a short essay titled "The most effective way to get out of this mess is to educate ourselves". Having discussed a few Swedish words which have made it to an international vocabulary, such as 'flygskam' she writes:

> **There is, however, another Swedish word that deserves far more attention than flygskam, and that word is folkbildning. It roughly translates to 'broad, free, voluntary public education' and it has most of its roots in the working class community that came into being after democracy was introduced to the country in the first decades of the twentieth century ... (2022, p. 325)**

The point Thunberg is making here concerns not the content of education but the means and impact of it. Education that deserves the label 'sustainability education' must be *folkbildning* in the sense of initiating the kind of change that makes not only individuals but whole societies capable of changing through learning.

It is urgent to send "a clear signal to the rest of the world that real and positive development is possible", as the Prime ministers want to do, but it is worth considering what that message could be. Perhaps it is wiser to focus on listening and collaborating than speaking and preaching. In education, both students and teachers need to relearn and unlearn to see clearly what has brought humanity to this situation, where humans stand now and what the entire planet needs most now and in the future. In this document. we want to present a few challenges of sustainability education in the Nordic countries today, but also to show possibilities and create hope for the future. We also hope to trigger thoughts and creativity.

2. The Mandate and Definition of the Work

This project, *Sustainability Education in the Nordic Countries* (SENC), is situated within the previously mentioned paradoxical situation. Under the title "Sustainable Living", the Nordic Council of Ministers initiated a multi-annual programme focusing on sustainable lifestyles in the Nordic countries that covers many different sectors. One of its sub-projects, Education for Sustainable Development, has the goal of making sustainable development an integral part of all education, for every age, from preschool to adult learning. All students shall acquire the knowledge and skills necessary for the enhancements of sustainable development, e.g., through education for sustainable lifestyles, human rights, equal opportunities, a culture of peace and global citizenship as well as the appreciation of cultural diversity and cultures' contribution to sustainable development.

The Icelandic Centre for Research (RANNÍS) had the responsibility of coordinating the current project, Education for Sustainable Development. A part of this project was to establish a group of experts to investigate the situation of sustainability education in the Nordic region. Seven experts from Denmark, Finland, Greenland, Iceland, Norway, Sweden and Åland were appointed to the group. These experts were responsible for defining the work, carrying out the research and contributing to the final document. In addition, two experts from the Swedish and the Norwegian Teacher Unions contributed to the work of the expert group.

The SENC project had two distinct aims. First, to gather information on how teachers in the Nordic countries think about and teach sustainability issues and how they relate their practice to the current United Nations' Sustainable Development Goals (UN SDGs). Various case studies on sustainability education in the Nordic Countries have been carried out, and they shed light on good practices and innovative ways to teach sustainability. Nevertheless, the broad picture is unclear and there is little knowledge on how teachers in general view their work in relation to sustainability. The first aim, thus, was to begin to fill in this gap by sending a survey to teachers in all the Nordic countries (see chapter 7).

The second aim was to bring about actual change — or at least try to progress closer toward sustainability. This second aim was vague and, within the time frame of the project, we did not expect to see any major development. Rather, the aim was to initiate a few processes which then will continue past the present project and gradually lead to real change.

Building on a previous project which produced, among other things, the report *Mapping Education for Sustainability in the Nordic Countries* (Jónsson et al., 2021) SENC aims at strengthening sustainability education with a focus on the role of teachers and their abilities and challenges. More specifically, SENC was given four broad goals:

1. To identify needs and weaknesses in relation to the sustainability of teacher education and in everyday school life.
2. Mapping of pedagogical methods, materials, and good examples (best practice) in each individual country.
3. To present results to relevant audiences.
4. To make recommendations, suggestions for action and find important target groups.

Previous work laid the ground by mapping sustainability education as a concern for policy and teacher education. The present project takes a more practice-oriented stance by focusing on what teachers think and do, and how they can be supported to make real change. To reach the aims of the project, educational administrators and teacher organisations were included alongside researchers and teacher educators. The work was organised with a focus on three different groups:

1. Administration: Policy makers and interpreters at national and local level, experts in ministries and directorates of education, and external evaluators.
2. Academia: Teacher educators and researchers.
3. Practitioners: Teachers, school leaders, and teacher students.

The project work called for organisation along two dimensions. On the one hand, the organisation is according to the intended audience (administration, academia, practitioners) and, on the other, according to some concept of educational design and educational change (Bildung, sustainable education, PACK). The latter will be discussed in the next chapter.

2.1 Members of the SENC Group

The project group was formed by scholars, teacher students and people from various administrative levels as well as people working for teacher unions. With such a challenging topic — sustainability education — it was necessary to include various stakeholders. The challenges of sustainability education cannot be met at a single level or by merely one group of professionals within the education system but require joint efforts from the entire system.

To cover the Nordic region, members of the SENC group come from all the Nordic countries, including the autonomous areas except for the Faroe Islands.

Denmark

Søren Witzel Clausen, Senior Lecturer, Faculty of Teacher Education, VIA University College

Finland

Lili-Ann Wolff, Associate Professor, Faculty of Educational Sciences, University of Helsinki

Riku Oras, Executive Director, Teacher Student Union of Finland SOOL

Greenland

Lars Demant-Poort, Associate Professor, Institute of Learning, University of Greenland

Iceland

Ólafur Páll Jónsson, Professor of philosophy at the School of Education, University of Iceland.

Guðný Jórunn Gunnarsdóttir, Teacher Student,School of Education, University of Iceland, and a teacher at the elementary School at Kleppjárnsreykir in Borgarbyggð.

Norway

Marianne Lindheim, Special Adviser, KS (Kommunesektorens organisasjon)

Trond Harsvik, Senior Advisor, Union of Education Norway

Ida Large, Head of Department, Norwegian Directorate for Education and Training

Sweden

Ann-Britt Sten Hodin, Director of Education, Swedish National Agency for Education

Veronica Persson, Senior Adviser, Swedish Teacher Union

Åland Islands

Emilia Walk Johansson, Special Adviser, Department of Education and Culture, Government of Åland.

The group met three times in person, first in Iceland on June 29–30, 2022. At this meeting the group worked on defining the project and planning the work ahead. The second in-person meeting was in Oslo, September 8, 2022, in conjunction with the conference *Framtidens lærerrolle i Norden* (https://nordicteachers.no/). The third meeting was again in Oslo on April 8–9 2024. In between the face-to-face meetings, the expert group met several times online to discuss various issues related to the project as a whole — composing the questionnaire and determining practical matters on how to conduct the research.

Members of the expert group also presented the work of the group in two conferences, first at NERA Conference in Oslo March 15–17 2023 (https://nfpf.net/blog/2022/10/03/nera-conference-2023-15-17-march-oslo-2/), and then at the Arctic Congress in Bodø from May 29 to June 3 2024 (https://www.arcticcongress.com/).

3. Sustainable Development as an Educational Aim

The target groups of this publication are governmental educational officers, educational trade union officers, educational researchers, and educational practitioners (teachers, school leaders, etc.). Sustainable Development (SD) as an educational aim appears rather differently for these distinct groups. While the administrators may approach it from the view of policy, administration and resources, the practitioners are often more concerned with their day-to-day working with students where the practicalities of school life may both pose challenges as well as open possibilities. The researchers are sometimes situated in-between the two groups, focusing on both policy and the work in schools and other educational settings. Addressing education for sustainable development (ESD) or sustainability education (SE) with these three groups in mind is, thus, a complex task. To focus the work and bring into sync these three different perspectives, we begin by discussing some organising concepts.

Similar to the report *Mapping Education for Sustainability in the Nordic Countries*, the concepts of Bildung and Stephen Sterling's sustainable education are here used as organising concepts (Sterling, 2001). Since one of the target groups is practitioners, this report also uses a more concrete or practice-oriented model called PACK, devised by Ólafur Páll Jónsson and Allyson Macdonald. The PACK model is framed around four questions addressing pedagogy (P), assessment (A), curriculum (C), and knowledge (K) (see Table 2):

Table 2: Four types of questions about educational reform

	P **Pedagogy**	**A** **Assessment**	**C** **Curriculum**	**K** **Knowledge**
Guiding questions	*How to teach students?*	*How to evaluate learning?*	*What is to be taught?*	*What knowledge is needed?*

Jónsson and Macdonald distinguish two ways of answering these four questions. The first is a conventional way, which corresponds to what Sterling has called "the conventional educational paradigm" (2021). According to this way of answering the four questions, one moves from right to left, beginning by identifying the relevant or necessary knowledge (K) and ending by devising methods that deliver the goods in an "appropriate" manner (P). According to the conventional educational paradigm, educational design would proceed in the following way:

(K) Gather experts to identify relevant knowledge and skills;
(C) Organise these as objectives of formal education;
(A) Devise a way of assessing the extent to which these objectives are met; and
(P) Develop appropriate practices for the work of students that connect the knowledge (K), the curricular objectives (C), and the assessment (A).

The second way to answer the questions about educational reform (see Table 2) relies on an alternative understanding of educational design that aims at change at a deeper level, second or third, and focuses on students' competencies, their own knowledge, values, ideas and participation in the learning process. This way moves in the opposite direction (from P to K) and also interprets the key concepts differently:

(P) Develop a pedagogy where teachers and students meet in a collaborative setting to learn from each other, and
(A) jointly assess the quality and the outcome of the educational activity according to measures that are developed as part of the educational activity,
(C) while working towards objectives that are at least partly defined through a collaborative learning process, which
(K) aims to make the learners question their conceptions of themselves and the world.

The four questions and the two ways of answering them are summed up in the following table (Table 3).

Table 3: Sustainable education framing of PACK-ing for educational design

	P Pedagogy	A Assessment	C Curriculum	K Knowledge
Guiding questions	*How to teach students?*	*How to evaluate learning?*	*What is to be taught?*	*What knowledge is needed?*
Conventional understanding	Present established knowledge and training for skills.	Assessed students, either formatively or summatively.	Curricula defines objectives and content of education.	Knowledge building is an accumulation of established knowledge and skills.
Transformative understanding	Engage with students in a collaborative setting.	Students and teachers together assess the process of learning.	Objectives of education are identified through collaborative learning.	Knowledge building is more about enabling conceptual change and transformation.

According to the transformative understanding of the PACK model, educational change for sustainability supports teachers and other practitioners in reflecting on how they think of education and shape the way they teach. This, in turn, calls for support for people at various administrative levels to work with teachers and students in developing their work. In this scenario, the role of academics and researchers is not to produce external expert knowledge but to support both practitioners and people at various administrative levels in their work.

When considering the Nordic countries' Overshoot Days (see Figure 2) we see that the change needed is not a matter of mere amendments or reform but a thorough transformation of how people live in the Nordic region, and in other parts of the affluent north. When looking at the countries with the earliest Overshoot Days, i.e. the countries with the most ecologically demanding economies, we see countries which boast of good educational systems. Among the top scorers on PISA for many years, Finland has an overshoot day at the end of March. The other Nordic countries are not far off with none getting past the first four months of the year.

If education is supposed to be a driver for change, then we need something drastically different from what we have seen so far. In *Sustainable Education: Revisioning Learning and Change* Sterling describes what he calls the 'conventional educational paradigm':

> Within this paradigm, most mainstream education sustains unsustainability — through uncritically reproducing norms, by fragmenting understanding, by sieving winners and losers, by recognizing only narrow parts of the spectrum of human ability and need, by an inability to explore alternatives, by rewarding dependency and conformity, and by servicing the consumerist machine. (2001, pp. 14–15)

Although over twenty years old, these words are not outdated. Other scholars have written in a similar vein. As early as 1992 Bob Jickling wrote a provocative paper titled "Why I don't want my children to be educated for sustainable development" where he argued that such education would be too instrumental at the expense of meaningful education (what we might refer to as *Bildung* in the Nordic context). He also said that the concept of sustainable development was too contestable to be useful to define aims in education, and that the prescription of particular outcomes conflicted with the development of autonomous thinking as an educational aim. The PACK model mentioned above is, in part, an attempt to respond to such worries. This model leaves the door open to a future that can be visioned and planned by the students, and even encourages them to question the entire SD idea and to suggest alternatives (see also Wolff, 2011; Wolff et al., 2024).

3.1 Main Trends in Sustainability Education

Within the field of SE or ESD, diverse conceptions of education related to sustainability have emerged. We will describe a few such approaches, beginning with various conceptual frameworks and then give examples of educational programs which explicitly aim at sustainability. In a paper titled "Learning for Change: Exploring the Relationship Between Education and Sustainable Development" Paul Vare and William Scott make a distinction between ESD1 and ESD2, which many later scholars and practitioners have found useful. They describe ESD1 as expert-knowledge driven:

> ESD 1 fits with the received view of sustainable development as being expert-knowledge-driven where the role of the nonexpert is to do as guided with as much grace as can be mustered. Some see this as UNESCO's view, and what—by and large—is driving the UN Decade of ESD, pointing, for example, to the section of the UN Decade's implementation plan (UNESCO 2005) which says: 'The DESD promotes a set of underlying values, relational processes and behavioral outcomes, which should characterize learning in all circumstances'. (2007, p. 193)

What Vare and Scott refer to as ESD2, on the other hand, is not about reaching certain predefined goals but locating SD within the learning process itself:

> **Some will see this as a case of double-loop learning, where we learn to do different things to be more effective. Examples include thinking about what 'being more sustainable' means ... From this perspective, sustainable development doesn't just depend on learning; it is inherently a learning process. (2007, p. 194)**

Vare and Scott then elaborate on the learning process which exemplifies ESD2 saying:

> **This way of thinking about sustainable development encapsulates the core role for learning as a collaborative and reflective process and captures the intergenerational dimension and the idea of environmental limits. (2007, p. 194)**

Arjen Wals makes a similar distinction between instrumental and emancipatory environmental education. He describes the former in the following way:

> **Much environmental education aims at changing learner behaviour, including attitudes, beliefs, and values. Many environmental education researchers and practitioners try to structure environmental education by using hierarchical levels of universal goals and measurable learning outcomes (see for instance: Hungerford and Volk 1990). It is no surprise that within an environmental education that seeks to change 'learner behaviour', the establishment of knowledge and awareness of nature and environment, and the application of what is learned, are considered essential steps in the learning process. Evaluation of the achievement of these goals is considered crucial for determining the success of environmental education and, incidentally, for justifying government spending on EE. (2011, p. 177)**

This kind of education falls neatly within the conventional paradigm that Sterling criticised for sustaining unsustainability. Wals then questions the instrumental approach on grounds similar to those that had scared Jickling away from ESD some twenty years earlier:

> **If a key function of education is fostering autonomous thinking about, among other things, environmental issues, then it would be contradictory to prescribe behavioural outcomes triggered by a learning activity or sequence of activities. (2011, p. 177)**

In summing up the difference between an instrumental approach and an emancipatory approach, which he favours, Wals writes:

> **In summary, an instrumental approach assumes that a desired behavioural outcome of an environmental education activity is known, more or less agreed upon, and can be influenced by carefully designed interventions. Conversely, an emancipatory approach assumes that the dynamics of our world are such that citizens need to become engaged in an active dialogue to establish co-owned objectives, shared meanings, and a joint, self-determined plan of action to make changes they themselves consider desirable and of which the government hopes will, ultimately, contribute to a more sustainable society as a whole … (2011, p. 180)**

The differences between ESD1 and ESD2, as well as the differences between instrumental and emancipatory education, fit well with the difference between conventional and transformative education highlighted by the PACK model. The conventional reading corresponds to ESD1 and instrumental education while the transformative reading corresponds to ESD2 and emancipatory education. What all authors agree on is the importance of internalising the principles of SE through personal and collaborative incentives that encompass a transformative mindset. Some scholars and practitioners have related this to the head-heart-hand approach to SE mentioned above (Jordan, 2022; Singleton, 2015).

3.2 Transformation, Competencies, and *Bildung*

As already mentioned, the policy documents used to implement sustainability in education are not undisputable. They have often been developed by a large number of people from various countries, with many kinds of experiences and from various disciplines. Therefore, the result is not always in line with pedagogic principles or educational research findings. Consequently, ideas and concepts may be used superficially or with an intention to make the measurement of learning results easy. In the following, we will present a few educational views that relate to SE.

3.2.1 Transformation

An often-mentioned approach related to sustainability is *transformation*. The UN policy report *Transforming Our World: The 2030 Agenda for Sustainable Development* (UN, 2015) includes the word 'transformation' already in its title. When discussing SE, transformation is increasingly suggested as the remedy. Obviously, all educational levels must support a profound worldview change, a transformation (Balsiger et al., 2017). Yet, such a transformation may include changes at many levels: personal, cultural, organisational, institutional, and so on. Yet, transformation processes are all but simple — they are extremely complicated.

In policy discourses, it may be unclear why, how, what or who to transform. It is most obvious that the state of the world is all but good. However, there is still no consensus on how to change the world to make it a better place to live. It is also worthwhile considering in whose interest any change would be, and what its consequences are (O'Brien & Sygna, 2013; Zilliacus & Wolff, 2021). Many voices argue that the Agenda 2030 and its SDGs are not radical enough (Briant Carant, 2017; Scott, 2015; Swain, 2018). They see the agenda as a tool to continue an unjust economic development. In contrast, they call for a global redistribution of resources.

Even if Agenda 2030 and similar policy agreements are not convincing enough, they point out that the course of the world needs to be altered. The urgent situation depends on human willingness and capability to change the development in a more sustainable direction. Obviously, the planet needs more than technical innovation and economic growth. It needs humans, who can solve the tremendous planetary problems while handling uncertainty and unpredictability. This, in turn, depends on profound knowledge about the planet and its limits, but also knowledge about society and everyone's knowledge about oneself (Wolff, 2011). In addition, the world needs a population with a willingness to learn from history, to live a conscious life in the present, and to build the future responsibly and jointly. For education to become part of the solution to current challenges, to be truly sustainable, it must be transformed. It is widely accepted that such transformation can take different forms. The phrases 'transformative education' and 'transformative learning' are used in many contexts, but often without much theoretical base (Rodríguez Aboytes et al., 2020) — sometimes so that they are little more than empty words.

For many decades, the theory of *transformative learning* has been used in adult learning contexts and lately also in SE contexts. In the 1970s, Jack Mezirow started the development of the "transformative learning theory". In adult education, Mezirow (2009) saw learning as a process in which the learners transform problematic frames of reference on specific topics (e.g., democracy) to make them open for change. According to the transformative learning theory, the learner is an active participant in discourses (Mezirow, 1991). The transformative learning theory is strongly based on earlier basic theories, and with help of many other scholars, Mezirow continued to develop the transformative learning theory for many decades (Wolff, 2022). This makes the theory complicated and a fast implementation of it all but easy. The transformative learning theory requires testing and developed to become a useful theory for SE.

3.2.2 Competence and competency

Another concept that relates to SE, and often is mentioned in connection to transformation is *competencies* (alternated with the word 'competence', which is not a synonym; competence is a state, i.e. the successful achievement of one or more competencies). In the wake of the 21st century skills and other contemporary educational concepts, and policy approaches, competence and competency (plural form 'competencies') have become increasingly attractive. This is also the case when discussing SE. In the 1990s, the OECD began to use competency as a development aim in educational contexts (OECD, 2014). In 2024, numerous SE programs strive towards developing the students' competence or competencies. Thus, numerous sustainability competency lists are presented in various educational contexts, especially policies, though the lists seldom explain what theories they are built on (Brundiers, et al., 2021). The competency approach is mostly instrumentally focused on changing people, and it is, therefore, worth considering if competency approaches are appropriate if the aim is to educate students to become independent and critical thinkers in a complex unsustainable world situation.

3.2.3 Bildung

A third concept increasingly common in SE is *Bildung*. It relates strongly to transformative learning, and partly shares the same theoretical roots. Both Mezirow's transformative learning theory and *Bildung* are built on thoughts of philosophers like Rousseau, Kant, Schleiermacher, Hegel, Herbart, and Habermas (Wolff et al., 2024). According to the idea of *Bildung*, humans can learn to exceed the present. Metaphorically this exceeding is like a creative dialogue in which a novice learns through a discussion with the surrounding world. Nevertheless, in the *Bildung* process the outcome is left open. Therefore, a *Bildung* process does not promote any specific way of thinking or living but is "a guiding concept that reflexively ties together a diversity of life experiences and lifestyles" (Riese & Hilt, 2021, p. 99). In both transformative learning and *Bildung*, critical reflection is a crucial element. By critically reflecting on the past, the student becomes able to transform the present towards something they consider better. Thus, *Bildung* helps the students to realise the shortcomings of their former knowledge, and envision the future (Uljens, 2020). Similarly, Wolfgang Klafki (1997, 1998) asserts that teachers do not know what knowledge students might need in the future. Therefore, Klafki includes 'epochal key problems' into the *Bildung* concept to address global crises related to both nature and society. According to Klafki (1998), *Bildung* includes promotion of a students' ability to critique, argue, and show empathy. The *Bildung* concept has also been criticized for being overly human-centred and recent work has both questioned and explored the possibilities of a post-human concept of *Bildung* (Taylor, 2017).

3.3 Approaches to Sustainability Education

Many agencies, such as international and interstate organisations have created programs and strategies on how to promote sustainability and sustainability education. Their reasons are, though, different. Some of them have a humanist aim, others a political goal, and still others may have an economic interest driving their task. These agencies also have various views of the role of education, and sometimes they are strongly instrumental, such as creating employment or aiming at economic success. Therefore, these documents may not present a unified view of sustainability education and are open for negotiations. A few of them are presented below. The first is the most cited, and it is a major document for people working with the implementation of sustainability all over the world.

3.3.1 United Nations and UNESCO: Sustainable Development Goals (UN SDGs) and Key Competences

In autumn 2015, the UN General Assembly adopted the 2030 Agenda for Sustainable Development creating a framework to redirect humanity onto a path for sustainable living. The agenda consists of seventeen goals (see Figure 4) which are meant to secure a sustainable, peaceful, prosperous, and equitable life on earth for everyone now and in the future. These goals are well known; they are featured on posters in many schools and a lot of learning material has been produced which is framed in terms of these seventeen goals.

Figure 4: *The seventeen UN SDGs adopted by the UN General Assembly on September 25th, 2015.*

Stockholm Resilience Centre has reorganised these goals into the so-called "wedding cake" model (see Figure 5). In this model the three circles correspond to the three pillars — environment, society and economy — in terms of which SD was defined in the report *Our Common Future* from 1987. From a pedagogical point of view, the "wedding cake" model relates the seventeen UN SDGs to the three pillars of sustainability. The wedding cake model can thus help teachers to have a better overview of the SDGs while simultaneously seeing the interrelationship between them.

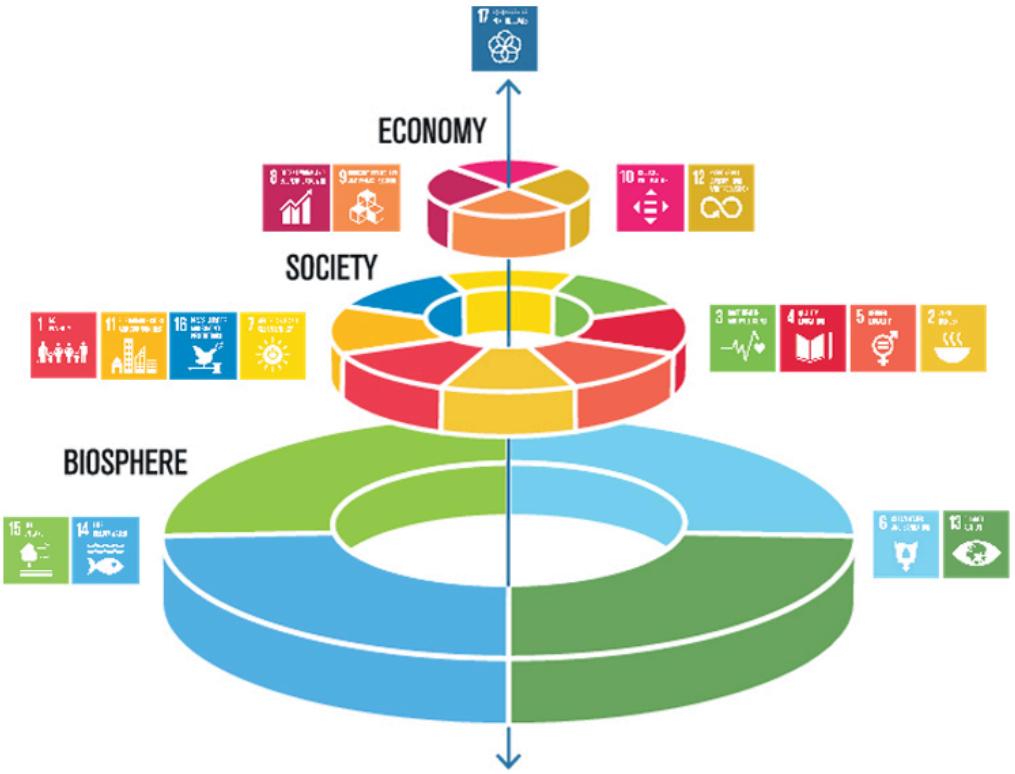

Figure 5: *The "wedding cake" model of the seventeen UN SDGs developed by Stockholm Resilience Centre. (Azote for Stockholm Resilience Centre, Stockholm University CC BY-ND 3.0.)*

In addition to the UN SDGs, the UN also defined broad key competences which were described in the following way:

> Key competencies represent cross-cutting competencies that are necessary for all learners of all ages worldwide (developed at different age-appropriate levels). Key competencies can be understood as transversal, multifunctional and context-independent. They do not replace specific competencies necessary for successful action in certain situations and contexts, but they encompass these and are more broadly focused. (UNESCO, 2017, p. 10)

These UNESCO key competencies are:

1. **Systems thinking competency:** the abilities to recognize and understand relationships; to analyse complex systems; to think of how systems are embedded within different domains and different scales; and to deal with uncertainty.
2. **Anticipatory competency:** the abilities to understand and evaluate multiple futures — possible, probable and desirable; to create one's own visions for the future; to apply the precautionary principle; to assess the consequences of actions; and to deal with risks and changes.
3. **Normative competency:** the abilities to understand and reflect on the norms and values that underlie one's actions; and to negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.
4. **Strategic competency:** the abilities to collectively develop and implement innovative actions that further sustainability at the local level and further afield.
5. **Collaboration competency:** the abilities to learn from others; to understand and respect the needs, perspectives and actions of others (empathy); to understand, relate to and be sensitive to others (empathic leadership); to deal with conflicts in a group; and to facilitate collaborative and participatory problem solving.
6. **Critical thinking competency:** the ability to question norms, practices and opinions; to reflect on one's own values, perceptions and actions; and to take a position in the sustainability discourse.
7. **Self-awareness competency:** the ability to reflect on one's own role in the local community and (global) society; to continually evaluate and further motivate one's actions; and to deal with one's feelings and desires.
8. **Integrated problem-solving competency:** the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solution options that promote sustainable development, integrating the abovementioned competences.

Various programmes and initiatives have taken up the SDGs and other material developed by the UN and developed diverse educational resources, methods and various supporting material. One such programme is The World's Largest Lesson (https://worldslargestlesson.globalgoals.org/). The web page offers the possibility to search resources by theme, SDG, resource type, age group, duration and language, with Danish, Norwegian and Swedish among the language choices in addition to English. A problem with the SDGs has sometimes been that people in various contexts, also in education, have chosen to split the goals and focus on only a few of them. To see them as a complexity that is intertwined has not always been easy.

3.3.2 European Commission: GreenComp

The EU Commission adopted a Council Recommendation on learning for environmental sustainability in January 2022. It provides recommendations, research evidence and good practice from across Europe and can serve as a guide for policy makers, educators, individuals and organisations working on the issue of sustainability in the education and training sector. Key EU policies point to the role of education and training in empowering and engaging people for environmental sustainability and boosting the skills and competencies needed for a green transition. The EU Commission's proposal recognises different movements and strands that work for SE. All these movements and concepts share a vision of education and learning which is transformative, embraces change and promotes sustainability.

To prepare the proposal, the EU Commission consulted widely on the current state of learning for environmental sustainability to collect good practice and to identify difficulties and barriers. Workshops were arranged with policymakers and stakeholders from the field of education and training, the research arena and the youth sector. In addition, a series of online meetings were held with teachers who were active on sustainability and environmental issues in their schools. This process led to a clear understanding that support was needed that could facilitate third level changes both on individual and societal levels. To this end the GreenComp approach was developed:

> **GreenComp is a reference framework for sustainability competences. It provides a common ground to learners and guidance to educators, providing a consensual definition of what sustainability as a competence entails. It is designed to support education and training programmes for lifelong learning. It is written for all learners, irrespective of their age and their education level and in any learning setting — formal, non-formal and informal. Sustainability competences can help learners become systemic and critical thinkers, as well as develop agency, and form a knowledge basis for everyone who cares about our planet's present and future state. (EU Commission, 2022, p. 2)**

GreenComp consists of twelve competencies organised into four areas: (1) embodying sustainability values, (2) embracing complexity in sustainability, (3) envisioning sustainable futures, and (4) acting for sustainability (see Figure 6). As a reference tool, GreenComp can serve a wide range of purposes, including education reforms described earlier in relation to the PACK model. GreenComp can also support education and training systems in cultivating critical thinkers who care about the planet, as it presently is and as it can be imagined as flourishing in the future.

Figure 6: *A pictorial representation of the GreenComp framework. The four competence areas are on the right with the 12 competences represented by the flowers, bees, honey and honeycomb.*

3.3.3 OECD: Future of Education and Skills 2030

In 2019 the Organization for Economic Cooperation and Development (OECD) published a series of concept notes under the heading *OECD Future of Education and Skills 2030*. The document begins by raising the following questions:

> **How can we prepare students for jobs that have not yet been created, to tackle societal challenges that we cannot yet imagine, and to use technologies that have not yet been invented? How can we equip them to thrive in an interconnected world where they need to understand and appreciate different perspectives and worldviews, interact respectfully with others, and take responsible action toward sustainability and collective well-being? (2019, p. 5)**

The first concept is what OECD refers to as the 'Learning Compass 2030' (see Figure 7), which outlines the knowledge, skills, attitudes, and values students need to constructively face their realities and shape their futures. OECD refers to the Learning Compass as a "learning framework" — not as an "assessment framework" or a "curriculum framework". According to OECD, the Compass offers a broad vision of the types of competencies students need to thrive in 2030, as opposed to what kind of competencies should be measured or can be measured. Moreover, the Learning Compass is not confined to formal education, which is guided by explicit curricula and instructional strategies, but applies to informal and non-formal education as well. The Learning Compass 2030 is composed of seven elements:

1. **Core foundations.** The OECD Learning Compass 2030 defines core foundations as the fundamental conditions and core skills, knowledge, and attitudes and values that are prerequisites for further learning across the entire curriculum. The core foundations provide a basis for developing student agency and transformative competencies. All students need this solid grounding in order to fulfil their potential to become responsible contributors to and healthy members of society.
2. **Transformative competencies.** To meet the challenges of the 21st century, students need to be empowered and feel that they can help shape a world where well-being and sustainability — for themselves, for others and for the planet — are achievable. The OECD Learning Compass 2030 identifies three "transformative competencies" that students need to contribute to and thrive in our world, and shape a better future: creating new value, reconciling tensions and dilemmas, and taking responsibility.
3. **Student agency/co-agency.** Student agency is defined as the belief that students have the will and the ability to positively influence their own lives and the world around them as well as the capacity to set a goal, reflect and act responsibly to effect change. Student agency relates to the development of an identity and a sense of belonging. When students develop agency, they rely on motivation, hope, self-efficacy and a growth mindset (the understanding that abilities and intelligence can be developed) to navigate towards well-being. This enables them to act with a sense of purpose, which guides them to flourish and thrive in society. Students learn, grow and exercise their agency in social contexts, and this is why co-agency is also crucial. Students develop co-agency in an interactive, mutually supportive and enriching relationship with their peers, teachers, parents and communities in an organic way in a larger learning ecosystem.
4. **Knowledge.** As part of the OECD Learning Compass 2030, knowledge includes theoretical concepts and ideas in addition to practical understanding based on the experience of having performed certain tasks. The Education and Skills 2030 project recognises four different types of knowledge: disciplinary, interdisciplinary, epistemic and procedural.
5. **Skills.** Skills are the ability and capacity to carry out processes and be able to use one's knowledge in a responsible way to achieve a goal. The OECD Learning Compass 2030 distinguishes three different types of skills: cognitive and metacognitive; social and emotional; and practical and physical.
6. **Attitudes and values.** Attitudes and values refer to the principles and beliefs that influence one's choices, judgements, behaviours and actions on the path towards individual, societal and environmental well-being. Strengthening and renewing trust in institutions and among communities require greater efforts to develop core shared values of citizenship in order to build more inclusive, fair, and sustainable economies and societies.

7. **Anticipation-Action-Reflection cycle.** The Anticipation-Action-Reflection (AAR) cycle is an iterative learning process whereby learners continuously improve their thinking and act intentionally and responsibly. In the anticipation phase, learners become informed by considering how actions taken today might have consequences for the future. In the action phase, learners have the will and capacity to take action towards well-being. In the reflection phase, learners improve their thinking, which leads to better actions towards individual, societal and environmental well-being (pp. 15–17).

Figure 7: *OECD Learning Compass 2030 (OECD, 2019).*

3.3.4 Council of Europe: Reference Framework on Competences for Democratic Culture

The Council of Europe (CoE) has developed various educational frameworks, activities, tools and resources and most of them — if not all — are relevant for the implementation of Agenda 2030. The organisation has, therefore, not set up new objectives, instruments or activities in relation to the UN SDGs, but has aligned the existing ones with relevant UN SDGs (see https://www.coe.int/en/web/un-agenda-2030/home).

The organisation is not directly responsible for implementing Agenda 2030; that responsibility lies with each state, but the instruments developed by CoE can, however, contribute to national implementation and reporting by member states. Since 2013, the CoE has been developing the Reference Framework for Competences for Democratic Culture (RFCDC). The RFCDC can be used by education systems to "equip young people with competences that are needed to take action to defend and promote human rights, democracy and the rule of law, to act as active citizens, to participate effectively in a culture of democracy, and to live peacefully together with others in culturally diverse societies". The RFCDC defines twenty key competences that are organised into four categories: (1) values, (2) attitudes, (3) skills, and (4) knowledge and understanding. These twenty competences are often represented as "the butterfly" (see Figure 8). Although "sustainability" does not appear as one of the competences within the RFCDC framework, it aligns well with both the UNESCO key-competences and the GreenComp developed by the European Commission.

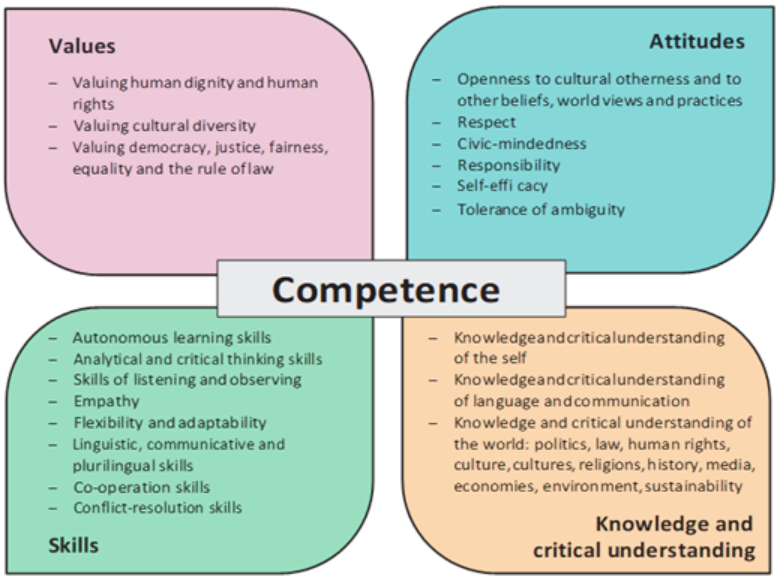

Figure 8: *"The butterfly" of competences for democratic culture developed by the Council of Europe* (https://www.coe.int/en/web/reference-framework-of-competences-for-democratic-culture).

4. Status of Sustainability Education in the Nordic Countries

In 2018 the Nordic Council of Ministers initiated a project focused on mapping educational policy concerning sustainability in the Nordic countries (see chapter 2). More specifically, the mandate for that project was to map how the educational policies in Denmark, Finland, Iceland, Norway, and Sweden reflected the demands of UNSDG 4.7 which states:

> **By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.**

The results of this project were published in the report *Mapping Education for Sustainability in the Nordic Countries* (Jónsson et al., 2021). What emerged was a complex picture of educational systems which all focus on various aspects of sustainability but often without explicit mention of the concept itself and, when mentioned, sometimes with a rather superficial understanding of it.

In the report *Mapping Education for Sustainability in the Nordic Countries*, the authors took the lead from the work of Sterling and others critical of the conventional educational paradigm to suggest framing of SE as involving three orders of change:

> **First order change and learning take place within accepted boundaries; it is adaptive learning that leaves basic values unexamined and unchanged … By contrast, second order change and learning involve critically reflective learning, when we examine the assumptions that influence first-order learning … At a deeper level still, when third order learning happens, we are able to see things differently. It is creative and involves a deep awareness of alternative worldviews and ways of doing things. It is … this transformative level of learning, both at individual and whole society levels, that radical movement towards sustainability requires. (Sterling, 2001, p. 15)**

The authors of the report then described these three orders of change as characteristic of learning that favoured compliance, criticality and radicality:

> **... first order learning values *compliance*; students are expected to comply with the values, practices, and evaluations of relevant knowledge already present. Second order learning values *criticality*; students are encouraged to be critical of the first order learning that takes place within the system. Meanwhile, third order learning not only values criticality but encourages *radicality*; students are encouraged and given space to not only be critical of the values and practices within the system but also to challenge those values and practices, pushing for new possibilities even against entrenched norms. (Jónsson et al., 2021, p. 7)**

Looking into various policy documents, from laws and curricula to various green- and white books on education, it was evident that different countries built on different traditions and that sustainability had been incorporated into educational policy in different ways:

> **Inclusion of sustainability in educational policies in Finland, Norway, and Sweden builds on a long tradition of environmental education and has, in many ways, been more consistent than in Iceland or Denmark. However, neither the Finnish, Norwegian, nor the Swedish educational acts mention sustainability explicitly and, although the word 'sustainability' or its variants appear almost 200 times in the Finnish national core curriculum, the incorporation of sustainability as an educational aim or subject is often superficial. This superficial inclusion of sustainability in educational policy becomes even more evident when looking at teacher preparation in some of the Nordic countries where the importance of sustainability education is often better addressed in political rhetoric than in educational reality. (Jónsson et al., 2021, p. 64)**

The report also reflected on the wider context for SE noting that public policy, such as appears in the strategy report *Good Life in a Sustainable Nordic Region: Nordic Strategy for Sustainable Development 2013–2025* (Nordic Council of Ministers, 2019) was heavily geared towards increased growth, defining educational aims primarily in terms of employability within the business community (see Jónsson et al., p. 67; Nordic Council of Ministers, 2019, p. 45). This does not align well with the understanding of sustainability as presented in the various educational policies of the Nordic countries. Finally, the report also shed light on little, even no apparent, focus on sustainability in teacher education, with many teacher education programs not having any explicit focus on sustainability.

4.1 What Has Changed since 2020

As already mentioned, sustainability is implemented in various ways in education in the Nordic countries. The educational policy in general and curricula are steadily renewed and many tangible projects and practices that strive to implement them are going on in both schools and other contexts. In this chapter and the next we will present a few examples of what takes place in relation to sustainability education in the Nordic region starting from policy and continuing with practice.

Denmark

From the autumn of 2024, the content for the individual subjects in the primary school must be revised, and sustainability will no doubt be specifically mentioned in large parts of the subject descriptions. At the moment, commissions will be established to draft subject descriptions. This takes place with the participation of representatives from the Ministry of Education, schoolteachers, teacher educators, and stakeholder organisations. The task must be finished in 2027.

Since 2020, the concept of sustainability has gained a more prominent place in national education documents in Denmark. The Danish teacher training was thoroughly revised in 2023. Sustainability was specifically mentioned in the purpose of the new teacher training, just as sustainability is embedded in a large part of the subject descriptions. Now, sustainability is both taught in the teacher training courses, and must be lived out in daily campus life by teachers and students.

Finland

Since the last mapping report was published in 2021, there have been only a few changes to educational policy in Finland. For example, the same national core curriculum for basic education which was published in 2014 is still in use. The term 'sustainable development' appears right at the beginning of the curriculum, emphasising the responsibility of schools to cultivate a sustainable future. The curriculum views humans as integral to nature and dependent on essential ecosystems. It stresses the importance of adopting a sustainable lifestyle, with basic education serving as the foundation for global citizenship and culturally sustainable development. Students are expected to recognize the seriousness of climate change and commit to sustainability. "Participation, involvement, and building a sustainable future" is one of the seven key competencies that students are required to develop, integrating various fields of knowledge and skills to support personal growth, education, work, and future activities. Furthermore, sustainability is a central theme across the other six competencies and is a guiding principle in shaping the organisational culture of schools. Sustainability is also incorporated

into most school subjects within the 2014 curriculum, where the word "sustainable" is mentioned nearly 200 times.

The Finnish National Agency for Education and the national Core Curriculum for Early Childhood Education and Care (2018) emphasise that all activities in early childhood education and care, as well as pre-primary education, are guided by the need for ecologically, culturally, and economically sustainable living. Ecological sustainability is fostered through practices such as sorting and recycling, mindful use of electricity and water, and monitoring plastic waste. Social sustainability involves fostering positive interactions, recognising children's strengths and emotions, and ensuring their participation and influence in activities. Economic sustainability is reflected in making wise choices, including acquiring items from charity shops and recycling centres. Cultural sustainability is promoted by valuing traditional play and games, embracing cultural diversity, and respecting different values and perspectives. Additionally, public access rights, a unique aspect of Nordic culture, and appreciating the architecture of buildings, such as observing colours, forms, and symmetrical decorations, are also integral to cultural sustainability.

The Ministry of Education and Culture has launched a broad-based development project on futures work in comprehensive schools. The aim of the futures work is to create a vision for schools that enables meaningful life for young people and supports learning opportunities in a rapidly changing world. The futures work of comprehensive schools is organized around three themes. They are *Artificial intelligence and technology*, *Basic skills and learning*, and *Ecological and social sustainability*. The futures work will be carried out in 2024-2025. It will produce a written vision for the future by the end of 2025. A parliamentary monitoring group has been set up to support the work.

Finnish teacher education is research-based; theory and practice are interwoven throughout the learning process. This approach aims to develop educational experts who are prepared for continuous professional growth throughout their careers. A crucial part of this process includes the independent writing of a master's thesis and studies in educational research methodology. However, despite the overall high standards of teacher education, sustainability is not always a prominent focus (Cockerell, 2020; Wolff et al., 2017).

Teacher educators at universities have autonomy in deciding how to implement sustainability topics in their programs. A 2012 study conducted by Maria Hofman found that no Finnish teacher education programs at the foundational level offered mandatory sustainability courses. The Teacher Student Union of Finland (SOOL) has advocated for the integration of SD into teacher education, highlighting teachers as role models for sustainable lifestyles. In 2019, SOOL demanded that teacher education institutions include climate change education in their programs, challenging them to incorporate climate change and sustainability topics. The

response was promising, with nine participating institutions committing to improve their SE. For instance, the University of Helsinki has implemented a mandatory SE course for all teacher students, and there are also other new possibilities to study sustainability education in other teacher education programs.

Greenland

In August 2023, two decades after the previous national curriculum had been adopted, a new national curriculum was made public. This called for a new standard on how to think subject matter into teaching on all levels of schooling from grade 1 through grade 10. One of the most significant changes from the previous curriculum is an increased focus on sustainability — in the sciences. Sustainability as a subject matter in the sciences is primarily focused on sustainable management of living resources in the sea and fjords around Greenland, and on land.

To support an idea of sustainability in both education and among the general public, a new section within the government of Greenland has had as its goal to map and develop online material on sustainability (Vores formål | Anguniakkavut). It is, however, unknown if this material has had any impact or influence on sustainability teaching in schools in Greenland.

Iceland

In Iceland, educational policy has not changed much since the mapping report was published in 2021. The same curricula are still in place, dating back to 2011. In these curricula, sustainability was defined as one of six fundamental pillars of all education, from preschool (2 to 6 years), through elementary school (6 to 16 years) to upper secondary school (16 to 19 years).

Those curricula also defined key competences similar to those that later appeared in the UNESCO document. In the Icelandic curriculum for elementary schools specific competence criteria are defined at the completion of grades 4, 7 and 10. These key competences are: (1) Expression and communication, (2) Creative and critical thinking, (3) Independence and cooperation, (4) Using media and information, and (5) Responsibility and evaluation of their own education (Ministry of Education, Science and Culture, 2014, pp. 88–90).

The most noticeable development in teacher education is the establishment of an M.Ed.-program in sustainability education at the School of Education, University of Iceland (https://ugla.hi.is/kennsluskra/index.php?tab=skoli&chapter=content&id=53345). The program is led by Prof. Auður Pálsdóttir who has for many years been among the leading scholars in sustainability

education in Iceland (Pálsdóttir and Jóhannsdóttir, 2021). This program is still in its early stages and although not many students have completed this program it is a clear channel for developing sustainability as part of teacher education.

Among the most serious shortcomings of Icelandic educational policy for sustainability that the *Mapping* report from 2021 revealed was lack of implementation following the adoption of the new curricula in 2011. This situation has somewhat improved with the publication of new support material. A new digital handbook on education for sustainability (is. *Menntun til sjálfbærni*) written by Guðrún Schmidt was published by the Directorate of Education in 2023. The handbook is a valuable resource for teachers at all school levels, but especially written with primary and secondary schools in mind. Challenges, definitions and pedagogy of sustainability education are reviewed with a special attention given to empowering and transformative approaches.

Various implementations are presented and ideas for projects with diverse teaching methods are presented. To promote important basic knowledge related to the goals and scope of sustainability education, the second part of the book deals with sustainable development, climate issues, biological diversity and actions that humanity needs to take. The book encourages critical questions, answers and discussions and empowers teachers to further develop sustainability education in the student-centred classroom.

Norway

The compulsory school curriculum, *Læreplanverket for Kunnskapsløftet (LK20),* was renewed and implemented from August 2020. The Overarching part of the curriculum does emphasises sustainability as one of three interdisciplinary topics: Sustainability, Common health and mastering of life (well-being), and Democracy and citizenship. These three interdisciplinary topics are integrated in the subjects when relevant. Final exams in Norway will, to some extent, assess the students' knowledge of, understanding of, and level of reflection on sustainability in relevant subjects. An evaluation program, conducted by several Norwegian universities, follows the implementation of the renewed curriculum. Certain reports focus on the interdisciplinary topics.

Sweden

The compulsory school curriculum was revised in 2022 (Lgr22). Revisions were made regarding sexuality, consent, and relationships, as well as other fundamental values. In the course syllabi content related to SD was revised and the concept '*promote sustainable development*' was introduced in some of the course syllabi such as civics, crafts, home and consumer studies, geography, and science.

In the curriculum it is stated that "*an important role of schools is to provide an overview and context, and it is important to adopt some overarching perspectives in all teaching*". The overarching environmental, historical, international and ethical perspectives which are intended to permeate all teaching remain unaltered. These perspectives, especially the environmental, are important for the school´s work with SD.

In late 2022 and spring 2023, two reports were published related to ESD from the Swedish school inspectorate. These two thematic reviews, Schools work with education for sustainable development and The school's handling of controversial issues in teaching highlights areas that are valuable focus on ESD work. The conclusions in these reviews will help education providers, school leaders and teachers to include the ESD perspectives in their ongoing quality work.

In recent years The Swedish National Agency for Education has intensified its support to schools in ESD. Teachers and school leaders can access support material and in service training via their website. There are learning modules available for peer-to-peer learning, web courses, education programmes, webinars, networks, information of conferences and the government initiated quality label: *School for sustainable development*. Since 2021 The Swedish National Agency has also offered a university course for principals called *Leading learning for sustainable development*.

Åland Islands

The Åland Provincial Act on Childcare and Compulsory Education entered into force in January 2021 and a new curriculum was prepared in parallel with the drafting of the new Act. The new curriculum for comprehensive schools in Åland Islands was enforced in August 2021, followed by the curriculum for early childhood education and care in 2022. The last time the curriculum was revised was in 1995, which meant that there was a great need for updated steering documents. For primary and lower secondary schools, extensive work was carried out both in the development and implementation of the new curriculum, and one of the parts that was largely renewed was the teaching of sustainability.

The new curriculum emphasises the importance of a sustainability perspective in all teaching. Sustainability is inscribed in all subject areas, so that the teaching of the subjects should endeavour to include sustainability as part of the teaching. Sustainability is included in all course syllabi and also in the assessment criteria for most subjects. The general part, which describes the overall mission of primary education, and its core values, also includes a chapter on sustainability, which emphasises that sustainability starts in childcare and should permeate all primary school activities. It is stated that in all their activities, and in cooperation with

homes, primary schools should pay attention to the need for a sustainable lifestyle from an ecological, social, and economic perspective. Civic competence, one of the eight key competences, which are emphasised in the curriculum, specifically emphasises sustainability. Civic competence is the ability to participate, influence and contribute to a sustainable future.

The implementation of the new curriculum is ongoing, and no evaluation has yet been carried out to show how teachers' teaching pertaining to sustainability has been affected by the new wording of the curriculum.

5. Inspiring Examples

The Nordic countries have been, and continue to be, in the process of implementing the concept of sustainability in their education systems. This has happened based on research that takes place at universities, within various national and international organisations, and which is published for policymakers in various academic journals and books and in the form of various reports such as the IPCC Climate Reports (last published in 2023). There is, however, a long and complicated road from new knowledge being published to teachers incorporating part of that knowledge into their teaching, and students being educated in sustainability. This long and complicated road is shown in the model of didactic transposition (see Figure 9), which schematically shows this process.

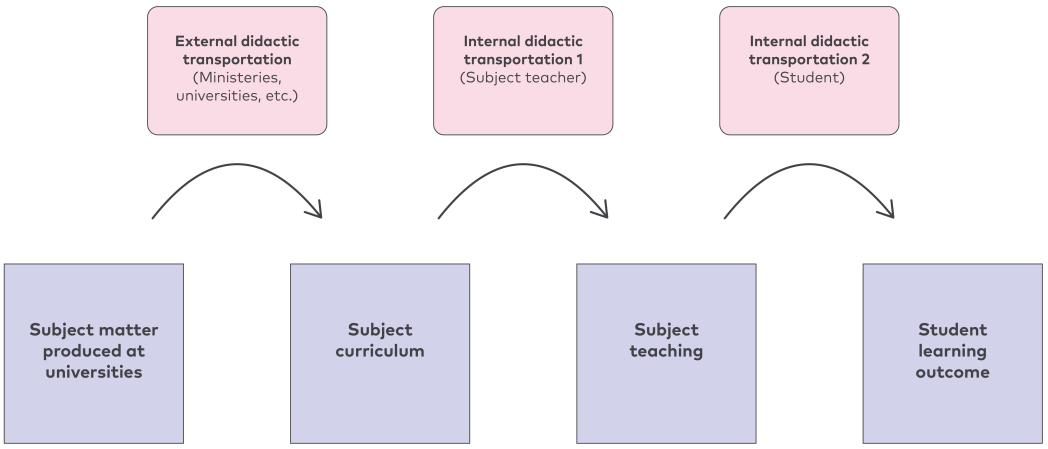

Figure 9: *The process of didactic transposition shows how knowledge goes from being produced at universities to ultimately becoming some kind of learning outcome for the students (Chevallard, 1989).*

As the survey results show (see chapter 7), there can be several barriers associated with teaching sustainability. Teachers in the survey mentioned lack of skills, lack of teaching materials, and an overcrowded curriculum which can be attributed to internal didactic transposition 1. The survey also mentions the students' lack of interest in SD as a relatively frequent occurrence, which can be attributed to internal didactic transposition 2. In other words, it is not an entirely easy process to develop and implement ESD — even if it is an extremely urgent and relevant agenda for the current education system in the Nordic countries.

The expert group has, therefore, found it relevant to provide a few diverse inspirational examples from educational work in the Nordic countries which might inspire teachers who are looking for more meaningful ways of engaging with sustainability in their educational practice. These examples are not intended as instructions or something to be widely replicated but rather to inspire teachers' imagination — their *faglige fantasi* — so that they and their whole school communities can find new ways of teaching sustainability and, perhaps also, new ways of flourishing at work.

Sustainable Energy Supply in the Local Area

Science education	Community engagement	Sustainable energy supply	Lower secondary education

This inspiring example is about natural science teachers who developed a thematic way of teaching about energy supply. The 7th grade science teachers wanted to develop and implement a joint course on sustainable energy supply in the local area. The science teachers came from the subjects of biology, geography, and physics/chemistry and jointly taught four 7th grade classes.

The teachers agreed that each class should work on how different forms of energy could be produced in the local area from a sustainability perspective, and what implications this would have for the citizens in the local area. The teachers agreed that the students had to work with wind energy, solar energy, geothermal energy, nuclear power, and coal power. In each class, there were to be five groups of students, and each group had to choose which of the energy forms they wanted to work with. The science teachers visited the different classes and provided professional input before the student groups were sent out into the local area to carry out various investigations. For example, some of the groups examined energy output from small wind turbines they had made themselves and subsequently conducted interviews with parents and friends regarding what they thought about the installation of wind turbines in the local area. Other groups investigated the energy output of solar cells and the optimal placement of them.

The course ended with the student groups presenting their projects. The students thus gained an insight into several forms of energy, and some of the implications it would have for the local community if they were to be placed there. During the course, the students had thus worked with the UN global goals no. 1, 9, 11, 12, 13, 15 as well as part of UNESCO's sustainability competencies.

In the course, the students were free to choose the forms of energy supply they wanted to study as well as what and how it should be investigated, while at the same time they gained an insight into a wide range of energy forms. The teachers determined the general framework for the project, and at the same time had great pleasure in working together with colleagues and gaining an insight into the colleagues' considerations and expertise.

A Student-initiated School Garden Project

Creative curriculum adaptation	Active student engagement	UN SDGs	Lower secondary education

This example of strong student co-determination in SE took place at a large school in Silkeborg, Denmark. In the centre of the school, there was a closed atrium yard which lay unused. A team of teachers teaching 8th grade (four classes) agreed to create a common course for the students, which was about transforming the atrium garden into a sustainability garden. The focus was on UN SDG 15, life on land, which was combined with several of the other UNSDGs. Each class was allocated ¼ of the area of the atrium garden, which they had to agree to develop in terms of form and content. Each individual student came up with ideas, which were subsequently discussed and either accepted or rejected by the rest of the class. Throughout the course, the students had a great deal of responsibility and co-determination; an important part of the task was precisely getting the students to negotiate an agreement in class in relation to the intervention. The role of the teachers in the course was mainly facilitative, ensuring that the students followed a plan and making sure relevant parts of the national curriculum were catered to.

In the process, one of the classes chose to combine UNSDG 15 with UNSDG 6, clean drinking water, and subsequently built a water-collection system for irrigation. Another class combined UNSDG 15 with UNSDG 2, stop hunger — building planter boxes with vegetables. A third class combined UNSDG 15 with UNSDG 3, health and well-being, and built garden furniture that would encourage the other students to spend more time outside.

When the school garden/living room had to be laid out, the students' input and expertise were included in many ways. In mathematics, they calculated the size and material consumption of planter boxes. In craft and design, they designed and built the planter boxes. Delivery of plant soil was also ordered, which had to be brought into the area. This was physically hard work — perhaps harder than what normally took place in physical education.

During the process, the teachers thus ensured that relevant professional content was included in the teaching. All in all, this meant that the project was extremely meaningful to the students, and they felt great ownership of the process and the finished sustainability garden. The students were proud to be able to harvest their own organic vegetables — something many of them had not experienced before.

The organisation and implementation of the course fits the PACK model (Jónsson & Macdonald, 2021). The students' interests are the starting point for the learning process, and students and teachers together develop, plan, and implement the course. This contrasts with more conventional teaching, where curriculum and evaluation govern the teaching.

Guidebook for Fostering Sustainability Education

Resources for SE	Primary and secondary education	Adult education	Critical thinking

The Finnish National Agency for Education has published a guide in three languages (Finnish, Swedish, and English). It aims to foster sustainability in learning, culture, and practices: https://www.oph.fi/en/sustainable-future. The guide provides comprehensive information and resources on SD for education experts, from early childhood to adult education. It covers various dimensions of sustainability and offers practical advice, materials, and case studies to support implementation in educational settings. Additionally, the guide encourages reflection on values, fosters constructive dialogue, and sparks critical thinking. The guide also provides useful tips and links (in Finnish) for promoting sustainability in early childhood education.

Climate Guide for Teachers

Resources for SE	Climate education	Climate change	Subject teaching

Maj and Tor Nessling Foundation in Finland has published a teacher's climate guide for subject teachers. This guide is available in three languages (Finnish, Swedish, and English). The teacher's climate guide is a resource material designed to support subject teachers in their teaching and educational work. It describes climate change from the perspective of each subject taught in elementary schools. Additionally, it offers visual materials and task ideas suitable for each subject.

Beyond the subject-specific material, the guide has compiled concise tips for multidisciplinary learning and climate education in primary schools, as well as general information packages on climate change and climate education.

Belonging to Nature

Resources for SE	Non-formal education	Head-heart-hand pedagogy

Belonging to Nature is a project led by several non-formal educators from many countries in Europe. Part of the project was to develop thirty workshops on nature connection that can be used in various settings with young people, adapted to their ages, natural surroundings, and to different aims. The manual is based on the concept of Human Ecology with activities focusing on different spheres: Self, Social, Earth, and Spiritual Ecologies. Activities range from energisers and team-building activities to long content-based sessions, all using non-formal methodology and having fun and learning as main ingredients. The activities have been tested in diverse environments. The project highlights the importance of young people's ecological development when spending quality time outdoors and connecting with nature. The activities are based on head-heart-hand pedagogy recognising the three main faculties of the human being — thinking, feeling, and doing — which correspond to understanding, sharing, and manifesting. See more at: https://belongingtonature.com/.

A School Project on Water

Water	Active student engagement	UN SDGs

An elementary-school teacher with students investigated local water resources through a problem-based approach related to a new water treatment plant. Students investigated what tools could be used if a new water treatment plant would be built. Based on their observations, students made their own suggestion on where to situate a possible new water treatment plant. The students also argued for the importance of clean water which related directly to UNSDGs 6 'clean water and sanitation' and UN SDG 3 'good health and well-being'. Furthermore, the students discussed the possibilities and the challenges of transporting clean water with ships to settlements in need of clean water.

The above example from a teaching session has been included in this report because it highlights a water issue that is present in several of Greenland's smaller settlements — access to clean water — and is founded on a problem-based approach of students' own inquiry.

A School Reinvention through Sustainability

Sustainability education	Creativity	Whole school approach
School development	Tertiary education	

Hallormsstaðaskóli in the east of Iceland is an educational institution providing a platform for people to develop their creative capacities for sustainability. An educational and cultural centre has been operating in Hallormsstaður for over ninety years. Teaching at the school has always been characterised by ideals that align with many of the current principles of sustainability, such as practical craft knowledge woven together with the ethics of using nature, science, and local resources with attentive care for both nature and society. The school was founded as a women's school, focusing mainly on household skills, but has undergone various reforms as society has changed while educational opportunities and demand have been transformed.

Some years ago, the school revised its take on education and provided a comprehensive program in Creative Sustainability for students at the upper secondary level. In 2024, the school began cooperating with the University of Iceland, offering a 60-ECTS program in Creative Sustainability. The school's website describes the policy and values of the school are described.

> **The concept of sustainability is controversial and constantly evolving. At Hallormsstaðaskóli, we take into account the seasons, weather and winds, but also issues that appear to us in our daily lives. The challenges of the future require new thinking, active listening, creative solutions and an analytical approach.**
>
> **We focus on promoting knowledge and ecosystem awareness, as well as training critical thinking and the sharing of knowledge and delving deep into our joy of play and creativity. (Hallormsstaðaskóli, n.d.)**

Clean Ocean

Resources for SE	Primary and secondary education	Pollution	The ocean

A collaborative Nordplus project called "Digital language meetups and Nordic cooperation for a greener future" developed common teaching materials about ocean pollution for Nordic schools, translated into Danish, Finnish, Icelandic, Norwegian, Swedish, and Faroese (https://nordeniskolen.org/da/temaforloeb/rent-hav). Supported by Nordplus, Icelandic organisation Landvernd, and Norden i Skolen, the initiative produced an interactive teaching package that includes e-books, animated films, and competitions focused on sustainability.

Teachers have praised the material for its accessibility and relevance, helping students understand their connection to the sea and the importance of marine conservation. The materials encourage critical thinking about plastic use and participation in activities like beach cleanups to promote environmental awareness. Norden i Skolen facilitated the distribution of this teaching material across the Nordic region, showcasing successful educational collaboration despite differences in history and context among the countries.

Norheim School

Sustainability education	Whole school approach	School development	Student governance

Norheim School is an elementary school with 260 students located in Karmøy. The school has been working on climate and sustainability for a long time and is environmentally certified with the Green Flag. Environmental and sustainability issues are a central theme in the school's activities. The school aims to teach students how they can contribute both collectively and individually to making environmentally conscious choices in their daily lives. SD is an integrated part of the curriculum, including topics such as waste sorting, energy saving, consumption, indoor climate, diet, transport, and the local environment.

Norheim School has established an environmental council where the majority are students, giving them influence and experience in participating in decision-making

processes and taking responsibility for the decisions made. The students, through the environmental council or by involving all classes at the school, conduct annual environmental reviews, allowing them to contribute ideas for measures that make SD an even better-integrated part of the school's activities. This gives students insight into the work with the environmental review and what guides the environmental action plan to be implemented. The school also prepares an annual activity plan.

In addition to climate and sustainability being a recurring theme, the school focuses specifically on climate and sustainability for twelve weeks each year. All grades and students are involved and participate. In this work, Norheim School emphasises what students can actively do. Students work on interdisciplinary topics such as sustainability and waste, beach clean-up campaigns, battery hunts, plastic pollution, circular economy, planting and harvesting, toxin-free schools, making birdhouses, and insect hotels. Norheim Elementary School has a holistic, systematic, and inclusive approach to working on climate and sustainability.

Drøbak Montessori Secondary School

Sustainability education | Whole school approach | School development | Student governance | International cooperation

Drøbak Montessori Secondary School is a small secondary school with big ambitions and it is Green Flag certified. The school's curriculum is directly linked to the environment and sustainability, providing students with practical experiences and the opportunity to influence the environment and society. The school wants to integrate environmental awareness into subjects so that it becomes a natural part of students' daily lives. Students work practically and theoretically with UN SDGs throughout the school year.

Additionally, students delve into a self-selected topic over four weeks, choosing from various subjects such as human rights, freedom of expression, exploratory work related to chickens and bees, and life under water. The school has a subject called "The Sea," where students learn about marine life and become independent in boating. The school also has bees, chickens, and a vegetable garden, and organises an autumn market where parents, siblings, and other interested parties are invited to learn about the school and buy food, such as homemade honey and

vegetables from the school garden. Drøbak Montessori Secondary School emphasises waste sorting and composting, using the compost to improve the soil in the school's vegetable garden and as fertiliser for plants and flowers. The school has established an environmental council with students who set goals and create plans for measures to be implemented.

Climate, environment, and sustainability are also central to the school's operations. Drøbak Montessori Secondary School is a Powerhouse school, meaning the school building is designed to produce more energy than it consumes over its lifetime. The building is heated by pumping warm air from two deep wells, and solar panels are installed on the roof. Occasionally, the school supplies electricity to the power grid. Students have learned how the building functions and use this knowledge when guiding visitors and informing them about the building.

The school participates in international collaboration related to sustainability, including student exchanges focused on renewable energy. In autumn 2022, the school organised sustainability games, to which students from several countries were invited.

Peer Learning as Key for Professional Development amongst Teachers

Sustainability education | Whole school approach | Student governance | Teamwork | Peer learning

Oxievång school in Malmö has been working systematically to make everyone involved in the sustainability work at the school. The school leadership supports organising teacher training and creates a forum for teachers to discuss the integration of sustainability in the various subject areas. All teaching staff attended specific courses on UN SDGs in order for every teacher to be able to integrate them into their subject areas. The school leadership facilitated teaching staff to start to work more in teams and meet every week. Peer learning led to developing and evaluating the teaching and learning, which has led to transparency and more knowledge about the overall pedagogic work. A central approach in teaching has been to strengthen the democratic perspective in pedagogic work. This is in order to increase pupils' capacity to express themselves critically and discuss controversial issues such as antisemitism and racism.

Thanks to the coordinated work of the teachers, pupils have been able to bring input from other subject areas into various lessons. One example comes from home economics. By further incorporating sustainability in the various subject areas, the course has reached more depth and it has been easier for students to see the links between the subjects. This has also resulted in more pupil-led activities, such as taking care of beehives and producing honey as well as choosing more vegetarian food. See more at: https://www.skolverket.se/skolutveckling/inspiration-och-stod-i-arbetet/inspiration-och-reportage/sa-arbetar-oxievangsskolan-med-fragor-om-hallbar-utveckling.

Backebo School Created Sustainability Councils for Students and Staff

Reduce consumption	Interdisciplinary education	School development	Student governance

Pupil engagement is key in Backebo School. They involved their pupils in the school's sustainability work through specific formalised councils. The pupil sustainability council had representatives from every class. The council's aim was to discuss which issues students found interesting to engage with. They met regularly to have continuity.

The school also created a council for staff working in the school which aimed at discussing how to work with the sustainability issues the pupil council found engaging. This council also included staff working in areas such as the building site, the kitchen, and caretaking. The student council would then have a shared responsibility in implementing their ideas. Backebo School has three overarching goals that have guided their work: create more possibilities to rest during the school day (this includes teachers and pupils), respect all living creatures and increasing knowledge on animal welfare, and decrease consumption at the school.

A key to working with sustainability amongst the teaching staff at the school was also to work interdisciplinarily for subject areas not to be isolated. In this way, teachers had an opportunity to include various perspectives and implement them in teaching and learning. To enable this way of working, there were formalised ways of meeting amongst teachers. Peer learning has been key in order for teachers to develop their competence in this field.

Teacher training occurs continuously through courses, networks, and projects with researchers in various subject areas including sustainability. Through interdisciplinarity, peer learning, and continuous professional development,

teaching staff have kept sustainability on the agenda. With specific councils for sustainability work at the school, it is easier to not lose track. See more at: https://www.skolverket.se/skolutveckling/inspiration-och-stod-i-arbetet/inspiration-och-reportage/sa-arbetar-backeboskolan-med-fragor-om-hallbar-utveckling.

Kökar Primary School

Green Flag	Whole school approach	Thematic work	Interdisciplinary education

One of the smallest schools in Åland has been working with the Green Flag for a long time, Kökar Primary School with five pupils in grades 1–9. They have followed the Green Flag strategy and worked on the basis of one of the themes specified in the program. The school has then worked on the theme during the school year, partly with theme days but also specifically in separate subjects.

The Åland primary school curriculum emphasises the importance of a sustainability perspective in all teaching. Sustainability is inscribed in all subject areas, so that the teaching of the subjects includes sustainability as part of the teaching. Sustainability is included in all course syllabi and is also included in the assessment criteria for most subjects. The Green Flag program is a support in implementing sustainability according to the curriculum.

In Kökar Primary School, a plan with objectives and contents is made at the beginning of the term. The pupils are involved in the work already in the planning stage and this has many advantages. Since there are so few pupils, the teacher still must review their tasks as they are all involved in all other work in the school.

The school has, thanks to the Green Flag, developed practical routines such as not using paper towels or disposable containers, and other measures for environmental reasons. Since it involves some bureaucracy to be a Green Flag school, the school is pausing this year. But routines established through the Green Flag program remain in place.

Nordplus: Advancing the Nordic Vision 2030 through Cross-Border Educational Collaboration

Educational support | Nordic cooperation | Development

Nordplus is the largest educational programme of the Nordic Council of Ministers, supporting mobility and network-building in the Nordic and Baltic countries, including Åland, the Faroe Islands, and Greenland. It promotes SE, from preschools to adult education, through cross-border cooperation and innovative projects as well as funding initiatives that incorporate green practices into teaching, such as climate change, green entrepreneurship, and SD. By fostering collaboration and building competencies, Nordplus plays a vital role in advancing SE and contributing to a greener future in the Nordic region. More information on the programme and how it works towards the Nordic Vision 2030 can be found on www.nordplusonline.org.

6. NGOs and Sustainability Education

Unlike many other subjects, NGOs are heavily involved in sustainability education at schools. In the survey, we asked participants whether they relied on some external programmes while engaging with SE. Several organisations stand out as the most common collaborators or support providers: WWF, UNESCO, UNICEF, and Eco-Schools (Green Flag). Out of 600 participants who responded to this question in our survey (see Chapter 7), only 131 said they did not rely on any external programme.

6.1 Influence of NGOs in the Field of Sustainability Education

In few fields of education is the presence of NGOs as evident and widespread as in sustainability and environmental education. Already in the 1970s, the nature education movement – and the later environmental education movement – emphasised the role of education in the protection of nature. These movements are the roots of sustainability education (Wheeler et al., 2015). The world's largest environmental organisation, the International Union for the Protection of Nature (IUPN) – now called the International Union for Conservation of Nature (IUCN) – was established in 1948, and its Commission on Education – later the Commission on Education and Communication (CEC) – was funded one year later. IUCN has member organisations in all the Nordic countries.

Also, the World Wildlife Fund for Nature (WWF) founded 1961 has, for years, been interested in education. WWF has offices in Denmark, Finland, Norway, and Sweden. The main drivers behind the report *Caring for the Earth: A Strategy for Sustainable Living*, published in 1991, was a collaboration project between IUCN, WWF, and the United Nations Environment Programme (UNEP). Already in 1980, the same organisations published the predecessor *The World Conservation Strategy: Living Resource Conservation for Sustainable Development*. This last-mentioned conservation strategy especially emphasises the role of education.

NGOs such as Eco-Schools or WWF are direct participants in schools from kindergarten to upper secondary schools and influence both the way schools interpret the local curricula as well as how they produce teaching materials,

assisting schools at changing their functioning and educating teachers. Eco-Schools was initiated in 1992 as a response to the needs identified at the United Nations Conference on Environment and Development, also known as the Earth Summit, held in Rio de Janeiro (https://www.un.org/en/conferences/environment/rio1992). This conference was held on the occasion of the 20th anniversary of the first Human Environment Conference, which had been held in Stockholm in 1972. The conference brought together representatives from 179 countries, not only government representatives but also members from the third sector who held a Global Forum, bringing together an unprecedented number of NGO representatives who presented their own vision of the world's future in relation to the environment and socio-economic development. The Eco-Schools program was first launched in 1994 in Denmark, Germany, Greece, and the United Kingdom with the support of the European Commission. Thirty years later, the Eco-Schools program is present in over seventy countries across the globe.

6.2 International NGOs

Many of the NGOs which provide support for SE in schools, or even offer schools holistic programmes, are international – working across borders not only in the Nordic countries but widely in Europe and globally. Some of those programmes are UN-affiliated while others are grassroots programmes.

6.2.1 Eco-Schools

The Eco-Schools (Green Flag Schools) have an extensive presence within the educational systems in the Nordic countries. In Finland, there are more than 350 elementary schools that have a formal relationship with Eco-Schools program, making it the country's largest SD program and providing an international environmental label for kindergartens, schools, educational institutions, and leisure operators. The presence of Eco-Schools in Iceland is also extensive, with over half of all elementary schools participating. In Norway, more than 1,000 kindergartens and elementary schools in more than 100 municipalities are members of the Eco-Schools network.

Sweden follows the same pattern; nearly 1,000 preschools and almost 300 schools have received the quality label Green Flag.

The program is based on a whole school approach and offers the participating institution a wide selection of support material while also providing a step-by-step development plan to make the school more sustainable. Schools who complete all the steps are awarded the Green Flag.

Denmark: Friluftsrådet (https://friluftsraadet.dk/)

Finland: Vihreä lippu–Grön Flagg (https://vihrealippu.fi/)

Iceland: Landvernd–Green Flag schools (https://menntuntilsjalfbaerni.is/)

Norway: Grønt Flagg (https://grontflagg.fee.no/)

Sweden: Håll Sverige Rent–Grön Flagg (https://hsr.se/gronflagg)

6.2.2 World Wildlife Fund Finland

World Wildlife Fund (WWF) Finland has its own environmental educators who arrange courses for teachers, produce material (alone or together with others), and support schools to set up environmental groups (https://wwf.fi/en/). The organisation has also had much influence in Sweden, where the Swedish branch (Världsnaturfonden WWF: https://www.wwf.se/utbildning/) offers teaching materials, tools, and methods for working with SD. For example, WWF has developed a teaching guide called *Influence the Future – Our City 2030* (https://www.wwf.se/utbildning/wwf-education/influence-the-future-our-city-2030/). The working method is interdisciplinary and aims to give students action skills in the transition to a sustainable society. WWF has also developed an online course for school leaders called Lead a School/Preschool for Sustainable Development – a Whole School Approach (https://kurs.wwf.se/).

6.2.3 UNESCO Global Citizenship Education

UNESCO has run the Associated School Network since 1953, when it was initiated with thirty-three secondary schools from sixteen member states. The network has currently over 12,000 schools worldwide which work together in support of peace, intercultural dialogue and understanding, SD, and quality education. With the launch of the UN SDGs, target 4.7 has received special attention within the network, specifically social, humanistic, and moral purposes of education.

Denmark: Den danske UNESCO nationalkommission https://www.unesco.dk/uddannelse/unesco-verdensmaalsskoler

Finland: UNA Finland https://www.ykliitto.fi/un-association-of-finland

Iceland: Félag Sameinuðu þjóðanna https://un.is/unesco-skolar/

Norway: FN sambandet https://fn.no/undervisning/undervisningsopplegg

Sweden: Svenska FN Förbundet https://fn.se/engagera-dig/fniskolan/

6.3 Local Programmes

In addition to the international programmes working in the field of SE, various local programmes or initiatives have emerged in the last decades. These initiatives take on diverse forms, from government-supported programmes to NGOs and other third-sector projects. Below are examples of such programmes. This is not intended as an exhaustive list but as an indication of what is happening in the Nordic region and a testimony to creativity and the determination of a diverse group of educators and activists.

Denmark:

Forum for uddannelse for bæredygtig udvikling https://rce-denmark.dk/

Grøn skole i Danmark https://groenskole.dk/

Nationalt netværk for naturfagsundervisere https://astra.dk/ubu/

Concito – fokus på bæredygtighed https://concito.dk/

Litteraturliste om bæredygtighed for undervisere https://www.laereruddannelsesnet.dk/wp-content/uploads/BAeREDYGTIGHED.docx.pdf

Finland:

Suomen Luonnonsuojeluliitto, Suomen Luontoiiitto, and Natur och Miljö

NGOs offering a lot of educational activities and material

https://www.sll.fi/en/

https://luontoliitto.fi/toimintaryhma/susiryhma/in-english/

https://www.naturochmiljo.fi/om-oss/vem/in-english/

Lyke (nature and environmental schools) https://www.luontokoulut.fi/?lang=en

Okka Foundation https://koulujaymparisto.fi/in-english/

Iceland:

Health-promoting schools https://island.is/heilsueflandi-grunnskoli

Sweden:

Naturskoleföreningen (The Nature School Association in Sweden) https://www.naturskola.se/

Naturskyddsföreningen (The Swedish Society for Nature Conservation) Skola startsida - Naturskyddsföreningen

7. Surveying Teachers' Educational Approaches

Since our work is aimed at supporting practitioners, a priority has been given to listen to what teachers say about their practices—how they teach sustainability and what kind of obstacles (if any) they encounter when planning, carrying out, and evaluating teaching sustainability. To do this, we chose to use the seventeen UN SDGs as our base for enquiring into teachers' experiences in teaching sustainability in the context of a survey. The first dataset was collected through an online survey among practising teachers in the Nordic countries.

7.1 Methodology

The survey was designed around an idea of wanting to know *how* teachers teach sustainability as well as *what* they teach when they teach sustainability, and what kind of obstacles – if any – they encounter in planning and carrying out teaching related to sustainability. To capture data that could help us in the quest, we used a combination of both closed and open-ended questions. Where closed questions served as the main data source for statistical analysis, respondents' answers to open-ended questions served as a trail into learning from teachers.

After a rigorous pilot testing of the questionnaire in all seven Nordic languages, the final version contained eighteen questions. With the help of various channels in each country, primarily teacher unions, the questionnaire was made available to randomly selected teachers across the Nordic region (Denmark, Faroe Islands, Finland, Greenland, Iceland, Norway, Sweden, and Åland Islands). The survey was available to teachers between the end of November 2023 and the beginning of March 2024; three reminders were sent out to teachers in that period. A total of 676 teachers from across the Nordic countries completed the questionnaire.

7.2 Main Findings

The design of the questionnaire allows for the collection of both quantitative and qualitative data. In this section of the report, findings from the quantitative part of the survey will be presented. Due to the limited number of respondents from all the eight Nordic countries (n=676), findings from the quantitative section of the survey will be presented for the Nordic region as a whole, and as descriptive data only.

The findings from the questionnaire are centred on teachers' experiences in teaching sustainability and will be presented through three themes related to sustainability:

1. Teachers' personal experiences with sustainability
2. Teachers' teaching experiences related to sustainability
3. Teachers' experienced obstacles to teaching sustainability

7.2.1 Teachers' Personal Experiences related to Sustainability

To understand how teachers relate to the issue of sustainability, we inquired into which of the seventeen UN SDGs they considered to concern sustainability. In answering this question (see Figure 10), they had the opportunity to tick more than one of the seventeen items.

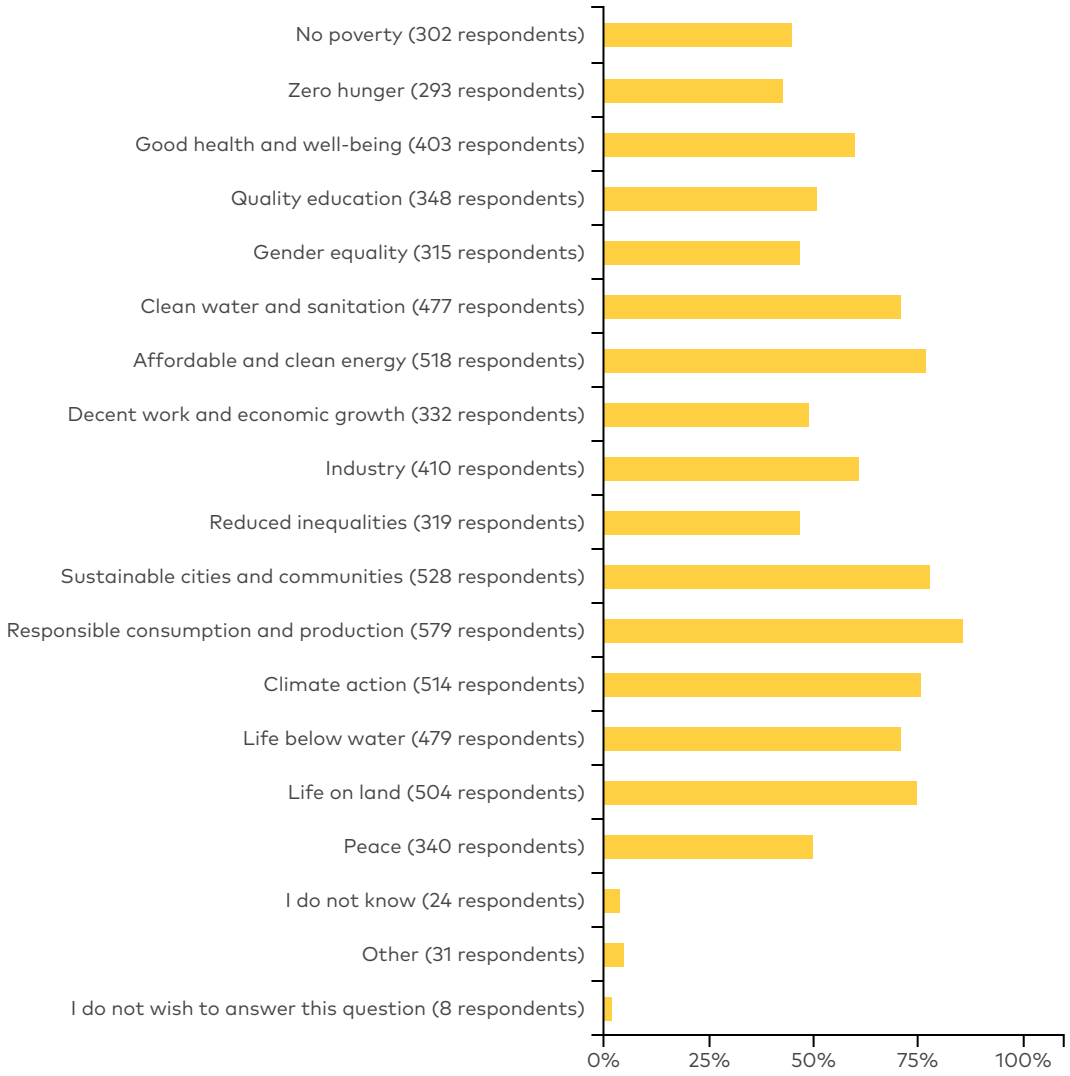

Figure 10: *Responses to the prompt: "In my mind sustainability concerns (mark all the options you relate to sustainability)."*

Teachers' responses to the question on which of the seventeen UN SDGs they relate to sustainability reveal that UN SDGs such as 'reduced inequalities', 'decent work and economic growth', and 'gender equality' are considered less related to sustainability than UN SDGs such as 'climate action', 'life on land', 'affordable and clean energy', and 'responsible consumption and production'. The data suggests a division in what teachers consider a sustainability topic. It seems that issues related to the environment and climate are valued higher than issues related to human systems, such as 'zero hunger', 'inequality,' and 'peace, justice, and strong institutions'. This division of opinions on sustainability issues might be an indication of their understanding of urgency; natural systems are under tremendous stress while a changing and warmer climate has had an increasingly violent impact on the entire planet during the past few years. This interpretation resonates with Demant-Poort and Berger's 2021 findings that student teachers in Greenland and Canada were very worried about how climate change affects both the natural world and their future as teachers.

Analysis of teachers' qualitative responses to this question reveals two themes in what 'sustainability' means to them: a 'nature first' theme and a UNSDG theme. In the 'nature first' theme, teachers express a deep concern for the natural world and a nature-human connection. In the questionnaire, one teacher wrote that "natural resources must be sufficient for us and future generations across the entire planet, and this includes plants and animals – conservation of species and biological diversity." Another teacher expressed the human-nature connection as a close interdependency:

> **That a human being understands that she is IN nature, is a part of nature. If you know that, you also understand that all you do that also harms nature, it will harm me as a human being, because I AM nature, knowing that I act long term, make decisions, and make choices that are good for me and my surroundings – now and seven generations into the future.**

According to the quotation above, sustainable living is a foundation for human existence, a dependency that is deeply rooted in a concern for an uncertain future. A third teacher expressed a need for change in how people live, that current ways of living are incompatible with a sustainable future, and if it is to be more sustainable "most likely we will have to decrease standards of living in our part of the world."

The UN SDG theme comprises teachers' understanding of sustainability as the combination of the seventeen UN SDGs. They express both a difficulty in choosing between the seventeen UN SDGs and also that choosing all is 'what one must do'. Many of the responding teachers consider sustainability first and foremost as something having to do with the natural world: climate change, biodiversity loss, and changes to ecosystems. There are, however, also teachers who express a broad sense of sustainability regarding all seventeen UN SDGs as equally important.

Related to the previous topic – what teachers consider a sustainability issue – we wanted to probe into what influenced their understanding of what sustainability is. Are teachers influenced by the media, social media platforms, or other digital sources? Are their students or their own children their main source of influence? Those were some of the considerations we had when we designed this particular question (see Figure 11). The teachers could indicate any number of items on the list.

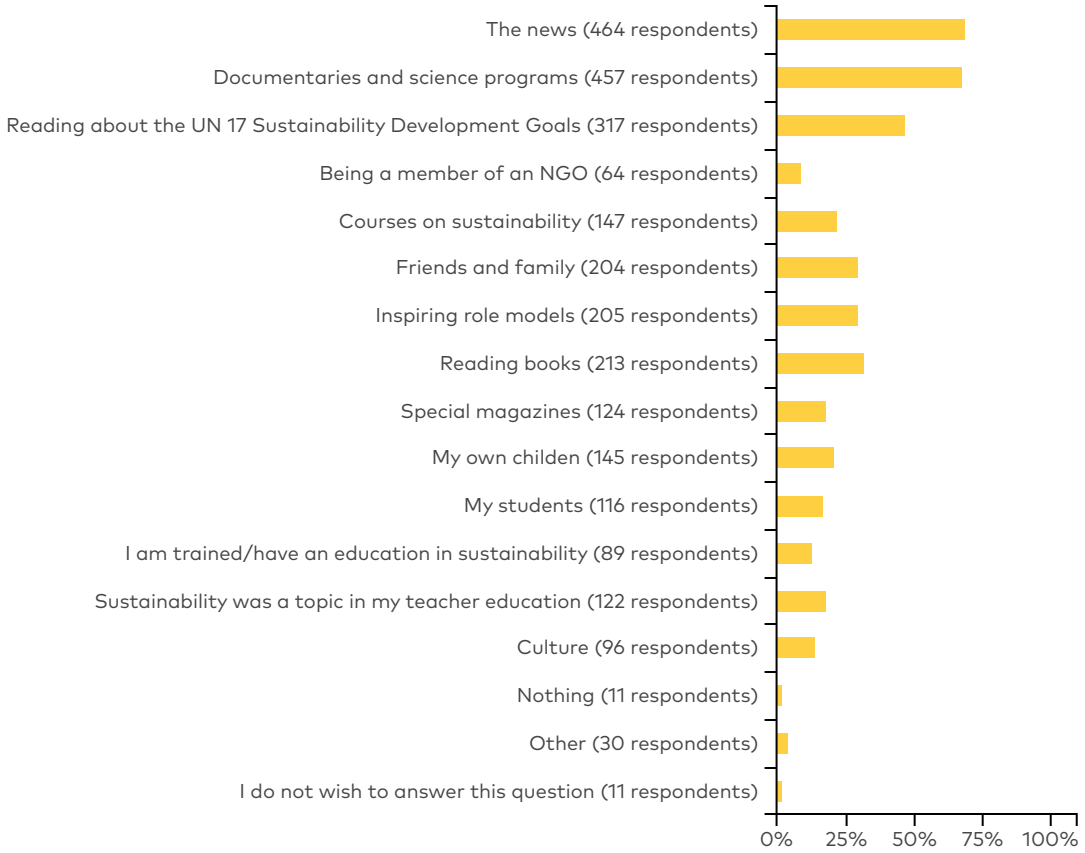

Figure 11: *Responses to the question: "What has influenced your understanding of sustainability?" Participants could indicate as many options as they liked.*

The data suggests that 'the news', 'documentaries and science programs', and their own reading of the seventeen UN SDGs are the sources that have most influence on teachers' understanding of sustainability. Fewer teachers are influenced by friends and family, students, and specialist magazines. What is particularly worrisome is that only 18% of the respondents indicated that sustainability was part of their teacher education program. That figure is, however, understandable

given the lack of focus on sustainability in teacher education across the Nordic countries as described in Chapter 5 of the report *Mapping Education of Sustainability in the Nordic Countries*.

Teachers' qualitative responses on the question revealed a similar broad variety. Some teachers were influenced by online media platforms and social media, whereas others were influenced by courses, their own academic work, and lectures. A few of the responding teachers relayed a story of how their understanding of sustainability is influenced by their own observation of changes. As an example, one respondent said that "I can see the changes in climate and nature with my own eyes."

7.2.2 Teachers' Teaching Experiences

Though relatively few of the responding teachers have indicated that they have worked with sustainability in their own training, it has not, however, had an impact on their own ambition to teach sustainability in their schools and to their students. More than 80% of the responding teachers indicated that they have taught sustainability (see Figure 12), when asked: "Have you taught sustainability in your class?"

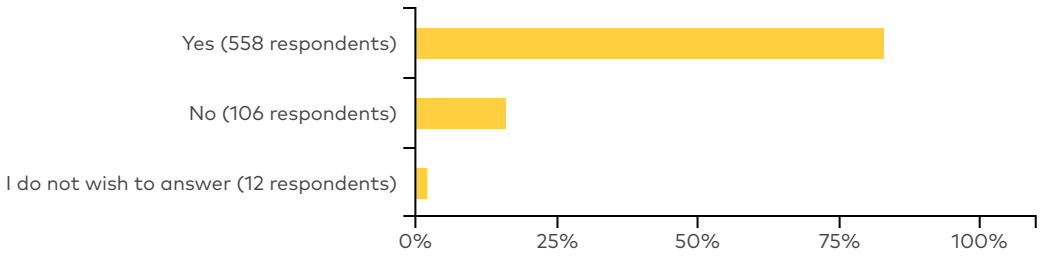

Figure 12: *Responses to the question: "Have you taught sustainability in your class?"*

Answers to this question gave us two directions for further inquiry: 'Yes (I have taught sustainability)' led to questions about *what* topic of sustainability they had taught, and *how* they had taught sustainability. 'No (I have not taught sustainability)' led to questions about what reasons they had for not including sustainability in their teaching and whether they experienced hindrances to doing so.

Teachers giving a positive answer to having taught sustainability then indicated which topic related to sustainability they included in their teaching (see Figure 13). For an answer, participants were given the option of indicating which of the seventeen UN SDGs they had focused on, with a further option of describing topics beyond the seventeen SDGs.

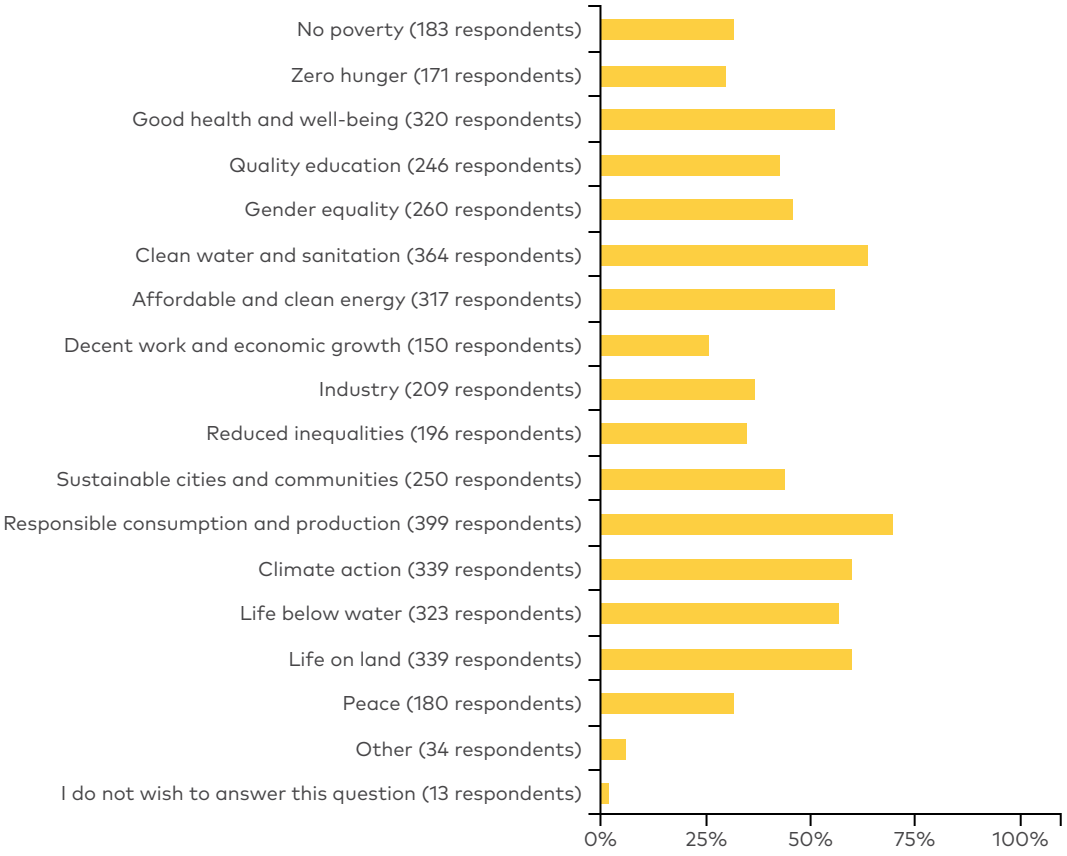

Figure 13: *Responses to the question: "What topics related to sustainability have you taught?" Participant could mark as many options as they found relevant.*

When teachers indicated which of the seventeen UN SDGs they had included in teaching, a preference emerged for issues related to the environment such as 'climate action', 'life below water', and 'life on land' as well as issues closely related to living conditions such as 'clean water and sanitation', 'good health and well-being', 'affordable and clean energy', and 'responsible consumption and production' which is the item most respondents mentioned (70%). What stands out among the seventeen UN SDGs are a few items concerning inter-human relations – or more conventionally political items – which received much less attention than the above-mentioned items concerning the environment and living conditions. Thus, the items 'reduced inequality', 'no poverty', 'zero hunger', and 'peace, justice, and strong institutions' were only indicated by around a third of the respondents.

The preference of teaching topics related to environmental issues as opposed to issues of inter-human relations may be an indication of how sustainability is comprehended as concerning human-nature on the one hand and lifestyles (consumption) on the other. Answers to the question about which topics teachers

have included in their teaching may reflect issues that are not directly related to their understanding of sustainability, such as availability of teaching material (this can influence choice of topics), conventions, or timetables, but also reluctance to bring controversial political issues (conflicts or lack of peace, inequality, poverty, and hunger) into the classroom. When answering the open question about what topics the teachers focused on when teaching sustainability, many mentioned 'fast fashion' and the clothing industry.

Aside from an educational focus on content through teachers' indication of which of the seventeen UN SDGs they have taught, it is of equal interest to understand *how* sustainability is taught. We therefore also asked the teachers what their focus is when they teach sustainability (see Figure 14).

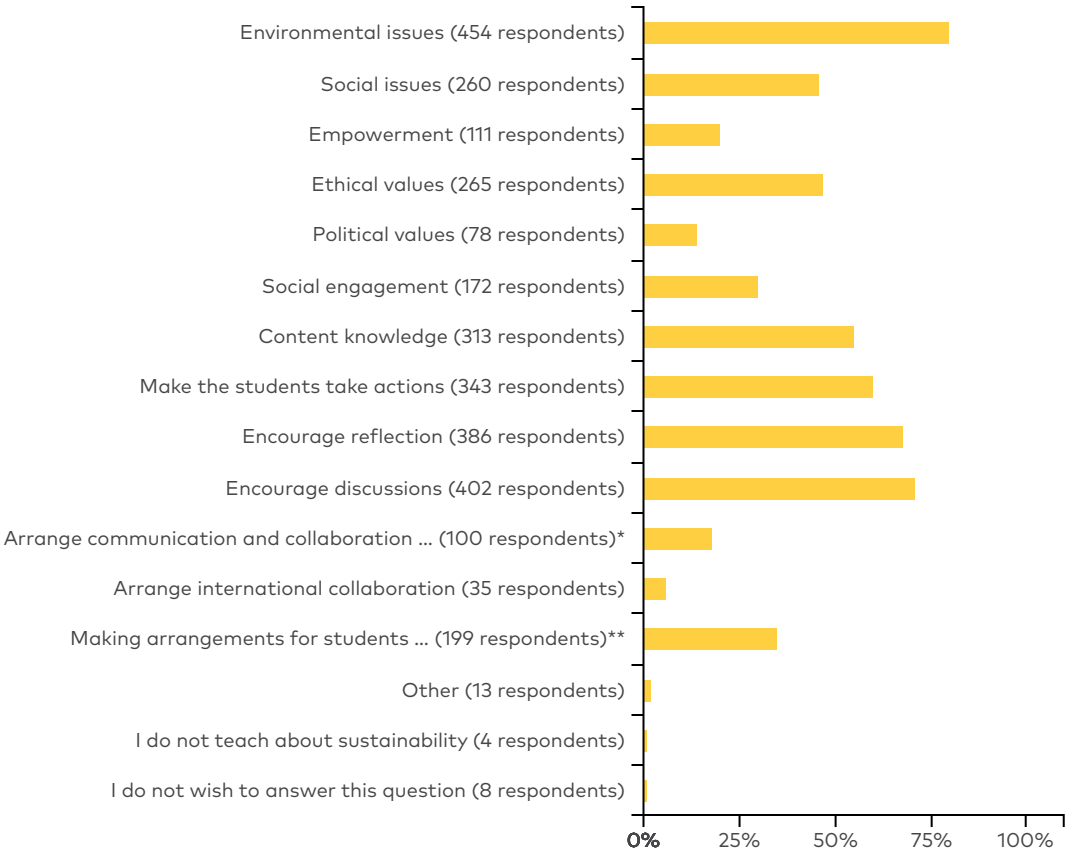

Figure 14: *Responses to the prompt: "When I teach sustainability, I focus on ..." Participant could mark as many options as they found relevant.*

* Arrange communication and collaboration with people from other contexts than the school
** Making arrangements for students to practice sustainability

Teachers could select any number of items on the list above. The first two items concern content, i.e. whether the teachers consider sustainability an environmental or a social issue. Between the two overarching items, there is a clear preference for 'environmental issues' (80%) over 'social issues' (46%). Looking at these results from the perspective of the head-hand-heart approach, we see a relatively strong focus on content knowledge (55%) – the 'head' – but there is also a clear prevalence of the 'hand' through participatory methods ('encourage discussion' at 71%), engagement-oriented methods ('make students take action' at 60%, 'making arrangements for students to practise sustainability' at 35%), and the 'heart' through reflection on ethical values ('ethical values' at 47% and 'encourage reflection' at 68%).

7.2.3 Teaching Development

In developing the questionnaire, we wanted to know more about how teachers across the Nordic region teach sustainability; how have they considered teaching a topic on sustainability, what kind of approach have they developed, and what range of materials have they considered necessary for their students to learn about a specific topic related to sustainability. We therefore included an open question where we asked teachers to describe a teaching approach on sustainability that they had developed. Around a quarter of those who responded chose to describe one or more lessons on sustainability they had developed, taught, and evaluated. Among these descriptions are a myriad of approaches to teach various aspects of sustainability.

Teaching 'sustainability' in all the varied aspects present within the UN SDGs can be difficult to comprehend for students. To help young students in that quest, many teachers have approached sustainability through a lens of teaching activities that are hands-on, close by, and relatable to most students from a local or regional perspective. Below, we will briefly describe what we see as three major trends emerging from these responses.

Recycling and Waste

One approach is 'recycling' activities in their school, local community, and household. One teacher wrote, "My students have worked with recycling, the recycling station, animals and plants." A theme closely connected to recycling is 'waste'. Collecting waste on a beach and categorising plastic in different fractions is an approach to sustainability that is easily comprehensible to students. It is easy for the students to see the difference their clean-up of a beach makes. One teacher wrote, "We look for waste close to the school. We follow waste through the waste-handling system."

Problem-based Approach

Several teachers described a problem-based approach to sustainability where students identify an issue or a problem at school and then work towards a solution. A teacher described this approach from a school meal perspective: "[The students] investigate why school food is thrown away, and then they work on how to solve the problem."

Critical Consumption Approach

Some teachers address sustainability in teaching through critical reflection on the consequences of modern life. Several teachers focus on the clothing industry where they have developed content and methods to address the 'fast fashion' aspect of modern life. Although fashion is perhaps best thought of as a social issue, these approaches often also reflect on how new fashion trends have a negative impact on the environment.

Problematising 'fast fashion' as an aspect of modern life resonates with a second minor trend – 'consumer lifestyle'. A teacher described how students have examined their own consumer habits. Such an approach might include not only what people consume but also how food is produced, making students research how local foods are produced, increasing awareness of sustainable growing techniques, and actively engaging students in growing their own food through a project with school gardens and a plant-based diet.

The teachers' responses to the open question on teaching approaches show impressive creativity in teaching. However, though many have described approaches to teaching sustainability, they also encountered a range of obstacles when working with students.

7.2.4 Teachers' Experienced Obstacles for Teaching Sustainability

Although the majority of those who responded to the survey said they had taught sustainability (83%), there were still 17% who said they had not done so. We were interested in knowing some of the reasons why those 17% had not taught sustainability. Was this due to systemic features? Was it a lack of subject-matter competence? Or did teachers not see sustainability as relevant? To probe this further, we presented the teachers with a range of statements on why they have not taught sustainability (see Figure 15). The items in this category ranged from lack of student interest to lack of priority on a national level.

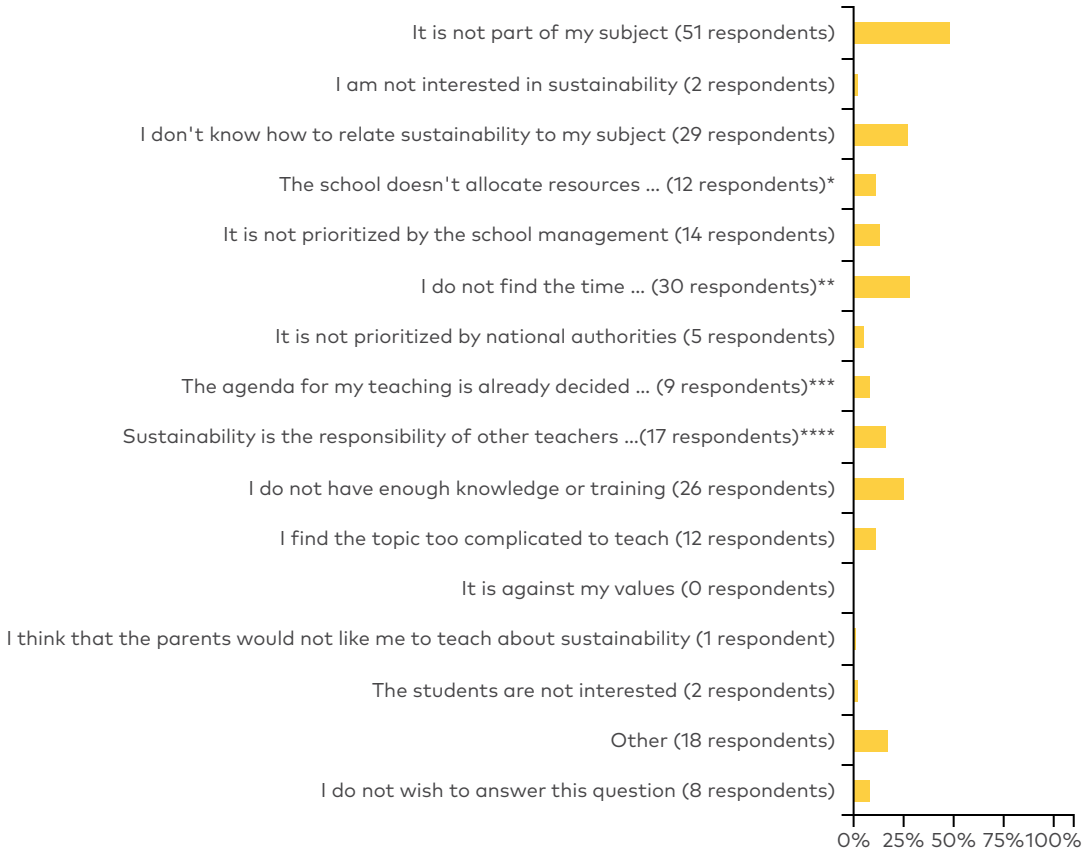

Figure 15: *Responses to the question: "Why have you not taught sustainability?" Participant could mark as many options as they found relevant.*

* The school (where I work) doesn't allocate resources for developing new sources
** I do not find the time - curricula is overloaded with other priorities
*** The agenda for my teaching is already decided by others than myself
**** In my school, sustainability is the responsibility of other teachers/subjects

Four different reasons for why teachers have not taught sustainability stand out (with a response rate of 25% or more). Of these four, 'It is not part of my subject' is by far the most common (48%). In light of the UN SDGs which comprise a wide array of issues, it is surprising that so many teachers should consider sustainability outside their subject area.

The number is perhaps less surprising if we consider how sustainability is presented in the curricula in the Nordic countries. Apart from the mention of sustainability in general or abstract terms as a cross-cutting theme, fundamental pillar, or in relation to transversal competencies, sustainability is often closely related to environmental issues and many subject curricula do not mention sustainability at all. In other words, there seems to be a lack of attention to what sustainability is in schooling, and this is reflected in teachers' arguments for not teaching sustainability.

Two other items on the list which get a high mention included 'I do not have enough knowledge or training' (25%) and 'I do not know how to relate sustainability to my subject' (27%). These indicate that there are teachers who might want to teach sustainability but are limited in their professional capacity, whether due to lack of knowledge or pedagogical skills. In addition, 28% of those saying they do not teach sustainability also answered 'I do not have the time — curricula is overloaded with other priorities'. We can perhaps conclude that at least some of those who lack the knowledge or skill do not find the time to overcome this barrier. The problem would, then, not only be lack of training but also lack of opportunities for professional development.

Among teachers who have indicated they teach sustainability, we were interested in knowing if they had experienced obstacles or hindrances in their teaching. Teachers' answers to this question would provide knowledge of systemic barriers to include a sustainability focus in teaching – outside teachers' responsibility (see Figure 16).

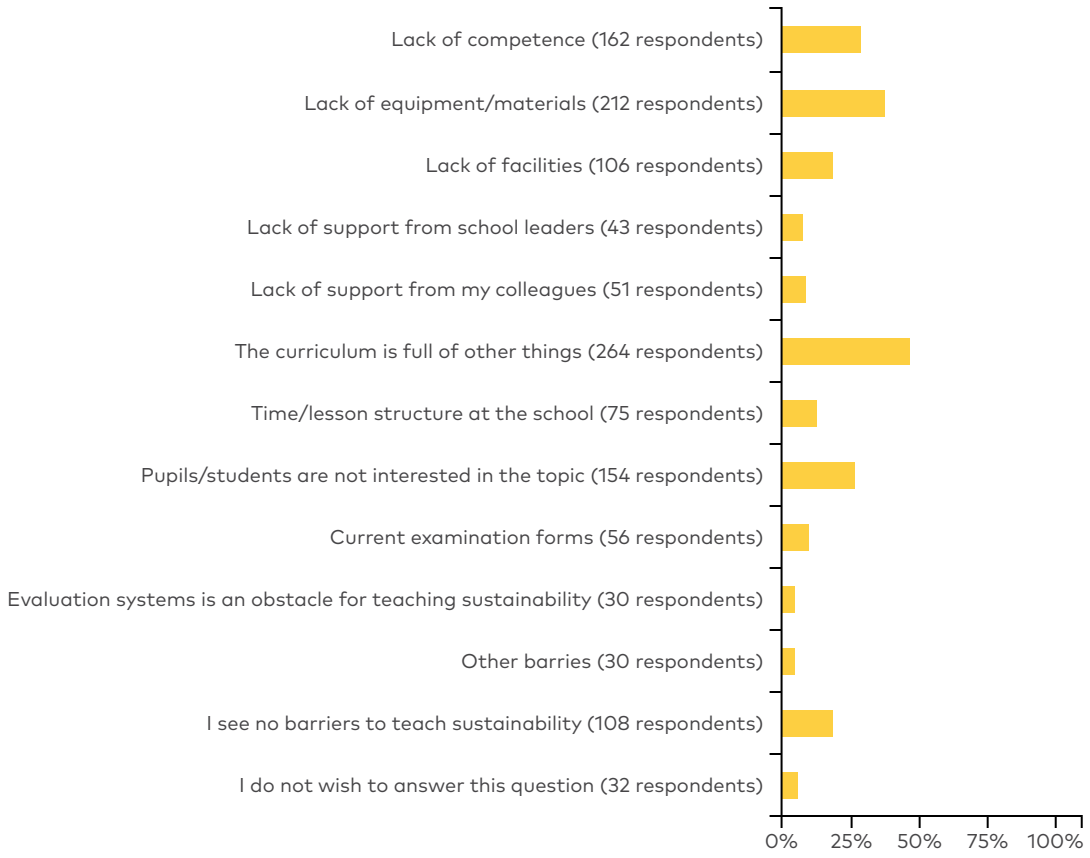

Figure 16: *Responses to the prompt: "Possible hindrances to teach sustainability" Participant could mark as many options as they found relevant.*

The teachers who say they do teach sustainability still experience a range of hindrances that affect what and how they teach. The most common hindrance is an overcrowded curriculum ('The curriculum is full of other things' at 47%). Teaching interdisciplinary or transdisciplinary issues that cut across conventional subjects adds to the complexity of teaching which often is organised along traditional subject categories. Teachers also experience a lack of competence (29%) and lack of equipment/materials (38%), which makes the overcrowded curriculum an even greater challenge to teaching sustainability.

The report *Mapping Education for Sustainability in the Nordic Countries* revealed how sustainability appears either as a cross-cutting theme or a fundamental pillar without a direct implication for teaching and not connected to specific sustainability content. When sustainability is given a more tangible interpretation in curricula, it is often mainly in the natural or environmental sciences, making the curricula appear more as a hindrance for teaching sustainability in other subjects rather than as a supporting document.

Speculation could lead to a coherence between two distinct items: 'lack of competence' (29%) and 'pupils/students are not interested in the topic' (27%). Teachers who teach sustainability but experience lack of competence may not be able to motivate their students. The link between these two items could be strengthened by the relatively high number for 'lack of equipment/material' (38%). Teachers' indication of lack of equipment and competence might stem from what Albert Paulsen refers to as a lack of subject imagination (*faglig fantasi*) and subject pedagogic imagination (*faglig-pædagogist fantasi*) (2006, p. 80). This lack of imagination means that teachers cannot free themselves from a more traditionalist approach to teaching – being too dependent on pre-determined content and material, i.e. bound to what would be the conventional interpretation of the PACK model where teaching is heavily dependent on curricular representation of expert knowledge.

When answering the open question about barriers to teaching sustainability, teachers elaborated on issues having to do with lack of time and overcrowded curriculum, saying 'there is not time for preparation and evaluation', 'not enough time for thorough work', and 'so much else I need to cover in a school year'. When such conditions are combined with lack of education and support material, what might be a challenge that pushes teachers to be more creative in their teaching instead becomes a hindrance and undermines their professional agency.

8. Implications for Continued Work

To teach sustainability is a complex task, requiring multidisciplinary content knowledge, both from the natural sciences (physics, chemistry, biology, ecology) and social sciences (economy, political science). In addition, sustainability education has an ethical component, urging people to reflect on moral issues and political values, which traditionally have been the subject matter of ethics and political philosophy. But in this unsustainable contemporary time, values cannot be the subject of mere academic reflection but must be actively engaged with; some may need to be revised, others abandoned, and new values adopted.

SE can also be emotionally challenging, requiring students to learn how to feel compassion for ways they did not know existed. All in all, SE requires not only much learning, but might also require much unlearning, abandoning old ways of relating and behaving. If this was not enough, SE also has an active component where people learn to situate themselves and participate in local and global environments and processes, often challenging entrenched habits and consumer patterns, uprooting traditions and customs, and learning to share the world anew. To complicate things even further, the changes that are required are often controversial, met with resistance inside and outside of school, and opposed by propaganda backed by fake news. It is, therefore, not surprising that we see teachers in our survey say they lack competence and support for teaching sustainability and that their students are not interested in the topic.

Although complex and even frightening when viewed in this way, SE can also be addressed in a more piecemeal way. Almost everything we do has consequences for sustainability: what we eat, how we travel home and to work, what we wear, the things we buy, how we dispose of old things, what we do to add colour in our lives, etc. In everything we do, there is a learning opportunity which is relevant from the point of view of SE. But to see these opportunities, develop them, and follow them through requires skills, attention, collaboration inside and outside of schools, and time. Some of the inspiring examples that we describe in Chapter 3 might give insight into where such opportunities lay and how they can be cultivated into real educational moments.

8.1 Policy, Curricula, and Educational Vision

Sustainability-related education policies have often aimed at changing the students' attitudes and behaviour to match predefined aims. But what are these aims? And what are the values on which those systems are based?

Some scholars have been sceptical about the promise of education as a response to current crises, pointing out that as a response it is slow and, also, that it may actually be moving things in the wrong direction. Sterling is among such scholars, arguing that conventional education seems to be sustaining unsustainable values and practices (2001). Thirty years ago – the same year the first Eco-Schools were founded – David Orr wrote that if we would listen carefully, it might "even be possible to hear the Creation groan every year in late May when another batch of smart, degree-holding, but ecologically illiterate, Homo sapiens [...] eager to succeed are launched into the biosphere" (1994/2004, p. 5). These are not mere pessimistic remarks from the past; it is actually well-documented that there are "clear, positive correlations between educational accomplishment and per capita CO_2 emissions" (Rappeley et al., 2024). The data is truly discomforting as shown in Figure 17.

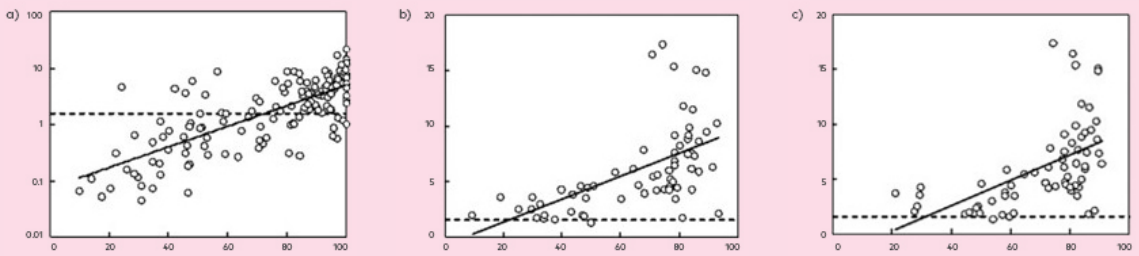

Figure 17: *Relationship of (a) the lower-secondary completion rate with CO_2 emissions per capita. Relationships between the ratios of fifteen-year-old students having (b) basic literacy and (c) numeracy and CO_2 emissions per capita. A dotted line denotes the CO_2 emission per capita in 2050 in the IPCC scenario leading to 1.3–2.1 Celsius degree temperature increases. (Rappleye et al., 2023, p. 2)*

The modern educational paradigm follows the conventional understanding of the PACK model described in Chapter 3. Within this paradigm, the aims of education are brought in from outside the education system, often catering to various social and economic forces that may be contrary to the aims of education or what teachers find important. When asked about possible hindrances to teach sustainability, 47% of the respondents in our survey say that 'the curriculum is full of other things'. David Hursh et al. argue that educational systems have been shaped by neoliberal tenets.

> It can be readily shown that neoliberal tenets have formed the core principles for primary, secondary, and higher education reform in many countries over the last two decades (Hursh 2008; Hursh and Wall 2011; Lave 2012). Leading Finnish educator Sahlberg (2011) writes that these countries adopt 'management and administrative models brought to schools from [the] corporate world' (203). Teaching, for example, is constrained by prescribed curriculum, and learning, evaluated through standardized tests. (2015, p. 306)

Teaching that is constrained by prescribed curricula and standardised tests is neither in line with the idea of transformative learning nor educational ideas grounded in the *Bildung* tradition. Whether at the practical level of classroom teaching or as school leaders, administrators, or researchers, educators must reflect critically on what education is aiming at and how it proceeds towards whatever aims are deemed worthy.

Even if people believe they have good reasons (knowledge) to change their own behaviour, and want to do so, they do not always act that way. In a large meta-study, Heimlich et al. (2014) have examined why knowledge-based belief does not appear in practice. Action requires the intention to act, but it is influenced by the prevailing norms and attitudes in society, the context, and elements like values, emotions, and experiences. Sustainability issues are complex and difficult to understand, and it is not always easy to know what the most sustainable choice in private life is, let alone in society. If the answers to the questions *How can we live sustainably?* and *How can we educate towards sustainability?* were easy, the world would have become sustainable long ago.

The language of competencies has become mainstream in educational policy discourse, with competencies sometimes further defined in terms of values, attitudes, skills, and knowledge. We see this in international programs such as the GreenComp of the European Commission and the Competences for Democratic Culture of the Council of Europe, but also in the OECD Educational Compass. But if we look around us in the so-called well-educated countries of the affluent north, it is obvious that people are too competent, have too much agency, and are too powerful. It is in virtue of our competencies that we are ruining the living conditions for humans on the planet. Has the success of education turned into horrors for humanity?

Perhaps the question is not about *how much* competence we have, but which competencies or what kind of competence. Have we possibly developed the wrong competencies? Perhaps we lack competencies related to caring for nature, appreciating the beauty of the world, and of being satisfied with what we have and who we are. We thus agree with The International Commission on the Future of Education.

> This is the right time for a deep reflection on curriculum. We must prioritize the development of the whole person not just academic skills. Here, we can find useful inspiration in the 1996 Delors report, Learning the treasure within, in its specification of four pillars of learning as learning to know, to do, to be, and to live together. Curricula should be increasingly integrated and based on themes and problems that allows us to learn to live in peace with our common humanity and our common planet. Finally, it is important to develop a strong base of knowledge about one's self and about the world – twinned objectives that allow each of us to find purpose and be better able to participate in social and political life. (2020, p. 18)

8.2 Educational Leadership for Sustainability

Educational leaders are in a key position to promote change in the world through education. While grand programs such as the UN SDGs, GreenComp, or the OECD Compass aim at change from the top-down – or outside-in – educational leaders play a crucial role for changing the educational frameworks from the inside out. A tree won't grow fresh leaves if the root system is dying. The roots of the educational systems are in the daily practices in schools. When teachers report lack of facilities, time, and support, they are reporting lack of nourishment for the roots of the entire system. This may entail initiating change processes on many levels, like global, national, and institutional (Wolff et al., 2024). Leaders must be willing to promote change of legacy, strategies, but also didactics, and the daily life in schools and other educational institutions. But leadership comes in many forms and the importance of peer learning also indicates that individual teachers can become leaders in their narrow circles. Educational leadership is "about shaping institutional educational cultures in which people can safely mature and flourish together" (Wolff et al., 2024, p. 82).

Real change will not happen unless policies and practices are simultaneously and steadily reshaped from the top to the bottom and the other way around. Therefore, everybody can become a leader of the educational process, a pedagogical leader towards sustainability, who promotes others by pedagogical means.

> Pedagogical leadership, understood as a pedagogic summons, entails directing an Other's self-activity to transcend their current state through a process of self-directed transformation and is not tied to any formal leadership positions, as all actors are potential objects as well as initiators of pedagogical summoning. In a leadership context, this means that formal leaders as well as co-workers provoke others to reflect, and question preconceived notions and norms. (Wolff et al., 2024, 84)

When the teachers who responded to our survey reported that they lack time and support, that the curricula are overloaded, and that they cannot find time to engage in meaningful work towards sustainability, we see this as an indication of a lack of professional agency which curbs the potential for educational leadership. Therefore, even if Wolff et al. (2024) address higher education, the quotation below is relevant for all educational institutions.

> **Consequently, the institutional community needs to learn, create, and rebuild the common space, its internal and external relations, its education, research, and all other activities. The institution could be seen as an organisation of individuals building flexible and changing groups, like a pulse in which new people come in and others leave, as is the case in all educational institutions. In such an organisation, the power is steadily divided and changing from the top to the bottom, which means that all individuals and groups, despite their hierarchy positions, are encouraged to make suggestions that will change the structures and procedures at the entire institution. Learning is also seen as flexible undertakings, in which knowledge is a complexity built on various subjects and scientific fields, and in which learning is more than a cognitive process. It is also embodied and emotional. (p. 90)**

Greta Thunberg, a schoolgirl who started the global movement Fridays for Future, is an example on how change can be initiated. Other movements have been small scale in the beginning, such as the Eco-Schools movement which began in only four countries but has grown without being led by a single leader but by commitments to values and a vision. In the book *Blessed Unrest: How the Largest Movement in the World Came into Being and Why No One Saw It Coming*, Paul Hawken describes a similar kind of leadership (2007). We might refer to this as leadership without leaders, since there is no single charismatic leader who kindles the spirit but rather shares a devotion to a common cause. Today, when so many world habitants are digitally connected, the power networks develop further possibilities for movements to grow. Curriculum development is usually much slower; conventional policy processes are vulnerable and may be left behind if they do not acknowledge what people call for.

At times when leadership without leaders is important, the teachers' role is perhaps more important than ever; in the classrooms, they have the power to choose the teaching topics and shape the space as an educational setting. They also have an obligation to teach students about what is most urgent to know in the world today. Sustainability is not only about learning, but also about *re*-learning and *un*-learning. And the learning that needs to take place concerns not only knowing; it is also about feeling and being. Thus, when we talk about educational leadership, we must also include what we might refer to as ethical and emotional leadership.

> Furthermore, compassion should also be nurtured in our students because it is the underlying mindset that fuels any motivation and willingness to address the dire challenges of the current climate crisis. Students need compassion for the environment and for the thousands of living species on the verge of extinction; compassion for the millions of human beings suffering the effects of ever-rising global temperatures and sea levels; and compassion toward the self – namely, the determination that neither I, nor my neighbour, nor my future descendants will experience the catastrophic consequences of climate change, a sense that we all deserve to live our time in a healthy and safe world. Compassion drives our students toward action and toward justice, and we as teachers would do well to emulate compassion and instill this mindset into the next generation of student leaders" (Iyengar and Kwauk, 2021, p. 314).

8.3 Conflicting Norms and Traditions

SE has its roots in environmental education which became a distinct discipline in the 1960s, prompted by increased awareness of environmental problems (Gough, 2013). The first UN conference on the environment was the Stockholm Conference in 1972 (UN, 1973). In 1977, the UN organised a special conference on environmental education in Tbilisi (UNESCO, 1977). Environmental education was by and large based on scientific content and skills; it was not political and emphasised spending time in nature, assuming 'awareness of nature would lead to changes in individuals' attitudes and behaviours' (Jordan et al., 2023; Stevenson et al., 2016; Tryggvason, et al., 2022). This has changed and SE is not only multidisciplinary – i.e. bringing together content from diverse disciplines such as natural science, social science, and philosophy – but is conceived of as transdisciplinary where the traditional boundaries between disciplines begin to fade away and a new kind of understanding emerges.

> A transdisciplinary approach to innovation differs from multidisciplinary and interdisciplinary approaches in that it is not just about working towards a shared goal or having disciplines interact with and enrich each other … Instead, transdisciplinary innovation is about placing these interactions in an integrated system with a social purpose, resulting in a continuously evolving and adapting practice (McPhee et al., 2018, p. 3)

In the context of SE, transdisciplinarity entails a complex collaboration across the traditional academic boundaries of the natural sciences, social sciences, and humanities, as well as between the boundaries between scholarly work, public activities (and even activism), and personal life. Orla Kelly and colleagues highlight this transdisciplinary nature of SE in a paper titled "A transdisciplinary model for teaching and learning for sustainability science in a rapidly warming world."

> **… social science perspectives can be used to situate considerations of power, justice, and historical responsibility at the centre of sustainability discussions while helping students understand the drivers of transformative change at the individual and societal levels. (2023, p. 2707)**

From the survey, it is difficult to infer directly how teachers work. However, given that 79% of the respondents in the survey focus on 'environmental issues' while only 46% mention 'social issues' and as little as 14% 'political values', the approaches that teachers take are perhaps more in the spirit of multidisciplinary work than transdisciplinary. These numbers are at least not indicative of a widespread practice of using social science "to situate considerations of power, justice, and historical responsibility at the centre of sustainability discussions" as Kelly et al. suggest. Likewise, the half of the 15% who do not teach sustainability give the reason 'It is not part of my subject', indicating firm disciplinary boundaries.

Many of the results in our study correspond with Sundstrøm et al.'s (2019) study among Norwegian teachers. The teachers in that study declared a lack of competence and support when it came to teaching sustainability issues, and they especially felt a lack of confidence in cross-disciplinary teaching. Therefore, their teaching was more about telling facts than triggering the students' own thinking. The results also match with a study by Bjønnes and Sinnes (2019) among staff and students at four Norwegian secondary schools. Their study uncovered a lack of resources and time for the implementation of sustainability as a cross-disciplinary topic in schools. They found that responsibility for sustainability was dispersed, and no one took the initiative but kept waiting for others to do the work.

Educational policies and curricula are often a conglomerate of several traditions and theories (Schaffar & Wolff, 2024), a compromise between conflicting views or even an aggregation without any unifying view of what they are addressing. Carlsson (2024) sees the twinning of the ideas of competence and *Bildung* as a general Nordic problem. The Finnish National Curriculum for Basic Education is a case in point. The basic principles of the curriculum are based on the *Bildung* tradition, whereas other parts include a skill/competency conception of education and a constructivist conception of knowledge. All these perspectives are tricky to combine for the teachers, who often must implement the curriculum alone in their own classrooms. If the curricula contain various worldviews, views of knowledge, and what it means to be a citizen of the country or the world, this brings a mixed message to both teachers and students and makes their daily work difficult. No wonder the pupils, who are forming their own identities and their conceptions of the world withing this chaotic environment, are often confused about their role.

Teachers must make choices, often on the go in the flow of their work which may take sudden and surprising turns, several times a day. In such circumstances, it may be easier to hold on to the subjects and leave behind cross-curricular, vaguely

formulated, or complex topics like sustainability and democracy. Even if cross-curricularity is a recommendation (as in the Finnish curriculum) or sustainability is defined as a fundamental pillar of all education (as in the Icelandic curriculum), the curricula give few tools on how to implement this approach (Schaffar & Wolff, 2024).

> **There is … a profound lack of theoretical foundation and didactic guidelines for cross- and transcurricular teaching. Research on interdisciplinary teaching … has been to a large part focused on higher education. Studies on crosscurricular teaching in primary or secondary school are predominantly descriptive, mostly confined to reporting the outcome of individual teaching projects. Hence paradoxically, research on crosscurricular teaching and learning, which aims at achieving unity and coherence, is itself highly fragmented. This means that even when crosscurricular teaching is officially encouraged or required by educational policy, as it is in many countries, it is left to teachers to make difficult decisions about the choice of topics and methods with little systematic guidance. (Mård & Klausen, 2024, p. 1)**

To implement cross-curricular topics like sustainability, teachers need support from the teaching community.

The PACK model discussed in Chapter 3 speaks directly to this reality; a sustainable school and the didactic implementation of sustainability is the work of many people and cannot be imposed as an expert advice from outside. Educational design and reform must be firmly grounded in the practical reality of teachers and other educators; cross-curricular teaching will only be developed where teachers have the possibility to discuss, plan and try out new ways teaching together. The role of experts in the field, whether those generating the scientific knowledge or providing pedagogical and technical skills, must be in the form of support in the learning process and not simply in the form of prescribed knowledge or skills to be transferred to the students. The same applies to administrative staff and others who form the educational community with teachers and students. The emphasis on whole school approach and learning communities reflects this view.

8.4 Weak Status of Sustainability in Teacher Education

SE is certainly demanding. So far, we have mainly been talking about what happens when the teachers and other players in the educational system have, so to speak, already arrived at the scene. But how are they prepared for the diverse tasks that await them? In the report *Mapping Education for Sustainability in the Nordic Countries*, programs on teacher education in the Nordic countries were scrutinised, revealing lack of emphasis on sustainability in teacher education.

In a study on teacher education in three Nordic countries (Finland, Iceland, and Sweden), Seikkula-Leino et al. (2021) similarly found that sustainability and pro-environmental issues were very limited in the primary teacher education curricula and not in line with urgent problems like climate change. In the three years since 2021, things have improved but the fact remains that a majority of teachers who work in schools, from preschools through upper secondary education, have had little or no formal training in SE. This may, in part, explain why NGOs play such a big role when it comes to teaching sustainability and developing a more sustainable school culture.

When teachers in the survey were asked what influenced their understanding of sustainability, almost 70% mentioned 'the news' and 'documentaries and science programs' while less than 20% indicated that 'sustainability' was part of their teacher education and 'my own children' (22%) score slightly higher than 'courses on sustainability' (21%). Given the complexity of the topic, not only the complexity of sustainability as such – or SD – but also the complexity of SE, these numbers are particularly worrisome. But these numbers are not surprising, given the weak status of sustainability in teacher education. Although it is important to improve teacher education in this respect, teacher education is a slow way of remedying the situation for the teacher profession as a whole. Along with pre-service sustainability teacher education, in-service teacher education is also needed. The same is true for principals and people in other leadership positions within the education system. Their education, both initial education and continued education, must include a clear fucus on sustainability as an educational aim and practice.

Continuing or in-service education for teachers and educational leaders can take various forms, and probably must take various forms if the required change is to take place. This can include formal education, such as specific courses and programs, but also informal education through peer learning and collaborative work within or across institutions.

As we finish this report, an article relating to SE is published in the Norwegian journal *Utdannelsenytt* ("educational news"). The text is very critical of the schools today, and the authors Gitte Cecilie Motzfeldt (teacher educator and researcher) and Judith Klein (researcher and international and national developer of SE) (2024) ask: "Is it possible to create inner motivation and real commitment to the big questions of our time when we measure, assess and compete at the same time?" Even if the schooling takes much longer than before, there is no time to think and discuss big issues, the authors claim. They state that, to be able to equip the rising generation with the means to handle burning global problems and search for their solutions, "we as educators must … take it seriously to think critically and act ethically, and free ourselves from obedience to the hamster wheel and competence goals." To rephrase their worries, we might say that they see great challenges to meaningful SE while schools are stuck in the conventional educational paradigm.

8.5 Continued Research

The survey presented in this report is an attempt to understand what the general situation is regarding SE in compulsory education in the Nordic region. Our survey must be seen as a first step, and as such it has raised more questions than answers. Moreover, SE in compulsory schools is a moving target – and a target that needs to be moved – for responses to be in line with the reality of educational practice. The information gathered through a survey like this must be collected on a regular basis. Evaluations of SE need to guide the development of didactics and teaching approaches. Pretty words like strategies and curricula in policy documents are not enough to make a change. Without evaluations, no one knows the outcome of revised curricula regarding sustainability.

The inspiring examples in Chapter 5 show that teachers and other educators in the Nordic region are working creatively towards sustainability, and the same can be seen in small-scale research. However, to move things in the right direction, we also need to know where the fault lines are. Thus, perhaps the most important data in the current survey is on how many teachers do not teach sustainability and why. In the survey, 15% of the respondents said they did not teach sustainability. This number is probably lower than the actual percentage since one can assume that those not teaching sustainability are less likely to take the time to answer a survey on SE than those engaged in such teaching. But whether the numbers are accurate, 15% is still too high a number, not least when half of those say that sustainability is not their subject. It is understandable that some do not know how to relate sustainability to their subject or that they lack time and find the curricula overloaded. This, we believe, points to a systemic challenge that individual teachers should not be left alone with. In an extremely unsustainable situation, saving the planet must be the highest priority but no one can save the world alone.

Like strategies, curricula, and other policy documents, textbooks tend to focus on individuals and their efforts towards more responsible living. At least Malmberg et al. (2018) found this tendency in Swedish textbooks. Their study shows that textbooks often depoliticise sustainability issues and only see individuals as responsible, instead of viewing the responsibility as a societal and political issue. The complex sustainability dilemmas definitely cannot be solved by merely trying to change individuals and their lifestyles. Individuals are parts of greater systems in which they are entangled, and students of all ages need political insight, empowerment, and to learn how to become participants in decision-making and solving of joint social, and even global, sustainability problems. Therefore, a topic that also needs thorough examination and development are Nordic textbooks in various subjects and how they deal with sustainability issues.

What our survey clearly shows is that Nordic teachers are a diverse group, some working creatively with the whole school and even the whole community towards sustainability, while others need help and guidance in how to implement sustainability in schools. They need training in both theories and methods, and they need knowledge. In addition, they need support from experienced teachers and opportunities to work in teams with colleagues. To become an experienced and confident sustainability teacher takes time, and the teacher must have that time. A lot of resources and efforts have been offered on digital training, and sustainability cannot be regarded as less worthy than the development of digital skills. Sustainability cannot be compared with school subjects either. The topic overshadows everything else students need to learn in school, since without a planet nobody needs a school.

9. Preparing Agents of Change

Sustainability requires knowledge about ecosystems, about how global politics and economy function, about societies and cultures, and about how to share a good life on this Earth, the only one we have. Nobody can learn to live a decent life together with others, humans and non-humans, through merely cognitive knowledge. SE is built on reflections, discussions, and individual and joint actions regarding values, attitudes, and a vision for the future.

The grey present and the bleak future we see today show us that a collapse of humanity is imminent in the collective dream we are living out today. But what is this dream to which we are now falling victims? It is the dream of mastery over nature, making it provide for our daily needs and turning the world into a safe, gentle, and foreseeable place. It is the dream of comfort and security. Despite the constant changes that humanity has witnessed since the dawn of the industrial revolution, changes that some say are happening faster than ever before, the dream of mastery over nature has been remarkably stable.

The dream of controlling nature, of making people the masters of their own destinies through making nature the servant of humanity, has been realised with more thoroughness than anybody could have imagined a century ago. Nature has been exploited in all imaginable ways, since while we have striven to realise this dream of mastery, we have lost all sense of a limit. While gaining control over nature, we have lost control over ourselves. In 1957, the Finnish philosopher Georg Henrik von Wright was already concerned about how technology – developed to realise the dream of security and comfort – had turned into a master dictating peoples' lives.

According to von Wright, knowledge can be used for both good and bad ends. Therefore, both humanity's self-acquired happiness and self-inflicted suffering have increased tremendously. In addition, increased technological control has affected people's desires and proven dangerous to their mental equilibrium. The technology that humans have created as their servant is now their master (von Wright, 1993, p. 127).

Facing the current sustainability crises, we need a different dream. Instead of dreaming about mastery over nature, we must learn to dream about harmony. To realise this new dream, we need a new vision for education. In a recent book titled *Curriculum and Learning for Climate Action: Toward an SDG 4.7 Roadmap for Systems Change*, Christina T. Kwauk and Radhika Iyengar describe five roadblocks

to "preventing the education sector from becoming a game-changer in climate policy and action" (2021, p. 4). The second roadblock is a lack of radical vision. If education is to be part of the solution of our current sustainability crises rather than adding to the problem, educators as change makers must be able to overcome these roadblocks. We agree with Iyengar and Kwauk that "the global education community must look deeply and critically into what it would take to transform our education systems in order for them to realize the rapid and radical change needed in our socioeconomic and socio-ecological systems" (p. 9). The starting point for such a change must be a new vision.

When we talk about transformative education in the context of SE, it is not only a transformation of the mind that is needed; we also need a transformation of the heart. We do not need to be smarter at managing the land; we must instead learn to love and respect it. Rather than seeking green growth, it is we – the people – who need to grow green. Instead of growing bigger, ever more demanding, ever needier, we need to grow within; we need to cultivate our perceptive capacities, our capacity for empathy, and our capacities for love.

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About this publication

Sustainability Education in the Nordic Countries

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Nord 2024:038

ISBN 978-92-893-8071-3 (PDF)
ISBN 978-92-893-8072-0 (ONLINE)
http://dx.doi.org/10.6027/nord2024-038

Cover photo: Marta Logina/Momenti
Photos in collage: Mette Johnsen/VisitDenmark, Marta Logina/Momenti, Ulf Lundin/Image Bank Sweden, Maskot/Image Bank Sweden, Niclas Jessen/VisitDenmark, Arne List/flickr, Marta Logina/Momenti, Mette Johnsen/VisitDenmark, Udirs bildebank, Niclas Vestefjell/Image Bank Sweden, Maskot/Image Bank Sweden, Vadehavscentret/VisitDenmark, Alexander Hall/Image Bank Sweden, Rebecka Eriksson/Visit Åland

Layout: Ida-Lina Strang
Published: 23/10/2024

Disclaimer

This publication was funded by the Nordic Council of Ministers. However, the content does not necessarily reflect the Nordic Council of Ministers' views, opinions, attitudes or recommendations.

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