Sustainable Development in Education

With Norway and Japan as Context

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Norway, Japan and many other countries have joined the UN's goals for sustainable development adopted in 2015. The purpose of this article is to explore which societal forces have led to these goals and how sustainable development has had an impact as a theme in education in Norway and Japan.

The research is based on curriculum theory and a qualitative study of curricula, management documents and public discourse on environmental protection and sustainable development. The situation in Norway is contrasted with similar developments in Japan to highlight possible differences.

The study concludes that the path from classical nature conservation to sustainable development in Norway and Japan has many parallel features, but somewhat shifted in time. Environmental problems as a result of intensive industry became a turning point, but in Japan it took longer before the authorities took action and introduced laws to protect people and the environment. This is explained by Japan's ambitions to become a great power and that industry as a driving force in this development has long been given free rein at the expense of the environment and people's health. In both countries, early grassroots movements played a significant role in the fight for environmental protection and sustainable development, often with teachers as driving forces. However, in Japan it took longer than in Norway before environmental protection was accepted as an assignment for the education system. It is believed that this is because school in Japan must be neutral, not be critical or take a stand on societal issues.

Today, education for sustainable development is included in national curricula, also for vocational programs. However, in practice, the theme seems marginalized in recent years. Social, economic and political issues also seem less emphasized. More focus on test-based teaching may be a contributing factor. It remains to see whether the new plans in Norway from 2020 will make a difference. In Japan, a lot of focus on entrance exams can also be a possible reason. Another dilemma, is whether sustainable development is compatible with continued economic growth and more consumption, and whether the school should problematize it.

Key words: Sustainable development, school, education, Norway, Japan, , 持続可能な開発

1. Introduction

The term sustainability is now often used in the media and the public discourse. Some claim that the term has become a trend word that has largely lost both meaning and effectiveness (Samuelsen, 2020). What meaning should it have in school, for example?

When the Brundtland Commission included the term in its report *Our Common Future* in 1987, it was briefly explained as a development that meets the needs of today without destroying the possibilities for future generations to have their needs met (Brundland Commission, 1987). The commission was appointed by the UN, which in 2015 adopted the UN's 17 sustainability goals, *Sunstainable Development Goals (SDG).* They are the world's joint work plan to eradicate poverty, fight inequality and halt climate change by 2030 (UN, 2015).

Sustainable development today affects important areas of society such as the environment and climate, social conditions and the economy. The purpose of this article is to explore the topic of sustainable development as a concept in Norway and Japan with support in curriculum theory, and how the concept is expressed in plans and practices for the school before and now.

Norway passed a climate law in 2018 and in new curricula for primary and secondary education, sustainability has now been introduced, which is a compulsory interdisciplinary topic (L20a, 2020). The Japanese Ministry of the Environment has prepared plans and guidance materials for similar teaching in the environment and sustainability in the Japanese school. In the autumn of 2020, the new Prime Minister of Japan, Yoshihide Suga, also announced that Japan will be a zero-emission country by 2050.

Curriculum theory is a suitable framework for studying the purpose, goals, content and practice of different types of education. Curriculum, or curriculum theory, is not a new concept: But there is no unambiguous idea of what a curriculum is, how it is created and how it is expressed in practice. In the research literature we also find different curriculum theories with different ideological and practical approaches. Perhaps the best-known and most widely used apprentice theory was formulated by Ralph Taylor (Taylor, 1949). It is often referred to as goal-rational in the sense that learning is formulated in specific goals that can be tested, and where deviations from the goal are used to correct learning. Curriculum for the Knowledge Promotion 2006 (KL06) is an example of such plans. An opposite to this type of curriculum is expressive plans that place more emphasis on the student's own expression, for example in practical and aesthetic subjects (Aakre, 2005, p. 42).

This study is more inspired by John Dewey's curriculum and similar theories. He emphasized that a curriculum must not be perceived as something static and final outside the students' own life and experiences, but as something fluid, embryonic and important that is created in a meeting between the students, the teacher and society (Dewey, 1902, p. 11). Lorence Stenhause argued that a curriculum should, as a minimum, provide a basis for planning learning, studying the learning process empirically and that the rationale for the plan must be able to be assessed critically (Stenhouse, 1975, p. 4-5). The latter is also about the curriculum in a social and cultural context, or what is referred to as the intentional plan as it is expressed in politics and the public discourse (Goodlad, 1979). Furthermore, we can talk about the curriculum as both a process and a product. Curriculum as a practice is in many respects a development of the process model (Grundy 1987, p. 105).

Definition of problem

Sustainable development is a comprehensive plan formulated in the UN's 17 sustainability goals that is difficult to describe in detail. There was therefore a need to limit the task in this text to three of the sustainability goals:

Objective 4 on quality education is the focal point in this text. Goal 6 on clean energy (Affordable clean energy) has been included partly on the basis that power development and especially the oil industry have been central to the Norwegian debate, while Japan does not have oil reserves. Japan is also a major supplier of technology referred to as clean energy: electric cars, ships and cars that run on hydrogen, heat pumps for households and the like. These in turn are related to Objective 13 on climate action, which is often associated with the Kyoto agreement hosted by Japan. Goal 14 on life in the sea is included because both Norway and Japan are large port nations with fishing, aquaculture and large shipping.

Sustainable development is also a topic that spans many subjects and activities in school and education. In order to achieve a structured selection from, among other things, curricula, one has chosen to obtain material from general principles, natural sciences, social sciences and one vocational subject, electrical subjects.

2. Method

This study is based on curriculum theory as described above, and a qualitative study of curricula, management documents and public discourse on environmental protection and sustainable development. Developments in Norway are contrasted with similar developments in Japan to highlight possible differences.

Document analysis consists of systematic collection of relevant documents and analysis of texts that form the basis for the themes and categories that are highlighted (Brymann, 2015; Bowen, 2009). Document analysis is a qualitative method that is well suited for studying the values, attitudes and intentions of texts, and the effect that these texts can have on society in general and in more specific areas such as school and education.

Based on curriculum theories, one has in this study concentrated on choosing sources that illuminate the two upper levels, the curriculum of ideas and the formal curriculum (Aakre, 2005; Goodlad, 1979). The first level is about how different interest groups and ideologies affect the content of an education. The second level is the formal curriculum as a management document, often in the form of regulations. The other levels play a secondary role in this study. How teachers interpret and operationalize curricula, and how students experience teaching, would require large resources to implement.

Document analysis was chosen because it is an effective method that can be carried out with small resources. The researcher does not influence the data in other ways than through his sample and his interpretation, which is easier to check afterwards. One avoids demanding processes of approval and certain ethical dilemmas, although one must take research ethics into account in the selection, interpretation and use of the texts.

In this survey, environmental issues in the public discourse are central in relation to changes and measures in education and schools. This means that the environmental debate in the media, political studies, decisions, laws and curricula for the school constitute the focus of this study. Since many countries have now joined the UN's sustainability goals, Norway and Japan were chosen as contrasts and to bring an international perspective.

3. From nature conservation to sustainable development - a societal perspective

Human activity that harms the environment is hardly a new phenomenon, but it was probably not until the 19th century that someone began to see this as a problem (Bentley, 2009). Charles Dickens also brought pollution from the new industry into the literature, as in *Bleak House*:

> *«Fog in the eyes and throats of ancient Greenwich pensioners, wheezing by the firesides of their wards; fog in the stem and bowl of the afternoon pipe of the wrathful skipper, down in his close cabin; fog cruelly pinching the toes and fingers of his shivering little 'prentice boy on deck" (Dickens, 1853, s. 1).*

Nature conservation

In Norway, the Nature Conservation Association (2020) was founded in 1914 and marks the beginning of environmental protection in Norway. The purpose was "to awaken and maintain the sense and interest of our people to protect the country's nature". The classical idea of environmental protection was especially about preserving nature for future generations. It was only after World War II that environmental protection gained a broader purpose and more general support. In 1951, a similar organization was established in Japan (NACS-J, 2020). In Norway, formulations about environmental protection were included in school reforms in the late 1930s (N39, 1939), but it was not until the 1970s that such environmental work was formalized. In Japan, it was especially the teachers who took the lead by establishing their own organization in 1964. But as part of the reconstruction of Japan after the war, local groups, the kominkan, were established, which are a form of welfare associations. Their purpose is to act locally to create a better and safer living and local environment in their area. They also formed the basis for the first protests against environmental damage in Japan (Ando and Noda, 2017, p.40). Japanese teachers were often at the forefront of protests against companies and authorities that did little to solve the growing environmental problems.

Industrialization and pollution

Rapid industrialization after World War II brought prosperity and welfare to the industrialized countries, among them Norway and Japan, which in their own way were strongly affected by the war. But the rapid reconstruction also led to pollution and increased pressure on natural resources. The problems also appeared in the primary industries of agriculture and fishing in the form of runoff to

water and sea, and overfishing of many species in the sea (Benum, 2015; Numata, 1980). Environmental problems affected humans and animals. There were lawsuits and claims for compensation.

One of the first environmental cases in Norway took place when Årdal aluminum plant was sued by farmers in Utladalen for damage to trees that died and cows that had their skeletons destroyed due to fluoride poisoning. A paradox in the case is that aluminum is a light metal that is important in modern green technology. Another Norwegian example is the Frierfjord, where Hydro's production of the light metal magnesium was one of the world's largest point sources for dioxin emissions. Many years later, it is still not safe to eat fish from the fjord.

Similar cases in Japan include Yukkaichi and Minamata, and last but not least Fukushima close to our own time. At Yukkaichi, a large refinery was built that refined crude oil with a high content of, among other things, sulfur dioxide, which was released untreated into air and water. People became ill, many died, the fish in the sea outside became inedible and the fishermen could no longer sell the fish they fished. Something similar happened at the town of Minnamata which has since become known for the disease Minamata Disease which was discovered there in 1956. It is a neurological disease caused by severe mercury poisoning. Signs and symptoms include numbness in the hands and feet, general muscle weakness, loss of peripheral vision and damage to hearing and speech. In extreme cases, insanity, paralysis, coma and death follow within weeks of symptoms. A congenital form of the disease can also affect fetuses in the womb. Minnamata also became known for an interesting school project about the case that was published in 1968, which we will return to in the next chapter. We do not know of any similar projects from Norwegian schools in this early phase. Now, many years later, Minamata will be the theme of a new feature film in cinemas with a premiere in the new year 2021.

Ecology and limits to growth

Gradually, there was a general awareness in many countries that economic growth has its price and that in the future it must be based on ideas about sustainability and protection of the environment. In Norway, several new voluntary environmental organizations were founded and environmental thinking left its mark on political work. Protection of the human habitat in the broadest sense was increasingly also an international issue. In 1972 the first UN conference on the environment was held in Stockholm. At the meeting, they agreed on a declaration including 26 principles on the environment and development, an action plan with 109 recommendations, and a resolution.

In 1972, the Ministry of the Environment was also established in Norway with politicians, botanists and Professor Olav Gjærevoll as the first Minister of the Environment. He was succeeded by Gro Harlem Brundtland, who later became head of the World Commission for Environment and Development, also known as the Brundtland Commission. Among the most debated issues were issues such as energy consumption, test drilling for oil north of the 62nd parallel and the development of hydropower. Development of the Alta-Kautokeinovassdraget became a major issue, not least for Gro Harlem Brundtland, who had her office occupied by Sami women activists. The case also became a turning point in the view of the Sami, the Sami culture and the rights of indigenous peoples (Aakre, 2005, p. 184). A few years later, a similar case in Japan came to the fore when it was decided to expand the Sarukawa River in Hokkaido without taking into account Ainu, an indigenous people there (Aakre, 2003).

Eventually, laws were passed that placed the responsibility on the person who pollutes or causes damage to nature, society or culture. Årdal works constantly made improvements and put in place treatment that resulted in large emission cuts. Today, 99.9 percent of the fluorine gas from the stoves is cleaned. The case was so visible and important that it is probably the single case that meant the most to pave the way for the Norwegian environmental administration.

In the 1970s, Japan was rebuilt after the defeat in World War II, and they recaptured the West in economic growth (Juran, 1989, p. 8). The ambitions of the great powers still had first priority and the industry almost free rein. In Japan, a sub-ministry on environmental issues was established in 1971, but it took time before environmental problems were recognized as a large-scale national problem. They were long marginalized to local incidents where special environmental problems arose. The general measures in school were for a long time to promote physical activity to strengthen children's immune system so that the body could better withstand the effects of pollution (Fujioka, 1981, p. 10). It was not until the end of the 1980s that efforts were made to strengthen environmental work, and the first environmental law was passed in 1993. It paved the way for formalizing environmental education in Japanese schools.

Sustainable development

Conferences and initiatives under the auspices of the UN resulted in many decisions with good intentions, but they did not shake the underlying conditions that create both environmental problems and inequality in the world. One major problem was the lack of commitment and cooperation between nations. Therefore, a new strategy was developed in an attempt to unite countries in working for sustainable development together. In 1983, the Norwegian Prime Minister Gro Harlem Brundtland

was commissioned by the UN to lead this work. One of the members of the commission was Saburo Okita from Japan. The Commission presented its report Our Common Future in 1987. It introduced the concept of sustainable development explained as economic growth, environmental protection and social equality (World Commission on Environment and Development, 1987).

Sustainable development has since remained a key concept in national and international politics. The report Our Common Future laid the foundation for later agreements, primarily at the Rio Conference in 1992 where three important agreements were adopted: the Climate Convention, the Convention on Biological Diversity and Agenda 21. Agenda 21 was a challenge to all the world's communities to act locally. from the same global goals. A protocol to the climate convention was adopted in Japan in 1997, better known as the Kyoto Protocol. Three years later, Japan also established a separate Ministry of the Environment and education for sustainable development was formalized as a goal for primary and secondary education in Japan.

The climate issue came to be central in the public discourse and programs were established for work on climate issues in schools. Al Gore, Vice President of the United States, had long been involved in various environmental measures and pushed hard for the implementation of the Kyoto Protocol, which called for a reduction in greenhouse gas emissions. In 1994, he launched the GLOBE program on Earth Day. Norway joined the program and many schools joined by sharing climate data via the internet, which was new at the time. More about the practical implementation in the next chapter. Al Gore was also awarded the Nobel Peace Prize in 2007, although several have pointed out that he himself has financial interests in companies for green technology. He received the award along with the Intergovernmental Panel on Climate Change, chaired by Rajendra K. Pachauri of India.

Japan also hosted COP 10 on biological diversity. It was held in Nagoya in 2010 (COP 10, 2010). These are now in the UN's sustainability goals that Norway, Japan and most countries have joined. They are a global joint work plan to eradicate poverty, fight inequality and stop climate change by 2030. When Joshide Suga became the new Prime Minister in the autumn of 2020, he announced that Japan will be a zero-emission country by 2050. He further claimed that there is no longer any contradiction between sustainability and economy in 2050.

The UN's sustainability goals now consist of 17 goals and 169 sub-goals. The goals will function as a common global direction for countries, business and civil society. They are also a major challenge for the countries' education, which is to foster and educate new generations who are able to realize the idea of sustainable societies locally, nationally and globally.

4. From nature conservation to sustainability development - a curriculum perspective

This chapter discusses sustainable development in light of the role of education in society. The sources are preferably limited to the intention curriculum, how these are expressed in formal curricula and to some extent how these become operationalized at the system level in education. How the teacher interprets and operationalizes the plans was not possible to implement in this study. The students' own experiences are also an independent and large field in themselves.

Environmental protection

In the previous chapter, Minamata and an interesting school project on the matter were briefly mentioned. It was conducted by students and teachers at the junior high school level and published in 1968 and gained great importance for the environmental issue in Japan, and especially teachers after it was presented at a meeting held under the auspices of the Japan Teachers' Union (Fujioka, 1981). The project was a good example of exemplary teaching and can still be highlighted as a model for such teaching today (Klafki, 2013). Klafki emphasizes thr environmental challenge as major issue to deal with in modern education. The project had a concrete and clear purpose. It should help students to:

- *understand environmental problems in connection with various interests and economic growth*
- *understand, in this case Minamata disease, as a consequence of pollution in the local environment, and the tragic effects of the disease on people and society*
- *be able to search for causes of environmental problems and how they affect different groups in society*
- *be able to investigate the responsibility for environmental damage and how such problems can be handled in the future within a sustainable society*

The project sprang from a local and concrete problem that the teachers at the local school addressed. It was not anchored in any formal curriculum or initiative at the political level. Takako Doi was probably the first to address the issue at the national level in 1970 through a critique of the school's textbooks, which she believed concealed the environmental problems she believed many companies were

responsible for (Amemiya and Macer, 1999). Takao Doi later became a prominent politician and leader of the opposition in the Japanese parliament Diet. This led to a revision of textbooks for primary and lower secondary school in 1971 with a greater focus on environmental issues. That same year, the Tokyo city government published a book on environmental issues that could pose a danger to humans, Ningen no Seikatsu wo Musibamumono. In 1974, the first international symposium on environmental science was held in Tokyo, and work on the curriculum for environmental science was carried out with the support of the Ministry of Education (MEXT). Environmental science did not become a separate subject, but a theme that schools should set aside time for in their local plans. In the first phase, it was a lot about hazardous substances.

In Norway, environmental studies did not become a separate subject in schools either, although several attempts have been made to achieve this. Already in the Normal Plan for the primary school of 1939 one finds the first traces of thoughts about environmental protection:

> *"Arouse interest in and love for the plant and animal life that the children have around them, so that they do not do unnecessary harm, but learn to protect plants and animals (animal protection and nature conservation)" (N39, p. 108).*

More specifically, environmental education has been conducted in Norwegian schools ever since the UN in the seventies put the spotlight on environmental problems (Christensen, Kristensen and Sætre, 1997). It was inspired by, among other things, the book "Silent Spring" (Carson 1962) which created debate and great engagement. So did the book "The Limits to Growth" by which the author himself was engaged (Meadows, Meadows, Randers, and Behrens, 1971).

Environmental science and eco-pedagogy

The first example of teaching material we know from Norwegian schools was developed for the school in connection with the European Year of Nature Conservation in 1970 (Stokke, 1970). This led to environmental and nature conservation being included as compulsory subjects in the new model plan for primary and lower secondary school, both the temporary M71 and the final plan M74:

> *Environmental and nature protection. Compulsory subject. Chemistry / physics (p.294). The cycle of elements in nature ... lead, mercury, sulfur dioxide (M71, p. 293).*

> *Environmental and nature protection as a compulsory subject. "Well-being", "Recreation" and dangers of reckless exploitation. Toxic effects, copper, mercury, sulfur dioxide, industrial emissions. (M74, p. 277)*

To help the school getting started with environmental education, an environmental learning project was started at the University of Oslo. The purpose was to prepare and test teaching plans for the first six years of primary school (Bjørndal and Lieberg, 1974, p.4). Schools in ten cities from Kristiansand in the south to Tromsø in the north were involved in the project. A very detailed and speific plan was arranged systematically in 76 subject booklets. The project was evaluated and they concluded with, among other things, interdisciplinary collaboration as a prerequisite for ecologically oriented pedagogy, that one must take as a starting point local conditions and the student's prerequisites and participation (Bjørndal and Lieberg, 1974, p. 121).

When all upper secondary education was gathered under a common law in 1974, environmental protection was also included in the law itself for this type of school:

> *The training shall promote ecological understanding and international co-responsibility (LOV-1974-06-21-55, §2).*

In the same year that the Brundtland Commission presented its report "Our common future", Norwegian schools adopted a new curriculum for primary and lower secondary school (M87). It had limited significance, but it marked the transition to a new era with greater emphasis on wholeness and coherence in the work with environmental issues in schools. The plan is characterized by the experiences from the Environmental Education project and by using concepts such as ecology and interdisciplinary teaching:

> *The study material must promote ecological understanding (M87, p. 45), and as interdisciplinary teaching: Environmental protection (M87, p. 101).*

Sustainable development

As early as 1993, a new, general curriculum for both primary and secondary education was adopted in Norway as an overarching value document for the reforms that were being planned. In this plan, the concept of sustainable development was included:

> *The interplay between economics, ecology and technology presents our time with particular knowledge and moral challenges to ensure sustainable development (L93, 1993, p.46).*

An entire chapter was devoted to The Environmentally Conscious Man. Guidelines for environmental education were introduced here, which announced the Government's willingness and expectation of an education that ensures sustainable development. The general plan also pointed out the value of interdisciplinary and ethically oriented environmental education.

The Norwegian school reforms in the 1990s went a step further from M87 by differentiating between teaching subjects, themes, projects and practical work as compulsory forms of work (L97, pp. 75-77). It laid the foundation for a more interdisciplinary and practical environmental education. A large number of new projects were started within the framework of environmental science in schools. Some projects have been completed, but most are still available and administered by the University of Bergen (Environmental Studies, 2020).

Climate was also on the agenda. One example is the Globe program that Norway joined. The agreement states that the program «… intends to strengthen the understanding of the global environment among school students all over the world…» (Lovdata, 05-04-1995 no. 1 Bilateral). Many schools combined the program with their own reference area in the school's immediate environment where they made observations and measurements that they shared with other schools via the internet nationally and internationally (Aakre, 1997). Particular emphasis was placed on achieving wholeness and coherence between subjects in annual plans, both in school and in teacher education (Aakre, 2004, p. 25). Some schools also introduced outdoor school as a pedagogical scheme where environmental protection and sustainability were an important justification.

However, this development was largely reversed in the wake of the "PISA shock" that hit Norway in 2001. PISA is an international project under the auspices of the OECD and aims to test 15-year-olds' skills in various fields, especially reading, mathematics and science (PISA, 2020). To correct what some claimed was a bad Norwegian school, the Knowledge Promotion was introduced in 2006 with more detailed and goal-oriented curricula. These should improve the results through testing and improvement (Bergesen, 2006). Interdisciplinary teaching and project work no longer became compulsory because the results were difficult to test. The schools chose to concentrate to a greater extent on basic knowledge of basic skills. In the work on this text in the autumn of 2020, the website of 25 primary schools was examined with regard to plans. All had annual plans for each individual subject, but no one had annual plans where the subjects were seen in context and in relation to overall themes or projects. Nor were any traces of the senior teams that were introduced with the subject renewal of the curriculum 2020 found.

A similar development took place in Japan, which in 1998 announced that interdisciplinary teaching, Sougou Tekina Gakushu, would be introduced in revised curricula for primary and secondary education from the school year 2000. The author himself could observe such teaching at Mino primary school in Gifu Japan in the spring of 2000. begins in Japan. (Aakre, 2001). They also demonstrated good routines for handling waste and reusing materials, including in the subject of crafts. In 2006, the Education Act was also revised, where §4 deals with sustainable development (translated by the author):

> *to foster an attitude to respect life, care for nature, and contribute to the protection of the environment (MEXT, 2006, §4).*

Principles were developed for such teaching with emphasis on local roots, motivated learning, problem solving and active forms of learning (MEXT, 2016). The interdisciplinary themes were also added at special times of the year and explained with concepts such as interdisciplinary and project work to promote the ability to solve problems and learn for oneself (Hamamoto, 2009). This form of learning was the basis for the introduction of education for sustainable development (ESD), that was introduced three years later (Maruyama, 2003). To support the implementation, the Ministry of Education in Japan prepared various forms of materials and guidance. A principal in Tokyo was also given the task of creating a supervisor in the form of an annual plan in which the various themes were integrated into each individual subject and adapted to the seasons (Ichinose, 2017, p. 41). We have chosen to include an English version shown in Figure 1.

As we see from Figure 1, the plan applies to 6th grade, which is the last year of primary school in Japan, and the school is located in Yanagawa outside Tokyo. In the column to the right are all the subjects and a separate field for "integrated strudies" with an indication of when in the year it is appropriate to take the topics. We see, among other things, that they have local roots. Furthermore, there are themes in each subject, but seen in connection with other subjects that fit in time with each other and to ensure good coherence and continuity in the learning work. These were principles that John Dewey, among others, emphasized (Dewey, 1938, p. 33). In this way, the teaching does not take care of the sustainability goals individually, but several and in a natural context.

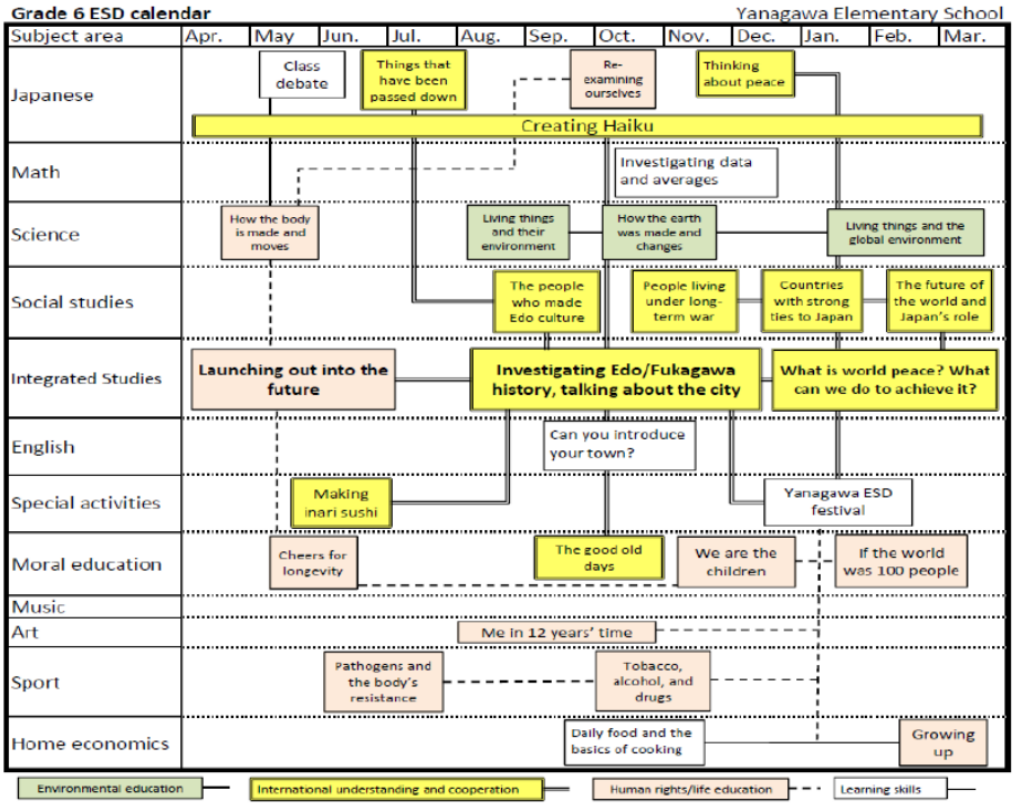

Figure 1. Education and sustainable development.

One year schedule at Yanagawa elementary school (MEXT, 2016)

In addition to indicative plans, study groups for teachers and online learning resources were established, including links to the UNESCO Associated School Network (ASPnet) (MEXT, 2017). Norway is also affiliated with ASPnet. It is administered by the UN. Many Norwegian schools are registered, but the network seems to play a smaller role in Norway than in Japan (ASPnet Norway, 2020). In Norway, online learning resources related to sustainable development are channeled through, among others, the Science Center (2020), which has been assigned a special responsibility by the government. One of the programs is about climate and contains three themes: 1 - The earth is getting warmer, 2 - Consequences, 3 - What do we have to do? and a workbook. The issues are illustrated with dialogues that will inspire problem solving and action on behalf of the climate, as shown in Figure 2.

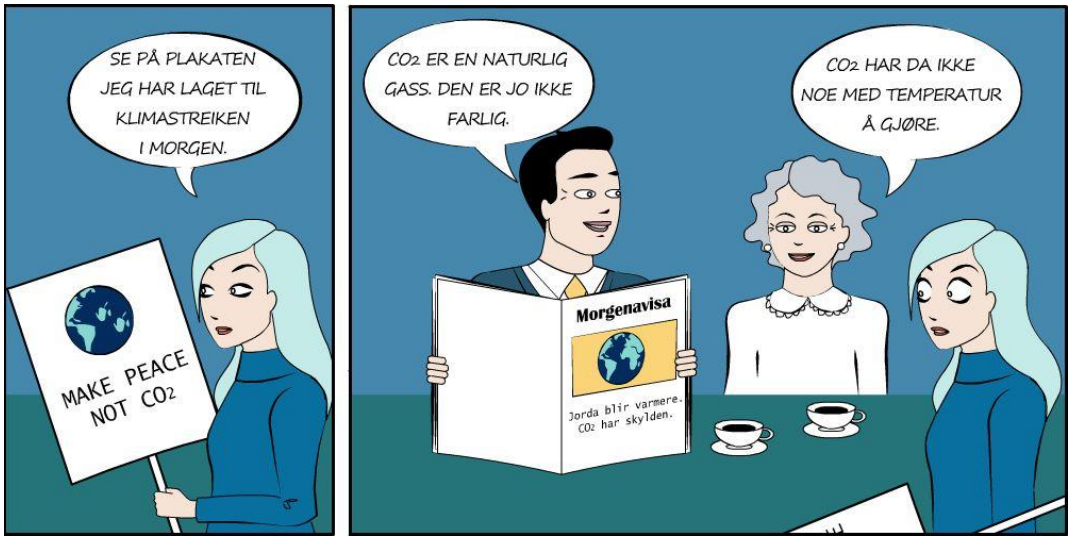

Figure 2. Climate as a topic in Norwegian secondary schools (Natrfagsenteret, 2020)

There is little research on the results of these reforms, but there is much to suggest that sustainability development and other topics were not emphasized in the subjects, but as interdisciplinary teaching with a few hours. This may be due to the fact that the PISA studies also reversed progressive reforms in Japan, where tests and fact-based entrance examinations are far more common than in Norway (Aakre, 2019, p.61).

In 2005, the Ministry of Education MEXT in Japan also adopted a ten-year plan for education in sustainability (MEXT, 2005). It resulted in a plan in 2008 to support the establishment of UNESCO schools to participate in the development of content and methods for education in sustainability. In 2017, the number of such schools was increased to 1043 (MEXT, 2016).

There is little research on the impact of the program, but a sample of teachers reported that students became more aware of sustainable issues and were able to see them as a problem for themselves and their own future. They were also more motivated to think about what they themselves can contribute to solving environmental problems in their immediate environment.

Most of the schools in the program were public schools. There were few private schools. They seem to place more emphasis on subject-centered teaching with clear measurement criteria that are easier to test than assignments with an open problem. Another problem that emerged in the Japanese study was that the absence of critical thinking and democratic decision-making in the Japanese school (Ichinose, 2017, p. 47).

The distance between good intentions in curricula and the student's actual learning is a problem that is repeated in the Norwegian exchange of words as well. Both during and after the introduction of the Knowledge Promotion in 2006, justified doubts were raised as to whether detailed goal management leads to better learning of lasting value for the students, later also referred to as in-depth learning. On the contrary, there is much to suggest that valuable holistic knowledge was lost in a school that became more and more theoretical (Sjøberg, 2014). In the work on this article, the website of 20 random primary schools was examined. All had detailed annual plans for each subject, but not annual plans that put the various subjects in context, nor interdisciplinary themes as required by the new curricula (Læreplanverket, 2020). It therefore remains to be seen whether professional renewal will be a reform for the better in areas such as sustainability, life skills and other overarching themes. Finally, we will therefore analyze some excerpts from the new curriculum in Norway.

In the overarching part, we find the general themes, including sustainable development where "students will gain insight into challenges and dilemmas within the themes. They must understand how we through knowledge and cooperation can find solutions, and they must learn about the connections between actions and consequences ». We note that the ambition is not only for the students to acquire knowledge about the topics, but also to discuss dilemmas and find solutions through collaboration. The theme is also visible in all subjects, but to a somewhat varying extent and concretization. Curricula for science subjects in 10th grade are comprehensive:

> • *describe the greenhouse effect and explain factors that can cause global climate change*
>
> • *account for energy conservation and energy quality and explore different ways to transform, transport and store energy*
>
> • *discuss how energy production and energy use can affect the environment locally and globally*
>
> • *give examples of and discuss current dilemmas related to the utilization of natural resources and the loss of biological diversity*

The curriculum for social studies 10th grade is more concise, but emphasizes that the pupils must "present measures for more sustainable societies" in a broad sense. A positive news with the new curriculum is that sustainable development has been included in the vocational programs at upper secondary level and adapted to each individual program. In the program for Engineering and Production (vocational subjects) it is described in detail as follows:

- *risk assess your own experiments and handle the waste from these in a responsible manner, explore and present technology related to their own educational program and evaluate it in a sustainability perspective.*
- *examine the properties of different materials and surface treatments and evaluate their use in a sustainability perspective.*
- *explain how climate change affects evolution, species distribution and biodiversity.*
- *give examples of the use of biotechnology and discuss ethical issues related to biotechnology.*
- *explain how some environmental toxins can accumulate in food chains, and consider measures to take care of health and the environment.*

So far, so good and the new curricula must be understood in a global and international perspective within the framework of the UN's sustainability goals. But it remains to be seen what priority they get in school. In Japan, ASPnet will be revised and adapted to the climate goals for 2030, but that work has not been completed.

5. Discussion and conclusion

Sustainable development as a theme in society and education has developed over time. In a historical perspective, the development can be categorized into four periods and today includes both the environment and climate, social conditions and the economy.

Man-made environmental problems have existed for a long time, but it was not until the 19th century that it became a topic in the public discourse and was perceived by some as a problem. This was especially true of littering and pollution in the cities and the inconveniences and health damage it caused to people. It also became a theme in the literature and indirectly a theme in the school where such literature was read, but not as a theme in the school's formal curricula until much later. Industrial exploitation of nature and the desire to protect untouched nature, led to the creation of organizations for that purpose. Another motive also came into play early on: scientific management of nature and natural resources. This led to the Norwegian Hunters' and Fishermen's Association (NJFF) being established as early as 1871. But in some cases, such as the view of predators, they were for a long time in opposition to classical environmental protection and the Nature Conservation Association, which was established in Norway in 1916. a similar alliance was established only in 1950, which may be related to the fact that industrialization and modernization of Japan as a great power had long been the first priority.

Normal plan for primary and lower secondary school of 1939 (N39) was the first formal curriculum in Norway, perhaps in the whole world, where formulations were taken up to arouse children's interest in and love of plant and animal life, and not to do unnecessary harm. There is no research on the effect of these formulations. But they were perhaps a sprout of resistance to the environmental devastation that industrialization brought after World War II. A similar development took place in Japan, where pollution from industry had more serious consequences for humans, animals and fish in the sea. There were grassroots movements, often with teachers leading the way and gradually getting the authorities to limit the destruction through laws and measures for a better environment. A school project in Minamata also formed a model for active environmental work in schools. Well helped by environmental movements in many countries, the environmental movement became a power factor in both Norway and Japan in the 1960s.

The 1970s were the breakthrough for environmental work in both the school and in the administration. The UN also took part in the environmental work. In the new model plans for primary and lower secondary school (M72 and M74), environment and nature conservation were included as a compulsory subject, and teaching aids in environmental science were prepared and tested in schools. The concepts of ecology and eco-pedagogy also came into use and expanded environmental theory to see the connection between nature, society and the environment.

In 1972, the Ministry of the Environment in Norway was also established as the first in the world. The first Minister of the Environment was a well-known botanist, politician and professor Olav Gjørevold. He was succeeded by Gro Harlem Brundtland, who later became head of the World Commission on Environment and Development, also referred to as the Brundtland Commission. It was this commission that launched the concept of sustainable development in its report Our Common Future in 1987, and which we use today. In 1990, she became Prime Minister again and began extensive reform work in Norwegian education from kindergarten to higher education. This close link was probably the reason why sustainable development was included in Norwegian curricula from 1993.

By the 1970s, Japan was rebuilt after World War II. However, the industry as motor in the struggle for Japan as a great power still had almost free rein. In 1971, however, a sub-ministry on environmental issues was established. But it still took time before environmental problems were recognized as a large-scale national problem. They were long marginalized to specific difficulties locally where such problems were obvious. The general measures were for a long time to promote physical activity in school to strengthen the children's immune system so that they could better withstand the effects of pollution. It was not until the end of the 1980s that efforts were made to strengthen environmental work, and the first environmental law was passed in 1993. This paved the way for formalizing environmental education in Japanese schools.

The Norwegian school reforms in the 1990s were a "great time" for teaching sustainable development. Many new programs were established, schools began to use the internet to collect, analyze and share environmental data, and the Norwegian school joined global environmental programs such as the Globe where climate change was central. Science centers were also established in many places with offers for children and young people in their free time. Teaching in sustainable development was included in both school subjects, themes and projects that became compulsory in the new curricula. But after the PISA shock in 2001, the free forms of work met with opposition from politicians and professional circles who believed that there was a connection between free forms of work and weak test results. The knowledge boost in 2006 provided for more goal management in subjects and basic skills. The good intentions for sustainable development were retained, but were in practice prioritized down in favor of more "test-friendly" teaching.

Environmental protection and formalized environmental education in Japan have been somewhat delayed in time compared with developments in Norway. It was not until 2001 that the Ministry of the Environment in Japan was established. Around the same time, environmental education was formalized in law and curricula. In 2008, environmental science was formulated as education for sustainable development and plans and programs were developed to promote such teaching in schools. The teaching is organized as Global schools through the UN network ASPnet, but is voluntary. In 2016, there were 1,018 schools registered, which is a relatively small number of schools in a national context. The planning seems to have good academic and pedagogical quality, but the activity seems to be small. Norwegian schools are also linked to ASPnet, but the Science Center and other learning media play a more important role there. In short: although the institutionalization of environmental education has developed positively in Japan since the 1990s, environmental education seems marginalized, especially in the context of the neoliberal restructuring of the entire education system beginning in the 2000s.

In Japan, a revision of ASPnet with new goals for the year 2030 is underway. In Norway, new curricula will be implemented in both primary and secondary education from the autumn of 2020. Sustainable development is included as an overarching theme that is mandatory and must be emphasized in all subjects, including vocational subjects. But it remains to be seen whether there will be a new impetus for sustainable development in Norway.

Both Norway and Japan are today well-developed societies where one experiences less pollution and other environmental problems than 50 years ago. Many environmental measures have been introduced in the form of treatment plants and households sort waste that is delivered for orderly handling. Most products are produced so that the materials can be easily recycled and reused and more and more clean energy is produced and used. But the UN's 17 sustainability goals are comprehensive and today affect important areas of society such as the environment and climate, social conditions and the economy. In

school and education in general, less emphasis is placed on the social, economic and political consequences of global environmental problems. Another fundamental question remains unanswered: is sustainable development compatible with continued economic growth and more consumption?

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