

Chapter 13

Education for Sustainable Development in Finland

Mauri K. Åhlberg, Mervi Aineslahti, Annukka Alppi, Lea Houtsonen, Anna Maaria Nuutinen, and Arto Salonen

13.1 Introduction

Finland is an interesting case with regard to Education for Sustainable Development (ESD), because of the high quality of Finnish Schools (as evidenced by their PISA performance), their teachers and the high esteem of Finnish teacher education and educational research. This high quality is based partly on long-term educational research, including the popularity of the ‘teachers as researchers’ movement in teacher education (Åhlberg 1988, 1989, 1990, 1998, 2005a, b, 2012, 2013a, b, c). In Finland the leading Department of Teacher Education is based at the University of Helsinki, where, in addition, the only Professorship of ESD in Finland can be found.

M.K. Åhlberg (✉)

Department of Teacher Education, University of Helsinki, Helsinki, Finland
e-mail: mauri.ahlberg@helsinki.fi

M. Aineslahti

Sorrila School, Valkeakoski, Finland
e-mail: mervi.aineslahti@gmail.com

A. Alppi

Mahnala Environmental School, Hämeenkyrö, Finland
e-mail: annukka.alpi@hameenkyro.fi

L. Houtsonen

Finnish National Board of Education, Helsinki, Finland
e-mail: lea.houtsonen@oph.fi

A.M. Nuutinen

City of Espoo, Espoo, Finland
e-mail: marinuutinen@gmail.com

A. Salonen

Faculty of Welfare and Human Functioning, Helsinki Metropolia University of Applied Sciences, Helsinki, Finland
e-mail: arto.salonen@gmail.com

Professor Mauri Åhlberg has been in this position from its inception in 2004 and has supervised research and development in ESD in Finland.

Most of the theoretical and empirical work has been associated with the Finnish Environment and Schools Initiative (ENSI) school network, starting in 1997. In Finland many key ideas of the ENSI programmes, such as innovating action research in schools, have been adopted. Good collaboration with the Ministry of Education and the National Board of Education have been essential. Since 2000, Lea Houtsonen has been involved in the administration and research of ENSI related educational research. Two doctoral theses of innovative ENSI schools have been completed (Ahoranta 2004; Aineslahti 2009) and one is underway (Alppi 2013). Nuutinen (2013a, b) and Siirilä (2013) collected data from the ENSI related UNU IAS RCE Espoo region (described later in this chapter).

In Finland, the importance of biodiversity education as an essential part of ESD was understood early on (see Åhlberg 1988), based on the importance of biodiversity and ecosystem services emphasised by all four UN World Summits for Environment and Sustainable Development (1972–2012) (see Åhlberg 2013e). Kaasinen (2009)—as a member of the Research & Development Group of Åhlberg's department—published her doctoral dissertation on species recognition in schools and universities, as an important part of biodiversity education. Åhlberg (2012, 2013) and Alppi and Åhlberg (2012) described and recommended the use of the interactive NatureGate approach (<http://www.naturegate.net>) for the identification of local species (see below).

The quality tools we have developed and tested include improved concept mapping. They were tested in Ahoranta's (2004) doctoral dissertation based on 6 years of design experiments. They were presented in publications by Åhlberg and Ahoranta (2005), Åhlberg and Kaivola (2006) and Kaivola and Åhlberg (2007) as tools to promote ESD both in schools and universities. The research and development on these quality tools have been internationally acknowledged, as evidenced by several refereed research articles (e.g. Åhlberg and Ahoranta 2002; Åhlberg et al. 2003, 2005a, b; Immonen-Orpana and Åhlberg 2010; Siirilä and Åhlberg 2012) and a research methods textbook (Wheeldon and Åhlberg 2012). But—as Salonen (2010) demonstrates in his ground-breaking doctoral dissertation for ESD—it is possible also to manage without it.

In Finland as in many other European countries there are many projects in EE and ESD. But many of them seem like fireworks. They look beautiful, but seem to have no lasting impact. They are not adding anything to each other, or building upon each other. In this chapter we describe several research and development projects that try to overcome these limitations.

We have tested cumulative collaborative knowledge building since the year 2000. The original ideas and experiments of collaborative knowledge building were tested and developed with school children in short term studies (Bereiter 2002). We wanted to test whether this method could be developed into a more cumulative version comparable to real scientific knowledge creation. The approach, including the Knowledge Forum® software platform (Åhlberg et al. 2001; Myllari et al. 2010), has now been employed in several doctoral thesis (e.g. Aineslahti 2009; Salonen 2010).

13.2 Mahnala Environmental School: ESD in an (Extra) ordinary School

Mahnala Environmental School (near Tampere) has grades 1–6 (pupils aged from 7 to 12). It follows the common curriculum of Finnish schools guided by the National Board of Education 2004 (OPH 2004). Mahnala Environmental School has demonstrated that an ordinary Finnish comprehensive school can become a centre for EE and ESD. ESD became an integrated part of school activities in 2004 (Table 13.1) (Fig. 13.1).

13.2.1 ESD at Mahnala Environmental School

Using ESD, different school subjects and educational objectives can be integrated into a coherent general education and school organisational culture. School organisational culture includes the way everyday life is organised and lived in the school. According to the Finnish Core Curriculum 2004 (OPH 2004), ESD has to be

Table 13.1 Overview of the most important milestones in the history of Mahnala Environmental School

1990	A kind of nature school was created by the former principal, an ornithologist. He had a licence to ring birds and he started the tradition of ringing birds with third grade pupils. Field studies and gardening were started. Collaboration with local citizens was also started
1996	Classroom teachers, including Annukka Alppi, brought ideas of modern Environmental Education (EE) to Mahnala Environmental School, including Global Learning and Observations to Benefit the Environment (GLOBE)
2002	Ms. Annukka Alppi joined a research group and started university level collaboration with Mauri Åhlberg, and at the same time joined national and international school R&D projects such as ENSI (originally supported by the Organisation for Economic Co-operation and Development (OECD), School Development through Environmental Education (SEED), Sustainability Education in European Primary Schools (SEEPS)
2005	The school developed its own model of ESD, including its own local curriculum and organisational culture to support it
2008	The school was selected to be part of the Development Centre for EE in the Tampere Region, areas of focus included early years' education, teaching and in-service training
2008	The Green Year medal, a national award, was presented to Mahnala Environmental School for their use of the schoolyard as a learning environment
2008	Participated in the international ENSI SUPPORT project and its conference in Espoo, Hanasaari
2008	Since 2008 the NatureGate® Online service (http://www.naturegate.net/) for learning about local species and their sustainability has been tested and used at the school
2010	Environmental Rose Award from National Society of EE
2012	Participation at ENSI CoDeS (collaboration of schools and communities for sustainable development) working conference, Vienna, Austria



Fig. 13.1 Pupils identifying a wild flower with the NatureGate interactive identification tool for local species (Photo: Annukka Alpi, www.naturegate.net (accessed 17 Apr 2014))

integrated in all school subjects and school organisational culture has to promote learning for wellbeing, a healthy environment and sustainable development.

The immediate surroundings of the school are the central source of inspiration for teaching and learning at Mahnala Environmental School. An important shared aim of the teachers of the school was to cooperate with the people of the school region. There was the will to promote environmental awareness and actions for conserving and improving the environment, conserving local biodiversity, and using it sustainably aiming at the wellbeing of the local people.

There are many possibilities for informal networking. Mahnala Environmental School is a rural school and collaboration with local farmers became very important. Harvesting in local farms, local forests, gardens, local nature have become important curricular topics as well as providing organisational activities to promote learning for sustainability, a good environment and a good life.

Rural life is part of the cultural heritage of the municipality of Hämeenkyrö, where Mahnala Environmental School is located. It is important for pupils to learn to understand, to conserve and to develop the local cultural heritage. In spring time the pupils of the Mahnala Environmental School take part in sowing seeds and planting at local farms. In the autumn they take part in harvesting. They have also followed the lives of farm animals such as chicken and sheep.

It has become a tradition at Mahnala Environmental School to incubate hen eggs in spring. In April 2012 pupils incubated eggs of the local provincial chicken breed (Häme-Tavastia). This rare, ancient breed had only 200 chickens left.

After successful incubation at the school, 13 new chickens were added to the flock. In this way pupils learnt to conserve biological cultural heritage and local biodiversity.

There are many lakes in Finland, some near Mahnala Environmental School. The school collaborates with local fishermen and nature entrepreneurs in arranging fishing when the school year starts in August/September. Later, in winter, when the lakes are covered by ice, pupils learn winter fishing from local fishermen, such as using nets under the ice or ice fishing through holes in ice. Pupils observe many of the 27 local fish species and acquire knowledge about them during these events. All the Finnish fish species can be identified using NatureGate online service (2014).

In Mahnala Environmental School pupils have learned both about wild nature and nature locally transformed by humans (local human history and culture). The local curriculum guide book details the learning objectives for each grade.

There has been an active collaboration between Mahnala Environmental School and another ENSI school in the nearby city of Valkeakoski, headed by Mervi Aineslahti. Pupils of city schools have the possibility to learn more deeply about farming and forestry and other aspects of country life when they collaborate with a rural school and vice versa.

13.3 Sorrila School: A Journey of Sustainable School Development

13.3.1 Theoretical Background

Mervi Aineslahti wrote her doctoral dissertation (Aineslahti 2009) about her work at and development of her school (Sorrila School). In her thinking, EE and ESD are concepts which complement each other. However, ESD has a wider meaning and content than EE. This is how Sorrila School understands the three main aspects of sustainable development as applied to school education:

- The ecological aspect contains things like: nature conservation and biodiversity, learning to identify local species as an obligatory part of the Finnish core curriculum for grades 1–6.
- The economic aspect: Sorting and recycling, consumption, supplies, material resources and maintenance. Basic principles of sustainable production, such as cyclical economy: waste from earlier processes become raw materials for the next processes so that all materials get cycled and/or recycled.
- The socio-cultural aspect: school climate and wellbeing, traditions, feeling of community and empowerment, active learning.

The aim at Sorrila School has been to reach for the balance between humankind and nature. In many cases EE has been understood in a narrow way, meaning only

activities in the ecological area. Schools may have worked only with nice little ‘nature games’ or sorting waste. However, the complex concept of ESD necessitates interaction on many levels and between different parts. It means seeing situations connected and as parts of systems.

For this school, ESD is seen as being based on positive thinking and sharing knowledge and energy for the wellbeing of the whole community: schools, homes, the municipality and NGOs. Sustainability can empower people. It gives them a feeling that together people can achieve more.

Learning in this socio-cultural framework is seen as social interaction. It is situated and always in connection with real life conditions. Therefore, local and regional networking and human interaction play a crucial role. Learning is also very closely connected to emotions, not to forget learning from elders and more experienced people (apprenticeships) as well as peers. *Transformative or expansive* learning is meaningful to the learner. Learning may change both the learner and the environment (Beach 1999; Engeström et al. 2002). The environment contains both physical and psychological elements as well as natural and artificial features (Vygotsky 1978; Dillon 2006). Dillon argues: “The central premise is that each time a learner encounters a new situation, the socio-cultural features of that situation are read afresh: learner and context interact and transform each other.” (2006: 71)

Dillon calls this a “pedagogy of connection” (ibid.). It is a way to visualise integrative learning. It is finding connections between different subject matters, school and real life, present and past. ESD is a good approach for finding connections. Integrative learning, originally called integrating learning, has been introduced by Åhlberg (1990, 2005a, b). It was adapted to Dillon and Åhlberg (2006). According to his “integrating learning theory” everyone has to take responsibility for his/her own learning in this complex world. It can be accomplished by being open-minded and able to see connections and integrate different subject matters and disciplines (2005a, b, originally in 1998).

Shallcross and Wals (2006) use the concept of a whole school approach. Teachers, pupils and school staff work together in order to develop the school into a sustainable school. Because human beings are part of many other systems, a school as a community of many human beings is even more complicated and therefore a challenging area for development. Learning does not take place only in schools and teachers are not the only professionals. A local community and parents give the school extra resources which empower both the school and the local inhabitants. Networking and cooperation form a win-win-situation. All participants benefit from such learning for sustainability. Pupils encourage their parents and local authorities to adopt more sustainable actions and ways to live. Positive examples make others curious and willing to be part of the ‘the circle of positive thinking’.

According to Aineslahtis (2009) school development and sustainable development have similar features. School development can be connected with learning in general and especially with lifelong learning. Each person’s experiences of good practices in the past can be used as building material for school development.

Not only the teachers' and the school staff's, but also the pupils', their parents' and the local community's ideas and knowledge should be used to make the school an arena for *collaborative transformative learning*. This means creating new ideas and knowledge for the whole community and acting in cooperation with each other.

13.3.2 Practical Experiences

Sorrila School is a large primary school situated in Valkeakoski, Southern Finland. There are over 400 pupils and grades from the preschool to 6th grade. Over the years, the school has taken part in several national and international school development projects, all connected to ESD. Being part of the Finnish ENSI-schools network has given it many opportunities to network and develop through shared experiences.

The first Comenius-project (2003–2006) was called *Exploring and Interacting with Our Environment* (<http://www.peda.net/veraja/valkeakoski/sorrila/comenius1>, accessed 9 April 2014). The school had partners from the UK, Austria, Hungary, Lithuania and another Finnish school, Mahnala Environmental school (see above), which also is an ENSI-school and a close partner over the years. The following project was aimed at developing learning environments. It was titled *Encounters*. During all these years 'Aunt Green' has been an important role model for the students and staff members (Fig. 13.2).

In the *Encounters* project, Sorrila School had a partner from Espoo, Keinumäki school, also a partner of the ENSI-network. The coordinating teacher, Anna Maria Nuutinen, Keinumäki school (Espoo, Greater Helsinki Region), is also a member of Prof. Åhlberg's R&D Group for ESD, and she was very influential in the creation of UNU IAS RCE Espoo (see below).

13.3.3 Conclusions

The change process that relies on sustainable school development leads the school along a road of positive renewal. It is not a series of individual projects but an ongoing process. Widening the concept of sustainability into social dimensions, the wellbeing of all the members of the school community as well as that of nature, its ecosystem services, of conservation and sustainable use of biodiversity, go hand in hand. Mervi Aineslahti and Sorrila school have also tested NatureGate online services at <http://www.naturegate.net> for species identification. According to the Finnish National Core Curriculum 2004 (OPH 2004) it is obligatory to learn to identify local species during grades 1–6.

Fig. 13.2 The Green flag and Aunt Green, Dr. Mervi Aineslahti in Sorrila school



13.4 From the Encounters Project to the UNU-IAS RCE Espoo

13.4.1 The Encounters School Project in Keinumäki School (Espoo)

The background of the *Encounters* School Project included the UN DESD (2005–2014), the international ENSI-Project with its SUPPORT-Partnership and Participation for a Sustainable Tomorrow which began in 2007.

The purpose of the *Encounters* Project was to find ways in which sustainable development and methods could become rooted in the school's daily activities. The project developed methods which involve networking with local stakeholders, authorities as well as researchers and experts and the selection of those pedagogical methods which support social interaction and participation and which enrich the working methods within the school's learning environment.

The goal of the *Encounters* Project in Keinumäki School was to ensure that sustainable development and ESD take place in the school's daily life. To reach the objective the school planned and carried out five learning units/packages, which take into account the following dimensions of sustainable development:

- (a) The ecological dimension: conserving and sustainable use of biodiversity, ecosystem functions and interaction, environmental exploration, human responsibility and influence, environment-friendly practices in everyday life, relationship with the nature.
- (b) The economic dimension: energy and water saving, sorting and recycling, consumption, equity, procurement.
- (c) The social dimension: wellbeing, relationships, respect, safety, equality, participation and influence, finding the joy of learning, critical and innovative thinking, empowering and discovery.
- (d) The cultural dimension: our own traditions and roots, multiculturalism, justice, tolerance, science and art. Old cultivars of plants and old animal breeds ought to be included also in this cultural dimension, because they are part of local biodiversity, i.e. part of biological cultural heritage.

The units aid children in noticing the socio/cultural history of the area. They learn to understand the relationships between people and nature; to see how the activities of various age groups affect nature; how people learn differently and how to approach differences. Finally they learn to understand how sustainable ways of life make a difference in building the future.

The five learning packages are:

1. Ancient Espoo helps the human senses to empathise with nature, its moods and changes in different seasons. Nature has been respected and appreciated in ancient times. The package combines art, music and history (mythical stories) into a fascinating entity. It allows students to become familiar with their own roots, and cultural history. Also, in other cultural areas, students can identify with the prehistory of their native country. The units cover the cultural sustainability of the region and consist of six workshops.
2. Medieval Espoo helps to understand how human beings are dependent on nature, soil, water and forest. This package familiarises the students with medieval times, ordinary life and special occasions. Medieval people were strongly linked to the surrounding environment, land and forest. Students learn about medieval occupations in different workshops.
3. The Nuksio National Park supports the relationship with the wild nature. It is important to have one's own experiences in nature creating the basis for future relationships. This learning unit includes a comprehensive experience of Nuksio's nature during different seasons.
4. Mapping one's own local environment demonstrates how empirical, inquire-based learning promotes understanding of interactions and the functioning of the ecosystem. The environmental learning package contains instructions for both teachers and students for experimental learning. The package includes

instructions for air, soil and water testing as well as for the exploration of organisms. The aim is that pupils obtain information through their own investigations in the local environment and learn by questioning. It is important to learn systems thinking, to think critically and innovatively. The Nature Gate online tool for species identification has been used (<http://www.naturegate.net>).

5. Keinumäki School as a learning environment covers everyday practices in school and supports sustainable lifestyles. The learning package aims to support students' wellbeing, participation, influence and activities in their own school, at home and in society. Cultural sustainability includes traditional human cultural history, traditions and multicultural aspects and issues of fairness and tolerance, but also conservation of old plant cultivars and animal breeds to conserve biodiversity.

13.4.2 From the School Project to the UNU IAS RCE Espoo

Espoo is the first Finnish municipality to have been approved as a part of the UNU's global RCE network (Regional Centres of Expertise on ESD). The network of RCEs worldwide aims to constitute a Global Learning Space for Sustainable Development. RCEs aspire to achieve the goals of the UN Decade on ESD (UN DESD 2005–2014), by translating its global objectives into the context of the local communities in which they operate.

13.4.3 RCE Espoo Goals 2011–2014

While both the UN DESD (2005–2014) and UN Decade on Biodiversity (2011–2020) are taking place, it is important to learn to identify local species, local biodiversity and to use it sustainably. For the future brochure of UNU IAS RCE Espoo, the NatureGate R&D Group suggested the following points to promote wellbeing and sustainable development:

1. Using NatureGate® <http://www.naturegate.net> we may learn to identify local species, and to use them sustainably. The sustainability aspect is based on the following reasoning chain: We cannot use any species for food, if we are not sure that it is not toxic. If it is edible, it is not wise to use it too much, in which case the species may become extinct.
2. Using NatureGate® we may map species of Espoo digitally, such as mushrooms, invasive species, berries, and wild flowers. At the same time we can monitor effects of climate change to distributions of organisms.
3. Using NatureGate® pupils at school learn to identify local species better and earlier.

13.5 An Ecosocial Approach in Education

13.5.1 *Good Life as a Common Goal*

A rapid growth of the population and more materialistic ways of life have transferred planet Earth into the era of the Anthropocene (Zalasiewicz et al. 2011). Human activity has become the most important impact factor on Earth (e.g. Cook et al. 2013). The importance of critical thinking has increased because we are more responsible for future generations than ever before in the human history.

Everybody is looking for a good life. In order to have a good life we focus on material things by buying a smarter phone, a faster computer, a bigger TV, or a bigger apartment (Myers 2000). However, while focusing on material things our subjective well-being might be reduced because of a weaker ability to enjoy positive emotions and experiences of everyday life (Quoidbach et al. 2010).

We tend to forget how simple immaterial things such as experiences of solidarity, harmony, affection and friendship keep us happy and satisfied. During the last decades individualism has increased everywhere and the pursuit of the so-called good life has been based on economic growth and on the power of new technologies (Hofstede et al. 2010). Individualism correlates with an accumulation of material goods. However, it is an unsustainable way to achieve subjective wellbeing.

If our relationship with other people, history and nature is instrumental, we may lose the joy of life, happiness and feeling of being supported by the community (Marglin 2008). According to the World Economic Forum inequality is the biggest risk for the near future (Howell 2013). Due to global markets our interconnections and interdependence are global. A hierarchy of ecological, social and economic interests forms the basis of cultural evolution. Different interests and values can be prioritised in such a way that the chances for a good life do not decrease, but rather increase. This consensus is represented in a new educational concept, called eco-social education, in order to have sustainable and resilient societies.

13.5.2 *Systems Thinking and a (Scientifically) Holistic Worldview*

The Earth forms a closed and self-sufficient system. In a closed system each part of the system must be in order, so that it can work smoothly. Human beings are part of nature's ecosystem. Nature is the foundation of material and immaterial human development. Systems thinking is a key to understanding the complex and dynamic world around us (e.g. Åhlberg 1988; Senge et al. 2008).

If our goal would be the well-being of human kind, our first concern would be the ecological one. The survival of humankind is fully dependent on ecosystem

services such as pollinating of plants by insects, water treatment services, waste decomposition, the UV radiation-protective ozone layer, natural pest control, and fruitful soil.

The economy is an ecosocial process. The ecological base for markets are healthy ecosystem services and a sustainable use of natural resources. In a sustainable society renewable resources cannot be used faster than they regenerate, pollution and wastes cannot be generated faster than they decay and are rendered, and harmful and non-renewable resources cannot be used at all (Sterman 2012: 41). Social justice of markets is based on decent work along every step of the product chain of goods and services (Salonen 2013).

The current stage of the Anthropocene extends all over the Earth. Our responsibility has also increased as the impact of human actions has spread all over the world. Systems thinking helps us to recognise that societies cannot be constructed on short-term economic requirements because the crossing of the planetary boundaries means, in the end, destruction of our economy. Therefore there is a hierarchy between ecological, social and economic elements of culture which form a framework for human activity. First, we have to secure the conditions for life on planet Earth. According to systems thinking ecosystems, societies and markets are in a hierarchical relationship to each other (e.g. Giddings et al. 2002):

1. The viability of ecosystems and the sustainable use of natural resources determine success and possibilities of society and economy.
2. Implementation of human rights (justice, equality, democracy, cultural diversity) determines success of the economy.
3. Markets are an instrument to achieve well-being, not an end in itself.

The above hierarchy is the foundation of the ecosocial approach in education. It does not deny the possibility of economic growth but it determines two conditions for that growth: taking care of the ecological boundaries, and a profound respect for human rights. If natural resources, ecosystem services, and human beings are merely instruments for market growth, our debt towards future generations will grow, and ethical values will be undermined (e.g. Stiglitz et al. 2009).

13.6 Ecosocial Approach and Sustainable Society

In the industrial age the pursuit of material prosperity was prioritised more highly than the nurturing of harmony and common wealth. Ecosocially educated people have a wider life orientation. They understand that human beings are part of the fragile planetary entity. They question consumption and an ownership-oriented lifestyle in the pursuit of the good life. Instead of the old paradigm of well-being they recognise planetary boundaries and replace the materialistic goals of life by cultural elements that produce long-term satisfaction, enhance the quality of life, and provide experiences of happiness. They are aware of the fact that once people have met their basic needs, their well-being is connected to immaterial capital

(Kahneman et al. 2006; Kahneman and Deaton 2010). Immaterial capital can grow forever without any boundaries. It includes knowledge, self-expression, freedom, affection and participation (Max-Neef 1992). This means that we understand the value of cooperative relationships and generosity (Rees 2010). Pursuit of happiness leads us to adopt a more community based life orientation (Graham 2011).

Ecosocial education is about learning to understand the balance between freedom and responsibility of humans (Salonen and Åhlberg 2012). A core insight is that we share our common planet with more and more people every day. This sharing should be as equal as possible because the deepest essence of development occurs when rich and poor get closer to each other (see Wilkinson and Pickett 2010). This leads to a more inclusive society. The companies have the right to make a profit for their owners as a reward for their contribution, but at the same time they have to play an active and responsible role in society whose manpower, infrastructure and natural resources they use (Salonen 2010: 54–60).

The transition towards a sustainable society is possible if we have ecosocially educated citizens. This transition is based on cooperation and community rather than competition between individuals. Individualism involves prioritising one's own interests and material goals in life. In contrast, community-oriented people take into account immaterial aspects of well-being and they tend to take care of the opportunities available for future generations (Kasser 2011: 207).

The overall aim of education is a civilised human being, who takes care of herself and her culture, the globe as a whole as well as the possibilities of future generations (Salonen and Åhlberg 2012). Such people are able to apply social and ecological information to a wide range of world situations. They also display the ability to imagine the predicaments of many types of people and future generations, and they have the ability to think reflectively (Nussbaum 2010). These skills and competences are the basis on which moral values grow (Nussbaum 2010). People with an ecosocial orientation are seeking a good life for everyone, everywhere and forever. It is a massive challenge, but their values do not allow less.

13.7 ESD from Viewpoint of the Finnish National Board of Education

13.7.1 The Finnish National Board of Education

The Finnish National Board of Education (FNBE) is responsible for constructing national core curricula for preschool education, for basic education and for general upper secondary education. The FNBE also guides and supports the implementation of the national core curricula which means the drawing up of the main lines of municipal and school based curricula.

Both of these processes—construction of the national core curricula and the drawing up of the main lines of local curricula in schools—are unique in Finland.

Both can be described as collaborative learning processes where it is possible for students to learn together from shared experience, from the experiences in other fields of society, and experiences in other countries. Research and practice are combined. In this process the curriculum developers try to create common understandings on the changes and needs of our society in the global world, and the needs of individuals in this society, and on how to express these in the best ways.

With regard to the creation of new curricula, as well as their evaluation and testing, the informal Finnish ENSI network and its individual members have been frequently used. For example, Mari Nuutinen has been a member of at least one of the groups for new curricula. From time to time Arto Salonen and Mauri Åhlberg have been invited to provide new ideas for the processes.

The teachers have very central role in these processes, not only in their own schools, but also in their municipalities and in national processes. Teachers are regarded as the best experts for teaching and learning, and their input both in curriculum development as well as in the development of the whole education system is highly valued. It has to be remembered that all teachers have university degrees and Master's level degrees including a Master's thesis.

Between 2012 and 2016 the FNBE will renew all national core curricula, and, based on that, municipalities and schools will conceptualise what these curricula mean at the local level and renew their local curricula. In this curriculum process it has to be better explained how we understand sustainability as the main goal of education, and how we include values connected to sustainable development to the value basis and working culture of the schools. The new curriculum shall support the learning and well-being of the children and help them gradually grow in their ability to understand the global world and to take responsibility for its sustainable future (Halinen 2012).

In autumn 2013 a profound reform of national core curriculum for general education was started. Sustainable development was to be emphasised. When preparing the reform the competences of global citizens were described in a preliminary fashion. Competences for leading a sustainable lifestyle are part of these. Sustainable lifestyles are based on a wise use of ecosystem services.

Progressive inquiry learning methods allow pupils to gain in-depth understanding of natural, built-up and social environments. They need to know how nature works, how human activities change the environment and in what ways the environment can be nurtured. It is important for pupils to become aware of their own dependence on the environment as well as of the consequences of their own actions and how these are linked to environmental problems. Guiding children and young people towards ecological thinking calls for familiarisation with local nature and environments. According to current and future curricula for Finnish comprehensive schools, learning to identify local species is obligatory. In Finland we have a large country, plenty of useful herbs, berries and mushrooms. It is wise to learn to identify the most common local ones, to conserve and use sustainably local biodiversity. In upper grades, pupils move from observations of their own local environments to global problems and their potential solutions.

ESD at school provides children and young people with opportunities to think critically and to participate in decision-making processes, involving responsibility and collaboration. Joining networks of like-minded people, social media and other groups brings about confidence in the possibility of change and may lead to structured social participation. Schools play a key role in guiding learners towards constructive criticism and innovative social action (Houtsonen and Jääskeläinen 2011).

In the current curriculum for 7–16 year olds, there are seven integrative cross-curricular themes, one of which is Responsibility for the Environment, Well-being and a Sustainable Future. The FNBE evaluated the implementation of these cross-curricular themes using a questionnaire. There were questions about knowledge, attitudes, values and actions. In total, 1,198 pupils from the 9th grade answered and the results were presented by Uitto (2012). Here we can only highlight some of the most important results. On average pupils have acquired knowledge of those issues related to sustainable development, such as sorting, recycling, energy-saving, where earlier research has established that teachers think they are important (Åhlberg 2005a, b). Newer important issues, such as preferring vegetables over meat products, were not very popular when the inquiry was undertaken in 2010. There was no question on conserving and sustainable use of biodiversity, although it is one of the key elements of local sustainable development according to the four UN World Summits on the Environment and Sustainable Development 1972–2012 (e.g. Åhlberg 2012, 2013a, b, c, d). For future curricula Åhlberg (2012) has suggested more emphasis on species identification as a stepping stone for biodiversity conservation and sustainable use. Use of NatureGate <http://www.natutegate.net> was suggested to be tested for that purpose.

13.8 Overall Conclusion and Outlook for Post-DESD

The above represents the results of our theoretical and practical work in ESD during the DESD (2005–2014). We have trusted the original ENSI-spirit of local innovative schools and teachers. Each of the presented school experiments and innovations for sustainable development is based on trust in well-educated teachers and their collaboration with university researchers and national school administration. The Finnish system encourages innovative teachers to develop their work and their schools to promote a sustainable future. After 2014 (and after the DESD) each school, teacher and researcher will continue to promote all the three main aspects of sustainable development.

When the DESD has finished, another important UN Decade continues, the UN Decade on Biodiversity (2011–2020). Global biosphere is the sum of local biodiversities. The patented system and method of NatureGate® will be developed to support local biodiversity and sustainability education even better. In Finland new school curricula are currently created. As far as we know, a sustainable future will be one of the core values of the new curricula coming into force in 2016.

Humankind faces bigger threats and problems than never before in its history, such as faster climate change than ever, and a corresponding loss of biodiversity and free ecosystem services. This means, among other things, that there will be food shortages in future. At the same time, humankind has built the internet, which is probably the biggest infrastructure created by humankind. This allows quick learning for those who want to learn by using it. Search engines such as Google provide much up-to-date information quickly. Using Facebook groups, relevant knowledge building and learning for sustainability, a healthy environment and a good life can be promoted. In Finland many of us are eager to test these new options.

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