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The conceptualization of competencies related to sustainable development and sustainable lifestyles



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Open Note of the IBE

The IBE has launched the series In-Progress Reflections on *Current and Critical Issues in Curriculum, Learning and Assessment* to open a communal space for a global conversation, collective production and discussion on those issues of high concern for Member States. It intends to support country efforts in mainstreaming challenging issues within the processes of curriculum renewal and development across different levels, settings and provisions of the education system.

Initially, the focus areas of the In-Progress Reflections series encompass, among others,: (i) Early Childhood Care and Education (ECCE) as a foundation of holistic child development and learning; (ii) Reading and writing in early grades to support the development of essential competencies; (iii) Youth Culture and competencies for Youth in the early 21st century (covering formal, non-formal and informal education); (iv) ICT curricula and inclusive pedagogy contributing to relevant and effective learning outcomes; (v) STEM (Science, Technology, Engineering and Mathematics) curricula to foster sustainable development; (vi) Curriculum for Global Citizenship Education (peace, human rights, sustainable development, values, ethics, multiculturalism, etc.); (vii) Assessment to enhance and support learning opportunities; and (viii) Inclusive education as an over guiding principle of education systems.

The series of reflections covers a wide array of knowledge products, among them: discussion papers, policy briefs, frameworks, guidelines, prototypes, resource packs, learning tools and multimedia resources. These materials are discussed, refined, used and disseminated engaging education and curriculum agencies / institutes, and in particular curriculum developers and specialists, development experts, policy makers, teacher trainers, supervisors, principals, teachers, researchers and other educational stakeholders. Also, they serve as reference materials for the IBE menu of capacity-development training on curriculum, learning and quality education – namely masters, diplomas, certificates and workshops – to forge policy and technical dialogue involving a diversity of stakeholders and to support sustainable country field work.

Through blogs and e-forums, we encourage the audience to actively interact and bring in diverse perspectives. Effectively, the online space for reflection allows us to stay connected, facilitates exchange between experts from different regions of the world, and truly fosters continuous reflection on the issues concerned. The blog is structured to gather diverse resources, which include tools and documents (as previously mentioned) under specific themes so as to provide a complex and rich set of materials targeted to the specific needs of Member States. The In-Progress Reflections will capture relevant visions, views and comments shared by the audience, and serve as a key resource to support Member States' efforts in mainstreaming relevant findings and effective practices in national policies, curriculum frameworks and developments and in professional practices.

Dr. Mmantsetsa Marope: Director, International Bureau of Education



The conceptualization of competencies related to sustainable development and sustainable lifestyles

Abstract: The education system of Finland has been developed soundly and steadily during the past 40 years. The guiding principles have been equity and equality in education as going hand in hand with the view to promote every individual's life-long learning. Following these principles, it has strengthened the sustainability of the system itself. This report describes the role of sustainable development and the importance of learning a sustainable lifestyle in Finnish basic (primary and lower secondary) education. It highlights the goals, values, tasks, and the conceptualization of the competencies related to sustainability in the 2014 National Core Curriculum for basic education. In addition, it describes the sustainable nature of the curriculum reform process itself. The report examines the role and the contribution of various school subjects and key aspects, such as the school culture and the learning environment, in creating a strong knowledge base on which to build the values, attitudes, skills and the will needed for sustainable lifestyle, and in promoting sustainable ways of living. The report concludes with lessons drawn from the Finnish way of enhancing sustainability in education.

Keywords: Competencies – curriculum – curriculum reform - education for sustainable development (ESD) – Finland – sustainable lifestyles

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Preface

This report describes the role of sustainable development and the importance of learning a sustainable lifestyle in Finnish basic (primary and lower secondary) education. The report clarifies the goals, values and tasks, and the conceptualization of the competencies related to sustainability in the 2014 National Core Curriculum for basic education. It also describes the sustainable nature of the curriculum reform process itself. The report examines the role and the contribution of various school subjects and aspects, such as the school culture and the learning environment, in creating a strong knowledge base for understanding the importance of sustainable development and in promoting sustainable ways of living. The report concludes with lessons drawn from the Finnish way of enhancing sustainability in education.

Finland's education system has been developed soundly during the past 40 years. The guiding principles have been equity and equality in education, and high quality education, in order to promote every individual's life-long learning. Following these principles has strengthened the sustainability of the system itself.

Basic education in Finland is a compulsory, comprehensive system that includes grades 1–9. It is inclusive and focused on promoting successful learning and all-around development for all children. Children usually start their basic education at the age of seven and complete it at the age of sixteen. The drop-out rate is less than 1%. Before basic education, children at the age of six have one obligatory year in pre-primary education, where the focus is on strengthening learning skills, and promoting children's self-confidence and the joy of learning. Early childhood education and care is offered to children between the ages of 0 and 6. After basic education, municipalities can provide one extra, voluntary year in order to solidify students' achievement and their ability to continue their studies at the upper secondary level. Upper secondary education is comprised of either general (that is, academic) or vocational education. Both forms of education are equally popular among young people, and they both provide eligibility for tertiary education. There are no dead ends in the Finnish education system. Rather, all students are supported in their studies so that they can go as far as possible towards fulfilling their potential.

Municipalities (that is, local authorities) are responsible for providing basic education. The Basic Education Act, the Basic Education Decrees and the National Core Curriculum for Basic Education are the national standards that the municipalities and schools use to draw up their local education curricula. Municipalities, schools and teachers are strongly autonomous in deciding how to organize education. Finland has not adopted accountability testing nor does it have any system of national inspection. Rather, accountability has been incorporated into the system through responsibility and mutual trust. This spirit of trust is especially visible in the national and local curriculum processes.

Introduction: Why it is important to learn a sustainable lifestyle in school?

The world around us has become more interdependent, complex and uncertain. Among the many huge challenges that we must face, adaptation to climate change is especially pressing. As humans, we are part of nature and completely dependent on the vitality of ecosystems. As the UNESCO Roadmap for Implementing the Global Action Programme on Education for Sustainable Development (2014) said, 'Rapid, sweeping and long-lasting change is altering our planet's environment in an unprecedented manner, while societies are undergoing profound shifts in their demographic makeup and social and economic fabrics'. The Roadmap also emphasized that planetary environmental change will require a holistic change in the way we think and act – a rethinking of how we relate to one another and how we interact with the ecosystems that support our lives. The Organisation for Economic Co-operation and Development (OECD) and the European Commission have also analysed the effects of the swiftly changing global economy and the digital transformation on our lives and on the skills needed in society. According to Irina Bokova, the Director-General of UNESCO, 'The risks and opportunities we face call for a paradigm shift that can only be embedded in our societies through education and learning' (UNESCO, 2014).

Finland has taken these challenges seriously. While previous governments have emphasized the importance of sustainability, the current Government Programme (2015) features goals connected to sustainable development. This Programme proposes that sustainability must be taken into account in all domains of society. Thus, its broad focus is on developing employment, working life and education, sustainable well-being and health as well as bio- and circular economies and clean technology, all aligned with the overarching mandate of sustainability. According to the Finnish Innovation Fund SITRA (2015), 'Sustainable well-being refers to the pursuit of good life within the Earth's carrying capacity'. Sustainable development is thus examined, understood and promoted in all of its dimensions: economic, social, cultural and ecological.

Sustainability in education

According to the UNESCO Roadmap (2014), there is now a growing international recognition that education for sustainable development (ESD) is an integral element of quality education and is key to enabling sustainable development. Clearly, countries have different education systems, representing different understandings of both educational quality and ESD; this report highlights the Finnish education system.

In Finland, education has a special role in building the future of the society and in promoting sustainability. The Government Programme (2015) says that Finland's growth is based on excellent knowledge and skills, sustainable development and a progressive renewal policy. The education sector plays a central role within these three perspectives.

Why is the quality of education seen as closely connected to sustainability? For citizens of Finland, a sustainable approach means coherent development towards equity and equality in education, as well as towards justice and social cohesion in society. It also means a persistent effort to implement the principles of sustainability and, ultimately, seeing them as a priority in education. A collaborative and participatory working approach enhances development in education; this means that reforms and change in the education sector are always negotiated and created together with municipalities, schools and other stakeholders. Teachers have an important role in all reforms. When they participate as partners in the reform planning processes, teachers tend to be more committed to implementing reforms and working towards common goals.

We explore the history of the role of sustainability in education, and the sustainable character of the curriculum reform process, in sections 1 and 2. In section 4, we describe how sustainability is included in the task description of the current basic education.

It is expected that education will provide people with high-quality competencies so that they will be able to fulfil their potential in private life, at work and in society. A broad set of competencies is needed in the fast-changing world. The European Commission document, *A New Skills Agenda for Europe* (2016), notes that high-level skills enable people to adapt to unforeseen changes and to promote the transition to a low-carbon and circular economy. In Finnish basic education, the focus of developing competence is on creating and promoting understanding about the importance of sustainable development and on providing students with both transversal and subject competencies for a sustainable lifestyle.

In the Finnish National Core Curriculum, a sustainable lifestyle for every individual and community is seen as the prerequisite for strengthening sustainable development in the whole society and on Earth. A sustainable way of living is a tool for building a sustainable future. Certainly no single individual, and especially no child or young person, can carry this responsibility alone. Nevertheless, every individual can do something by becoming conscious about the effects of everyday acts and choices, and by growing into active citizens who engage in constructive criticism. Everyone needs a sound knowledge base on which to build the values, attitudes, skills and the will needed for a sustainable lifestyle. Everyone needs to learn what to do in practice and how to promote sustainable development by their own actions. In section 8, we examine the seven transversal competencies needed for a sustainable lifestyle from the viewpoint of sustainability; these competencies are defined in the core curriculum. In section 9, we explain how the objectives of transversal competencies, especially objectives connected to a sustainable lifestyle and sustainable development, are embedded in the syllabi of different school subjects in basic education.

Schools have a key role in creating the knowledge base and in promoting values, attitudes and skills in teaching and learning, as well as in setting an example for a sustainable way of living through everyday practice. Schools can also enhance students' understanding of the need for sustainable development and can enhance their desire to take action for it. In addition to the family, school is a central educator of children and young people; it should, therefore, support their personal growth, their holistic well-being and their life management skills (SITRA, 2015). Sustainability is not only about the future. It should be present in students' everyday life at home and in school. Therefore, it is important which values are guiding schoolwork as well as home-school cooperation, and how everyday life at school and in children's learning environments is organized. The concept of learning that the school community adopts and shares is also vital. We explore these ideas from the perspective of sustainability in sections 3, 5, 6 and 7. Finally, section 11 offers a conclusion about the lessons learned from the Finnish experience.

1. Steps towards sustainability's central position in the curriculum

It is important to know the history that led to the extensive education reform, and that pointed to the need to strengthen education for sustainable development. An understanding of previous reform actions, and how well municipalities and schools have adopted the main principles and practices of ESD, is helpful in understanding Finland's basic education currently. Before discussing the place of sustainability in the Finnish system, we first offer some history on sustainability in Finland's basic education.

A short history of sustainability in basic education

In Finland, ideas about sustainable development have long been included in the national standards of basic education. When the current basic education system was formed in the 1970s, the focus was mainly on environmental education; the 1985 National Core Curriculum also mentioned perspectives on human rights and global responsibility. The 1994 National Core Curriculum described concepts such as nature's diversity and an ecological way of living, as well as the ecological, cultural and social dimensions of sustainability. Environmental education was defined as one of the possible cross-curricular topics, but the decision to implement it was left up to local authorities. Some schools and teachers eagerly developed their work according to principles of sustainability, but this approach did not extend to the whole education sector.

At the beginning of the 2000s, the Basic Education Act and the government's development programmes for education strongly emphasized sustainable development. The government required education at all levels to take sustainable development into account in teaching and learning. Various development programmes were launched and networks of schools focusing on sustainability were formed. Many municipalities and schools also had international contacts through programmes such as Environment and School Initiatives (ENSI¹), Global Learning and Observations to Benefit the Environment (GLOBE²), Green Flag³, the Baltic Sea Project⁴, UNESCO Associated Schools Network (ASPnet), and the Regional Centres of Expertise (RCE) network⁵ on ESD. In the 2004 National Core Curriculum, values such as human rights, equality, democracy, natural diversity, the preservation of environmental viability, and the endorsement of multiculturalism, all of which represent different dimensions of sustainability, were included in the value basis of education. Objectives and core content were formulated in the core curriculum for *responsibility for the environment, well-being, and a sustainable future*, which are all examples of the cross-curricular themes. Municipalities and schools were expected to plan for the implementation of these themes.

1 Environment and School Initiatives (ENSI) is an international network, which has supported educational developments, environmental understanding, and active approaches to teaching and learning, through research and the exchange of experiences internationally since 1986.

2 The Global Learning and Observations to Benefit the Environment (GLOBE) Program is an international science and education programme.

3 Green Flag is a part of international ECO Schools program (recommended for instance by UNEP).

4 Baltic Sea Project (BSP) is a UNESCO Associated Schools Flagship Project.

5 The Regional Centres of Expertise (RCE) network on ESD is coordinated by the United Nations University.

In cooperation with many other organizations, the Finnish National Board of Education produced both printed and web materials, guidebooks and media programmes, and organized competitions and certificates with the goal of supporting teachers in their efforts in ESD. A national evaluation (2012) of the 2010 implementation of the cross-curricular themes gave public visibility to the results of these efforts. Even though the municipalities and schools differed in how well they implemented the cross-curricular theme of sustainability, 92% of teachers had positive attitudes towards ESD, and they also felt more competent in teaching this theme than other cross-curricular themes. The same evaluation examined students' knowledge, attitudes and values, as well as their ability to enact them (that is, their sustainable lifestyle). With 72% of students providing correct answers, the results indicated that students' knowledge was at a good level. Further, most pupils had also adopted positive attitudes towards sustainable development. In particular, they seemed to have a good understanding of human responsibility for the environment. However, their ability to act according to the principles of sustainable development was still limited. While more than half of the students said that they try to recycle their garbage, save energy and protect the environment in everyday situations, such as watching TV or commuting to school, they did not mention other areas of sustainability very often. Most students did not give evidence of a firm commitment to sustainability. In these three areas – knowledge, attitudes and values, and the ability to act – girls' results were stronger than those of the boys. Big differences among different parts of the country or between cities and the rural areas were not apparent.

The results from the evaluation and other research were encouraging: both teachers' and students' knowledge and attitudes were at a good level. However, there were still challenges, not only in the area of sustainable lifestyles, but also in values and attitudes. In order to create more opportunities for students to implement their knowledge, there was a need to develop the school culture and working approaches. Researchers also recommended that values should be discussed much more with students because the adopted values seemed to have a strong influence on students' actual behaviour. Evaluation results also showed a need for more firm and clear national guidelines concerning all cross-curricular themes. At the same time, though, municipalities' and teachers' autonomy and pedagogical freedom needed to be respected and supported.

The role of sustainability in the new core curriculum

This history was thoroughly studied in preparation for the 2012 – 2016 Finnish curriculum reform, the most recent one. We learned that steps towards making sustainable education the centre of the curriculum have been taken slowly but systematically. We thought that the current moment would be the right one for defining sustainable development, in all of its dimensions, as the priority task of basic education. In this rapidly changing and challenging world, teachers are ready to embrace the importance of sustainable development and to develop better ways of educating their students for a sustainable way of living.

We also understood that the National Core Curriculum must answer the questions *Why* (Why is the change needed?) and *What* (What is worth learning in basic education?) more clearly, so that municipal authorities and teachers could better concentrate on the question *How* (How should it be done in practice?) in the local curriculum and in everyday schoolwork. We needed to rethink together how every school could be a better learning environment, and a supporting and encouraging community for meaningful learning and for meaningful being.

This led us to define new goals and guidelines in the new National Core Curriculum stipulated for basic education at the end of the year 2014. With this curriculum, sustainability was not only one cross-curricular theme supported by some of the values in the value basis. Instead, it was the overarching task of basic education and strongly embedded in all elements of the core curriculum. The new core curriculum, with its focus on promoting a sustainable lifestyle, represented a holistic approach to sustainability. This approach covered all dimensions of sustainability as well as students' and the school community's developing competencies, and their safety and well-being.

In the next section, we explore more closely the process of creating the 2014 core curriculum.

2. Sustainability in the curriculum reform processes

The best educational outcomes occur when the principles of sustainable development are part of the system for guiding education, and for the design of both national steering documents and local decisions. These reform processes should exemplify the characteristics of sustainability by enhancing the cooperation and the active involvement of people working in education, and in the whole society.

How to promote the sustainability of the reform

Research has proposed that adopting bottom-up and top-down approaches in school reform concurrently results in sustainable change, through utilizing and integrating the strengths of both approaches (Hargreaves and Fullan, 2012; Pietarinen et al., 2016). This means using both the state's ability to provide a framework, direction and resources, and to bring people together and build networks, and the local-level stakeholders' capacity to learn, create, give feedback and find the best practical solutions.

According to Pietarinen et al. (2016), the combined bottom-up/top-down approach is more likely to give the curriculum reform overall coherence. Reform proceeds more coherently when there is appreciation for the understanding and the experiences of all those involved in and affected by the change, and when the reform is based on the knowledge in these views. The exercise of transparent and participatory leadership also promotes coherence; examples of this are developing structures to foster participation and using expertise among stakeholders to steer the curriculum reform. Combining the bottom-up and top-down approaches utilizes multiple sources of feedback, leadership for managing change, and extensive knowledge-sharing. It helps people make sense of what will happen and how change can be beneficial for their work. Pietarinen et al. (2016) emphasize that implementing a curriculum reform always entails translating new ideas into new educational practices, which involves complex sense-making processes. Collective sense-making is likely to facilitate a shared interpretation of the reform; therefore, it provides a tool for building curriculum coherence and strengthening the reform's sustainability. These features seem to characterize both Finland's educational steering system and, especially, the latest curriculum reform process.

The educational steering system in Finland

The education steering system in Finland consists of national standards and municipal decisions about education provision. Strong and active cooperation among the national, municipal and school levels characterizes the system. The whole system aims at supporting teachers' and students' work to promote the best possible learning. The system does not include efforts to monitor or supervise basic education, as with inspections or nation-wide achievement testing.

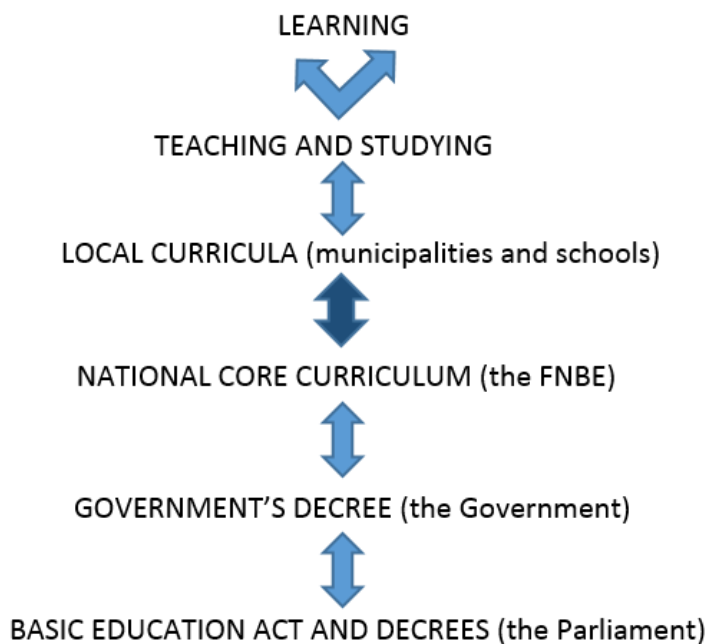


Figure 1: The steering system of education in Finland

Regarding basic education, the Finnish Parliament stipulates the Basic Education Act and Decrees. These documents lay out the prescribed subjects and main orders concerning the provision of education. In a Government's Decree, the Government determines the broad, national objectives of education referred to in the Basic Education Act. Another Government task is to allocate instructional time for the teaching of different subjects and subject groups, and for guidance counselling. Approximately every tenth year, the Government reforms the Decree on both the national goals and the allocation of instructional time in basic education; as mentioned, the most recent reform was in 2012. Based on both the Basic Education Act and Decrees and the Government's Decree, the Finnish National Board of Education (FNBE) prepares and chooses the National Core Curriculum for basic education. The FNBE is an autonomous state agency that works closely with the Ministry of Education and consists mainly of education professionals.

The FNBE leads the national curriculum deliberations and is in charge of creating the national core curricula for all levels of education (excluding tertiary education), as well as supporting local curriculum processes. In the core curriculum, the FNBE determines the objectives and the core content of different subjects and cross-curricular education, of guidance counselling and of other educational guidelines referred to in the Basic Education Act, as well as the basic principles of home-school cooperation and student welfare.

The curriculum deliberations are open, interactive and built on the wide-ranging collaboration of various stakeholders. They include real dialogue and reflection on the mission and the qualities of education, and on the role of schools in building sustainable well-being and the future of our society. These processes use technology in order to create better and more extensive opportunities for stakeholders to be involved and to collaborate (Halinen et al., 2013; Vahtivuori-Hänninen et al., 2015).

Basic education curriculum reform 2012- 2016

Arising from the renewed Government's Decree 2012, the FNBE initiated the National Core Curriculum reform process in autumn 2012. It invited teachers, principals, local education authorities, teacher educators and researchers from all over the country to participate in the process of designing the core curriculum. The process lasted from autumn 2012 until the end of 2014, when the FNBE specified the new core curriculum for basic education. Based on this national document, municipalities and schools designed their own local curricula, which were to be ready before the school year began in August 2016. From autumn 2016 onwards, teaching and learning in all basic education schools must be based on the new curricula.

In the curriculum reform process, results from research and evaluations as well as from development projects, were collected and analysed. Discussions with municipal authorities, principals and teachers helped the national authorities recognize the strengths, weaknesses and needs of everyday schoolwork and of sustainability in education. It is also important to note that other stakeholders in society were ready to support the reform process and help the national authorities, and the municipalities and schools, in their efforts.

The FNBE formed dozens of working groups that produced the drafts of the core curriculum; several hearings of experts were also organized. The drafts were published three times during the design process on the websites of the FNBE; feedback was solicited from municipalities and schools, as well as from other interest groups. All interested individuals could access the drafts digitally and give feedback; organizations, groups and individuals were eager to present their ideas on how to develop the draft further. The feedback was published on the websites and was taken into account when refining the drafts and designing the final document. Civil society organizations played a very active role in the process and their views received serious attention (Halinen et al., 2016).

Besides the curriculum working groups and the digital feedback systems, the FNBE also published the Curriculum Roadmap at the beginning of the deliberations. The Roadmap described the phases of the national curriculum process and suggested the steps to be taken at the local level during the process. It also included the most important topics to be discussed in the curriculum process. Through the Roadmap, municipal education authorities and schools were able to perceive the curriculum reform process as a whole and to anticipate the most important questions to be solved. It helped municipalities and schools to start their local curriculum deliberations simultaneously with the national process, and to reflect on and develop their own thinking and ideas during the reform process. This promoted extensive participation and was important in creating an atmosphere of unhurried work, cooperation and trust (Halinen et al., 2015; Halinen et al., 2016).

According to follow-up research on Finland's basic education curriculum reform (Pietarinen et al., 2016), two distinctive elements characterized the top-down/bottom-up strategy used in the reform: a participatory sharing of knowledge that increased transparency, and a responsible hand guiding the change. In peoples' minds, these elements were associated with the reform's success, both in terms of its perceived educational impact, and in terms of the coherence in the new curriculum's internal structure. In the reform, citizens felt that the expertise of the participants and the different interest groups was appreciated, and that contradictory views were valued. They also felt that the leadership steering the curriculum reform was transparent and encouraged participation.

Research results (Pietarinen et al., 2016) show that the way in which stakeholders assessed the consequences of the reform largely determined the reform's perceived coherence. The impact of the curricular decisions was thus critical for achieving coherence. The researchers emphasize that this is crucial for facilitating sustainable school development at the local level, and for ensuring educational equality at the societal level. Both of these levels are essential if stakeholders are to view the reform as meaningful, and thus feel ownership of it.

Reflecting sustainability in the curriculum process

One of the issues discussed keenly in the curriculum reform process was sustainability and its role in education. Local education authorities and schools, as well as several civil society organizations and other stakeholders, emphasized the importance of sustainability in today's complex world, and presented their views on how sustainability should be outlined in the National Core Curriculum. They also reflected on what sustainability would mean in schools' everyday routines.

Research and development work done by universities and, for instance, by the Finnish Innovation Fund SITRA (2013), gave strong impetus for this curriculum work. Enriched by these ideas, and supported by the curriculum advisory group that represented the 16 main stakeholder groups⁶ in Finnish society, the FNBE made decisions on the National Core Curriculum.

In the following sections, we examine in detail how sustainable development and a sustainable lifestyle are included in Finland's 2014 core curriculum.

⁶ These groups are: 1) Ministry of Education and Culture; 2) Ministry of Social Affairs and Health; 3) National Institute for Health and Welfare; 4) Trade Union of Education in Finland; 5) The Association of Finnish Local and Regional Authorities; 6) The Finnish Book Publishers Association; 7) Confederation of Finnish Industries; 8) The Central Organization of Finnish Trade Unions; 9) Finnish Parents' League; 10) The Association of Finnish Principals; 11) The Association of Swedish Speaking Teachers and Principals in Finland; 12) The National Network of Universities' Teacher Training Schools; 13) The Association of Experts in Education; 14) The Saami Parliament; 15) National Advisory Board of Romani Affairs; and 16) The Advisory Board of Ethnic Relations.

3. The concept of learning in the curriculum reform

When making educational reforms, one of the main topics that should be examined is the concept of learning. Considerable discussion about the nature of learning was needed in the Finnish curriculum reform. Debates took on such questions as: What do we mean by 'learning'? What is a good learning process? How should we develop learning environments? What is the teacher's role? How about students? How are thinking and learning interconnected? Why are thinking and learning-to-learn so important? We discussed our understanding of learning openly, shared it, and then made it tangible in the core curriculum and in the local curricula.

Besides discussions, the reform process made use of the most current knowledge emerging from brain research and research on learning. The significance of positive emotional experiences and motivation in learning, as well as the importance of interaction and collaboration, were taken into account. The concept of learning included in the National Core Curriculum 2014 emphasizes students' active agency and awareness of their own learning as parts of a high-quality, goal-oriented learning process. These same features also have a strong effect on sustainable lifestyles.

One of the interesting questions in evaluating the curriculum reform relates to the concept of learning that was adopted. How will the concept of learning influence the way in which education is provided? How will it become visible in the organization of the school day, in pedagogy, in the assessment of learning, and in the goals and objectives set for teaching and learning?

We look next at the role of ESD in the task description of basic education in Finland.

4. ESD as a basic task of education

In analysing the challenges of the fast-changing, complex, interdependent world during the curriculum reform process, we in Finland learned that sustainable development cannot be merely one topic or a cross-curricular theme in education. Rather, it should be viewed as the main task and goal of education. To build and safeguard our own future, it is necessary to educate people to understand the importance of sustainable development and to be able to live in a sustainable way.

It is crucial for education that the educational importance of sustainable development and a sustainable lifestyle be expressed in law and emphasized by political decisions. This is currently the case in Finland: the present Government's Programme (2015) includes the principles of sustainability (see Introduction). Basic Education's overall task of emphasizing sustainability is described in the Basic Education Act and specified in the educational goals included in the Government's Decree 2012. These goals have steered the preparation of all aspects of the National Core Curriculum. They have also influenced the preparation of local curricula and are implemented in everyday schoolwork. The main goals are:

- Growth as a human being and membership in society;
- Requisite knowledge and skills; and
- Promotion of general knowledge and ability, equality and lifelong learning.

Because of the importance of sustainable development and a sustainable way of living in basic education, these goals encompass all dimensions of sustainability (Annex 1).

The National Core Curriculum 2014 includes the task description that makes these goals concrete in basic education. The four main task areas are *educational*, *social*, *cultural* and *future-related*. The core curriculum stipulates that education will promote every student's participation, a sustainable way of living and growth as a member of a democratic society. Students must also be educated to know, respect and defend human rights.

Regarding the *educational task*, the principle of inclusion guides the development of basic education. This means that everyone must be assured of accessible education, and that all students' learning, development and well-being must be supported at school, together with at home. Education must enhance the development of students' competencies and strengthen their positive identity as human beings, learners and community members.

Basic education's *social task* is to promote equity, equality and justice as well as to build up human and social capital. Addressing its own mission, education is called to prevent inequality and exclusion and to promote gender equality. All students are supported in recognizing their personal potential and in selecting their learning paths without gender-based restrictions.

The *cultural task* is to promote an all-embracing cultural competence, appreciation of cultural heritage and diversity, and to support students in building their own cultural identity and cultural capital.

The *future-related task* emphasizes global education and the ability to live in a rapidly changing world. Students should learn to meet pressures for change openly, to assess them critically and to assume responsibility for making choices that build our future. Basic education contributes to creating preconditions for fair and sustainable development, in line with the United Nations Sustainable Development Goals (Annex 2).

5. Sustainability in the value basis of education

Executing the task of basic education and promoting sustainability requires change, not only in subject syllabi and in the objectives for teaching and learning, but in all areas of school life. It is important that people working in education share the values that promote awareness and understanding of the need for sustainable development and a sustainable lifestyle. These values must be present in everyday schoolwork and become visible in the school culture, as well as in teaching and learning in all subjects.

Discussions on values as tools in the reform

Discussion can promote people's awareness and understanding. Discussions on values and the main tasks of education were an important part of the Finnish curriculum deliberations; not only education professionals but also students and their parents engaged with these topics. Partners outside the school were also invited to share their views on the important issues and trends in society and in the world; they enriched the value of the discussion enormously. These are typical of the questions that we reflected upon together:

- What is happening in our world and in the society surrounding the school?
- Which phenomena and development trends are important to think about?
- How are these trends influencing our everyday experiences and the lives of children?
- What kind of effects do they have on education and on teaching and learning?
- What kind of society and world do we want to promote in our work?
- What are the values that we want to build our life on – in school, in society, in the whole world?
- Is it possible to agree on the most important values that we all share?
- What do these values mean for everyday schoolwork? How will they be actualized?
- What, then, are the most important tasks of education?

Values and tasks were discussed at the very beginning of the curriculum reform process, and they formed the basis for all other elements of the core curriculum. Municipalities and schools were encouraged to start their own discussions immediately as soon as the first drafts of the values and main tasks included in the National Core Curriculum were published; local and school-based discussions contributed to the national processes as well as to the local ones. Local education authorities were asked to organize discussions and invite the participation of school staff, parents, students and other partners, and to give feedback to the FNBE on the drafts of the core curriculum. When discussing the feedback, school principals, teachers, parents and students became aware of the plans at the national level. They could reflect on and discuss what the most important values in their own community should be, why these values are important, and any diversity in values that might exist in the community. They had the opportunity to share ideas about what the most important tasks of school should be and how the schools should work to fulfil these values and tasks.

Municipalities in Finland acted autonomously in deciding how to organize the discussions on values and the main tasks of education – as well as all other curriculum topics – and how much time to give them. Despite differences among municipalities, these discussions were organized in almost every school. Often, teachers held discussions with students first; the main results of these discussions were then presented to parents either in parents' evenings or on digital platforms. In some municipalities, value and task reflections were published on the web, and partners outside school were invited to participate. In its recommendations and in the Curriculum Roadmap (see section 2), the FNBE particularly encouraged municipalities and schools to include students and their parents in these discussions. The FNBE will collect and analyse the information from the local deliberations in 2016 – 2017; the Finnish Education Evaluation Centre (FINEEC) will conduct a more thorough analysis in 2016 – 2020.

Four main values of basic education

At the national level, the values which are the basis for preparing the entire core curriculum were discussed first. Four main values were defined:

- Each student's uniqueness and right to a good education;
- The importance of humanity, general knowledge and ability, equality and democracy;
- Cultural diversity as richness; and
- The necessity of a sustainable way of living (Annex 3).

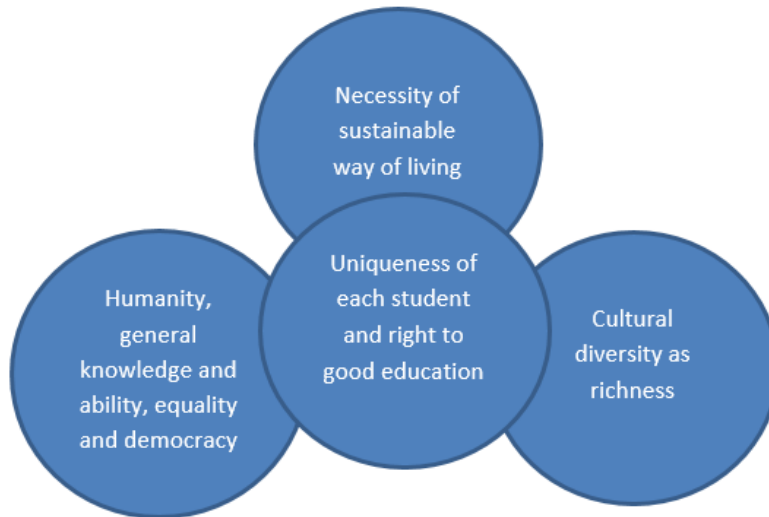


Figure 2: Four main values of basic education

One of these four national values, *The necessity of a sustainable way of living*, emphasizes the importance of sustainable development and a sustainable lifestyle, and articulates the idea of eco-social knowledge and ability (see also section 8). The definition of eco-social knowledge and ability encompasses the concept of the renewable economy and stresses an understanding of the seriousness and the consequences of climate change. This value also comprises the role of technology for the future of humankind, emphasizing that we can find solutions, especially for an ecologically sustainable future, through technology if our values lead us to ethically right choices.

The other three main values also encompass elements related to sustainable development and a sustainable way of living, especially in their societal and cultural dimensions. The starting point for all of these values is respect for every child and the commitment to enhancing children's personal growth and holistic well-being. All of the values also stress the importance of human rights and respect for life. Basic education directs students to defend these values and to appreciate the inviolability of human dignity; it thus promotes well-being, democracy and active agency in civil society.

These values form the basis for the local curricula. In the local deliberations, these values are enriched by local viewpoints and by descriptions of how the values are enacted in schoolwork and in everyday teaching and learning. The core curriculum highlights the significance of a values-based education in a world where information communicated by multiple forms of media and global information networks, as well as through social media and peer relationships, shapes the value systems of children and young people. Discussions on values guide students to recognize values and attitudes they encounter and to assess them critically, and support students in the vital task of building their personal value systems.

In the next section, we examine the important role that school culture has in value-based education.

6. Sustainability embedded in the operating culture of education

While setting ambitious goals, defining the task of education and the concept of learning, and creating a meaningful value basis are important, they are not enough. In order to strengthen every student's awareness and understanding about the need for sustainable development and a sustainable lifestyle, a school culture and learning environment around sustainability must be created. Schools teach best by example, by the way they actually function. Similarly, the role of municipalities is to encourage, guide and support schools by their own example. Further, national authorities should define goals and guidelines for municipalities, leading by their own example.

The importance of the operating culture

In the process of educational reform, positive and challenging changes to schools' operating culture are always vital. The operating culture plays a key role in implementing education, and always affects the quality of the schoolwork that students experience. The culture of a community is comprised of practices that have been shaped by its history and culture; a community's operating culture may thus be shaped and changed.

The 2014 core curriculum emphasizes that both conscious and unconscious factors shape schools' operating culture. For instance, the school culture affects those who are within its sphere, regardless of whether they recognize that culture's significance and impact. Adults' behaviour is transmitted to students, who adopt values, attitudes and customs prevalent in their school community. For example, models of interaction and language use, gender roles, and ways of using and recycling materials are passed on to students. Understanding the impact of the school culture and recognizing and rectifying its undesirable features is an important part of its development (Halinen, 2015).

School culture promotes sustainable lifestyle

A community's practices provide the clearest manifestations of its operating culture. Schools need to promote sustainable lifestyle and well-being by their own example. Using materials more effectively and recycling, using energy in a sensible way, decreasing the amount of waste and moving to digital teaching materials are concrete ways to teach students how to better live within planetary limits (SITRA, 2015).

The daily structure of the school day is also important for learning around sustainable well-being; this includes all regular activities and aspects of the school day, like morning assemblies, breaks between lessons, usual festivities, and afternoon clubs. The learning environments, the atmosphere and the relationships between people, home-school cooperation, as well as leadership practices in the school community are all similarly consequential; all should be developed from the viewpoint of a sustainable lifestyle. Schools should not be alone in doing this; rather, the whole education system should grow according to the same principles of sustainability.

Development principles for the school culture in the 2014 core curriculum

According to the 2014 core curriculum, open and interactive discussion, characterized by respect for others, is the basic precondition for developing this operating culture. This ensures the participation of all community members and inspires trust. Learning environments and the approaches used in teaching and learning are also important dimensions of the school culture; their development and use must also be discussed. Local and school-based curriculum deliberations offer excellent opportunities for these discussions.

The core curriculum includes goals for developing learning environments and working approaches; section 7 examines these goals more thoroughly. Here, we articulate the seven basic principles included in the core curriculum for developing an operational culture in school. Those principles are: 1) Having a learning community at the heart of the school culture; 2) Ensuring well-being and safety in daily life; 3) Fostering interaction and a flexible working approach; 4) Promoting cultural diversity and language awareness; 5) Promoting participation and democratic action; 6) Insisting on equity and equality; and 7) Prioritizing environmental responsibility and an orientation towards a sustainable future (see Figure 2). The purpose of these principles is to support education providers and schools in directing their activities. The principles are articulated from the particular perspective of a school community (Annex 4).



Figure 3: Development principles of the operating culture in basic education

The principle of *Prioritizing environmental responsibility and an orientation towards a sustainable future*, which focuses on the need for a sustainable way of living, emphasizes that the school demonstrates its responsibility towards the environment by its everyday choices and activities. It also highlights the role of non-physical factors in furthering a sustainable lifestyle. The school community’s task is to inspire hope for a good future by laying a foundation for eco-social knowledge and ability. Students’ active involvement in planning and implementing a sustainable everyday lifestyle is seen as crucial. Teachers promote students’ realistic and practical attitude towards shaping the preconditions for a good future, which reinforces the students’ growth into responsible community members and citizens. Students are encouraged to encounter the world’s diversity with an open mind and curiosity, and to act for a more just and sustainable future.

The other six principles articulate features that are also important for, and enacted in, a sustainable school culture. A learning community develops through dialogue and encourages learning together and learning from each other, as well as exploring and experimenting. It appreciates empathy and friendliness, and promotes well-being and safety. As a learning community, school is multilingual and connected to its surroundings; it is a part of a culturally transforming and diverse society where the local and the global, different identities, languages, religions and worldviews coexist and interact. It promotes understanding and respect between individuals and groups, along with responsible action. School emphasizes participation and involvement, realizes human rights, operates democratically; it enhances and strengthens equity and equality.

Those who provide education are tasked with creating the preconditions for implementing these principles in schools and developing the schools' own operating culture along the same guidelines. The goal is to create a culture that promotes learning, participation, well-being and a sustainable way of living. The prerequisites for implementing these principles include taking local needs and possibilities into account, cooperating with parents and other partners, and supporting students' genuine involvement in developing the community.

7. Sustainability of learning environments and approaches for teaching and learning

Learning environments and approaches for teaching and learning are important elements of the school culture. Developing them from the viewpoint of sustainability creates optimal conditions for students to adopt a sustainable lifestyle and to understand the need for sustainable development.

The National Core Curriculum 2014 defines general goals for developing learning environments and for approaches to teaching and learning. Teachers in Finland have autonomy in choosing their methods and organizing learning environments. The core curriculum focuses on creating common guidelines along which teachers can determine their own choices.

Sustainable learning environments

In the National Core Curriculum 2014, the term ‘learning environments’ refers to the facilities, locations, communities and operating practices where learning and studying take place. The learning environments also include the tools, services and materials used for studying; information and communication technology are also viewed as important parts of versatile and sustainable learning environments. All members of the community influence the learning environments by their actions. Well-functioning learning environments offer possibilities for a sustainable way of working in schools by promoting interaction, participation and the communal building of knowledge. They also promote active cooperation with communities or experts outside the school.

In developing learning environments in Finland, the holistic well-being of every student and the whole school community is considered. The environments must be safe and healthy, and promote students’ healthy growth, development and learning. The learning environment should also be a pedagogical setting that can be adapted to various uses, taking the specific needs of the various subjects taught into account. The learning environments must offer possibilities for creative solutions and for exploring phenomena from different perspectives. In addition, the fact that students acquire new knowledge and skills outside of school is taken into account when developing and crafting the learning environments.

Teaching and learning approaches promote learning and sustainable well-being

The core curriculum 2014 emphasizes the importance of multipurpose learning approaches and methods, which let students experience joy and success in learning, and which support creative activities appropriate for different age groups. These approaches and methods stress the role of experiential and functional working methods, engaging different senses, and using movement to increase the experiential nature of learning and to strengthen motivation. The core curriculum emphasizes, for instance, that drama and other forms of artistic expression promote children’s growth into persons with self-knowledge, healthy self-esteem and creativity who can express themselves in a variety of ways and engage in constructive interaction with different people and groups.

Certain methods may also be chosen to support communal learning, in which competence and understanding are constructed in interaction with others. Students should be guided towards taking various roles, sharing tasks among themselves and assuming responsibility for both personal and common goals.

Lack of motivation in students is a challenge for many teachers. The core curriculum guides teachers to strengthen motivation by using methods that support students' self-regulation and their experience of inclusion within a working group. Teachers are advised to select helpful methods in their interactions with these students and to guide these students in using new working methods, strengthening their ability for self-regulation. Students develop learning-to-learn skills optimally when teachers guide them in planning and evaluating their own ways of studying. Becoming aware of the objectives for learning, as well as the principles and the criteria of assessment, strengthens students' commitment to their studies. All this motivates students to assume responsibility for their own learning, as well as for their well-being and a sustainable way of working in the school community, thus promoting the achievement of the educational goals.

In the next section, we examine the competencies that are needed in a sustainable lifestyle.

8. Sustainability in the transversal competencies defined for basic education

The need for transversal competencies

Understanding the need for a sustainable lifestyle and sustainable development is vital in building eco-social knowledge and ability. Creating opportunities for pupils to acquire knowledge and skills in different knowledge areas helps in building this understanding. Even more important is strengthening students' ability to apply this knowledge and skill in different contexts, to understand how concepts and topics in different subjects are interlinked, and to recognize the connections and interdependency among the world's phenomena. This kind of boundary-crossing capability (Engeström, 2015) is often described by defining *transversal competencies*, or key skills, which should be at the centre of learning. For instance, the European Commission emphasizes the importance of such skills in the document 'A New Skills Agenda for Europe' (2016). This document asserts that, with the right skills, people are equipped for good-quality jobs and can fulfil their potential as confident and active citizens. In the document, the word 'skill' is used synonymously with 'competence'. Competencies are generic, highly transferable and relevant to multiple social arenas and work situations. The document also emphasizes that, in addition to skills/competency policies, the quality and the relevance of education are key to shaping innovation and building the future.

The Finnish curriculum reform process stressed that the increased need for transversal competencies arises from changes in the surrounding world. Clearly, the sheer amount of information is growing exponentially, and technology makes it easily accessible. Instead of burdening teaching and learning with heavy loads of facts, learners can be encouraged to seek information, to evaluate it critically, and to build new knowledge and understanding together with others. Competencies that link different fields of knowledge and skills are needed for personal growth, for study and work, as well as for civic activity, both now and in the future.

Seven transversal competencies in the 2014 core curriculum

When creating the 2014 National Core Curriculum in Finland, including its descriptions of competencies, we explored a great deal of new material, including competence theories and practices from the European Union (EU), OECD, and UN, from several different countries and from international research projects. In addition, we studied considerable societal and future-oriented research concerning, for instance, the development of working life and professions, and the consequences of digitization; we also examined psychological and educational research concerning the newest findings on learning and human development. We then connected our conclusions to the traditions of Finnish basic education. We wanted to build on our strengths and help our teachers feel confident with the reform. On this foundation, we created a new vision with the indispensable transversal competencies.

In the 2014 core curriculum, 'transversal competence' denotes knowledge, skills, values, attitudes and desire. 'Competence' also means the ability to apply knowledge and skills in a given situation. How students use their knowledge and skills is influenced by the values and attitudes they have adopted and their willingness to engage.

We define here seven transversal competencies, which are presented in Figure 4 (see also Annex 5), and describe a) *Why* these competencies are important; b) *What* the main objectives for each competence are; that is, what is important to learn; c) *How* it is possible to enhance the development of these competencies in teaching and learning; and d) *How* to proceed from grade 1 to grade 9. After general descriptions, we present the primary areas of focus for grades 1–2, grades 3–6 and grades 7–9.



Figure 4: Transversal competencies in the basic education in Finland

Transversal competencies are interconnected; their shared objective aligns with the main goals of basic education. This shared objective takes students' age into account in order to appropriately support their growth as human beings, and impart the competencies required for membership in a democratic society and a sustainable way of living. In this effort, it is particularly vital to encourage students to recognize their uniqueness, their personal strengths and their potential for development, and to appreciate themselves.

Values, the concept of learning, and the operating culture laid the foundation for developing the transversal competencies. Each subject builds students' transversal competencies through the concepts, content and methods typical of that discipline. The process of developing competence is influenced not only by subject content that students study, but also, and especially, by how they work and by the nature of the interaction between the learner and the environment. The feedback that students receive, along with the guidance and support for learning, influence their attitudes, motivation and willingness to act.

It is also very important that the objectives of the seven transversal competencies be connected clearly to the objectives of different school subjects. In fact, the transversal competencies have been taken into account in defining the subjects' objectives and key content areas. The different subject syllabi highlight the links between the objectives of the subjects and the objectives of the transversal competencies. This supports teachers in promoting the development of transversal competencies simultaneously with subject competencies; because these two processes are strongly interlinked, their implementation is easier for teachers. Being aware of the objectives of transversal competencies and promoting that awareness in students is vital in teachers' work (Halinen et al., 2015).

Based on the descriptions in the National Core Curriculum, municipalities and schools decide in their local curricula how to organize teaching and learning in order to promote the development of transversal competencies. They also decide if they want to focus on some transversal competencies more than others, and how this focus is made apparent in schoolwork.

Two of the seven transversal competencies described in the 2014 National Core Curriculum focus especially on a sustainable lifestyle and a sustainable future: *Taking care of oneself and managing daily life* and *Participation and involvement in, and building a sustainable future*. We present the main points of these two competence descriptions here; the remaining competencies add other perspectives on sustainability. More information is in Annex 5.

‘Taking care of oneself and managing daily life’ as a transversal competence

Managing daily life requires an increasingly wide range of skills. These skills cover health, safety, human relationships, mobility and transport, conducting oneself in an increasingly technological daily life, and managing personal finance and consumption, all of which are elements of a sustainable lifestyle. Moderation, sharing and being economical are encouraged. Basic education encourages students to think positively about their future. Thus, it is important that students

- are encouraged to take care of themselves and others, to develop skills needed in managing their daily life, and to work for the environment’s well-being;
- have opportunities to practise looking after both their own safety and that of others in various situations, for instance in traffic;
- are provided with opportunities to assume responsibility for both their own work and actions, and for joint work and actions, and to develop their emotional and social skills;
- are provided with basic information about technology, advised in sensible technological choices, guided in using technology responsibly and invited to consider ethical questions related to it;
- are guided and supported in developing their consumer skills and capabilities for managing and planning their personal finance; and
- have opportunities to practise making choices and acting in a sustainable way.

‘Participation and involvement in, and building a sustainable future’ as a transversal competence

Participating in civic activity is a basic precondition for an effective democracy. Skills in participation and involvement in the future, as well as a responsible attitude towards it, can be learned only by practising. The school environment offers a safe setting for this; basic education also builds a foundation of competence for students' growth into active citizens who use their democratic rights and freedoms responsibly. The school’s mission is to reinforce each student’s participation. It is thus important that students

- are provided with experiences through which they learn about involvement, decision-making and responsibility in their community and society, and learn to understand the significance of rules, agreements and trust;
- learn to work together, are offered opportunities to practise negotiation skills, arbitration and conflict resolution, as well as critical reflection on issues. Students should also be encouraged to view differing parties as equal and to use the lens of a sustainable way of life when considering ideas;
- learn to understand the significance of protecting the environment through their personal relationship with nature;

- are guided to understand the significance of their choices, their way of living and their actions, not only for themselves but also for their local environment, the society and nature as a whole; and
- are supported in developing capabilities for evaluating operational methods and structures, both their own and those of their communities and society, and for changing them so that they can contribute to a sustainable future.

The concept of eco-social education is vital in all transversal competencies

The concept of eco-social education crystallizes the core ideas of sustainability in Finnish basic education. This concept, which was introduced in the value basis and in the operating culture, is also a part of all transversal competencies.

According to Salonen (2010) and Lerkkanen et al. (2015), eco-social education incorporates four basic dimensions. The first consists of *freedom and responsibility*. Freedom makes a good life possible, and simultaneously obliges us to act responsibly. The second dimension encompasses *ecological integrity and diversity*: it relates to our basic physical needs and the preservation of the diversity of life. The third encompasses the *interdependence and equality of humans*, which provides a foundation for all human coexistence and for human rights. The fourth dimension represents the *activities of an eco-social human community*, in which a functioning democracy, non-violence and peace are the basis of well-being.

Lerkkanen et al. (2015) explain that learners in eco-socially conscious education are given the opportunity to reflect on sufficiency: When do people have enough? Sufficiency should primarily be defined through non-material values because the earth and its natural resources are limited. In teaching, sufficiency could be explained, for example, through communal values; in that case, sufficiency need have no limits. In eco-social teaching and learning, learners are given responsibility for their learning as well as for choosing the content. Responsibility means emphasizing mutual dependence and cooperation, both within our species and between our species and other forms of life. Only by examining dependence can we understand the impact of our activities on other people and ecosystems.

According to Lerkkanen et al. (2015), eco-socially conscious education is based on ‘systems thinking’, which teaches learners to understand the system in which they are involved, where the actors come from, and why they participate in this system. When students who are viewing things systemically observe a change in their environment, they enter a four-phase thinking process. First, they find out which systems are linked to the change. Second, they think about the mechanisms that caused the transformations. Third, they examine the interaction and the interdependencies of the systems associated with the phenomenon. Finally, they consider how the several systems operate together.

Enhancing competencies and eco-social awareness requires interdisciplinary teaching and learning, and building more coherent, multidisciplinary learning modules. This effort, which we discuss in the next section, has been one of the most interesting and inspiring challenges in Finland’s curriculum reform.

9. Working across subjects: multidisciplinary learning modules and phenomenon-based teaching and learning

The interdependent phenomena of this complex world do not respect the division of subjects, which usually organizes schoolwork. By observing the world through broad phenomena, such as climate change or the circular economy, instead of through fragmented, separate subjects, students have more possibilities for learning to understand that the environment, the economy and well-being are inescapably interlinked. It also helps them to develop their resilience and their ability to cope with change.

In Finland, the Basic Education Act stipulated which school subjects are obligatory. The FNBE is tasked with defining objectives and the main content areas for these subjects. At the local level, municipalities and schools can decide to provide partly or totally integrative teaching and learning as long as they are careful to take the objectives and the main content areas of different subjects into account. Teaching and learning in grades 1–2 are usually totally integrative, but there is more emphasis on subject teaching after that. In grades 7–9, education is usually organized by subject. The law requires teachers to prepare yearly reports on pupils, in which assessment is subject-based. Using written evaluations or numerical grades, these reports must appraise how well students have reached the objectives set for each subject in that school year.

In this context, openings in the reform for more integrative and phenomenon-based teaching and learning were not easy to find. The earlier national core curricula offered several cross-curricular themes. In 1990s, teachers were allowed to decide if they would work with these themes or not; in the 2004 core curriculum, the cross-curricular themes became obligatory. However, according to the national evaluations, not all schools and teachers implemented them in practice. The nation-wide descriptions in the core curriculum focused more on the content than on the objectives of the themes; further, there were no practical guidelines for actualizing the core curriculum themes.

The 2014 core curriculum also does not include descriptions of cross-curricular themes. Rather, descriptions of the seven transversal competencies help teachers understand and act on developing competence. A new pedagogical tool, the *multidisciplinary learning module*, is now compulsory, and makes it easier for teachers to adopt an integrative and phenomenon-based working approach. Integrative instruction, whose purpose is enabling students to see the relationships and interdependencies among the phenomena to be studied, is seen as a vital part of the operating culture of basic education.

The integrative approach guides students in linking knowledge and skills in various fields and, in interaction with others, in structuring them as meaningful units. By both examining large concepts and doing specific exploratory work in the multidisciplinary learning modules, students apply their knowledge and participate in the communal building of knowledge. This allows students to perceive the significance of topics learned at school for their own lives and communities, for their society and for humankind. In the learning process, students are supported in expanding and restructuring their worldview. The National Core Curriculum (FNBE 2014) stipulates that:

In order to guarantee every pupil's possibilities of examining wholes and engaging in exploratory work that is of interest to the pupils, the education provider shall ensure that the pupils' studies include at least one multidisciplinary learning module every school year. The objectives, contents and methods of multidisciplinary learning modules are decided in the local curriculum and specified in the school's annual plans. The duration of the modules must be long enough to give the pupils time to focus on the contents of the module and to work in a goal-oriented and versatile manner over a longer period. The topics of the modules are planned locally to reflect the principles of school culture.

Local resources and opportunities are exploited in the planning and implementation of the multidisciplinary learning modules. The modules offer excellent opportunities for cooperation between the school and the society around it. The local and topical nature of the contents to be covered and their societal significance improve the motivation of teachers and pupils alike. It is vital that the pupils take part in the planning of the modules. The purpose of the learning modules is to approach functionally issues that are part of the pupils' world of experience and that expand it with the aim of

- strengthening the pupils' participation and offering opportunities for involvement in the planning of the objectives, contents and working methods of the studies;
- bringing up issues that the pupils find meaningful and interesting, and creating opportunities for discussing and working on them;
- providing additional opportunities for studying in different groups, as well as with pupils of various ages and with several different adults;
- offering opportunities for combining what the pupils have learned outside the school with school work;
- giving space for intellectual curiosity, experiences and creativity and challenging the pupils to engage in many types of interaction and language use situations reinforcing the application of knowledge and skills in practice; and
- practising agency that is consistent with sustainable lifestyle, and inspiring the pupils to act in a manner that contributes to the community and the society.

In order to plan and implement multidisciplinary learning modules, there must be a kind of integration among subjects that represent different approaches; the school's other activities, such as school meals, breaks, morning assemblies, visits from luminaries and study trips, all need to be pulled in and used too. All subjects are involved in implementing the learning modules as the current topic requires. The approaches, concepts and methods typical of each subject are used to study these modules.

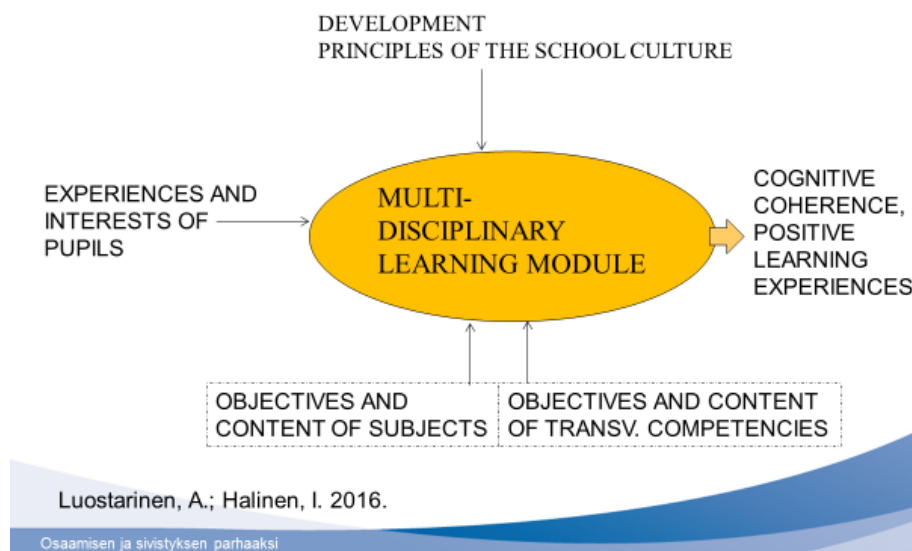


Figure 5: Multi-disciplinary learning module

Multidisciplinary learning modules and competence development do not mean abolishing school subjects. Rather, the role of subjects is changing, and much more cooperation among subjects is needed.

10. ESD in different school subjects

When the mission of education is to promote a sustainable lifestyle and, through that, to enhance sustainable development and well-being, input from all school subjects is needed. Every subject can provide teachers and students with useful tools typical of that distinctive discipline. These tools include concepts, methods and learning environments, and specific topics.

In Finland, subjects like environmental studies (in grades 1–6), biology, geography, physics, chemistry, health education and home economics (in grades 7–9), history and social studies (in grades 4–9) and religion/ethics (in grades 1–9) offer a great variety of tools for ESD. Sustainability becomes apparent in the task descriptions, the objectives and the main content of these subjects. But all other subjects have their own perspectives also, and they all share in the responsibility for enhancing different dimensions of a sustainable lifestyle and sustainable development.

In order to focus more on deep learning (that is, metacognitive skills) and the development of competencies, content in all subjects was reduced in the 2014 core curriculum. At the same time, the role of the objectives and their assessment criteria has been strengthened. Better and more intensive interconnection among subjects is encouraged. The core curriculum highlights integrative, inquiry-based and collaborative learning and the importance of activating, empowering and encouraging a good atmosphere (Lerikkanen et al., 2015). Research findings show that an inquiry-based or problem-based learning approach has positive effects on learning, and is also cognitively demanding. Deciding where inquiry- and problem-based learning is applicable takes careful consideration; when using it, instruction must always be adequately planned and implemented.

In the Finnish National Core Curriculum, the objectives of a sustainable lifestyle, development and well-being are so strongly embedded in the objectives and the main content of all subjects that it would be impossible to present them all here. In Annex 6, we examine environmental studies in grades 1–6 and biology in grades 7–9 in detail; for other subjects, we offer a summary of the main points concerning content, objectives and assessment.

11. Lessons learned

This report has described sustainability in Finnish basic education and in the new National Core Curriculum 2014. In it, we have explained how sustainability has been included in the curriculum in order to promote sustainable development and a sustainable lifestyle through education. This report emphasized that it was also important to conduct the curriculum reform process in a sustainable way and, through that, to create the best possible circumstances for high quality teaching and learning. In brief, here are some reflections on a successful and sustainable reform process in education:

1. Know your own history and build on strengths.

- Find out how sustainable education has been developed and implemented in education so far.
- Find out what teachers already know and are able to do in sustainable education, and what they think about it. Encourage them and support them to be confident in thinking their own work critically.

2. Utilize the best experiences from other countries, as well as findings from research, evaluations and development projects of your own country. Build a strong knowledge base for the reform.

3. Take care of sustainability in the curriculum planning process: empower individuals and communities and look for community-based solutions.

- Involve people in the process and listen to their experiences and ideas carefully, utilize their expertise and make their suggestions visible in the curriculum:
 - local education authorities, principals and teachers, and other school staff;
 - teacher educators and researchers; and
 - other organizations in society, representatives of different fields of life.
- Involve or ask local education authorities and schools to also involve pupils and parents in the process, and listen to their experiences and ideas carefully.
- Make the process transparent and collaborative:
 - respect different opinions;
 - share knowledge and information actively;
 - publish the drafts of the document and ask for feedback;
 - publish the feedback; and
 - use technology and digital forums to organize open discussions and possibilities for collaboration.
- Plan the process well, so that people are able to anticipate:
 - what we try to achieve together;
 - how the process will proceed (timing, working methods, etc.);
 - when and how they can influence the process, and how they can participate and give feedback.
- Take care to coordinate the reform process well in order to keep the process coherent.

- 4. Take a look at the complex world around school and focus on shared visions, values and faith in the future.**
 - Utilize the analyses of societal development and changes in working life and results of futures research.
 - Common goals and positive future visions motivate people to participate and work together towards the future.
 - Shared, clear values form a strong basis for the work in all areas of education, in all teaching and learning.
 - Support given by legislation, government policy and other fields of society is valuable.

- 5. Analyse and include all dimensions of sustainability in the curriculum; decide on the concepts you want to use and explain their meaning.**
 - ecological, social, cultural and economic dimensions
 - concepts like climate change, eco-social knowledge and ability, a circular economy, sustainable well-being, etc.

- 6. Notice that competencies needed in the complex world include knowledge, skills, values, attitudes and resolve.**
 - Define the competencies needed for a sustainable lifestyle and for building a sustainable future.
 - Define the objectives to be reached in these competencies during the early years and in pre-primary education/basic education/upper secondary education, etc.
 - Specify what these objectives mean in different school subjects and how they could be promoted by working across subjects (in phenomenon-based projects, in multidisciplinary learning modules, etc.).
 - Diminish the content of teaching and learning, focus on the main objectives and promote active learning processes.

- 7. Focus on understanding the big picture and learning by experiences.**
 - Seek solutions that help teachers and pupils understand the necessity of sustainable development and acquire a good knowledge base for it (in various subjects, across subjects and in all school activities).
 - Allow time for discussions on the values and the main tasks of education.
 - Support schools in developing school culture, learning environments and working approaches that create prerequisites for collaborative learning and learning by experiences, and thus enhance teachers' and students' values, attitudes, skills and desire to act according to a sustainable lifestyle.
 - Support schools in developing themselves as learning communities, helping them to connect better with the surrounding area and experts outside the school.
 - Notice that sustainability is not only about the future; it should be present in students' everyday life at school.

8. Focus on students' all-around development and sustainable well-being (sustainable well-being refers to pursuing a good life within the Earth's carrying capacity).

- Support teachers in developing their approach for teaching and learning, and encouraging feedback, dialogue, interaction, and collaboration in teaching and learning so that students' active role in learning will be strengthened.
- Utilize the potential of all subjects in developing competencies for a sustainable lifestyle and in promoting students' all-around development; notice, in particular, the value of subjects like music, visual arts, crafts, physical and health education, and home economics.
- Use technology and other pedagogical means to support the development of every individual to his or her full potential.
- Support teachers, pupils and learning communities in developing their resilience and their ability to cope with change.

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Annexes

Annex 1: Main goals set in the Basic Education Act (FNBE 2014)

The national goals of education are laid down in the Basic Education Act and, in greater detail, in the Government Decree. These goals steer the preparation of all aspects of the National Core Curriculum. They also steer the preparation of the local curricula and are implemented in everyday schoolwork. They point the way to examining education as a whole that imparts general knowledge and abilities needed today and lays a foundation for lifelong learning. Sustainable development and sustainable way of living are clearly defined as important goals for basic education, and all dimensions of sustainability are included in the main goals:

Growth as a human being and membership in society

Section 2 of the Government Decree underlines the educational task of the school. Supporting the pupils' growth as human beings and into ethically responsible members of society is a central goal. Education must also support the pupils' growth into balanced adults with a healthy self-esteem. Pursuant to the Decree, education promotes knowledge and understanding of cultures and ideological, philosophical and religious traditions, including Christian ones, and the heritage of Western humanism. In addition to respecting life, other people and nature, the Decree highlights the inviolability of human dignity, respect for human rights and the democratic values of Finnish society, including equity and equality. General knowledge and ability is also seen to include cooperation and responsibility, promotion of health and well-being, learning good habits and manners, and promotion of sustainable development.

Requisite knowledge and skills

Pursuant to Section 3 of the Government Decree, a key goal of education is laying a foundation on which the pupils can build extensive general knowledge and abilities and broaden their worldview. For this, both knowledge and skills in different fields of knowledge and cross-cutting competence that links the fields of knowledge are required. The significance of skills is highlighted. The Decree notes that the knowledge that is taught must be based on scientific information.

Promotion of knowledge and ability, equality and lifelong learning

Section 4 of the Government Decree contains goals and principles that direct the organization of education and pupil welfare. All activities must reinforce educational equity and equality and improve the pupils' learning-to-learn skills and capabilities for lifelong learning. The Decree stresses the utilisation of interactive learning environments and learning outside the school as instructional resources. It also underlines the significance of a school culture that promotes pupils' growth and learning as well as effective pupil welfare.

Annex 2: Task description in the National Core Curriculum for basic education (FNBE 2014)

Basic education is regarded as the cornerstone of the Finnish education system and also part of a continuum that starts with early years' education and care. Basic education offers the pupils an opportunity to build an extensive foundation of general knowledge and ability and to complete their compulsory education. It imparts capabilities and eligibility for upper secondary education and training. It helps the pupils to identify their personal strengths and hopes and to build their life and future by learning.

The mission of basic education may be examined from the perspective of its educational task, social task, cultural task and future-related task. The development of basic education is guided by the inclusion principle. The accessibility of education must be ensured. Each school providing basic education has an educational task. This means supporting the pupils' learning, development and well-being in cooperation with the homes. Basic education offers the pupils possibilities for versatile development of their competence. It reinforces the pupils' positive identity as human beings, learners and community members. Education promotes participation, a sustainable way of living and growth as a member of a democratic society. Basic education educates the pupils to know, respect and defend human rights.

The social task of basic education is to promote equity, equality and justice. Basic education builds up human and social capital. Human capital consists of competence, whereas social capital comprises contacts, interaction and trust between people. Jointly they promote individual and social well-being and development. The mission of basic education is to prevent inequality and exclusion and to promote gender equality. Basic education encourages girls and boys to study different subjects equally and promotes information and understanding of the diversity of gender. Each pupil is supported in recognizing their personal potential and selecting learning paths without role models determined by gender.

The cultural task of basic education is to promote versatile cultural competence and appreciation of the cultural heritage, and to support pupils in building their own cultural identity and cultural capital. It promotes understanding of cultural diversity and helps the pupils to perceive cultures as a progression of the past, the present and the future where everyone can have agency.

Changes in the world outside the school unavoidably affect the pupils' development and well-being as well as the operation of the school. In basic education, the pupils learn to encounter pressures for change openly, to assess them critically and to assume responsibility for making choices that build our future. Global education as part of basic education contributes to creating preconditions for fair and sustainable development in line with UN Sustainable Development Goals. As far as possible, schools work together with schools and education actors in other countries. Basic education exerts influence as a driver for positive change that contributes to society, both at the national and the international level.

Annex 3: Value basis in the National Core Curriculum for basic education (FNBE 2014)

Uniqueness of each pupil and right to a good education

Basic education is underpinned by the idea of the specific value of childhood. Each pupil is unique and valuable just as he or she is. Each pupil has the right to grow into his or her full potential as a human being and a member of society. To achieve this, the pupils need encouragement and individual support as well as experiences of being heard and valued in the school community. They also need to feel that the community cares about their learning and well-being. Equally important are experiences of participation and opportunities for working together with others to advance the functioning and welfare of the community.

Each pupil has the right to a good education and success in their studies. While learning, pupils are building their identity, their understanding of humanity, worldview and philosophy of life and finding their place in the world. At the same time, they come to understand themselves, other people, the society, the environment and different cultures. Exclusion from learning means that a child's educational rights are not implemented and is a threat to his or her healthy growth and development. Basic education creates preconditions for lifelong learning, which is an elemental part of building a decent life.

The significance of values education is highlighted in a world where information communicated by multiple forms of media, global information networks, as well as social media and peer relationships shape the value systems of children and young people. Discussions of values with the pupils guide them to recognise values and attitudes they encounter and to also think about them critically. Pupils are supported in building their personal value systems. The joint reflection of school and homes on values, and cooperation underpinned by this, promote security and the pupils' holistic well-being. The staff's open-minded and respectful attitude towards different religions, views, traditions and conceptions of education lays the foundation for constructive interaction.

Humanity, general knowledge and ability, equality and democracy

Basic education supports the pupil's growth as a human being who strives for truth, goodness, beauty, justice and peace. In personal growth, conflicts between aspirations and the current reality unavoidably arise. Being able to address such conflicts ethically and sympathetically and having the courage to stand up for what is good are part of general knowledge and ability. It also means that individuals and communities are capable of making decisions based on ethical reflection, putting themselves in the place of another person, and consideration based on knowledge. The perspectives of ethics and aesthetics guide pupils to think about what is valuable in life. General knowledge and ability manifest themselves in our attitudes to ourselves, other people, the environment and information, in the ways we act and in our willingness to take action. Educated persons strive to act correctly and show respect for themselves, other people and the environment. They are able to use information critically. An effort towards self-regulation and accepting responsibility for our own development and well-being are also part of general knowledge and ability.

Basic education is built on respect for life and human rights. It directs pupils to defend these values and to appreciate the inviolability of human dignity. Basic education promotes well-being, democracy and active agency in civil society. The development of basic education is guided by the goals and extensive principles of equality and equity. Education contributes to promoting economic, social, and regional and gender equality. Education shall not demand or lead to religious, philosophical or political commitment of the pupils. The school and education may not be used as channels of commercial influence.

Cultural diversity as richness

Basic education is built on a diverse Finnish cultural heritage. It has taken shape and is being formed in interaction between different cultures. Education supports pupils in building their personal cultural identity and their growth into active actors in their own culture and community, while promoting their interest in other cultures. It also reinforces creativity and respect for cultural diversity and promotes interaction within and between cultures, thus laying a foundation for culturally sustainable development.

In basic education, people from varying cultural and linguistic backgrounds come together and get to know many different customs, communal practices and beliefs. Pupils learn to look at issues from the perspectives of other people's life situations and circumstances. Learning together across the boundaries of languages, cultures, religions and beliefs creates a setting for genuine interaction and communality. Basic education lays the foundation for global citizenship that respects human rights and encourages the pupils to act for positive change.

Necessity of a sustainable way of living

Humans are part of nature and completely dependent on the vitality of ecosystems. Understanding this plays a key role in growth as a human being. Basic education acknowledges the necessity of sustainable development and eco-social knowledge and ability, follows their principles and guides the pupils in adopting a sustainable way of living. Sustainable development and ways of living comprise an ecological and economic dimension as well as a social and cultural dimension. The leading idea of eco-social knowledge and ability is creating ways of living and a culture that foster the inviolability of human dignity and the diversity and ability for renewal of ecosystems, while building a competence base for a circular economy underpinned by sustainable use of natural resources. Eco-social knowledge and ability means that pupils understand the seriousness of climate change, in particular, and strive for sustainability.

The way humans develop, use and make decisions about technology is based on their values. They have a responsibility to steer technology into a direction that safeguards the future of humans and the environment. In basic education, pupils examine the conflicting aspects of our modes of consumption and production in terms of a sustainable future, and together seek and implement solutions that improve our way of living over the long term. Pupils also learn about social structures and solutions that impact on the development and they are guided in exerting influence on them. Basic education broadens pupils' horizons, allowing them to appreciate their cross-generational global responsibility.

Annex 4: Principles guiding the development of school culture (FNBE 2014)

A learning community at the heart of the school culture

The school operates as a learning community and encourages all of its members to learn. A learning community develops in dialogue. The community is strengthened by working together and through participation. Reflecting on the goals, regular evaluation of one's own work and a peaceful atmosphere promote the learning of a community. It is supported by feedback from homes and other partners. Learning is also promoted by drawing on information received through development efforts, evaluations and research. The significance of pedagogical and shared leadership is emphasised, and ensuring a favourable setting for learning is a particular focal point of leadership.

A learning community creates preconditions for learning together and learning from each other. It also creates a setting for exploring and experimentation, and for experiences of enthusiasm and success. The community encourages each one of its members to try their best, and to also learn from their mistakes. It sets suitable challenges and supports the community members in recognizing and drawing on the strengths of both individuals and the community. As members of a community, pupils may build a positive and realistic self-image and develop their natural desire to experiment and explore. A learning community understands the importance of physical activity for learning and diminishes a sedentary way of living. It appreciates concentration on work, the efforts that learning requires and bringing work to a conclusion.

Environmental responsibility and sustainable future orientation

A learning community accounts for the necessity of a sustainable way of living in all of its activities. The school demonstrates its responsible attitude towards the environment by its everyday choices and activities. Material choices and operating methods that waste raw materials, energy and biodiversity are replaced by sustainable ones. The role that immaterial factors of a sustainable way of living play in well-being is highlighted, and time is set aside and visibility is given for these factors in everyday schoolwork. Pupils are involved in planning and implementing sustainable everyday life.

A learning community inspires hope of a good future by laying a foundation for eco-social knowledge and ability. A realistic and practical attitude towards shaping the preconditions for a good future reinforces the pupils' growth into responsible community members, municipal residents and citizens. It encourages pupils to encounter the world's diversity with an open mind and curiosity and to act for a more just and sustainable future.

Well-being and safety in daily life

The structures and practices of a learning community promote well-being and safety, thus creating preconditions for learning. These perspectives extend to all schoolwork and guide everyone's work. The individual characteristics and equality of community members and the community's needs are taken into consideration in the activities. The school's practices are flexible and enable versatile activities. Physical exercise and shared activities that promote mental well-being are a natural part of each school day. Communal pupil welfare is a key part of the school culture.

Pupils have equal access to guidance and support for their development and learning, both as individuals and as group members. The community appreciates empathy and friendliness. Bullying, violence, racism or other types of discrimination are not acceptable, and inappropriate behaviour is intervened in. Schoolwork aims at predictability in daily activities and at a peaceful atmosphere. Experiences of being heard and treated fairly are building blocks of trust. Calm and accepting mood, good social relationships and an attractive environment promote a harmonious and pleasant working atmosphere.

Interaction and versatile working approach

Interaction, cooperation and a versatile working approach are factors that promote learning and well-being for all members of the community. A learning community recognises the diversity of learning and building of knowledge and operates flexibly. It encourages experimentation and gives space for active learning, creative work, physical activity, play and experiences that are characteristic of various ages and different learners.

Various working approaches and learning environments are systematically applied in schoolwork, and regular efforts are made to work outside the classroom. Opportunities are created for project-type work, studying in modules, and cooperation both within the school and with actors outside the school. Cooperation and interaction of the adults in the school, both among themselves and with the society around the school, support the pupils' growth into persons capable of effective interaction and cooperation. Doing things together helps pupils recognise their own uniqueness and promotes their skills in working constructively with different kinds of people. Information and communication technology is used to promote interaction and the use of multiple senses and channels in work.

Cultural diversity and language awareness

The school as a learning community is part of a culturally transforming and diverse society, where the local and the global intermesh. Different identities, languages, religions and worldviews coexist and interact. Internationalisation at home is an important resource for a learning community. The community appreciates and draws upon the country's cultural heritage and national languages as well as cultural, linguistic, religious and philosophical diversity in the community itself and in its environment. It brings up the importance of the Sámi culture and various minorities in Finland. It promotes understanding and respect between individuals and groups as well as responsible action. The community recognises the right to one's own language and culture as a fundamental right. Pupils become acquainted with cultural traditions, constructively discuss different ways of thinking and acting, and create new ways of acting together.

One manifestation of cultural diversity is multilingualism. Each community and community member is multilingual. Parallel use of various languages in the school's daily life is seen as natural, and languages are appreciated. A community with language-awareness discusses attitudes towards languages and linguistic communities and understands the key importance of language for learning, interaction and cooperation and for the building of identities and socialisation. Each subject has its own language, textual practices and concepts. The languages and symbol systems of different fields of knowledge open up different viewpoints to the same phenomenon. The instruction progresses from everyday language to the language of conceptual thinking. In a language-aware school, each adult is a linguistic model and also a teacher of the language typical of the subject he or she teaches.

Participation and democratic action

A learning community constructs its operating methods together. A school culture that promotes participation, realises human rights and operates democratically lays a foundation for pupils' growth into active citizens.

Pupils participate in the planning, development and evaluation of the activities in accordance with their developmental stage. They get experiences of being heard and appreciated as community members. The community encourages democratic dialogue and participation and devises operating methods and structures for them. Student association activities offer an important channel for the participation of pupils. They are complemented by other operating methods, including peer supporters, mentors, voluntary work or different sustainable development activities. They also reinforce cooperation and interaction in the entire school community. Cooperation with various branches of administration, parishes, organizations, companies and other actors expands the pupils' ideas of the society and action in a civic society. Contacts with schools in different countries improve skills in acting in a globalised world.

Equity and equality

A learning community promotes equity and equality. Members of the community are encountered and treated as equals, independently of any personal characteristics. Equality does not mean that everyone is the same. Equal treatment comprises both safeguarding everybody's fundamental rights and opportunities for participation and addressing individual needs.

Pupils' conceptions of their gender identity and sexuality evolve during their time in basic education. A learning community promotes gender equality by its values and practices and supports pupils in forming their gender identity. The approach of the instruction is characterised by gender-awareness. The community encourages pupils to recognise their potential and to study various subjects, make choices and commit to studies without gender-related role models. By selecting and developing learning environments, working methods and learning materials, appreciation of human diversity can be made visible.

Annex 5: Transversal competencies

Viewpoints connected to sustainable lifestyle of the remaining five transversal competencies (two competences are examined in the report):

Thinking and learning to learn

- Learning to make observations, and to seek, evaluate, edit, produce and share information and ideas;
- practising exploratory and creative working approach, being open to new solutions;
- learning to consider things from different viewpoints, to seek new insights, to look for alternatives, and to combine perspectives and think outside the box;
- learning to use information independently and together with others for problem-solving, argumentation, reasoning, drawing conclusions and invention, as well as to analyse the topics critically from different viewpoints; and
- developing skills for systemic and ethical thinking.

Cultural competence, interaction and self-expression

- Adopting culturally sustainable way of living and acting in a diverse environment: learning to recognize and appreciate cultural meanings in their environment, building a personal cultural identity and a positive relationship with the environment, seeing cultural diversity as a positive resource;
- learning to know, appreciate and develop the surroundings and its cultural heritage;
- learning to value the significance of their own background and their place in the chain of generations;
- learning to show respect for human rights, especially the rights of the child; recognizing what is unacceptable as a violation of human rights; and
- developing skills in appreciative interaction and self-expression.

Multiliteracy

- Learning to interpret the world around them and to perceive its cultural diversity; and
- developing skills in interpreting, producing and evaluating various kinds of text which will help pupils understand diverse forms of cultural communication and build their personal identity (in this context, text means information expressed by systems of verbal, visual, auditive, numeric and kinaesthetic symbols and their combinations).

Competence in information and communication technology (ICT)

- Understanding the use of ICT and its operating principles and key concepts, developing skills in using ICT for productive purposes;
- learning to use ICT in managing information and for inquiry based and creative work;
- learning to use ICT for interaction and networking; and
- learning to use ICT responsibly, safely and ergonomically, and to assess the impact of ICT from the perspective of sustainable development; learning to be responsible consumers of ICT.

Working life competence and entrepreneurship

- Developing interest in and positive attitude towards work and working life, understanding the importance of work and entrepreneurship in society and in their own life;
- learning team work, project work and networking; developing capacity in employing oneself, entrepreneurships, risk assessment and controlled risk-taking;
- learning responsibility, reciprocity and striving for a common goal, perceiving one's own work as part of the whole, anticipating difficulties and encountering failures and disappointments;
- being encouraged to grasp new opportunities with an open mind and to act flexibly and creatively when faced with change, to take initiative and to look for various options; and
- developing persistence, systematic way of working, working independently and together with others.

Annex 6: Objectives and main content areas

The presented objectives and main content areas are those that are most strongly connected to the enhancement of a sustainable lifestyle. They do not cover the whole syllabus of the subject. With the objectives for grades 7-9, the assessment criteria for the level 'good achievement' are also presented. These criteria are given in the National Core Curriculum for the final assessment at the end of basic education.

1. Environmental studies (in grades 1-6)

General task of the subject

Environmental studies is an integrated subject, which comprises the fields of knowledge of biology, geography, physics, chemistry, and health education and includes the perspective of sustainable development. Viewpoints of both natural and human sciences are integrated in it. In environmental studies, pupils are considered a part of the environment in which they live. Respect for nature and a life of dignity in compliance with human rights are the basic principles in teaching and learning.

In environmental studies, pupils are supported in building a relationship with the environment, developing their worldview, and growing as human beings. The objective of instruction is to guide the pupils in knowing and understanding nature and the built environment, the related phenomena, themselves, and other people as well as the importance of health and well-being. The multidisciplinary nature of environmental studies requires that pupils learn to acquire, process, produce, present, evaluate, and appraise information in different situations. The instruction is based on scientific information, and attention is paid to the development of critical thinking. Environmental studies pay attention on the ecological, cultural, social, and economic dimensions of sustainable development. A key objective of environmental studies is to guide pupils to understand the impacts of choices made by humans on life and the environment, now and in the future.

The subject lays a foundation for competence in the different fields of knowledge covered by the subject. The aim is to recognise their significance to the environment, technology, daily life, humans, and human activities. In biology, it is essential to learn to know and understand the natural environment, humans, life as well as its development and its preconditions on Earth. In geography, it is central to explore the pupils' local environment and to understand different areas of the globe, the phenomena that occur in them, and the lives of the people living in them. In physics, it is essential to understand and explain the basic structures and phenomena of nature, also using information obtained through research conducted by pupils. In chemistry, it is central to observe different substances in the environment and to examine, describe, and explain their properties, structures, and changes that take place in them. In health education, it is essential to learn to understand factors in the environment and in human activities that support and protect health and to promote the development of competence that supports health, well-being, and safety.

The objective of teaching and learning is to attract and deepen pupils' interest in the various fields of knowledge of environmental studies. Equity and equality are promoted by offering each pupil opportunities to get acquainted with all the fields of knowledge of environmental studies as well as the associated technology and educational paths.

Specific task in grades 1-2

In grades 1–2, pupils' curiosity and interest in phenomena in their surroundings are stimulated through problem solving and research assignments based on play. Pupils also practise analysing and naming elements in their surroundings and issues related to their own well-being and safety.

Objectives

- To support the development of the pupil's environmental awareness and to guide the pupil to act sustainably in the surroundings and the school community.
- To encourage the pupil to wonder, ask questions, and use collaborative discussions as a basis for small research assignments and other activities.

Content areas

- *Reflecting on the necessities of life:* Pupils learn about the necessities of life in terms of food, water, air, warmth, and care. They become acquainted with food production and the origin of drinking water. They learn about everyday health habits and practise the related skills. Pupils consider the things that bring people happiness and joy. Together with the teacher, pupils develop the school day practices from the viewpoint of health, well-being, and learning.
- *Practising a sustainable way of living:* The contents are selected diversely from different areas of sustainable development. Pupils practise taking care of their own belongings and shared items. They learn to reduce the amount of waste they generate, to recycle, and to sort waste. Pupils learn about their home region and its significance. They participate in improving the state of their surroundings and in promoting the well-being of the school community. Pupils consider the significance of their own actions for themselves, other people, and their surroundings.

Specific task in grades 3-6

In grades 3–6 pupils are guided to understand their own growth and development. Problem-solving and research assignments are utilised in deepening their interest in phenomena in their surroundings. Towards the end of the grade unit 3–6, they also reflect on the characteristics of different fields of knowledge.

Objectives

- To support the development of the pupil's environmental awareness and to guide the pupil to act and become involved in his or her surroundings and community in order to promote sustainable development and to appreciate the significance of sustainable development to himself or herself and the world.
- To encourage the pupil to promote well-being and safety in his or her actions and surroundings and to guide the pupil in acting safely, appropriately, and responsibly and protecting himself or herself.
- To guide the pupil in perceiving the environment, human activities, and the related phenomena using the concepts of environmental studies and in developing his or her conceptual structures from preconceptions towards accurate use of concepts.
- To guide the pupil in exploring nature, identifying organisms and habitats, and thinking ecologically as well as to guide the pupil in understanding the structure, vital functions, and development of humans.

Content areas

- *Exploring the environment:* The selected contents include research assignments related to the pupils' own living environment. In the living environment, pupils observe the abiotic and biotic nature, the built and the social environment, and the phenomena, materials, and technological applications in their surroundings. Assignments direct the pupils to practise the different stages of conducting research. Pupils study the weather, the soil, and the bedrock. By examining changes in the movement of objects, they familiarise themselves with the concept of force. They identify organisms and habitats, compile a herbarium with guidance and carry out experiments to study the growth of plants. They also observe the significance of different environments in their local area from the perspective of well-being. They get acquainted with the rights and duties associated with acting in the environment.
- *Building a sustainable future:* Aspects to be considered in the selection of contents include fostering biodiversity, climate change and its mitigation, sustainable use of natural resources, promotion of health, caring for the pupils' own cultural heritage, living in a multicultural world, and the global welfare of the humankind now and in the future. Pupils reflect on the impacts of their own actions on themselves, other people, animal welfare, nature, and society. They practise environmentally responsible actions in their surroundings as well as taking care of others. A collaborative project is carried out where pupils practise participation and involvement at the local or the global level.

Objectives related to learning environments and working methods of environmental studies in grades 3–6

The choice of working methods and learning environments is based on pupils' personal experiences of issues, phenomena, and events related to humans, the environment, human activities, and daily life. When selecting learning environments and working methods, learning by doing, experiential learning, using drama and stories, as well as the multidisciplinary nature of environmental studies are taken into account. The phenomena of the various fields of knowledge of environmental studies are explored in authentic situations and environments, when possible. In addition to school facilities and the teaching group, the learning environments include a versatile range of local natural and built environments, various communities and interaction situations, ICT environments as well as local opportunities, including cooperation with nature schools, museums, companies, non-governmental organizations, and nature and science centres. Pupils' participation and interaction in planning and carrying out simple research projects and reflecting on different perspectives and solutions is important for the achievement of the objectives. Active participation in studying a phenomenon, theme, or topical problem supports pupils' learning in accordance with the objectives of environmental studies.

2. Biology (in grades 7-9)

Task of the subject

The task of the subject of biology is to help pupils understand life and its development, increase pupil's awareness and knowledge of nature as well as to guide pupils to understand the operation of ecosystems, vital functions of people, and the principles of heredity and evolution.

The teaching and learning of biology also includes working in nature and guiding pupils to familiarise themselves with the characteristics of biological information acquisition with the help of inquiry-based learning. Approaches of field and laboratory work are used in examining nature. Experiential and experimental learning creates joy of learning and stirs pupils' interest in examining the status of their living environment and changes within it. Information and communication technology is utilised diversely in teaching and learning. The use of technology promotes equality and equity among pupils in the subject of biology.

Pupils' problem-solving and teamwork skills and the development of togetherness are supported in throughout teaching and learning. Pupils develop abilities for studying and working in academic fields that utilise biology.

The teaching and learning of biology helps pupils understand how the knowledge and skills in biology can be applied and utilised in their own lives, in ethical reflection, and in following current news related to biology as well as how societal decision-making can be influenced. Pupils' environmental awareness and desire to conserve biodiversity develop in teaching and learning. Pupils develop abilities for becoming involved in the development of their surroundings and contributing to it as well as preserving its vitality. Pupils are guided towards a sustainable way of living and understanding global responsibility.

Objectives and their assessment criteria

- To guide the pupil to understand the basic structure and functions of the ecosystem as well as to compare different ecosystems and recognise species:
 - The pupil is able to describe the basic structure and functions of a forest ecosystem and to recognise different ecosystems and species in their food webs. The pupil is able to describe the significance of biodiversity to the functions of ecosystems and to consider the importance of sustainable use of forests for organisms and human beings.
- To guide the pupil to examine the adaptation of organisms to various habitats and to understand the significance of diverse habitats for biodiversity:
 - The pupil is able to make observations on the occurrence of species and to describe the adaptation of species to new habitats. The pupil recognises species or organisms typical of his or her surroundings and understands their importance to biodiversity.
- To guide the pupil to evaluate changes occurring in natural environments and human impact on the environment and to understand the significance of ecosystem services:
 - The pupil is able to make observations and conduct small research on the natural and human-caused changes in the natural environment of his or her surroundings. The pupil understands the limited nature of natural resources on Earth and the significance of ecosystem services and has basic knowledge of a sustainable way of living as well as public rights of access and citizen's responsibilities.
- To encourage the pupil to apply biological knowledge and skills in his or her own life and in societal discussion and decision-making:
 - The pupil is able to describe how biological knowledge and skills can be utilised in daily life and in the society and is able to justify his or her views with biological knowledge. The pupil participates in a nature conservation project in his or her surroundings, including its implementation and reporting on its results.
- To inspire the pupil to deepen the interest in nature and its phenomena and to strengthen his or her relationship with nature as well as his or her environmental awareness:
 - Using examples, the pupil is able to describe how to act in nature in a sustainable manner while preserving biodiversity.

- To guide the pupil to make ethically founded decisions:
 - The pupil is able to utilise biological knowledge and skills in the evaluation of questions of responsibility related to the human being and the environment and to present arguments in favour of ethically sustainable choices.
- To inspire the pupil to become actively involved in building a sustainable future:
 - The pupil is able to describe ways of acting in order to build a sustainable future.

Content area

Towards a sustainable future: The contents include the preservation of biodiversity, the climate change, sustainable use of natural resources, and changes in the surroundings. Pupils reflect on the ecological, social, economic, and ethical principles of using natural resources, as well as sustainable food production and animal welfare. The opportunities provided by bio economy and ecosystem services for a sustainable future are discussed. Pupils get acquainted with the goals, approaches, and accomplishments of nature conservation.

3. Geography

Objectives and their assessment criteria

- To encourage the pupil to consider the interaction between human activities and the natural environment and to understand the significance of sustainable use of natural resources:
 - The pupil is able to describe how the natural environment affects the life and livelihood of human beings and what kind of effects human activity has on the state of the natural environment in Finland and around the world. The pupil is able to explain why the sustainable use of natural resources is important.
- To guide the pupil to preserve nature, the built environment, and the diversity in them as well as to enhance his or her participation and involvement skills:
 - Together with others, the pupil participates in a project where he or she is involved in improving the comfort of the surroundings or the preservation of biodiversity. The pupil understands and is able to describe the significance of global responsibility in his or her own activity.
- To support the pupil in becoming an active citizen who acts responsibly and is committed to a sustainable way of living:
 - The pupil is able to explain how to act responsibly in and outside of school. The pupil is able to take a position on questions of sustainable development and to provide examples of how to act in line with a sustainable way of living.
- To guide the pupil to appreciate his or her regional identity as well as the diversity of nature, human activity, and cultures and to respect human rights in all parts of the world:
 - The pupil is able to characterise factors influencing his or her regional identity and to describe the significance of his or her surroundings and its diversity. The pupil is able to describe the significance of cultures and diversity among human beings and to examine societal phenomena from the viewpoint of human rights.

Content area

A sustainable way of living and sustainable use of natural resources: The instruction focuses on sustainable use of natural resources and the possibilities of bio economy in Finland and elsewhere in the world. The pupils examine the life cycles of products and consider their personal consumer choices and activity as responsible citizens. They get acquainted with environmental changes, particularly the climate change and the loss of biodiversity. The state of the environment and possibilities for cooperation in the Baltic Sea region are discussed. The effects of globalisation and questions of regional development are reflected on through examples.

4. Physics

Objectives and their assessment criteria

- To guide the pupil to use his or her competence in physics in building a sustainable future and to evaluate his or her personal choices in terms of sustainable use of energy resources:
 - Using examples, the pupil is able to describe how competence in chemistry is needed for building a sustainable future. The pupil is able to describe different alternatives from the perspective of sustainable use of natural resources and product life cycles.
- To encourage the pupil to formulate questions about the studied phenomena and to further develop the questions to serve as a basis for research and other activities:
 - The pupil is able to form questions about the studied phenomenon. The pupil is able to specify the questions to serve as the topics of research or other activities, for example by limiting variables.

Content area

Physics in the society: Contents related to physical phenomena and technological applications are chosen, particularly from the viewpoint of the society and its development. The main emphasis is on energy production and sustainable use of energy resources. Pupils familiarise themselves with different educational paths and professions in which competence in physics is required.

5. Chemistry

Objectives and their assessment criteria

- To guide the pupil to use his or her competence in chemistry in building a sustainable future and to evaluate his or her personal choices in terms of sustainable use of natural resources and product life cycles:
 - Using examples, the pupil is able to describe how competence in chemistry is needed for building a sustainable future. The pupil is able to describe different alternatives from the perspective of sustainable use of natural resources and product life cycles.

Content area

Chemistry in the society: Contents related to chemical phenomena and applications are chosen particularly from the viewpoint of technology and the well-being of the humankind. The main emphasis is on sustainable use of natural resources, and the idea of product life cycle is one of the used perspectives. Pupils familiarise themselves with different educational paths and professions in which competence in chemistry is required.

6. Health education

Objectives and their assessment criteria

- To support the pupil's ability to critically evaluate communication related to health and illness and to analyse the rights, responsibilities, and means of involvement of the individual in matters of health and safety in his or her learning environment and local communities:
 - The pupil is able to evaluate the reliability and importance of communication related to health and to justify conceptions related to health and safety. The pupil is able to analyse the consequences of various ways of life to other people and to the health of the environment and to use examples to describe measures and means that affect health in the surroundings.
- To guide the pupil to understand the significance of the environment, communities, culture, and information and communication technology to health and well-being:
 - The pupil is able to describe essential direct and indirect impacts on health caused by the living environment and to describe connections of communities, culture, media, and information and communication technology to health.

Content area

Health, communities, society, and culture: Ability to study and work and functional capacity in adolescence are included in the contents. When examining a sustainable way of life, social sustainability, and responsible consumption are taken into account. When discussing the health impacts of the living environment, key approaches to the promotion of health and the prevention of illness as well as health services, civic activity, and health risks in the environment are addressed. Sources of information and diverse means of health marketing and involvement are explored, particularly from the viewpoint of the reliability of information and health impacts. The role of culture in promoting health as well as cultural sensibility, sustainable way of living, equity and participation of citizens, and respect for human rights are taken into account in the contents of health promotion. Different viewpoints, such as childhood and the rights of children, ageing, disability, and long-term illness, are addressed when discussing the contents.

7. Home economics

- To guide and encourage the pupil to select and use materials, utensils, appliances, and information and communication technology in a way that promotes well-being and sustainable consumption:
 - The pupil acts economically in home economics when selecting and using materials and technology, and considers the choices in terms of health and sustainability.
- To guide the pupil to adopt a sustainable way of living by paying attention to environmentally conscious and cost-conscious daily-life choices:
 - The pupil is able to manage basic waste sorting at home and to explain the connections of measuring, calculating, and nature-preservation in daily life at home as cost-conscious and environmentally conscious actions.

8. Other school subjects

Other school subjects include their own viewpoint to sustainable lifestyle and development, too. They are all also needed in multidisciplinary learning modules. Here are only a few examples of how dimensions of sustainability are visible in the objectives of these subjects. The objectives and their assessment criteria are for grades 7-9 and for the final assessment at the end of grade 9:

Crafts

- To guide the pupil to think economically and to make choices in the crafts process that promote a sustainable way of living:
 - The pupil is able explain and justify the significance of crafts for a sustainable way of living and to make choices accordingly in his or her work.

Visual arts

- To encourage the pupil to take cultural diversity and sustainable development into account in his or her visual production as well as to influence through his or her images:
 - In his or her visual production, the pupil examines cultural diversity and sustainable development and recognises the possibilities of influencing through images.
- To guide the pupil to examine the significance of visual arts and other forms of visual culture for the individual, the community, and the society from the viewpoints of history and culture:
 - The pupil participates in discussions on the significance of visual arts and other forms of visual cultures relying on his or her own interpretations.

Music

- To guide the pupil to explore his or her musical experiences and the aesthetic, cultural, and historical diversity of music:
 - The pupil is able to express his or her own perception and experiences of different musical activities.

History and Social science

- To guide the pupil to evaluate alternative futures based on his or her knowledge of history:
 - The pupil is able to describe how interpretations of the past are used to justify choices made for the future.
- To guide the pupil to practise his or her ethical evaluation skills related to different human, societal, and economic questions:
 - Not used as a principle for grade formulation. The pupil is guided in reflecting on his or her experiences as a part of self-assessment.
- To guide the pupil to perceive the principles of the constitutional state and the universal significance of human rights as well as to deepen his or her knowledge of the operation of the Finnish legal system:
 - The pupil is able to describe and explain the principles of human rights, the constitutional state and the structure and operation of the Finnish legal system.
- To guide the pupil to understand the basics of economy, to manage his or her personal finances, and to act as a responsible consumer with the principles of sustainable development:
 - The pupil is able to explain the significance of saving, investing, and consuming in his or her life and in the national economy.

- To guide the pupil to expand his or her views on the society and to participate in societal activity and discussion as well as to use his or her media skills and knowledge of the society in forming his or her views and in acting as a citizen:
 - The pupil is able to express and justify his or her opinion appropriately, to apply different skills of involvement, and to act constructively as an active citizen in the local community.

Religious studies and ethics

- To guide the pupil to get acquainted with the key concepts of ethical thinking and human rights as well as the ethical principles of the studied religion and other religions and worldviews:
 - The pupil knows key concepts of ethics and is able to name them. The pupil is able to name the most important human rights conventions and explain their key contents. The pupil knows ethical principles of the studied religion and other religions and worldviews.
- To encourage the pupil to consider life questions belonging to humanity, current ethical questions, and the relationship of his or her values with them:
 - The pupil is able to reflect on life questions belonging to humanity and to describe current ethical questions.
- To inspire the pupil to reflect on the ethical dimensions of his or her choices and their impacts on well-being and to encourage the pupil to a sustainable way of living:
 - The pupil is able to reflect on the ethical dimensions of his or her choices and to explain their influence on the well-being of themselves and others and on sustainable development.
- To encourage the pupil to reflect on the impact of his or her choices on a sustainable future both locally and globally:
 - The pupil is able to name central features related to the sustainable future of nature and the society and to examine the significance of a sustainable way of living for the future. The pupil is able to name means of local and global involvement.
- To guide the pupil to become aware of the significance and ethical foundations of human dignity, human rights, and human equality:
 - The pupil is able to name the most important concepts related to human rights and equality and to justify the significance of human rights.

Language education

All languages (mother tongue and literature, other domestic language, foreign languages) emphasise plurilingual competence and encourage using languages in different situations. They strengthen pupils' language awareness and parallel use of different languages as well as the development of multiliteracy. Pupils are guided to become aware of the multi-layered linguistic and cultural identities they and others have. The significance of minority languages and endangered languages is also discussed in teaching and learning. Teaching and learning strengthens pupils' trust in their language learning abilities and in using their language proficiency confidently, even when it is limited.

Language education guides pupils to value their own language and culture as well as cultural diversity, and supports pupils in building a linguistic and cultural identity as well as guides them to value different cultures and languages.