

Towards Sustainable Development in Higher Education – Reflections

Publications of the Ministry of Education 2007:6

Edited by
Taina Kaivola
Liisa Rohweder

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OPETUSMINISTERIÖ

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MINISTRY OF EDUCATION

Ministère de l'Éducation

Ministry of Education

Department for Education and Science Policy

P.O. Box 29, 00023 Government

Finland

<http://www.minedu.fi>

<http://www.minedu.fi/publications>

Layout: Teija Metsänperä

Cover image:

Photo: Liisa Rohweder, 2007

Artwork: Lighthouse ISOKARI, Finland (2003), technique: acrylic, serigraphy,
by Kati Kaivanto (email: kati.kaivanto@hotmail.com)

Helsinki University Press, 2007

ISBN 978-952-485-304-0 (nid.)

ISBN 978-952-485-305-7 (PDF)

ISSN 1458-8110

Publications of the Ministry of Education, Finland 2007:6

Foreword

This book is a joint effort by Finnish academics, educators and educational authorities to discuss and clarify the currently very topical issue of education for sustainable development (ESD), with special focus on higher education. In this way we also hope to create international interest in the experience Finland has gained in implementing ESD in its educational system and from other practical applications of ESD.

The Finnish Government included the promotion of sustainable development in its development plan for education and research in 2003. This development plan is a key steering tool for the Ministry of Education. The promotion of sustainable development has also been incorporated into the national core curricula in basic education and in general and vocational upper secondary education. It is also addressed in the annual performance agreements concluded by the polytechnics and universities with the Ministry of Education.

The preparation of the Baltic 21E programme started in the Baltic Sea Region (BSR) countries in 2000, when each of these countries conducted a national survey concerning the implementation of the ESD. The Baltic 21E programme was approved by the ministers of education of BSR countries in 2002. Finland was the first to start the implementation process with a pilot and a trial phase.

In 2002 the Ministry of Education appointed a special Committee on Education for Sustainable Development, which drew up a national plan for launching the Baltic 21E programme in Finland. The Committee included Ministry of Education representatives and experts working as ESD coordinators in their sectors. The launch plan for Baltic 21E proposed development projects and ESD activities in all sectors of the education system, in liberal adult education and in research.

In its final report¹ in 2006, the Committee described experiences gained from the implementation of the launch plan and made recommendations for the future. This work formed the basis for the ESD strategy, which the Committee published in February 2006 (at an ESD conference²) and which now serves as Finland's national action plan for the UN Decade of Education for Sustainable Development (2005–2014, DESD). This strategy was the first national DESD strategy in the whole of Europe. In its strategy, the Committee presents a vision and strategic lines for ESD in the education system, which were based on national education policy documents, the Baltic 21E programme, the ESD Strategy of the United Nations Economic Commission for Europe (UNECE), and the University Charter for Sustainable Development, the so-called Copernicus Charter.

This book is follow-up to all the processes described above. Its starting point is a book published in Finnish in 2006 for the Finnish higher education sector.³

The publication in hand seeks to highlight some viewpoints on how to enhance sustainable development in higher education – to give ideas for reflection. Each author is naturally responsible for the opinions expressed and they do not necessarily represent the official policy of the Ministry of Education.

The Editorial Board of this book was chaired by Monica Mélen-Paaso, Counsellor for Education, Ministry of Education. The book was expertly edited by Adjunct Professor Taina Kaivola, University of Helsinki and Dr. Liisa Rohweder, Haaga-Helia University of Applied Sciences. We gratefully acknowledge the contribution of Professor Lars Rydén,

¹Sustainable Development in Education; Implementation of...(2006). Reports of the Ministry of Education, Finland 2006:7. www.minedu.fi/publications

²Cantell, M. (2006; ed.). Seminar on Education for Sustainable Development 15 Feb 2006. Publication series of the Finnish national commission for UNESCO No 83. www.minedu.fi/publications

³Kaivola, T. & L. Rohweder (2006; eds.). Korkeakouluopetus kestäväksi. Opetusministeriön julkaisu 2006: 4. Yliopistopaino, Helsinki. www.minedu.fi/publications.

Uppsala University, Sweden, in the editing process as well as in the development of some key ideas for this book. Professor Ossi V. Lindqvist provided valuable editorial and scientific support in the production of this book. The editorial team has been assisted by Jukka Haapamäki, Senior Adviser, Ministry of Education. Ms. Laura Murto as translator has contributed to the completion of this publication in the English language. The Editorial Board wish to express their special thanks to all the authors of this publication and to the Ministry of Education for financing this work.

As a contribution from Finland to the UN Decade for education for sustainable development, the publication will be available at the website of the Ministry of Education (www.minedu.fi/publications) and to institutions of higher education also through ESD in Higher Education – a national resource centre 2007–2009 (www.bup.fi).

Helsinki, 24 January 2007

On behalf of the Editorial Board,

Monica Melén-Paaso
Chair
Counsellor for Education
Ministry of Education

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Summary

Taina Kaivola

Liisa Rohweder

The starting point of *Towards Sustainable Development in Higher Education – Reflections* is a book published (in Finnish) for the higher education sector in Finland (Kaivola & Rohweder 2006). Moreover, it is a follow-up to several processes initiated by the Finnish Government and the Ministries of Education and the Environment in translating the ideas of the UN Decade of Education for Sustainable Development into teaching practices. The purpose of the publication in hand is to highlight some approaches to enhancing sustainable development in higher education and arousing interest in curriculum development and pedagogical reflection.

The fifteen chapters of this book are arranged under four themes. The first theme addresses the framework of education policy in the implementation processes and probes the value base and educational basis of education for sustainable development. In the chapters under the second theme Science and Education for Sustainable Development, academics from different scientific fields discuss the dimensions and underpinnings of environmental, economical and socio-cultural aspects of education for sustainable development. The third part of the book illustrates how sustainable development is implemented in theoretical and practical studies in some degree

programmes in universities and polytechnics. International networking in the Baltic Sea region is also highlighted. The last theme Looking Ahead brings the reader back to the frame of educational policy and our responsibility as academics and citizens for the future of generations to come.

Addressing the Challenge of Sustainable Development in Higher Education

In the first chapter Mr. Antti Kalliomäki, the Minister of Education, delineates the current policy guidelines at the national and international levels. He points out that education, research and innovation play a key role in promoting sustainable development. The promotion of sustainable development is an integral part of Finnish education policy and a consideration in the steering of higher education by the Ministry of Education. Professor Ossi V. Lindqvist continues by asking if sustainable development is sustainable. He emphasizes that higher education, by its very nature, is an international and social enterprise, and thus has a duty to provide support all sectors of the society in responding to the challenge of furthering sustainable development.

Dr. Liisa Rohweder also addresses the challenge of sustainable development in higher education by considering some aspects of the inter-relationships and inter-dependencies in sustainable development. She illustrates the light approach and the value-based approach to sustainable development in training programmes. The first part ends in a chapter on the ethical challenge of sustainable development. Professor Lars Rydén reflects on the problem of reintroducing ethics into sustainable development and strengthening it further. He draws attention to the fact that many of those who work daily with sustainability issues are of the opinion that sustainable development has recently become too much of a technical issue.

Science and Education for Sustainable Development

The second theme looks at sustainable development in terms of science and research-based higher education. In the first contribution, Professor Ilkka Niiniluoto, Rector of the University of Helsinki, presents education for sustainable development from the point of view of philosophy and history of science and humankind. He asks, how can scientific research and education best promote sustainable development? He points out several scientific methods that provide tools for investigating the current state of nature and its development. He finds it evident that all areas of natural and social sciences – especially when they work together in multidisciplinary projects – can contribute to furthering sustainable development. In the next chapter, Adjunct Professor Taina Kaivola and Professor Mauri Åhlberg continue by considering the goals of the UN Decade of Education for Sustainable Development in terms of the quality of higher education. They introduce concept mapping as a powerful and practical tool for improving the quality of teaching and learning, and explore ways to assess the impact of education for sustainable development on society.

Professor Heljä Antola Crowe and Ms. Johanna Kohl investigate aspects of socially sustainable development under the heading *Empowering Higher Education with Hopeful Advocacy*. They use practical teaching experiences and research evidence from Finland and from Bradley University in Illinois. The authors claim that our rationalistic-logical academic environments often steer us away from scrutinizing or even acknowledging the way in which social, cultural and emotional experiences affect learners' daily lives. People, including university students, get disconnected between the indoor and the outdoor environments. The writers discuss empowering advocacies in the light of reflective practices in education and society, among other things, by introducing the concept "sustainability literacy". Ms. Lili-Ann Wolff closes the theme with her interpretation and analysis of the concept of Bildung from the viewpoints of both higher education and education for sustainable development.

Implementing Education for Sustainable Development

The third part concentrates on the present and future role of sustainable development in degree programmes in Finnish higher education. Taina Kaivola highlights the education of comprehensive school teachers, while Liisa Rohweder concentrates on education for sustainable development in the curricula and teaching practices of business schools. Sustainability issues in technology education and technology research are studied comprehensively by Mr. Simo Isoaho and Professor Tuula Pohjola. Dr. Anne Virtanen and Ms. Anne-Marie Salonen continue with a discussion of natural resources and environmental studies in universities of applied sciences, which see sustainable development as a formidable challenge. Professionals working with natural resources and the environment are in a key position in the search for ecologically sustainable ways of exploiting, shaping and protecting our living environment while securing its economic exploitation, our cultural diversity and our social well-being in the future.

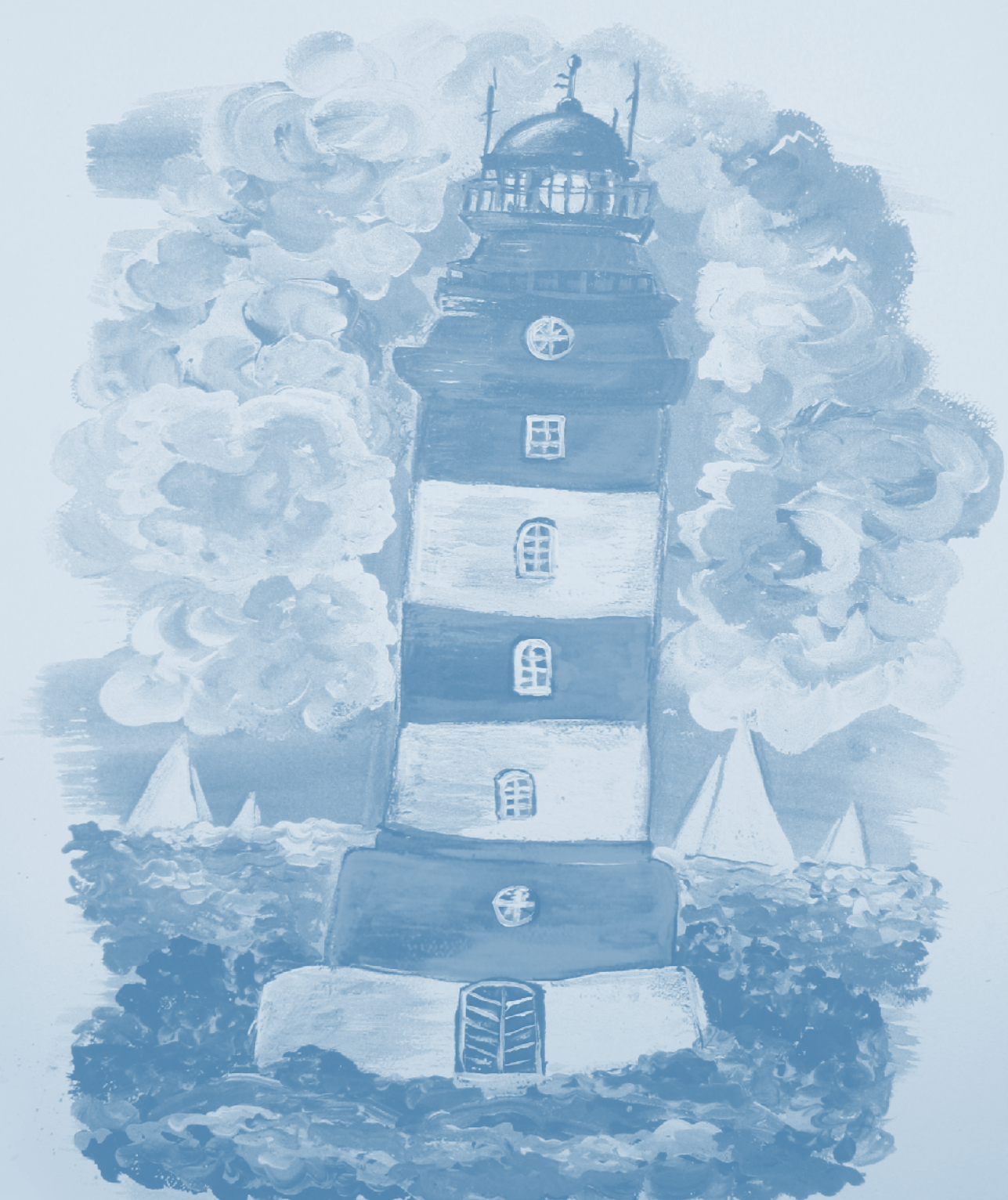
The section ends with a look at joint international efforts to promote sustainable development in the university networks in the Baltic Sea Region. Dr. Paula Lindroos presents the missions and achievements of two interacting networks for education for sustainable development in higher education. The Baltic University Programme (BUP), established in 1991, has grown into one of the largest university networks in the world. The Baltic Sea Sustainable Development Network activities started only some years ago, but have already played an important role in the development of and cooperation in education for sustainable development among universities of applied sciences in Finland and more widely in the Baltic Sea Region.

Looking Ahead

The last part wraps up some key ideas with a reflective futures perspective. Lars Rydén starts with a personal insight, challenging the reader to take a stand and start to act for sustainable development. The chair of the

Editorial Board, Monica Melén-Paaso, reflects on the various education policy processes and co-operation between nations in identifying the challenges of the UN Decade of Education for Sustainable Development. Her writing crystallizes the message of this publication by referring to Søren Kierkegaard, who believes that life must be lived forwards, but can only be understood backwards.

I Addressing the Challenge
of Sustainable Development
in Higher Education



MIII 1833 Isookari anno 2003
60°43,1'N 21°00,9'E
Kati Luoma-03

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1 Higher Education for Sustainable Development – International and National Guidelines

Antti Kalliomäki

Some current policy guidelines

Sustainable development has become an important issue on international, regional and national agendas concerning education policy over the past few years.

Finland's National Commission on Sustainable Development adopted a reviewed national strategy on sustainable development in June 2006. In February 2006, the Ministry of Education's Committee published its strategy on education for sustainable development (ESD), which now serves as Finland's national action plan for the UN Decade of Education for Sustainable Development.

The EU and Finland have fairly similar strategies on sustainable development. Finland's strategy aims to combine the sustainable use, maintenance and protection of natural resources, and to secure the wellbeing of its citizens and society so that Finland becomes a country that knows how to use its know-how and strengths in a sustainable manner. In the future, information and teaching will be added to

the list, as they shall be significant in fostering values and attitudes favourable to sustainable development and sustainable choices. In order to achieve this goal, we must pay more attention to teacher training, both in under-graduate programmes and in continuing education.

The promotion of sustainable development was already included in the Council of State's education and research development plan in 2003. The plan is one of the central steering documents of the Ministry of Education. In April 2006, the Finnish government presented its report on education policy to the Finnish parliament. The report emphasises the importance of sustainable development in education, research and innovation.

Education, research and innovation play a central part in the promotion of sustainable development. It is no exaggeration to say that the promotion of sustainable development is an integral part of the objectives of Finland's education policy, and that it is part and parcel of the steering of higher education conducted by the Ministry of Education.

International political guidelines

Sustainable development was discussed for the first time on a global level at the UN Conference on the Human Environment, held in Stockholm in 1972. This meeting for the first time put environmental concern on the international political agenda. The shift from a concern for the environment to a concern for a sustainable development was a result of the next milestone in 1987, when the UN World Commission on Environment and Development published a report entitled *Our Common Future* (also referred to as the Brundtland Report). The report was especially significant, because it was the first to articulate what sustainable development means: "*Sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs*". In addition, the prologue argues that: "*The changes in attitudes, in social values, and in aspirations that the report urges will depend on vast campaigns of education, debate and public participation.*"

The Brundtland Report paved the way for the UN's Earth Summit, held in Rio de Janeiro, Brazil, in 1992. The conference led to a declaration and a comprehensive action plan, called Agenda 21. There was also a conscious shift away from mere identification of environmental problems towards finding solutions to them. Thus it has been recognised that pertinent solutions are not any more the sole prerogative of natural sciences, but they require a multidisciplinary approach embracing e.g. economics, management and social sciences at large, understanding of human health issues, and even psychology, etc.

With Agenda 21, sustainable development acquired the international aims necessary to propel it forwards and it also became an established concept in international politics. In the year 2000, heads of government and state gathered under the auspices of the UN to show their support for the world organization's efforts concerning sustainable development, and to strengthen the positive aspects of globalisation. The ensuing Millennium Summit Declaration and the eight Millennium Development Goals ("MDGs") form a challenging set of time-bound international goals both in a qualitative and quantitative sense.

In the following UN conference on sustainable development, which was held in Johannesburg in 2002, sustainable development had evolved to encompass the interconnectedness of the three key dimensions of sustainable development, namely the economic, social and ecological. In addition, globalisation has ushered in issues such as culture, democracy, health and education on the global agenda for sustainable development. The Summit stressed the significance of regional cooperation and implementation. As an outcome the United Nations General Assembly declared 2005–2014 a Decade for Education for Sustainable Development (DESD).

The fact that the UN declared the decade (DESD) is one concrete example of the UN's commitment. The decade is being coordinated on an international level by UNESCO, which in turn lays the foundations for national actions. The United Nation's Economic Commission for Europe (UNECE) adopted in March 2005 the Vilnius Framework for implementation of

the UNECE strategy for Education For Sustainable Development.

The European Council of June 2006 adopted an ambitious and comprehensive renewed SD strategy for an enlarged EU. It builds on the Gothenburg Strategy of 2001 and is the result of an extensive review process that started in 2004. The EU has revised its strategy on sustainable development wisely, because it sees sustainable development more holistically than before. The global dimension of sustainable development is crucial. Not only should the EU be at the forefront when it comes to promoting sustainable development in general, but it should also pave the way when it comes to implementing the commitments of the UN Millennium Declaration, the international development goals and the Johannesburg Summit. The promotion of development policy and sustainable development are closely related and complement each other in terms of goals.

Education for sustainable development in Finland

The EU is an important regional actor for Finland. The most significant organizations, programmes and projects that promote sustainable development on a regional and national level, however, are those found in the Baltic Sea region. One such programme is the Baltic 21 Programme, which is in fact an Agenda 21 for the Baltic Sea Region. This agenda dates back to 1998. The aim of the agenda is to promote sustainable development in the countries around the Baltic Sea. It has a timeframe of 30 years, and it takes into consideration environmental as well as the socio-economic concerns. The agenda is a way of bringing together international, national and local initiatives.

The Baltic 21E Programme, which is a Baltic 21 Agenda sub-programme on education, was adopted by the ministers of education in the Baltic Sea region in 2002. This programme aims to develop the education systems of the Baltic Sea region so that the various dimensions of sustainable development become a natural and permanent component of the education systems, including non-formal education. The Baltic

21E Programme also contains goals and actions for research and development.

The aforementioned international and regional programmes have necessitated national strategies for actual implementation. In order to carry out the Baltic 21 programme, the committee on education for sustainable development set up by the Ministry of Education wrote a launching plan for the Finnish Baltic 21E programme in 2002. An action plan on education for sustainable development, based on the pilot projects of the launching plan, was put together in 2006. This action plan also serves as the national implementation plan for the Baltic 21E programme.

The launching plan for the Baltic 21E programme as well as the implementation plan were used as starting points when the Ministry of Education devised the national strategy for the UN Decade of Education for Sustainable Development.

Conclusions

There is no universal model of Education for Sustainable Development. While there is a general consensus on the principles of sustainability and their supporting concepts, differences according to local contexts and priorities will persist. Therefore, content, context and relevance become important aspects of quality.

When looked at from an international perspective, it is worth keeping in mind that development policy and the promotion of sustainable development are deeply entwined and mutually beneficial. In fact, development policy and sustainable development policy can be seen as two sides of the same coin, where the common element between these two sides is quality. The integration of ESD in our educational systems enhances the EFA (Education for All) goal number 6 – the improvement of quality of education – and that in turn enhances development policy according to the UN Millennium Declaration.

2 Sustainable Development, is it Sustainable?

Ossi V. Lindqvist

The articles contained in this book together offer an excellent review and summary of the challenges that the concept of sustainable development offers to the contents and processes in higher education. This is not a matter only of any single country or region, but the issues of global developmental trends obtain a prime importance in this context. The United Nations has declared the years 2005–2014 as a decade of promoting education for sustainable development.

Higher education at large, by its very nature, is an international and social enterprise, and thus its duty is to provide support and responses to this challenge. The issue related to sustainable development can also be seen as one of the fundamentals of any society, and the failings in this respect can be costly, especially in human terms. Basically, sustainable development is a human issue. So far its major field of concern (also in terms of research) has been for the environment, but its applicability has been extended to cover almost every human endeavour, from business to public administration, to foreign aid to developing countries, etc. Recently business companies (including even those in the banking sector) have often included this slogan in their strategies, the same way as they started to go 'green' in the 1990's, but its real impact remains to be

seen beyond purely public relations efforts.

The philosophical and pedagogical backgrounds for the concept of sustainable development in education are thoroughly discussed by several authors in this publication. (Also, OECD has had a project, a few years ago, on securing a sustainable future for higher education itself.) It may be instructive that some practical issues are also discussed in this context that complement the pedagogy in both teaching and also in directing research and research training in higher education.

The concept of sustainable development, or at least aiming towards it, implies that we have predictive knowledge about the world. Historically for centuries or even millennia, this knowledge came from the prophets or astrologers or foretellers. The world was considered a kind of predetermined process and individuals guided by their 'fate'. The concept of risk as a guiding force came into use only in the early 20th century, first as a statistical concept and then also in business, especially in insurance business. (Though a kind of risk was recognised in money lending already in the Medieval Ages, as it was counted as part of the interest paid.)

Yet in fact, we do not possess any 'perfect knowledge' about the world, and we have to live with this very notion. An activity could have an 'effect' with certainty, or present a 'risk' with some probability. Of course, natural sciences do not produce any 'final truths', but only hypothesis that have been verified several times and not strongly falsified a single time (à la Popper), but see also Popper (1970). One recent (and actually an old) attempt to overcome this difficulty is the introduction of the concept of precaution in the precautionary principle. Yet in principle it has the same basic pitfalls as the concept of sustainable development itself, and in the worst case its only response may be a 'stop the world', or aim towards the zero-growth-rate in the economy, as happened in the mid-1970's as a reaction to the so-called oil crisis.

In the area of environmental impact, for instance, the concept of risk is usually included in the aim towards sustainable development. This requires both *objective* judgements, that is verifiable facts or observations, and *subjective* judgements, made

on basis of beliefs and values and on how people 'feel' about them. But the problem here also is that most of the environmental impacts are actually by-products of some other activities that generally aim to benefit people. This is and has been a challenge for all environmental research and judgement; that is, how to strike a balance between the apparent costs and (and often diffuse) benefits. Geographically the costs and benefits may also be spread in an uneven way. The balance of course is also dependent on the time horizon used, but our values may often prefer a relatively short time horizon.

Yet the predicted climate change is usually seen both as an immediate or short term problem, but also as a phenomenon which will affect all future human generations. So there seems to be a conflict of targets, though fortunately recent policy developments seem to be moving more and more towards win-win solutions. But conflict management still remains as core means to the sustainable use of natural or human resources (cf. Kyllönen et al. 2006).

Predictions are usually much more 'reliable' in closed systems, but the world often resembles and is a very open and dynamic system. E.g., we have the data about the current human population parameters to foresee the future trends, but still a lot of surprises may emerge. Yet this should not prevent us from undertaking appropriate measures, since all decisions about the future are risky anyway (and should be seen as kind of risk analyses), and we have to accept it, according to the best of our current knowledge. Not all our decisions today need to be perfectly 'right', but it is equally important that we learn from our past mistakes. Thus part of the concept of sustainable development should and must always involve a strong learning component.

Another example from my own field in fisheries management may be instructive. As a management tool of this natural resource a concept of 'Maximum Sustainable Yield' (MSY) was developed in the 1960's and 1970's. It was meant to indicate how much fish we can catch without endangering future catches. This was also a Finnish strategy in the management of fishery resources ('*Saaliskapasiteetti*', in Finnish). Now it is recognised that the application of this management concept has contributed to the demise

of world fishery resources and fish populations, though at 'verbal' level it may appear flawless. I was critical about MSY because I calculated that MSY was a concept that could not be measured or targeted in dynamic field conditions. Measuring the 'actual' level of MSY takes time, and once you start fishing according to the 'established' MSY level, the state of the fish stock has already changed, and often with the simple outcome of overfishing. It is a kind of 'optimisation' scheme, except that one does not know which are the prime parameters to be optimised. The handicap also was that the MSY level was indicated in tonnes of fish, without regard to the genetic structure of the fish stock, and worse still, without any regard to the human social and economic components and consequences, that is, the role of the fishermen and the market (Lindqvist 1977).

This should teach us that in the management of natural resources there are several other components than the (economic) physical entity itself; the social, cultural and even historical elements are always present. And too often this process goes against the social and the cultural. At least in fisheries management, the social element is now being recognised somewhat better, after some severe learning processes. But the overall lesson should be that while the target itself (MSY) may be unattainable as such, at least we can get hold of and try to regulate the very processes that aim towards the target, with time. But even that is not an easy task.

Environmental management at large has had several theoretical (and practical) approaches, one of the most influential being under the banner of adaptive management. Its track record of implementation appears rather weak, according to a recent penetrating analysis by Gregory et al. (2006). A particular problem here is related to the decision making in face of different types uncertainty, especially if we do not know or appreciate the actual quality of the available data.

New practices in research policies may also be helpful from the standpoint of sustainable development. In the past when research was an 'internal' matter for the universities, the assessment of its social impact was usually made *ex-post*. The results were interpreted and (possibly) applied only after

the research was done. Now the emphasis is towards *ex-ante*, that is the problems are defined ahead of the process and certain (national) priorities are set for the research. Yet both approaches are needed even today, since often we may be rather poor in predicting where and how the most important and influential discoveries and innovations are made. Human curiosity as such can be a powerful driving force in innovations. Sustainability should not mean evasion of risk taking either, because new innovations and discoveries could and should be necessary for our good future. Furthermore, sustainability is not a linear trend based on our time, but a self-correcting learning process far into the future.

Also the Finnish innovation policy (Knowledge, Innovation and Internationalisation 2003) recognises the need for a balance between the social, cultural and technological development: its explicit aim is towards social and technological innovations. Traditionally, innovation as a term referred only to technological advancement, but now it has been expanded towards social innovations in a way that also could support sustainable development in its best sense. In the same way, the current emphasis on interdisciplinary research and education at large could again help us to tackle the human problems and their solutions better in the same context .

There have been a number of attempts at defining what actually is *sustainable development*. Without repeating the many explicit (and different) definitions given, I would hope that such a definition (or definitions) will not be a monopoly of any particular group driving its own particular interests. Rather, I would see that the definition belongs to the civil society at large, which takes care of and supports the cultural, social, economic, and ethical dimensions of our lives in a balanced way. This is the core challenge for our higher education institutions at large, and, in fact, also for our entire education system and the society. At the end, sustainability is to the people.

3 What kind of Sustainable Development do We Talk about?

Liisa Rohweder

Sustainable development has to do with the way human's perceive and understand the social, cultural, economic and environmental aspects of their ethical and spiritual being. People interpret the goals of sustainable development differently because this in turn depends on how a person sees relationships and inter-relationships between nature, society and the economy. Questions related to and the importance assigned to efficiency, sufficiency, the ideal state of the environment, equality, democracy and responsibility towards future generations become pivotal. The concept of sustainable development being so extended, multidimensional, normative and inspiring means that people have on the one hand high expectations of it and on the other hand are doubtful on it. What kind of route should be chosen; is it enough to commit to small adjustments or is a serious reconsideration of the entire basic of industrial society needed?

In this chapter, I will first consider some of the aspects of the inter-relationships and dependency between the different dimensions of sustainable development. I will then focus at two cases, which

represent opposite ends of the education for sustainable development spectrum. I shall call them light approach and value-based approach to sustainable development. (In management research equivalent theoretical terms are weak vs. strong sustainable development. See e.g. Ayres et al. 2001: 155; Springett 2005: 143). They are useful for the purpose of analysing the aims of education for sustainable development, although in real life sustainable development is not a choice between two ends. It is rather a question of a continuum and about finding the right balance between the light and the value-based approach.

Discussions about how the ecological, economical and socio-cultural dimensions of sustainable development should be balanced inevitably revolve around value rational choices and the meaning of action in education. Not everyone in higher education shares a common view of what the goals and contents of sustainable development are or what should constitute education for sustainable development. So, it is important to give due consideration to the different interpretations of sustainable development and how the different dimensions of sustainable development are perceived to interact.

Inter-relationship between the dimensions of sustainable development

Nowadays, an approach that integrates ecological, economical and socio-cultural dimension of sustainable development is endorsed both in international and national definitions of sustainable development. It is no small task to find a way in which to develop and integrate the different dimensions of sustainable development so that they would be in harmonious balance with each other. For instance, a company might weaken its economic profitability by improving its level of environmental protection or by enhancing social wellbeing. Inversely, putting economic interests in front of everything else can weaken the state of the environment and social wellbeing. Then again, taking care of the environment and using natural resources in moderation will ensure propitious conditions for economic activity in the future. A clean environment,

for instance, will ensure good preconditions for tourism and avoiding over fishing will mean that fishermen will be able to pass on their livelihood to the following generation. Taking good care of wellbeing of staff does have an effect on the company's financial success; a motivated personnel is a company's central resource. Essential questions are, is there a conflict between economic development and sustainability and on what time horizon should sustainability be examined?

Sir Stern (2006), the former economist of World Bank, has illustrated a positive interrelation between economic activities and ecological sustainability on a long term basis. Stern suggests that to fight climate change we need to invest 1 % of GDP now, while if we do not do that we will in some years have a recession compared to or much worse than the 1920s. The findings in Stern's report turn economic argument about global warming on its head by insisting that fighting global warming will save industrial nations money. According to him it is not just an environmental problem, but a problem dealing with economics and development, conflict prevention, agriculture, finance, housing, transportation, innovation, trade and health. Stern argues that tackling the problem may not prove as economically painful as some experts predict. Investment in low-carbon technologies could stimulate the global economy.

Results from the World Economic Forum's (2006) comparative study on the level of environmental protection in different countries and their respective economic competitiveness are also encouraging, as it would appear that economic and environmental sustainability are not completely incompatible on a national level. According to the latest competitiveness ranking, Switzerland, Finland, Sweden and Denmark are in the top five of most competitive countries. These same countries have been ranked among the best in several rankings on environmental protection. They are democratic countries with a stable political situation and they have high scores according to the Human Development Index. This would seem to imply that social sustainability has a positive impact on economic and ecological sustainability. Indicators, however, are just that they give us an indication of how things are. One should not, therefore, draw

conclusions based on indicators that are too far-fetched.

In addition to the examples above, there can be found several other positive and negative examples of interrelationship between economic activities and sustainable development (for e.g. Porter & Kramer 2006:1). None present a universal solution as to how to balance the different dimensions in a sustainable way. The solution is inextricably linked to time: how to make people today care about the quality of life of future generations? What is our responsibility towards future generations? This dilemma – ethics of sustainable development – should be brought up in education as well (see more about the ethics of sustainable development chapter 4, Ryden: The Value Base of Sustainable Development). Ethical and moral rules play a role in how the different aspects of sustainable development are reconciled. These rules must be opened up and submitted to critical examination as a part of education for sustainable development. The question remains: what kind of sustainable development should we aim for?

Light and value-based approach to sustainable development

In the value-based approach of sustainable development, the ecological, socio-cultural and economic dimensions form a balanced integrated whole with long-term planning. Advocates of value-based sustainable development believe that the economic exploitation of natural resources is essential to humankind, but instead of aiming for economic growth for the sake of economic growth only, people should aim for a more moderate alternative economic growth (Steady-state economics) (Ayres et al. 2001: 159). The objective should be to combine economic growth and social justice within ecological limits (the carrying capacity of the ecosystem), and to secure such an ideal state from generation to next. The prerequisite in the value-based approach is that the logic which guides our society's functioning must change so that it allows us to take into consideration the modern ideal of diversity of values and to reflect all our activities in relation to what constitutes a good

life and a secure world. The value-based approach of sustainable development is often met with scepticism, because it would require fundamental changes in society's structures and attitudes.

The light interpretation of sustainable development, on the other hand, sees that securing development and growing prosperity is of greatest importance (Ayres et al. 2001: 156). The light interpretation is based on a highly anthropocentric way of thinking, and it is typically utilitarian. Nature is mainly seen as a resource that people can rightfully dominate and exploit but still, with certain rules. When interpreted lightly, sustainable development is almost exclusively considered from the point of view of sustainable economic growth and this to the detriment of all other dimensions. However, the light interpretation of sustainable development is criticised by environmentally aware social scientists and ecologists. They say it is only a way of making people feel less guilty when in fact nothing really changes (green gloss). On the other hand, one should not be that critical of the light approach as it can still be seen as a start in the continuing process of sustainable development, which is hopefully heading towards an inter-generational value-based approach. This will take generations and a re-evaluation of our western way of life. It is easy to declare oneself in favour of the value-based approach of sustainable development. Implementing it is a whole different story.

How seriously should we take sustainable development in education?

An educational theory for sustainable development has its roots in the theory on environmental education. From the 1980s onwards, environmental education has had to make way for education for sustainable development. For researchers working in education and training for sustainable development today, the overriding paradigm is that the goal of education is to endorse a way of life advocated by the value based interpretation of sustainable development. These researchers think it is important that education about sustainable development and education for sustainable

development be equally integrated in education. The development of a learner's knowledge, skills, values and attitudes is what is most important – just as instilling a sense of responsibility and inciting action for sustainable development. Several studies show that from the learning point of view the following concepts hold particular significance: the ideal of a good life, critical and holistic thinking, democracy, inter-generational thinking, respect for diversity and empowerment (Palmer 1998; Kearing & Springet 2003; Welsh & Murray 2003; Brown & Macy 2004; Thomas 2005).

In recent years education for sustainable development has been recognised as a main strategy in the process of sustainable development, and consequently it has gained several advocates on the international political forum. The UN has declared 2005–2014 the Decade of Education for Sustainable Development. The common goal of the UN and its member states is that the principles of sustainable development are incorporated in the national curricula of the whole education system. As stated by the UN, the objectives of education for sustainable development should be devised within the framework of local socio-cultural, economic and ecological circumstances without neglecting the global dimensions.

This was also the starting point of the working group set up by the Finnish Ministry of Education, which formulated a national strategy and guidelines for the UN Decade of Education for Sustainable development (A national strategy and guidelines 2006–2014 for education for sustainable development 2006). The working group's paper also serves as the national implementation plan for the Baltic 21E Programme in Finland. The strategy is anchored in the Finnish government's commitment to the UN Decade of Education for Sustainable Development (DESD), the UNESCO and UNECE (United Nation's Economic Commission for Europe) documents on its implementation and the Baltic 21E Programme (2006).

Relevant UN documents, the Finnish Ministry of Education's sustainable development strategy and most researchers in the field of education for sustainable development challenge higher education establishments to teach, research and develop

according to the value-based rather than the light interpretation of sustainable development. This means current ways of thinking and perceiving the world will have to be called into question and the goals of society re-assessed. The challenges that the value-based interpretation of sustainable development present have yet to be acknowledged on a concrete level.

It is not an easy task to integrate the different aspects of sustainable development into a curriculum in higher education, be it according to the value-based or light interpretation. The process becomes more evident if sustainable development is looked at in a systematic, multidimensional and open way. What is important to keep in mind when considering the goals and teaching methods of education for sustainable development is whether the aim of education is to transmit information that is relevant today or whether education should aspire to develop attitudes, a willingness and skills for the sustainable building of the future.

When working on the curriculum, one should find out how the nature of the information dispensed in different disciplines is taken into consideration in education, what the traditions of the field of science are and what the relevant professional practices are. Likewise, one should ascertain whether the teaching related to sustainable development is based on pedagogical content knowledge or on the traditions of the educational establishment in question or of the relevant field of science. Would teachers require further training? Can teachers have access to relevant training? Those working within higher education need encouragement and support in incorporating the ecological, economic, social and cultural elements of sustainable development into their research, teaching and mentoring.

Although the Finnish Ministry of Education tries to encourage higher education establishments to integrate the sustainable development perspective into all their activities through its strategy, higher education establishments bear ultimate responsibility for its implementation as autonomous establishments. Higher education is increasingly market and achievement orientated. The question is, where does thinking along the lines of sustainable development fit into all of this? One way of getting round this dilemma

is to have the Ministry of Education set sustainable development as one of its performance targets. This would give the strategy more backbone. In my opinion, higher education establishments should take up the challenge of sustainable development as a positive opportunity for development both in research and teaching, as a necessary ingredient to activities that aspire to be highly ethical and of a high quality. This requires, however, that all actors within higher education establishments understand what is meant by sustainable development and what the objectives of the institution are regarding the promotion of it.

The ideal would seem to be that education for sustainable development should support the value-based inter-generational interpretation of sustainable development, which already in itself encompasses the idea of nurturing all the elements of sustainable development in a balanced way and in dialogue with one another. It is questionable whether such an approach is plausible in the competitive present day western society. Be as it may, education is the right place to start integrating value-based and thus inter-generational oriented sustainable development into the society. Sustainable development should be seen as a dynamic process; accordingly, development goals should be reviewed when visions, circumstances and the level of knowledge change. Higher education establishments could assume a strong role in this process thereby contributing to a more sustainable society.

4 The Value Base of Sustainable Development

Lars Rydén

An origin of ethics

In education for sustainable development (ESD) a discussion of ethics is a key component. ESD has often been discussed in terms of a new kind of education, in which the student not only should know about issues such as environmental threats and global change, but equally much need to get involved personally, mature in understanding his or her place on earth, and mature as a responsible individual (Sterling 2001 and 2005b). All of this requires a discussion of values, values which need to be spelled out, discussed and applied to become the property of the individual. The challenge of sustainable development becomes to a large extent the challenge of a new ethics. This is also expressed in practice. Many of those who work daily with sustainability issues express their view that during the last few years SD has become too much a technical issue. We need to reintroduce and strengthen the ethics of sustainable development to go further.

A generation ago the call for action to protect our environment was heard over the world. Some of these calls (there were many) became symbolic and promoted widespread debate in the mid-1960s. In

1962 Rachel Carson in her book *Silent Spring* stated that, unless we stop our progressive poisoning of the planet, it will end in disaster, in a silent spring (Carson 1962/2002). Other earlier landmark publications, including *Limits to Growth* (Meadows et al. 1972), *Blueprint for Survival* (The Ecologist 1972) and *Small is Beautiful* (Schumacher 1973), added to identifying the range of environmental problems world-wide and the increased awareness.

The global action for sustainable development thus started with a concern for the living world. The approach taken by many of these early whistleblowers was that we humans, who constitute only one out of the myriad of life forms on planet Earth, should respect the integrity of Nature and all other forms of life.

The call was answered immediately. Already the year after the 1972 Stockholm Conference the World Council of Churches discussed sustainable development as a response to what was called “lack of respect for Gods Creation”. This developed into the establishment of the *Ethics Working Group of IUCN*, the World Conservation Union, one of the main UN bodies. This group, with members all over the world, quite many of them theologians, initiated the modern discourse of sustainable development, and they did so on a purely ethical platform, indeed, on a bio-centric platform. Its ethics was first published in 1980 in the IUCN World Conservation Strategy (Rydén & Sundström 2003).

The background to the new concern is a fear that we humans have already caused, or are in the process of causing, large damage to the Earth and all humans, animals and plants living on it, in fact to such an extent that we could even endanger the possibility to continue to live on Earth in the future. A part of the picture is that we already did so for a large number of species which are extinct, due to human activities. Edward O. Wilson, the American researcher who introduced the concept of biological diversity, estimates that some 4 000 to 6 000 species are extinct every year and that the influence of humans has increased the rate of extinction of species about 1 000–10 000 times (see e.g. Millennium Ecosystem Assessment, www.maweb.org).

We might ask: Do we have the right to do this? What are in fact our rights? Are we allowed to

take resources from others? Are we allowed to take resources from future humans? Are we allowed to take resources from other species of animals? Are we allowed to exploit other species for our purposes at all, and if so, in what way is it ethically acceptable to do it?

All these questions were asked as part of the early modern history of SD. It seems obvious that we need to agree on many of these issues before deciding on what we plan to do. Environmental policy is dependent on environmental ethics. If we require a new environmental policy it would be a very important task to develop this ethics.

Bio-centric ethics maintain that we, humans, have a duty to respect the integrity of Nature. It is important to make this point of departure clear, since the debate which followed has mostly taken a rather different direction. Most accepted political and legal documents are based on an anthropocentric ethics. Anthropocentric ethics characterise most documents of sustainable development - the Rio declaration, the Biodiversity convention, as well as the Brundtland Report. In anthropocentric ethics it is more or less explicitly stated that natural resources and the environment should be protected in order for us humans to use them and lead a good life. It is the view that the environment is there for humans and the society; the environment is only instrumental: to feed us, to provide resources, or to be enjoyed. The biocentric view on the other hand maintain that other life forms have a value of their own, regardless if they are useful to us or not, and should be respected for that reason.

Regardless of which of these views one accepts, it is clear that they maintain that we should respect the environment more than what is the case at present. In fact the practical consequences of the two kinds of ethics are not always very different (See further in Rydén 2003, which forms the background to this article).

Ethics comes to the forefront

From the mid 1980's to mid 1990's a series of documents and reports were published which today

constitute a base of work on sustainable development. Virtually all of them make reference to the importance of a “new ethics”. Perhaps best known is the World Commission on Environment and Development, also called the Brundtland Commission after its chairperson, the then Norwegian Prime Minister Gro Harlem Brundtland.

The Commission essentially conducted a political process in which the “poor south” required development, while the “rich north” asked for environmental protection. Sustainable development became the compromise, synthesis and consensus. But the process was much influenced by the IUCN group, perhaps not the least since they were neighbours (the Commission was located in Geneva and IUCN in Gland just a few km away). IUCN invoked an important element of ethics that was very much adopted by the Commission. In the report from 1987 *Our Common Future* they write: “*We have attempted to demonstrate how human survival and well-being may be dependent on our capacity to successfully transform the principles behind sustainable development into global ethics.*”. Mrs Gro Harlem Brundtland expressed herself in a similar way when opening the World Conference on the Changing Atmosphere in 1988. She said that to come to grips with the environmental dilemma requires that “*we develop... a new holistic ethics in which economic growth and environmental protection go hand in hand around the world.*”.

Similar references are found in e.g. the *Agenda 21* document, the *Rio Declaration*, the *Caring for the Earth* publication from the IUCN, and the *Convention on Biological Diversity*.

There is thus no doubt that the leading figures in the work for environment and development considered ethics central to success. But it is not obvious what actually they would specify as central values in such an ethics. Perhaps it was more clear when the chairman for the environmental committee in one of the municipalities in Sweden gathered all truck drivers in the city to a discussion about diesel quality. His argument was that “*I would like to see that our municipality is a place where our kids - and everyone - would be able to breath clean air.*”. After the meeting the drivers promised to use Green Diesel even if it was slightly more expensive.

His ethics was that we do not have the right to make the air in the city so unhealthy that kids suffer. The concept of sustainable development takes us one step further. It requires that we respect also the next generation and those far away and their needs and requirements in life. It might seem very natural to be concerned about the next generations, but in fact in the context of ethics it is a new principle. Conventional ethics are concerned with those that are close to us now. Environmental change, especially regional and global environmental change, requires that we expand this scenery considerably. Our car driving will influence fellow humans on the other side of the earth as the carbon dioxide produced enhances global warming. It may also influence my grand grandchildren or anybody’s grand grandchildren if the global warming will stay on for a hundred years, which it certainly will. This situation is new or at least it is new to our immediate experience.

The reference to future generations (inter-generational) is also implicit in the definition of sustainable development in the report *Our Common Future* from 1987: “*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*”. This is often understood as the ethics of sustainable development. Sustainable development starts with the concept that we have moral duties towards future people. But the inter-generational ethics is not able to answer all questions with regard to environmental protection and use of natural resources, and it does not address some of the fundamental concerns for how to organise a society to pursue sustainability.

Between generations – An ethics on a planetary scale

The inter-generational ethics – our responsibility towards future generations – is well established as an ethics of sustainable development. But there are several other ethical principles which have been advanced and also established as part of the SD agenda.

The responsibility towards all of us who live today is referred to as intra-general ethics. As a responsibility towards fellow human beings, on a personal level, it

is age old. But what about the larger context in which all people living on the planet is included? A principle of equal right to the resources of the planet seems rather well developed in e.g. the Rio document, in the Natural Step four basic conditions for SD (efficient and equal use of resources) (Holmberg 1994). It is also a basic condition in the Factor 10 concept (Schmidt-Bleek 1997) and the Factor 10 website). This concept maintains that industrial countries need to reduce their resource flows by a factor of ten. The reason is that the rich countries now using some 80 % of the resources, and the poor countries, the majority of the population on the planet, only uses 20 %. To establish a sustainable long-term resource use equal for everyone the industrialists will need to reduce by an approximate factor of 10, while the developing countries could increase by a factor of two. It should be noted that both the Factor 10 concept and the Natural Step were established by natural scientists, in fact physicists.

The ethics of intra-generational rights is much more revolutionary than we might be aware of. It questions the traditional power perspective and also respect of ownership. The first effort to implement such an ethical principle may be (not everyone agrees) the 2005 introduced global carbon trading as part of the Kyoto protocol of the climate convention. At least in principle it uses a scheme of equal rights. In practice, of course, half of the world did not sign the protocol and it only started to distribute emission rights.

The principles of equity are referred to in many other contexts of environmental protection. However in practice the world is now becoming more and more unequal. In general poor countries are becoming poorer and richer countries richer. Also within countries inequity is increasing. We have a long way to go to a world of equity. Even if the first results of the climate negotiations are successful it seems far away from sharing resources with future generations. Not much oil and gas will be left for them. Not much wilderness will be left for them. Not much biological richness and diversity will be left.

We in the west are using resources too much. If everyone on the planet used as much as we do up to six planets would be needed. The conventional way to respond to this is to ask for efficiency. We need

to be more effective when using e.g. energy. This is of course important, but it is not enough. We have to use less. We have started to discuss a society of efficiency, but we should discuss much more a society of sufficiency.

How to introduce sustainability – an ethics of everyday life

In Agenda 21 it is maintained that sustainable development can not be a top down process. Agenda 21 asks for participatory schemes for introducing sustainable development. It requires that everyone gets involved. The 40 chapters of Agenda 21 constitute a long list of the stakeholders in a planetary work plan and what they should do. It is a principle not only of rights but also of responsibilities.

This is democracy, and there are good reasons for maintaining the importance of democracy here. Some argue, however, for the opposite view: that sustainable development requires that a “benevolent dictator” decides what is allowed or not to protect to the world from the greedy exploitation that will make future life difficult. But this is not well founded in experience. A solid record tells us that autocratic states are very much more exploitative of the environment than democracies, and that injustice is even worse than in democracies.

The right of everyone to be part of the political process in our societies and the duty to share responsibilities should be included as a third ethical principle of sustainable development. This is often referred to as governance. Governance is when authorities do not rely only on command (legislation) and control but also on cooperation – with business, universities, interest organisations, etc – to govern and implement what is needed for sustainable development. This is not only because of respect for others but equally much because we have to cooperate to make it possible. A single actor is not strong enough.

The participatory process requires respect for the other actors. We need to respect diversity; we need to solve conflicts without using violence. The respect of human rights may also be seen as an ethical principle of sustainable development and part of democracy.

How to use the ethics

We can see ethics in action when a conflict between different values occurs. The development of hydropower provides a clear example. A large hydropower station requires traditionally that a dam is built in a large river and that a reservoir, often several tens of kilometres, forms upstream. As a consequence the flowing of water in the river is curtailed: No more beautiful waterfalls, the flora and fauna of the river changes, and people living upstream have to move out of the area where the reservoir is formed. These negative developments are balanced by the prospect of producing large amounts of renewable energy, which of course will constitute a resource and blessing for perhaps millions of people for all future.

What should we do? Build the power station or not? Obviously the engineers cannot answer. They only know how to do, not if it should be done. Neither do the biologists know; they can only tell about the consequences of various alternative actions, which ecosystems will be damaged or even extinct. The economists do not know either. They can just tell about the costs of moving a human population, investments and the income from future electricity production.

Proposed power stations are often political hot issues and the outcome will depend on the values of those who take part in the decision. Some of them will value most the new electricity and say yes; some will value more the natural flow of the river and the wild landscape and say no; others again will say no because of respect for the individuals that otherwise would be forced to move out from the valley where the new reservoir will form.

It is quite seldom that a value has such an absolute character that a decision only because of that will go in a definite direction. In general it will be a compromise where several values are respected to a degree but not absolutely. However the last few years biological diversity and respect for the existence of species has become an absolute value in certain situations. If so it might be that the expected consequence of the extinction of a species will itself stop a project.

Building of hydropower station has in real life repeatedly become very controversial, sometimes with

violent action as a consequence. Action groups that occupy territories to block work by machines, and demonstration against such projects in the capital of the country, are not unusual. The large intrusion in nature of this kind is often violating important values to many individuals. In Sweden the continued expansion of hydropower was discontinued when the parliament passed a law that protects the four remaining large rivers in the North of the country from exploitation. Now the development of small-scale hydropower seems to be a possibility to use the force of water without changing nature very much.

The hydropower example also serves to illustrate that the changes needed in our societies for sustainable development are not trivial, they require new skills and new ways to organise ourselves and that energy and infrastructure are central issues. But, in fact, practically all decisions about environmental protection have this dimension of conflict between values although it may not always be so clear. When installing equipment for cleaning flue gases for example there is a conflict between saving money (assuming no charge) and reducing pollution. When protecting an area there is also a conflict between economic interests, e.g. timber production, and conservation interests.

We need to find ways to handle all these conflicts in a reasonable way. In general they concern exploitation of nature for the purpose of humans or preserving it either for humans or for its own sake. It is obvious that a pure bio-centric ethics if generally accepted, would have big consequences for the way we conduct environmental policy and work. But one may adopt also weaker forms of bioethics. A special form is the so called weak biocentrism (Stenmark 2000). This form of bioethics holds that actions should be judged based on how they influence other living beings, but with preference for humans and other sentient beings. This standpoint is in many countries codified in animal welfare politics and law. It is also part of the rules for ecological farming, where it is required that animals should have the possibility to a natural behaviour. Obviously this rule is grossly violated in much animal production in the countries in Europe.

In practical works sustainability managers look for win-win situations, in which both values are respected. They can quite often be found. Respect for nature

is not necessarily always only a cost. Timber from certified forests may illustrate a kind of solution to the dilemma cited above.

Is there a basic value of sustainable development?

Is there a basic value of sustainable development? When answering this question it is not enough to refer to the inter-generational ethics of the Brundtland Commission. It is much more important to see that the call for sustainable development is a response to a crisis between humankind and the planet, and requires an ethics corresponding to this crisis. It can be approached in at least two ways.

One way is to go back in history. The biocentric or, life-centered ethics is not new and has been argued for by many individuals throughout history. The famous Swiss physician, scientist and musician Albert Schweizer (1949) was respected for his stand which he lived up to in his life. He wrote in 1949 that:

The great fault of all ethics hitherto has been that they believed themselves to have to deal only with the relations of man to man. In reality, however, the question is what is his attitude to the world and all life that comes within his reach. A man is ethical only when life as such is sacred to him, that of plants and animals as that of his fellow men, and when he devotes himself helpfully to all life that is in need of help... The ethics of the relation of man to man is not something apart by itself: it is only a particular relation which results from the universal one.

This citation echoes a spirit that is very often expressed by young students in the Baltic University Programme. Sustainable Development is perceived as the chance for them to create a good life. A life that is not exploitative, a life where the natural world can be enjoyed, just as well as society with all its cultural and spiritual and technical artefacts, where both non-human life forms and others of our own species are respected. Sustainable development as the quest for the Good Life is one ethics.

A second way is to develop our existing ethics further. The development of a new ethics is in many ways pursued by the Council of Europe and

the United Nations, as global institutions. Thus a policy to implement and defend human rights in many countries are pursued by those institutions, and the catalogue of common rights are expanding, e.g. a recent one is the Convention on the Rights of Children. The UN work constitutes an effort to develop a global ethics, as asked for by the Brundtland Commission. May such a global ethics include in a more clear way the values discussed above? Some of the documents referred to initially do this e.g. in the Rio Declaration. As analysed clearly the values discussed in these documents are all anthropocentric but has expanded from traditional ethics into inter-generational ethics.

The next step should be an ethics that declares that also the non-human part of the eco-sphere has integrity to be respected. The Earth Charter process aims to produce such a document. The *Earth Charter* is in preparation since several years by interest groups from all over the world. The intention was originally to have the Charter accepted by the United Nations General assembly in 2001. It is seen as an ethical foundation for sustainable development, and could be understood as an enlargement of the Declaration of Human Rights, or as a basic document for a global environmental ethics. The present text was established on March 25, 2000 and is available on Internet at the address www.earthcharter.org. The Earth Charter organisation is presently undergoing a rapid development.

In the end – what is sustainable development?

Quite often the inter-generational ethics of the Brundtland Report is referred to as a definition of sustainability. Others seem to be prepared to accept almost everything that is worth working for as an alternative definition of sustainable development.

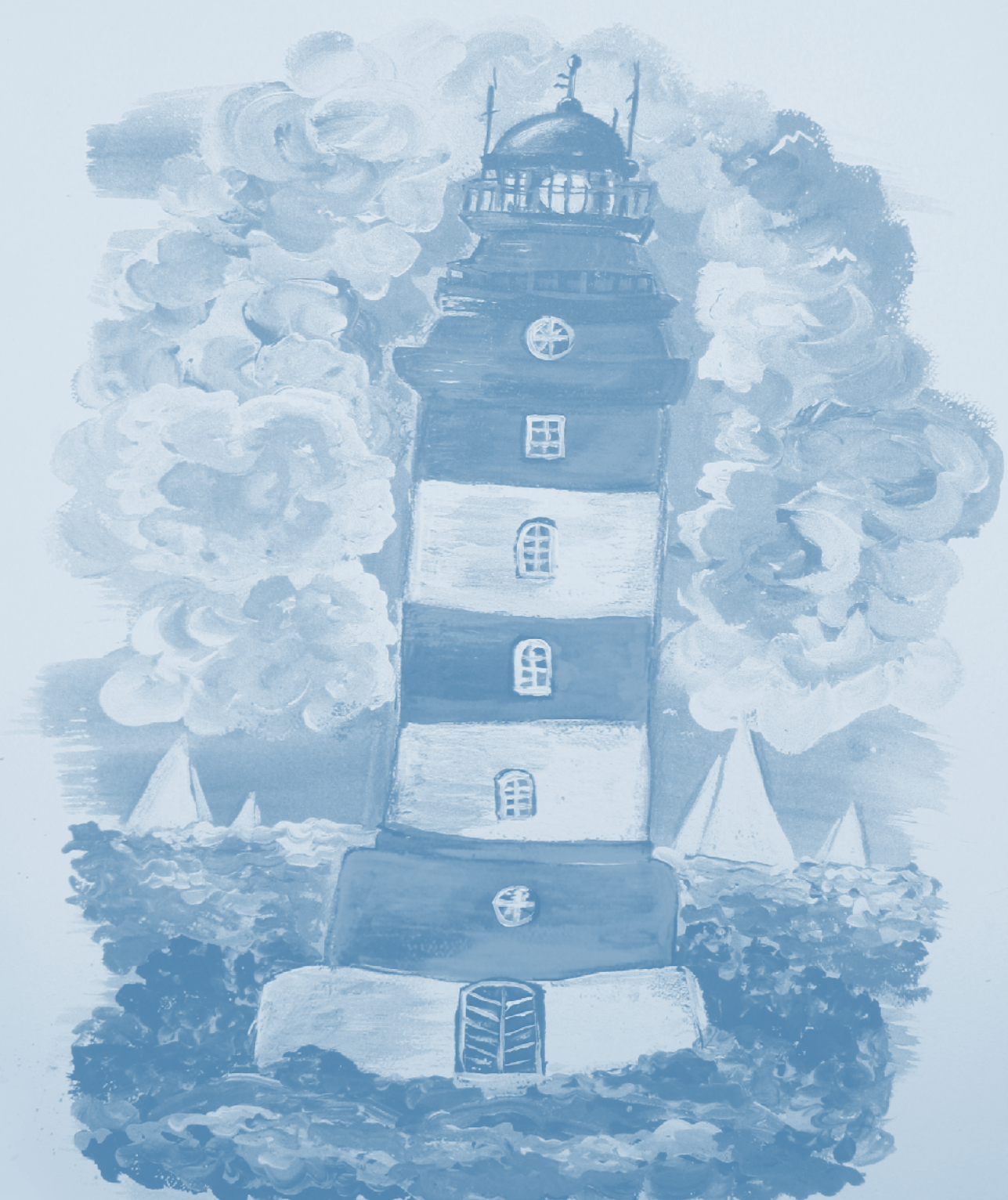
Neither of these ways to see the issue of sustainable development is so very useful. Alternatives exist. In the technical sense it is very simple to be precise: A sustainable system is a system which may go on for ever, while sustainable development is a development that leads to such a system. This explanation, however,

does not help us when working practically, but that does not inter-generational ethics either. For practical purposes it is better to say – in very simple terms – that sustainable development is the challenge *to create welfare within existing resources*. Here the two sides of sustainability, the natural resources perspective and the societal, human welfare perspective are both spelled out. (See further in Rydén 2006).

In practical terms we need to find out what can be accepted as welfare. In a way we are back to the dilemma of the Brundtland Report, that is the difference between need and greed. In the discussion there is the accepted claim that poverty should be alleviated, and the view that mass consumerism should be curtailed. Both are bad for the planet. Both are bad for the societies. The challenge of sustainable development is to change both.

So where do we end up? Is sustainable development a personal concern, or societal concern? Where is the responsibility?

As with many future issues it is both. It may become clearer if we compare sustainable development to happiness or peace. They are important or even indispensable, but equally difficult to define or measure.



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5 Science and Sustainability

Ilkka Niiniluoto

About 10 000 years ago a leap in the evolution of the humanity occurred, when our ancestors started to actively influence the course of nature in agriculture. The rise of new human cultures brought about novel tools and professions, villages and towns. With the advent of the skill of writing, the ancient world created philosophy and science, which started to flourish in the scientific revolution of the early modern age. Simultaneously with the 18th century Enlightenment, the “age of utility” resulted in a technological revolution, whose later stages can be seen in the 20th century industrial society and in the 21st century post-industrial information society.

In the cultures of the East and the ancient Greece, the ideal relation between man and nature was harmonic and peaceful co-existence. In contrast, the Jewish and Christian traditions understood man as the master of nature. Also modern “Baconian” science emphasized that human beings are not any more in the mercy of natural forces, but with the help of science-based technology men can command nature to obey their own purposes. As an alternative to this ideology, the tradition of romanticism thought that the main task of human beings is to protect and admire God’s creations and their beauty.

The influences of human actions to the natural

environment were visible already in the old age in the destruction of Mediterranean forests. Urbanization and industrialization motivated demands about the protection and conservation of nature since the 18th century. However, it was only after World War II that a world-wide awareness emerged: men have intentionally and non-intentionally burdened nature, ruthlessly exploited non-renewable natural resources, and polluted air and seas. UNESCO published in 1962 its recommendation concerning “the safeguarding of beauty and character of landscapes and sites”. The green movement emerged in the 1970s. The responsible futurists in the Club of Rome published their work *The Limits of Growth* in 1972.

It is evident that solving the global problems created by human activities needs international co-operation and agreements. The central keyword in this area is “sustainable development”, introduced to the public in *Our Common Future* (1987), the Report of the World Commission on Environment and Development. In spite of the signs of a world-wide ecocatastrophe, Brundtland’s Report was optimistic that international co-operation with joint efforts can secure the continuing development of the humanity. The more pessimistic critics of the Report, on the other hand, have argued that the program of sustainable development has not yet sufficiently analysed the economic and political causes of the ecological crisis, so that industry and governments can simply without bad conscience within the present way of life continue to harm natural and social environment. These issues have been highlighted in the debates about the Kyoto agreement on carbon dioxide wastes (1997) and the World Summits in Rio de Janeiro (1992) and Johannesburg (2002).

Sustainable development was originally defined as a dynamic process which “*meets the needs of the present without compromising the ability of future generations to meet their own needs*”. A virtue of this definition is its concern for the future: we are not allowed to selfishly and short-sightedly look only after our own momentary profits, but our children and their descendants should also have sufficient conditions of living. A weak point is the reliance on the concept of “need”, which is left without a proper analysis. In the kernel of the political debates about sustainable

development, one can find the contrast between the necessities of life (energy, nutrition, housing) and the new needs and practices of consumption created by rapid technological development.

Brundtland’s Report was mainly concerned with ecological threats, but it recognized that human and social behaviour in both rich and poor countries has dramatic effects on our environment. The Johannesburg Summit identified three pillars of sustainable development: economic development, social development, and environmental protection. Today UNESCO advocates a very broad definition where sustainability covers, among other things, the management and protection of natural resources, climate change, global warming, biodiversity, health, rural development and urban planning, poverty reduction, corporate responsibility, cultural diversity, education for all, free flow of information, human rights, gender equality, and peace. If one is worried that such an extensive list of virtually all important human goals loses the focus on environmental issues, the holistic approach to sustainability has the merit of recognizing the interrelations between ecology, economy, culture, and society.

The official definition of sustainable development is anthropocentric in the sense that it is concerned with the living conditions of the human species on earth. Thus, its value orientation is the instrumental or prudential utilization of nature for human purposes. This is one way of justifying environmental protection as a form of man’s responsibility for nature. During the last decades, ecological movements and the new philosophy of environment have promoted views which defend the intrinsic value of life and nature. Besides the animal rights movement, which treats the individual members of other species as equally valuable as human beings, programs of “deep ecology” attribute an intrinsic value to the biodiversity of all species of plants and animals (“biocentrism”) and untouched natural landscapes (“naturocentrism”).

International organizations, national governments, business firms, the media, and NGOs have all their roles in our common political and moral task of sustainability. How can scientific research and education best promote sustainable development? It is clear that all areas of natural and social sciences –

especially when they work together in multidisciplinary projects – can give their contribution to this goal.

First, the methods of science provide tools for studying the current state of nature and its development. Systematic observations in research stations help to follow e.g. the quality of water, flora and fauna in lakes and oceans. Atmospheric observations may concern the temperature and quality of air, the amounts of ozone and carbon dioxide, or the density of pollution and toxic substances. Time series of such observations may tell alarming news about changes in nature.

Secondly, environmental research may focus on lawlike patterns of change in natural phenomena, e.g., the interaction of atmosphere, land, and seas. With knowledge about such laws of nature, it is possible to build theoretical, often mathematical models for explaining and predicting the temporal development of natural systems.

Thirdly, a crucial challenge of multidisciplinary environmental research is to bring the human agent into the systems in consideration. What harmful changes in nature are due to human actions and interventions? What kinds of technologies might be helpful in the protection of nature? What cultural habits, social practices, and economical arrangements best support the goal of sustainable development? Here natural sciences, technological research, biology, agricultural and forest sciences, medicine, urban studies, cultural studies, economics and other social sciences have to work together. In this way, the subject matter of research is broadened to the interaction of man and nature, especially the rational utilization of natural resources and its cultural, social, and economical aspects and conditions.

Fourthly, as far the concept of sustainable development contains other pillars besides the environmental perspective, medicine, the humanities, education, psychology, law, and social sciences are directly relevant to their study. Systematic inquiry can follow the current state of society and seek knowledge about its temporal changes. Sustainable development of a society requires that its economic basis is secure, but in the global world this goal is conditioned by international co-operation and competition. In spite of its importance, economic success has to be

balanced with considerations of human welfare and social justice. On the other hand, economic stability in the long run depends on the ways in which natural resources are used and cultivated. Thus, we see again that research on social sustainability remains one-sided or incomplete if it does not bring to its focus the interactions between nature, economy, culture, and society.

Knowledge about the behaviour of natural and social systems gives us evidence-based information about the prospects of rational environmental and social planning. It is important to know what probable consequences our alternative actions will have. A systematic methodology for outlining such different scenarios has been developed in futures studies. But empirical and theoretical expert knowledge alone is not a sufficient basis of environmental and social planning and decision-making, we need also a clear value-based vision of desirable futures. Such value questions cannot be reduced to the empirical study of human needs, since they always include a personal commitment to what we regard as desirable or valuable. Conflicts arise easily between different interest groups – e.g. land owners and active citizens in environmental protection. In democratic societies, different moral opinions are accepted, and such controversies are reconciled by legislation and by the political system (e.g. the parliament). But value questions can also be rationally debated in philosophy. Environmental ethics is a branch of philosophy which considers questions about the intrinsic and instrumental value of nature. More generally, our ethical views concern the conditions of good human life and just society.

In education for sustainable development, multidisciplinary environmental research and ethics are important subject matters. Introduction to cognitive and moral attitudes about natural and social environment are needed in schools – and already at home and Kindergarten. Universities and institutions of higher education have important roles as well. As we have seen, all scientific disciplines have a potential for increasing our understanding of the conditions of sustainability in the wide sense. In a more specific sense, UNESCO has created programs, networks, and chairs devoted to problems of sustainable development.

The Baltic Sea Project is a fine example of regional co-operation in research and teaching. The University of Helsinki has established – besides its traditional faculties of bioscience, agriculture and forestry, and social sciences – a research network of Environmental Research (HERC), a chair in environmental policy, and a teaching programme on environmental problems for students from all faculties.

6 Theoretical Underpinnings of Education for Sustainable Development

Taina Kaivola and Mauri Åhlberg

Defining education for sustainable development

Humans are biopsychosocial beings characterised by culture, communities and societies, economy and politics. Education, and these days especially education for sustainable development, is an essential part of human development. According to the much quoted definition of sustainable development given in the Brundtland Report (WCED 1987), sustainable development is development that will satisfy the needs of the present and future generations. After over two decades of working in this field, Mauri Åhlberg has come up with the following conclusion: From biological viewpoint all organisms have real needs. If they are optimally satisfied, then the organisms flourish, they have good environment and good life. The definition contains two pivotal concepts: real needs and their optimal satisfaction. This is the core of sustainable development.

The traditional pillars of sustainable development are ecologically sustainable development, economically sustainable development and socially sustainable development. Three new pillars have been added by Åhlberg (2005 and 2006): culturally, health-related and politically sustainable development. From viewpoint of biology there is the following difference between biological development and cultural development. Biological (genetic) development is based on changes in genes and in DNA. Cultural development is based on learning. In this sense, culturally sustainable development is the most pivotal aspect of sustainable development. All of the pillars have their roots in ethical and moral thinking related to values and other knowledge of the world.

A value theory for sustainable development

Freedom, equality, truth, goodness, beauty, wisdom and sustainable development are values. We apply Ilkka Niiniluoto's (1979) value constructivism to education for sustainable development and its research. Values are not something apart from science. On the contrary, the educational duty of science and education makes it essential to submit them to systematic scrutiny. On the one hand all citizens have a right to enjoy values, like freedom, equality, truth, goodness, beauty, wisdom and sustainable development. On the other hand they have a duty to defend the same values, when they are threatened.

In the words of Niiniluoto (1979): *“Even though value systems change as times go by, no matter what the situation in which values have been determined, there remains one completely objective fact: what objects are valuable and what are not.”* From the point of view of education for sustainable development it is very important that research in biology, psychology and sociology have always found the same real needs of the human organism that must be optimally satisfied for a person to be able to say that they have a good life. In information society, or better knowledge society, “knowledge of the laws of nature” is seen as a valuable educational objective. It is not valuable in itself just because someone has decided it is a desirable

objective, but because without it life cannot survive, it is unsustainable and the quality of life is degraded. Critical scientific realism maintains (e.g. Niiniluoto 1999; Åhlberg 2005 and 2006) that if your life is founded on as truthful understanding as possible that you will then you probably live a life that is as good as possible. Moreover, this means that you are capable of taking care of the environment, of protecting it and sometimes developing it even for the better.

The quality of learning and the instrumental importance of economic values

UNESCO (2005:2) emphasises the importance of improving the **quality of learning** in education for sustainable development. In addition, the current priority is that education for sustainable development should be included in all education:

Within the broad goals established by the UN General Assembly, subgoals for the Decade of Education for Sustainable Development (DESD) at the national level are to:

- provide an opportunity for refining and promoting the vision of and transition to sustainable development
 - through all forms of education, public awareness and training;
- give an enhanced profile to the important role of education and learning in sustainable development.

The objectives for the DESD are to:

- facilitate networking, linkages, exchange and interaction among stakeholders in ESD;
- foster an increased quality of teaching and learning in education for sustainable development;
- help countries make progress towards and attain the millennium development goals through ESD efforts;
- provide countries with new opportunities to incorporate ESD into education reform efforts.

The following realization was an important starting point for the development of an integrating theory of education for sustainable development: only

a sustainable, competitive economy can produce enough resources for a sustainable development, for creating and taking care of a good environment and for providing a good life for humans and other living beings alike. That is why the theory of continual quality improvement, which is the basis of the theory on high quality learning, is part of the theory on education for sustainable development (Åhlberg 1998).

What is meant by “quality” when we talk of continual quality improvement and the quality assurance that goes with it? In layman’s terms and in, for instance, qualitative research, quality refers to any sort of variation, which is often due to people’s perceptions, concepts, opinions, attitudes, values and actions. Most literature on quality will mention the concept of quality only in passing by referring to Pirsig (1976), who has declared that a concept of quality cannot be defined.

In reality, we need a definition of quality that can be submitted to continuous critical scrutiny when we deal with improvement of quality, quality management and quality assurance: quality corresponds to a product’s, services or processes ability to satisfy real needs optimally. The better real needs of a “customer” (be it individual, community or humankind) are satisfied, the higher is the quality of a product, service or educational process. For example, a lecture delivered by a top expert to first-year undergraduates may vastly surpass the students’ level of knowledge thus making it impossible for them to understand the lecture. No matter how “top” the expert is, the lecture would not be of a high quality from the point of view of students present. Only continual research will tell us what the real needs in each situation are and how these needs can be optimally satisfied. The range would be from poor quality to openly high quality. Openly here means that no matter how high quality an object is, it is always possible that there be another object, which is of an even higher quality.

How can ESD be implemented in teaching practices?

According to UNESCO (2005: 159–194), humankind is moving towards information societies. There is a

difference between information and knowledge. This is why we prefer the term emerging knowledge society. Access to information networks and information is not enough. Participation and knowledge building are also required. When promoting sustainable development, we should research and develop our work so that we become a part of the knowledge building community for sustainable development. In recent years, an increasing amount of universities have started organizing pedagogy courses for their teachers so as to specifically improve the quality of teaching.

For example, the university pedagogy studies’ introductory course at the University of Helsinki has a development assignment worth 10 ECTS where a student must analyse, develop and evaluate an aspect related to their own teaching or guidance. Another forum for teachers to naturally analyse and develop their own way of teaching is when teachers from different faculties get together for the revision of degree programmes. The University of Helsinki made some major revisions to its courses in subject based integrated themes (school subjects) with the participation of teachers from many different faculties already before the Bologna Process. The project put together common, multidisciplinary and crossdisciplinary courses for its departments and teacher training schools, among other things (Kaivola, Kärpijoki & Saarikko 2004).

Based on feedback from university pedagogy courses and degree programme revisions, university lecturers attach great importance to the peer support that they get through courses, be it face-to-face or in a web environment. Long-term development work creates partnerships and peer networks thanks to which teachers are more willing to develop and analyse their own working methods. These already existing partnerships and networks provide a point of entry for education for sustainable development themes, which have been largely absent from university pedagogy courses. Unfortunately a substantial amount of lecturers have only short-term contracts, which considerably hampers the functioning of such networks and the development of one’s own working methods.

The idea of improved concept mapping

One of the most useful and easily adopted tools to use in teaching and the study of complex sustainable development issues is concept mapping. Concept maps are especially handy in higher education when used to clarify the shared understanding of members of a working team or study circle. Education for sustainable development encourages students and teachers to use the interdisciplinary and transdisciplinary approaches. In most cases, concept mapping can help participants to understand and clarify not only their own knowledge building but also the constructions of knowledge by other members of the study group (Figure 1).

Concept maps are easy to construct using pen and paper. An excellent computer software, called CmapTools program, is also available free of charge on the Internet. The CmapTools program has been developed by the Institute of Human and Machine Cognition (IHMC 2006). With this digital tool for concept mapping one can, for example, share information and understanding with others in a virtual learning environment on the Internet and one can publish one's own concept maps with pictures and data resources on the Internet (cf. Åhlberg & Kaivola 2006: 85–88).

There are different versions of concept mapping and people having differing opinions on how general or specific a concept mapping tool should be. However, it is common knowledge that concept mapping was developed at Cornell University, and most articles on the use of concept mapping refer to Novak and Gowin (1984). In their book, the most common version of concept mapping is as follows: There are circled concepts with links connecting them, and the links are labeled or phrased in order to create meaningful statements. Elaborating this idea further, the main elements of an improved method for concept mapping introduced by Åhlberg (see for example 2004) are clarified by ten statements:

- 1 All concepts are interpreted as main elements of thinking and learning, and they are always inside frames.
- 2 There is no accurate limit on how many words may be included in a concept label. In an improved concept map as many words as are needed are used to name the concept accurately.
- 3 In order to have a meaningful proposition, all links between concepts have arrowheads to show in which direction the connection from one concept to another is to be read.
- 4 The expressions connected to links may be short or long, but they must accurately express the thinking of the person whose thoughts are concept mapped. The essential point is that the link includes a verb expression and the resulting proposition is meaningful and more or less true, plausible, probable, etc.
- 5 You may connect pictures, videos, sounds, etc. to concept maps.
- 6 Whatever learning theory is used, you may still use concept mapping because it is as general a method as is speaking or writing. Everything that is spoken or written can be transformed to concept maps, and all good concept maps can be easily transformed back to ordinary speaking or writing.
- 7 Novak and Gowin (1984) and Novak (1998) argued that concept maps should always be hierarchical. This is often sound and economical, but not always. There are also ontological and epistemological reasons why good concept maps may not be always hierarchical. The world is a system, and therefore, the best conceptual representation of it is a conceptual system, a concept map, which may not always be hierarchical.
- 8 In a good concept map each concept is mentioned only once, similar to a good geographical map in which each place is named only once.
- 9 If each concept is only mentioned once on the concept map, then it is easy to count how many links each concept has to and from other concepts. The number of links with other concepts is a good estimate of centrality of that concept in the thinking of the person whose thoughts are concept mapped.
- 10 Sometimes it is useful to be able to read a concept map only in the order that you intend it to be read. It may not always be from top to bottom. For example, it may be a transformed part of a textbook, and the order in which propositions are read is important. Then you may add to each link a number showing the order according to which the propositions should be read.

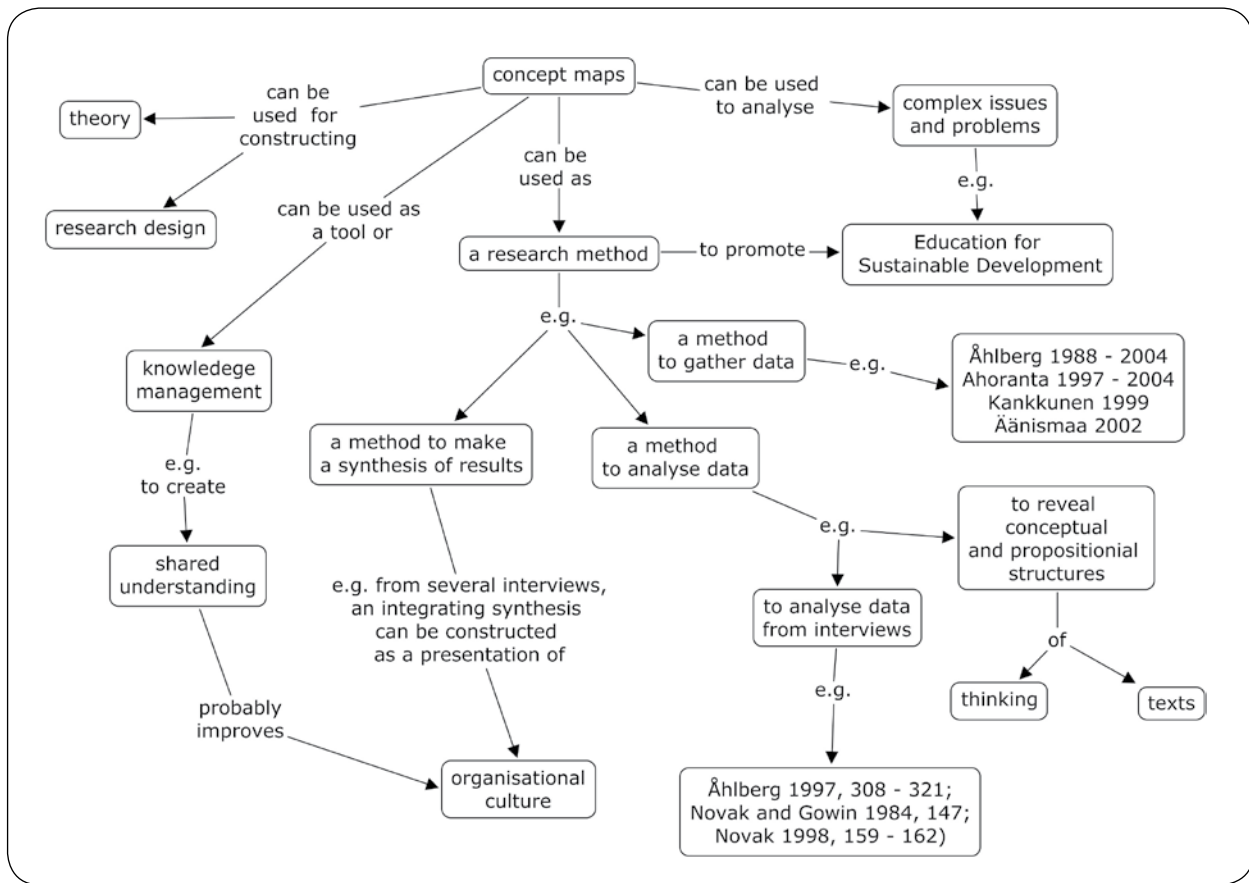


Figure 1. Improved concept mapping as a method for research-based teaching (adapted from Åhlberg 2004 and Kaivola & Åhlberg 2005).

The implementation of education for sustainable development

“Putting internationally endorsed goals into practice is such a complex matter” is something that was repeated ad nauseam during the preparation process of the UN’s Decade of Education for Sustainable Development. Experience has since revealed that what makes interaction especially difficult when trying to implement education and training for sustainable development is the fact that concepts related to sustainable development are defined and understood in so many different ways depending on the circumstances. Likewise, many social, institutional and traditional factors related to the organization of education and training seem to prevent the promotion

of sustainable development in the daily practices of educational establishments. Themes that transcend the conventional division of school subjects inscribed in the official curricula are not easy to teach in practice in compulsory education – let alone higher education. A third impediment that is often referred to is the lack of symmetry between the environmental, social and economic pillars when integrating them into teaching (Tilbury & Wortman 2004).

Universities have an autonomous status in Finland, which means that reforms and changes coming from the outside get filtered through into teaching and studying very slowly. This institutional factor and the ones mentioned just earlier are glaringly obvious in Finland’s higher education establishments. For example, the main focus of education and training

for sustainable development is still on environmental teaching and education and nature conservation. To be sure, their import should in no way be underestimated in the promotion of sustainable development, on the contrary: environmental education and inculcating a sense of respect for nature are commendable and valuable undertakings, and touch upon several fields of environmental research and training. Having said that, because the very aim of the UN DESD is to stretch the boundaries of sustainable development so as to have it extend to social and economic sustainability, it is important to show special concern for those areas of higher education where the thematic of sustainable development has been overlooked. NatureGate ® is a promising international research and development project, which starts from flowering plants, moves on to ecosystems and their free services to humankind and from here advances to ecologically, economically and socially sustainable development (Åhlberg, Lehmuskallio & Lehmuskallio 2006).

One of the central objectives when realising DESD goals is that education and training be of as high a quality as possible. Higher education that produces diverse expertise no doubt produces characteristics that influence the way society functions. The influence of higher education is a regular topic in education and research policy, as it is when discussing the student volume of particular educational institutions or their profiling. How do we measure or evaluate the influence of education for sustainable development and research related to it?

The degree programmes of higher education were reformed so as to better take into account the requirements of the labour market. The effectiveness of education can be described fairly easily with numerical indicators on the employment situation and amount of retirees, say, in vocational and compulsory education. The indicators then show the amount of qualified teachers in relation with the amount of permanent teaching positions and the yearly number of students who graduate as qualified teachers. The need for teachers is followed very closely when planning undergraduate and further education, so as to keep track of what teachers are needed the most. Funding is provided by the Ministry of Education, and its decisions are based on evaluations, studies

and surveys; effectiveness is measured in the amount of students who graduate and their grades. It is not, however, as straightforward to determine whether university graduates get and settle down in teaching positions that they are directly qualified for.

Obviously indicators only provide a cursory glance on effectiveness. How do you measure effectiveness when you are trying to establish the aptitude of university and polytechnic graduates to promote sustainable development in their work? And how can higher education teachers have an influence on this? We will consider these questions by drawing on the work of Mustajoki (2005) who has studied the effectiveness of research and the different ways in which researchers can exert an influence on society. To start with, influence can be divided into three categories: (1) publications and senior advisor positions, (2) indirect influence through students and (3) participating is the accumulation of scientific information and understanding in as many ways as possible.

Researchers and university lecturers participate in the social dialogue through their publications and by acting as experts. Popularizing research findings in newspapers and non-fictional books is a direct way of influencing society, just as being an expert that gives statements, public lectures and takes active part in, say, non-governmental organizations and politics.

Higher education teachers exert an influence on society indirectly by giving students the requisites to assume different functions in society. A significant channel for reaching elementary school children and secondary students is through text books and other study material. The effectiveness of continuing education for school teachers and vocational education teachers should be not forgotten, as it quickly gets passed on to pupils and secondary education students.

A third way for higher education teachers to make a difference is to take part in the accumulation of scientific knowledge and understanding on many fronts. Educators can take on responsibilities in the academic community or the scientific administration, but the most powerful way of inducing change is by writing scientific publications that get read and quoted.

In reality the ways of influence are very complex, but the three just mentioned give a general impression of effectiveness and its ebbings and flowings. It would thus seem that from the point of view of effectiveness in education for sustainable development the continuing education provided for practicing teachers and making sure that this training is based on scientific research and of high quality is one of the most important things for higher education teachers during the UN Decade of Education for Sustainable Development. This is when effectiveness reaches the masses in a relatively short period of time.

It is worth reminding that the most significant impact a researcher can have on society is by forming a new generation of researchers and other experts for society. These people work and live as citizens, the benefits of which can only be discerned in society years later in the long run. Although sustainable development experts are required in every sector of society, we also need to educate citizens that will want to and know how to take into account sustainable development in their daily lives. That is why we as academics are in a prime position when it comes to implementing sustainable development in higher education.

7 Empowering Higher Education with Hopeful Advocacy

Heljä Antola Crowe and Johanna Kohl

Introduction

The United Nations declared the years 2005–2014 to be a decade of education for promoting sustainable development. The International Decade 2001–2010 advocates a culture of peace and non-violence for the children of the world. It promotes cultural, linguistic and social diversity in education, education for sustainable development, advancement for human rights, gender equality and development, intercultural dialogue, promoting tolerance, human security and peace. Themes for sustainable development are varied and systemic: human rights, peace and safety, cultural diversity, cross-cultural understanding, health and well-being, natural resources, democracy, developing responsibility and trust, HIV/AIDS, and so on. These foci are very real, borne of the concerns we now read about regularly.

Be worried. Be very, very worried. Climate change isn't some vague future problem – it's already damaging the planet at an alarming pace. Here's how it affects you, your kids and their kids as well.

Earth at the tipping point. How it threatens your health.

These are headlines from an April 2006 issue of *Time magazine*. Incidentally, a student recently exclaimed: “*Why do we not do something we know we could do? Why do we not tell people, this is what we need to do and then proceed to do it?*” Why indeed!?

Laymen and professionals alike will assign different meanings to sustainability and sustainable development, all of which translate into a multitude of ideas, threats, collective challenges and daily practices. In the September 2006 U.S. News and World Report biologist Edward O. Wilson extends a plea for preservation of the environment: “*It is quite possible by the end of the century we could destroy the rest of the natural world and with it as many as half the species of plants and animals on Earth.*” (Schulte 2006: 24). The human suffering engendered by natural and environmental disasters throughout the globe have shaken scientists, educators, planners, parents, policy-makers, and politicians. Catastrophes seem to present us with insurmountable challenges and this leads to a sense of impending doom.

In response to a discussion about recent hurricanes, mudslides, earthquakes and the tsunami, a university student exclaimed: “*We are afraid to watch television any more for the fear that we ourselves won't have a future.*” This statement demonstrates the social effects of the sustainability issue and it calls for a more effective ways of addressing sustainability in higher education. Children develop a sense of fear, anxiety and concern for their own future very early in their growth: they overhear discussions and see television programmes, which they do not always understand past the built-in tone of doom. At the same time students and teachers in school and university environments are under increasing threats to their personal security while experiencing a stark alienation from the outdoor environments (Louv 2005). Many students are worried, concerned, and even apathetic.

Be it that what constitutes an “environmental problem” is culturally bound, we must also recognize that ignorance about problems in various localities around the world will not make the challenges go away. Boundaries do not stop environmental problems, or even concerns for physical and emotional safety. Moreover, environmental concerns are intricately linked to issues of well-being and our

way of interacting with people within and from other cultures.

Although the whole issue of sustainable development is very complex and systemic, and even though educators are concerned and greatly affected by ecological and economic sustainability, the cultural and social sustainability issues are the ones that are crashing into the higher education classrooms with full force. All of these issues are intertwined with the values that socially sustainable communities embrace: respecting nature and life, responsibility, physical and mental health and well-being of teachers and students, global, national and cross-generational justice, equality and tolerance, diversity cross-cultural capacities and democracy. There seems to be a rift between what is known about the state of the earth, and the examination of what people in general will do in order to learn to live in harmony with nature, their decisions and their capacity to affect change for a more sustainable society and world.

Challenges in higher education

Our rationalistic-logical academic environments often steer us away from scrutinizing or even acknowledging the way the social, cultural and emotional experiences affect learners' daily lives. The environments we have created in academia are far more anchored into the rationalistic-logical way of thinking about the environment, life and people rather than the holistic way. The splintering of life experiences, a hectic everyday life and a disconnection between the indoor and the outdoor environments take its toll on the tertiary education students. And yet studies show that there is interdependence between the emotional, cognitive, physical and intuitive functions and that these have an influence on learning (Clark 2005).

Making people aware of this disconnection is not easy. “*We are an attention-deficit society, and so many people are desperate for someone to just listen to them*” (Soul Light 2005). Accumulating research shows that if our goal is to support academic success, it is vital that we address the social and emotional factors in learning as (Goleman 1995 and 2006; Elias et al. 1997; Zins et al. 2004). While we know the effects of burnout and

are regularly confronted by students' social difficulties, we still remain stoutly focused on the rational-logical knowledge-information-academic achievement and do not integrate social and cultural aspects in our higher education learning environments.

Higher education environments need to leave space for physical, social, emotional and spiritual well-being. Zinz et al. (2004) propose a framework that addresses these aspects on a personal level:

- 1 Self-knowledge: Identifying and recognizing emotions, recognizing one's strengths, needs and values, self-efficacy beliefs, spirituality.
- 2 Social awareness: perspective taking, empathy, appreciating diversity and respecting others.
- 3 Responsible decision-making: identifying problems and analysing situations, ability to solve problems, evaluating and reflecting, personal, moral and ethical responsibility.
- 4 Self control: Controlling impulses and handling stress, motivation, self-discipline, ability to organize and set goals.
- 5 Handling relationships: Communication, social engagement and building relationships, ability to work together, negotiating and handling conflicts, seeking and giving help.

When discussing culturally and socially sustainable development, there is a real danger of being stuck in the gloom of environmental and economic threat to the point of paralysis, which may lead individuals to experience indifference and hopelessness. Positive psychology, which in the 1990s paved the way to thinking more positively in terms of our influences on the environment, indicates how emotional life is crucial in enlarging people's personal resourcefulness. People tend to be more talkative, tolerant and innovative when engaged in positive interactions. This mood often expands learners' capabilities to seek new discoveries (Seligman & Csikszentmihalyi 2000; Seligman 2001). How to work toward the authenticity of interactions that leads to effective advocacy for sustainable development?

Toward an empowering learning culture in higher education

In a culture where empowerment of its members is sought, it becomes natural to focus on sustainable development and our place in the global world. Intentions are important because they are integrated in people and the way we view ourselves. Globalization requires that as humans we become aware of the interconnectivity of all peoples (Senge et al. 2005). Supporting diversity, tolerance and the ability to understand others are important culturally and socially sustainable competencies which are present in empowering learning cultures.

Aldous Huxley (Swan 1992:109) commented that experience is not only what happens to us but what we do with what happens to us. In this respect natural disasters and the reality of human suffering is a challenge shared by everyone in higher education, both within the disciplines but also across disciplines in transdisciplinary fashion with shared issues and questions (Blewitt & Cullingford 2004). Transdisciplinarity, as defined by Thompson Klein (1990), demands movement beyond older forms of interdisciplinary cooperation and a radical blurring of all boundaries (not just the divides of disciplines but also the gap between the academic world and society). Transdisciplinarity also underscores the heterogeneity of knowledge and the notion that there is no longer a single hierarchical educational path to scientific research. By contextualizing knowledge, we are moving from legislation to interpretations and mediation (Bauman 1987).

We live most of our lives indoors – this physical separation from nature (the outside world!?) is one of our challenges. In the Finnish cultural and geographical context where there is an abundance of green areas and lakes, experiencing natural environments is deeply ingrained in the way people grow up and interact with each other. Parts of Finnish culture – family weekend walks, time spent at summer cottages as well as the sauna culture – are routine reminders of the connection between people and nature. In a more urban setting this connection is not quite as effortless: many Finns find that their time is taken up by the demands of their working life and other

technologically oriented activities. In other places the picture is bleaker still. Americans, for instance, spend as much as 75% of their life indoors (Swan 1992:201) and as many as 80 % of population in the U.S.A. live in urban-like environments where green areas and nature per se is hard to see or experience (Louw 2005:113–116).

Academic silo thinking is inculcated in us early in our educational experiences. Not only are we separated from nature and outdoor environments but also from other disciplines and people who are socialized through another educational terminology. Many students find there is not much room for a more integrated, natural way of interacting with others in the academic environment. Enriching the higher education curriculum with a variety of learning approaches, project work, and interactive experiences would be beneficial for the sake of learning culturally and socially welcoming interactive practices (Pajak 2003). Empowered teachers are very important not only for students but also for the higher education communities and the entire collaborative community network. Empowerment is connected to the well-being of humans and the well-being of their communities.

Empowerment is a feeling of one's own strengths. It is responsible creativity borne by a sense of freedom of action. It is both a social and individual process (Robinson & Siitonen 2001). An empowered person emanates a positive disposition stemming from an atmosphere of trust and an experience of being a valued member of the community. An empowered person courageously uses his/her freedom of action and is motivated to do their best. They are also willing to take on responsibility for the well-being of other members of the community. Culturally and socially sustainable development can be supported by nurturing characteristics which empower individuals in communities.

Educational possibilities in sustainable development are anchored into four pillars of learning, namely learning to do; learning to know; learning to be; and learning to live together (Blewitt & Cullingford 2004). In an empowering university culture the transition to a socially and culturally sustainable future begins within people, through our daily choices and decision-making. It begins in how we meet our own

inner selves and others and how we commit ourselves to developing a world citizenship.

In relation to empowerment and well-being, we need to look carefully at how people view their own lives within the local community, the university community and the global community. Regardless of resources, possibilities and information available to people, our behaviour could better align with our own decision-making. Alignment between knowledge and behaviour is a key toward personal well-being. This direct awareness starts early in a student's life. Thus sustainable development seems to be a powerful aspect of learning. It is not only about building up respect for the environment and nature but for individuals themselves.

Reflection

In an empowered learning community all members of the academic community are given the opportunity to reflect on their own learning. This goes towards creating a dialogue about sustainability on the university campus, and it alleviates the crippling sense of nothing-can-be-done. When learners reflect, they gain valuable in-depth understanding by analyzing, articulating, gathering new information, connecting, focusing on details, observing, taking different perspectives, and questioning. Through meta-thinking, reflective activities and experiences, we can learn to ask deeper questions and consider action.

Reflection is a form of interpersonal intelligence, an important milestone in becoming a socially aware person. Isokorpi (2004:32) reminds us that in a rapidly changing world it is crucial to have an acute and flexible sense of one's own desires, needs, concerns and individuals' optimal way of learning. Reflecting also helps us see things further back in history and far into the future. Many Native North American cultures consider as far as seven generations ahead in their decision-making.

Socially and culturally sustainable development requires that we intentionally build institutions that are more humane and supportive of all of their members. The almost pathological comparison of achievement, institutions and students disturbs the learning processes:

When we allow our schools to be organized according to mechanical schedules and their success to be determined in achievement-test scores rather than self-worth, self-awareness, and health of the children, we are telling children they should learn to be machines, not people. When people believe they are no longer as important as machines, then soul is set aside in fact of regularity, creativity dwindles into routine acts carried out by production lines, rather than creating self-fulfilling craftsmanship. Drug abuse, alcoholism, anxiety, hypochondria, and escapist pursuits become common in an attempt to compensate for that part of life that machines have gobbled up and hidden away in our perception (Miller 2006: 115).

Our environments should be supportive of learning intellectually, socially and emotionally. In a supportive environment the following characteristics are present: a peaceful learning atmosphere, a constructive community, mutual respect, shared decision-making, democratic participation, social responsibility, appreciating diversity, valuing human worth, personal connections, caring and functioning communication, emotional intelligence, collaboration and conflict resolution (Carlsson-Paige & Lantieri 2005:113). Students become more engaged in the learning process when they can actively participate and share in each others' learning experiences. This considerably lowers cultural, social and institutional barriers (Robinson et al. 2002). Louv (2005:34) points out that being separated and at a distance from nature creates difficulties in using our senses, it increases attention problems and both physical and emotional illnesses.

The dog-eat-dog mentality, which often defines institutions – including the academic ones – eat away at the sense of community. Although people physically live closer to each other, especially in urban areas, loneliness has increased as people live more through interactions with technology rather than in relationships with people and nature (Swan 1992: 268). Noddings (2005: 1) is concerned by the fact that our technological capacity has surpassed our moral competence to manage the technology we have created. Who can help us articulate our concerns relating to sustainability? Can we find trustworthy experts who can guide us? Who would those experts be?

Experts of social sustainability

For years Finland has been one of the leading knowledge societies. This development is reflected in high technological skills and successful international business ventures. These technological and economic successes do not, however, give a whole picture of the Finnish knowledge society. The whole spectrum of Finnish society is behind this development, as Finland has chosen to build a knowledge society that takes everyone into account (Hautamäki 1997; Ahokas & Kaivo-oja 2003).

An important goal of the knowledge aspect of Finnish social politics is to increase direct democratic participation in local matters where empowerment often occurs. Participation and advocacy require many-fold skills and access to information. Social sustainability has been governed by the environmental policy sector, but it should cut across all sectors – including the social sector too. For example social workers possess knowledge they could share with other sectors on sustainable living or the needs and ambitions of different kinds of people. Sustainable development needs to be understood horizontally where administrations in the respective sectors and organizational structures are under pressure to restructure. Thinking which cuts across sector boundaries is imperative in understanding and recognizing the dimensions of sustainable development.

”Sustainability literacy” is needed in order to determine whether an action or information is sustainable in a local context, at a particular time, or in the larger societal context. Sustainable here means that the issue, phenomenon or problem is being recognized, evaluated and interpreted while taking into consideration the dimensions of sustainable development, for example, in local environmental planning.

Discussions around sustainable development have been strongly linked to societal discussion. This has resulted in various forums with experts meeting and collaborating in various projects. Nowotny et al. (2001:209) call these forums agora. It is a development of an intimate, interactive and anticipatory awareness. The agora embraces more than a market or politics.

It is a public space, which invites exchanges of all kinds and creates a context where wishes, desires, preferences, demands and needs can be articulated.

To some extent, sustainable development covers everything from technical to social education. In Finland, especially polytechnics have instituted sustainable development into their curricula so that it either permeates all disciplines or is a special focus (Kuosa et al. 2006). Especially adult education is facing a challenge; how to meet the needs of working life in a sustainable fashion (aging population, life-long learning); what is sustainable educational politics; what are our needs in the future; where are specialized experts needed? Do businesses and administration need people educated in sustainable development? Or do they need professionals retrained through vigorous sustainable professional development programmes?

Determining the quality and quantity of future educational capacity is not an easy task (Kuosa et al. 2006). We need to carefully evaluate future educational trends and we need to discuss both the training and job prospects of future specialists and generalists directly with the labour market. The number of master's and doctoral level professionals and their placement within administration, academia and businesses must also be determined.

Integration is difficult to achieve with experts within a discipline institution and sub-politics (see Beck et al. 1994) but in reality experts change their roles and position depending on the context they are working in (Kohl 2004). Context is influenced by the roles of other experts and especially the type of knowledge being used. Herein lies a core challenge in sustainable development: from segregation to integration where there is room for both specialists and generalists. Cross-sector functions, interdisciplinary connections, networked education where all parts of sustainable development are taken into account, are not only a vision but a mission. Goals can be reached by action.

Social and sustainable development

The President of Finland Tarja Halonen and the President of Tanzania Benjamin William Mkapa

co-chaired the World Commission on the Social Dimension of Globalization, set by the then United Nation's Secretary General Kofi Annan. Its task was to explore the social dimension in various societies and communities around the world. The presidents emphasized the importance of examining the issue holistically – so not only from the economic perspective but also from the local, human perspective.

The report created by the Commission underlines the importance of having a shared goal whereby difficult tasks and a shared value base are accomplished through listening and respecting others (A fair Globalization 2004). The Commission's activities are an example of the value of interaction and its effectiveness in making change happen.

A strong social dimension in the Commission's work meant universally acceptable values, and respecting human rights. The framework included at least the following challenges:

- 1 Focus on people. Recognizing people's needs, respecting their rights, cultural identity and autonomy, providing meaningful work, community empowerment, and gender equity.
- 2 Democratic state. Making it possible for a state to manage integration to the global economy and to strengthen economic and social opportunities and security.
- 3 Raising the level of responsibility.
- 4 Strengthening partnerships. Dialogue and partnerships are democratic tools of international organizations, governments, corporations, work force and societies.

The social is everything that touches people's lives, their everyday activities, their celebrations in all forms as individuals, as part of community and society. Fears, hopes, and threats are experiences that have to become a part of the social sustainability dialogue. Interactivity, partnerships and conflict resolution are all social action, which can lead to socially sustainable development. Social, cultural, economic and ecological sustainability permeates everything, which for example has to be taken into account by experts when planning zoning projects. It is imperative that education, leadership and administration be supportive of these efforts.

For example, building housing districts, roads and energy plants changes the environment. These changes have far reaching effects on people's well-being including their health, quality of life and appreciation of life. These changes also have ecological, cultural and economic consequences. Social sustainability and its effects on people can be approached by studying changes in:

- Lifestyle (how people live, work, play and interact)
- Culture (shared beliefs, customs, values, language and dialect)
- Community (its conformity, stability, characteristics, services and circumstances);
- Political structures (participation in decision-making regarding their daily lives, level of democracy, recourses related);
- Environment (availability and quality of nutrition, level of risks; sufficient sanitation; physical security; using and controlling natural resources; quality of air and water);
- Health and well-being;
- Individual and economic rights;
- Personal fears and hopes (perceptions of security and the future of the community). (See Sairinen & Kohl 2004)

The variety of issues in this list show how the social ingredient penetrates and links services, production and refinement as well as transportation, living conditions, nutrition and education sectors. It eloquently shows why social sustainability should be considered both at the individual, communal and societal levels. "Sustainability literacy" cannot be achieved without education for sustainable development

Challenges for the future

It is a daunting challenge to bring the discussion about a socially sustainable future to the forefront. Discussion of what is socially and culturally sustainable development needs methods and theories used in the social sciences, and an awareness of the whole field of social reality. This requires dialogue

between the different actors so that the economic, ecological, cultural and social dimensions can be connected. Connections need to be made between the different sectors but action also needs to start from the grassroots with the experiences of local people being put on a par with expert knowledge, by giving individuals opportunities, responsibilities, rights and obligations (see Yli-Pelkonen & Kohl 2005). Everyone is an expert in certain contexts. Who defines expertise depends on the problem, the phenomenon, and the needs and goals of a situation. Partnerships and interaction are crucial in acting in a sustainable manner. From the vantage point of an individual we must see communities and societies. There should be a continuum between the local level and the global level. Environmental problems will not respect national boundaries nor can they be solved by one country alone.

Diversity is part of socially sustainable development. Either-or thinking is not productive. Choices exist and they should be examined critically, remembering a balanced approach to sustainable development. Economic principles should not be allowed to over-rule softer values and quieter groups. Social sustainability must be as important as the technological and economical dimensions. For the sake of our future, we must learn to read the weak signals of education and study them in various contexts. Weak signals are currently existing small and seemingly insignificant issues that can tell us about the changes in the future. In other words, they are today's clues and signs providing us with hints of the possible events and trends in the future (Hiltunen 2006).

We must be able to meet the challenges in every discipline. More specifically this requires the following from higher education:

- 1 Unbiased and critical scrutiny: Social sustainability is not a barrier but an opportunity.
- 2 Resources: How is sustainable development being integrated into teaching?
- 3 Values: What values is sustainability built on?
- 4 Roles: Which societal sectors locally are needed and what roles will these sectors take on?
- 5 Interaction: How to create a stable framework?

- 6 Concept of time: Evaluating the perception of time; what is a short time for one, is a long time for another person, group or institution.
- 7 Creativity and innovation: Flexibility in structures.
- 8 Partnerships: Various networks.

Conclusion

Cultural and sustainable development can be understood using a tree as a metaphor; it grows its roots deep into the soil and its branches extend wide and high toward the sky. It is a concept, which is attached to an enlarging sphere with some of its branches withering. Sustainable development as a concept intertwines actors, activities, phenomena till these branch off and develop into new concepts.

Sustainable development cuts across all sectors and integrates into all learning and teaching. It also creates counter-arguments. Sustainable development could become a separately focused project with its own actors, institutions and experts. As a result, we can see two kinds of paths emerging, both rife with possible problems. In a nutshell we can see integration as a superficial attempt at sustainability with no real substance and no real connection to the whole. In the case of the second path changes are required from actors, learners and teachers. This entails continued professional development, new programmes and the development of existing ones. Experts in the field of sustainable development would be needed, experts who can see sustainable development as a holistic endeavour both in terms of form and content.

Culturally and socially sustainable development is about learning to take steps and learning to take them one at a time. It is desirable that an open conversation ensues within the social sector about socially and culturally sustainable education and its methods. Discussions about well-being are often limited to health and leave out the socio-political perspective, not to mention cross-sector thinking. Sustainable development is not integrated into the social sector but within each sector and even then the economic and ecological issues are more emphasized. The environment is seen as an underlying factor in well-being but a healthy environment is often not

discussed in this context.

Anchoring into the community and the experiential nature of collaboration, partnerships and cross-sector activity are key concepts in understanding socially and culturally sustainable development. We need new structural ways of understanding expertise. In the politics of education it is time to meet the present challenges. Aging population and life-long learning must be seen as resources of sustainability. Reflecting on these issues requires new types of forums, which are both structurally and spatially opportunities for experts to meet and dialogue. The agora of sustainability is open to all.

"The Earth's future has always been uncertain; but we cannot say that we are not forewarned. Global challenges will not go away". In this remark Cullingford (2004:251) suggests that higher education institutions let sustainable development become more central in the extant curriculum and by making sure that the argument it entails is carried forward in an authoritative and civilized manner. Universities should, ideally, be engaged in improving conditions in the world, in enhancing sympathetic conduct and in spreading enlightenment. We always have a choice, as individuals, as groups, institutions and societies. We "can be negative, as well as creative, self-centred and prejudiced, as well as enlightened and understanding" (Ibid. 251). We have a moral and practical urgency to be positive, to become thoughtful change agents, active advocates for connections and hopeful beacons of effective transdisciplinary dialogue.

8 The Quest for a Route to Sustainable Development in Higher Education

Lili-Ann Wolff

Sustainable development is a demanding educational challenge, not least because of its contradictory and indistinct character. Numerous strategic educational efforts targeting sustainable development have still not led to any appropriate and successful route.

When reflecting on education for sustainable development and its historical preconditions in Europe, we easily reach philosophical paths and might stumble on the German concept of *Bildung*. Although *Bildung* may be considered old-fashioned and thus less worthy in the present context, it is still worth considering in a search for new frameworks for higher education.

In this chapter I will first try to interpret and analyse the concept of *Bildung* from the view of higher education, and secondly, from the view of education for sustainable development. Then I will do the same but vice versa by examining higher education and education for sustainable development from the viewpoint of *Bildung*. In short, the aim of this chapter is to investigate if it is possible, and which way, to combine the ideas of *Bildung* and sustainable development in higher education.

Bildung, education and science

In the late 18th and early 19th centuries many German Enlightenment philosophers referred to the concept of “Bildung” as a holistic approach in the development of humankind through education. Although the German word Bildung is a strong humanistic concept with its origin in the Greek concept *paideia*, it does not directly correspond to any current English word. It is often translated as education, but although this word has multiple meanings it does not clarify the core concept of Bildung. In contrast to the common use of the word education, Bildung has no fixed purpose; it is more like a progression. It can be compared to a journey where a person leaves her or his hometown and embarks upon an adventure with an open mind and then returns with new ideas and ways of considering things (cf. Gadamer 1989). During the Age of Enlightenment Bildung first and foremost meant freeing oneself from the “chains” of rational thought, the church and the society.

The modern idea of Bildung is based on the following assumption: a human person is an active rational being capable of action that can surpass the immediate present. Bildung does not, however, simply happen. It relies on pedagogical activity, where the students, novices or newcomers are allowed to question the world around them. In other words, Bildung is about a self in dialogue with the surrounding world. This dialogue takes place in a creative process, and that is why it is difficult to define. Hence the goal of Bildung always remains open in relation to the future.

At the beginning of the 19th century, the culture and education minister of Prussia, Wilhelm von Humboldt started to apply the concept of Bildung in his reformation of the ‘new’ university and the civil servant education programmes. Later same century, the advocate of the Finnish educational policies, Johan Wilhelm Snellman, emphasised in 1840s that the role of schools is to educate individuals into thinking and willing subjects and that the role of universities in turn is to educate these thinking willing subjects into knowledgeable subjects. According to Snellman, knowing is an amalgam of tradition, whereby individuals assimilate the ideas that are already present, and of self-consciousness, i.e., that persons reflect on

things on their own. An individual can thus achieve a balance between self-consciousness and tradition. In other words, knowing is the ability to realize what is rational in tradition (cf. Kantasalmi 1990).

Universities thus have a role as educators as well as a duty to advance science. The role of a university teacher is to guide her or his students in their quest for what studying really is and to even push students to question the very concepts that the teacher presents. In Snellman’s opinion, students are only fully educated scientists once they have acquired the ability to examine independently traditional knowledge in a creative manner. This does not mean that students must seek for knowledge on their own. Rather, knowledge is the end result of a learning process, where the role of the teacher’s guidance as well as the students own reflection and interaction with other students are important elements.

Dietrich Benner (1997), whose views are considerably more recent, has an interesting take on Bildung as well. Benner first compares the ideas of Humboldt and Max Weber on what Bildung, education and science are, and then creates his own version of what Bildung is. The three concepts or ideas are so intertwined in Benner’s version that they cannot be defined on their own. Just as Humboldt, also Benner is of the opinion that a university teacher must exhort students to take part in the research process. It is then a learning process where both teacher and student develop throughout. The teacher and student create new information together. In other words, the teacher does not teach “ready-made” science. Students are led to discover the scientific way of thinking as science can never produce a finished or ‘final’ product – it is a process “under construction”. University graduates are thus not educated but into humble civil servants, but into citizens and cosmopolitans with a scientific education capable of philosophical and moral-political judgement and action.

The realm and limits of knowledge are taken into consideration when analysing the role of knowledge in society and culture, and its moral dimensions in a student’s personal life. According to Humboldt, science has to be free from the influence of the state and any other interest groups. Weber had a very similar opinion, but he made a stark contrast between

value judgements and facts, and was against mixing philosophy and science. Humboldt, on the other hand, claimed that philosophy should be a part of science so as to combat orthodoxy. The so-called value-free science extolled by Weber can nonetheless lead to the very dogmatism it seeks to avoid. This scenario can be avoided by considering philosophy, science and practices both together and separately, and by discussing openly the limits and possibilities of science. This is a way of fostering education that contributes to Bildung (cf. Benner 1997).

Without a doubt, Benner's suggestion is a challenge for modern higher education policy and teaching. On one hand, it implies the study of philosophical and other scientific problems as separate theories. On the other hand, it employs philosophy as a way to solve the problems related to the application of science in real life.

The challenges of higher education in a sustainable society

Higher education institutions and the corporate world are engaged in extensive cooperation liaison all over the world (Martin 2000). However, when academic freedom and the autonomy of university may be reduced, it is an obvious risk that higher education is transformed into a tool for corporate purposes. In the western world, decision-makers have started increasingly to couple knowledge to a production factor, just as natural resources and labour have been for a long time. This seems to make knowledge objective and it even acquires an exchange value on the market. Regarding knowledge as a subjective part of Bildung is thought of as old-fashioned. Human learning capabilities, skills as well as cultural qualities, are in that case simply made comparable with economic capital investments in the form of just another capital.

While global markets expect higher education institutions to serve them, the United Nations expects them to promote sustainable development, which is also a form of global justice. Answering to these two calls is quite a tall order. It is especially difficult for higher education establishments to promote

the principles of sustainable development if the society around them or the educational policy and management do not appreciate them accordingly. This might imply that higher education establishments only assign a numerical value for nature and its creatures – the majority of humans included – and their habitats just like the corporate world often does.

Nature then only has instrumental value for humans, just like knowledge. Currently, education is considered contradictory, because although it champions reasonable development, it is still based on a rational worldview with a bend towards neo-liberal economic policies. On top of that, sustainable development is added mainly as surface decoration or flavour. The contemporary education is postulated to promote various global intentions; technical development, cultural pluralism, social equality, economic competition, biodiversity, and so on. Aiming at such a mixture in society policy or educational rhetoric can be more or less an obvious self-deception.

The quintessential idea of Bildung is that human beings have intrinsic possibilities for self-development, but also for a joint development of the society. Actually, education has not been able to promote this often paradoxical dual potential. The huge problems arising from the increased use of nature in poor countries because of raised living standards and egocentricity in the rich countries are signs of this incompetence or nonsensicality. As the world situation has changed dramatically since the Age of Enlightenment and the environmental damages caused by human actions have become evident, the quest for Bildung can definitely not be the same as in the 18th or 19th centuries. A totally instrumental education is not sufficient either. A more profound education can on the contrary challenge both teachers and students to evaluate and reflect on the excluding feature of their own cultures and on their own personal values and develop abilities for actively participating in common undertakings. The idea of sustainable development undoubtedly needs a stable educational ground. So why not a new kind of Bildung? The image of Bildung, according to Peltonen (1997), is an extension of the classical Bildung concept and comes close to the three dimensions of sustainable development (the

ecological, economical and socio-cultural). Bildung is then a changing process, where individuals act both alone and jointly in cultural, social and natural environments, creating, defining and transforming themselves as well as their environments.

The idea of sustainable development is founded on an optimistic view of the future whereby humans and technology evolve continuously and can solve all the environmental problems. This is hardly realistic, and that is why the role of education is to enrich our knowledge of humans and the world. The current optimism could be replaced with action-orientated realism. The western societies are in danger of sacrificing the very values that make life worth living in the name of the pure market economy and efficiency.

Human society will never achieve sustainability unless citizens realise how other people and creatures should be treated and how personal choices matter when it comes to mending local and global wrongs. The crux of the problem is precisely the fact that the consequences of our personal decisions may be felt somewhere far away, both in temporal and geographic terms. Living in a sustainable manner may not be felt particularly necessary, people forget their responsibility, or then it just becomes too hazy a concept to bother at all.

A problem might also occur in case scientists insist on working in their own worlds and if they see their own experts as the only legitimate representative of a certain research question. This may occur in the so-called cutting edge research; besides war and space research, also research combining information technology with medical or biological science. Biotechnology may, for example, have many implications for both particular individuals and societies. Genetic engineering easily opens the door to eugenics and makes ethical considerations especially urgent. Also brain engineering experimenting, e.g., with implantation of silicon chips in individual brains needs to be seriously and widely discussed. When human body components are treated like objects, the experimental works seem increasingly instrumental and mechanical. The reflection on *what life* is becomes more crucial than ever. What is technically possible is not necessarily ethically or politically so (cf. Habermas 2003).

Scientific reason or rationality alone will not suffice to guide us to a more sustainable future. Universities will have to combine knowledge and human values; otherwise they are in danger of sinking into the same moral apathy along with the rest of the information industry. Bawden (2004) suggests engaging in a liberating democratic discourse that allows a synergy between theory and applied knowledge, between scientific debate and moral arguments – just like Benner suggested earlier. Bawden, however, incites debate between the academic world and the civil society as well.

This would mean that academic knowledge would not be automatically thought of as the only truth that is more ‘rational’ than all other knowledge. Academic expertise could then even be questioned through common sense and morals. Within the academic arena, a widened interdisciplinary discourse might reveal how different power fields, such as education, science, economy, and politics, are interlinked. The debate on sustainability is multifaceted and can not and should not exclude anyone’s voice. An enlarged view of education, with more emphasis on understanding instead of mere information, and on stronger moral commitments, further highlights the qualities of multidimensionality and openness.

The relationship between education and sustainable development

Education has always emphasized the cultural features of humans more than the natural. The gap between humans and the rest of nature is being constantly renewed. It is a tremendous task to reverse the trend and to bridge the gap between human and nature through education. However, the future of humankind cannot be neglected as a marginal educational issue. It is in the most essential interest of all biological organisms to survive as species. Human beings are able to reflect on their own continued existence, but also on questions like present-day human rights, equity, and the rights of other forms of nature. The role of humans as natural beings interacting with other parts of nature in their daily life might need to be included

as an important introspective part in the education for the contemporary problematic and risky world. The examination of how humans relate and have related to nature in the past then becomes crucial, and includes the study of how natural resources have been used and distributed during all of human history. This in turn reveals political and historical indications about power struggles, equal/unequal interaction with other humans and moral opinions in altered circumstances.

In the current situation it is not enough anymore to educate people for special professions. A new kind of education could, therefore, be built on previous attempts to enlighten the world. An enlarged Bildung process could serve as basis for all other educational efforts. This could be relevant in a situation where individuals and groups in their search for sustainability constantly intermingle with strong anonymous global economical and political forces with contradictory interests.

Political and economic systems are getting more and more globally interlinked in a modern-day society. It has become increasingly difficult to understand either of the two without being a politician or economist. Everyone, however, should be entitled to such an understanding, as otherwise a considerable portion of the people in other professions will be excluded from important decisions regardless of their educational level. Even so, sustainable development cannot be ordered from top down. Otherwise, instead of a common, open and malleable process we will end up with yet another instrumental, maybe even economic objective that is endorsed through normative education. The sustainable development project itself must be subjected to open and critical discussion.

The skills of creating visions and making one's own choices both individually and jointly then become more important than learning to adapt to a ready-made world view. Learning for tomorrow is also about knowing the past, considering the present and recognizing oneself as a distinctive part of a larger entirety. Unfortunately, education cannot directly solve all current and future global problems, but higher education can nevertheless obtain a significant position in the debate. It is doubtless a tremendous educational challenge to balance freedom of individual actions in relation to the society, especially with

the societies at a distance in time or space, and not forgetting the nature without apparent legal rights.

Conclusion

The classical idea of Bildung could therefore still be relevant if we want to develop responsible political identities. That is why I wanted to discuss sustainable development within a wider context of education. It is the responsibility of universities to be at the forefront when it comes to evaluating the developmental trends of science and the human economy. This must be done both rationally and through open moral discussion. Higher education establishments must also take active part in the debate and action regarding the sustainable development of present and future societies. The only way for higher education establishments to systematically change our course towards sustainability is to ensure that all internal and external stakeholders take part in the discussion on tomorrow's society and education. At that point it becomes natural to bring both sustainable development and education to the discussion when considering such basic questions as to where education really is heading, what is the ultimate goal of higher education, what kind of world and life are we educating people for? Only then would European higher education institutions have assumed the leading role in coming up with creative solutions and initiating the forces of change needed to promote sustainable development.

Sustainable development is actually a difficult concept to define. This can, however, open up new opportunities for higher education to bring about new ways of thinking. Higher education establishments representing top knowledge institutions could hence take a key position in the joint creation of a new kind of Bildung, an important element of which would be discussion on sustainable development. This discussion would no longer be a detached monologue, but rather a communal one. It would be a dynamic and flexible synergy issue for different sciences and subjects so that science, education, art and practices are combined, transformed and developed. It would be shared by those affected by it and those participating in it, regardless of a person's position, qualifications, social status, or even age.



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9 Sustainable Development in Teacher Education

Taina Kaivola

Introduction

Finnish pupils have achieved exceptional scores in the OECD countries' Programme for International Student Assessment (PISA) surveys. As a result, Finnish teacher education has become the subject of keen interest. The standard explanation as to why teacher education is so successful is because teaching as a profession attracts talented young people, and that that is why so many apply for a degree in teaching, especially in elementary school teaching. Secondly, the fact that teacher education is based on research – just like any other academic subject – is also seen as an essential part of the recipe for success. Tuition in teacher education is based on information that has been accumulated through research, and every student studying to become a teacher does research. Students that have education as their major as well as those that have their teaching subject as their major and education as their minor engage in research and analysis that reinforce their identity as a teacher when writing their theses (e.g. Kansanen 2004; Niemi & Jakku-Sihvonen 2006). In their theses, students often analyse the ways teaching, studying and learning

processes, and teaching materials and tools operate in real teaching situations.

In this chapter, I will illustrate how the objectives of education for sustainable development have been included in Finnish teacher education and what needs to be done in the near future. More specifically, I will focus on teacher education for compulsory education in universities. Most of the examples are from my own university, the University of Helsinki.

Sustainable development as a cross-curricular theme in education

Students in initial teacher education become familiar with the national core curricula of compulsory school as well as other normative texts relevant to teaching, and the teaching material based on national guidelines during their educational studies. These studies include both theoretical analysing and teaching practice. Students do their practical training in the university's teacher training schools or in some other schools working in cooperation with the university. That is when prospective teachers get a practical introduction to the national core curricula in compulsory education and upper secondary education, and to the schools' particular curricula that are based on the national guidelines.

The Finnish National Core Curriculum for Basic Education (2004) introduces seven cross-curricular themes representing central emphases on the educational and teaching work. Their objectives and contents are incorporated into numerous subjects; they integrate the education and instruction of different disciplines. Through them, the educational challenges of the present and future time – including education for sustainable development – are met. The themes are as follows: (1) Growing up, (2) Cultural identity and internationality, (3) Communication and media skills, (4) Participatory citizenship and entrepreneurship, (5) Responsibility for environment, wellbeing, and sustainable future, (6) Safety and traffic, and (7) The individual and technology.

In a similar way, in the National Core Curriculum for Upper Secondary Education (2003), sustainable development is a theme that crosses all subject

boundaries and lends itself most naturally with the theme of Participatory citizenship and entrepreneurship. These cross-curricular themes are also emphasised in in-service teacher education programmes run by, for example, the Finnish National Board of Education in co-operation with universities and polytechnics.

The phrase “principle of permeability” is often used in connection with the promotion of sustainable development. The gist of this principle is that the central themes of sustainable development permeate – become an integral part of – all education and training both in terms of content and pedagogical practices. This is something that should come across in the practical running of the university as well. For instance, having one separate compulsory undergraduate course on sustainable development is hardly going to enforce the principle of permeability. In the worst of cases it can become just another course that you complete only because you have to.

Ways of implementing, and especially responsibilities, have to be designed for each faculty and department. The principle of permeability is not enough in itself. Professors should lead research groups on sustainable development, and develop teaching based on research that preferably involves several faculties working in partnership. At the same time, the whole teacher body should be able to encourage students to choose research topics for their theses that will lead to a deeper understanding of how sustainable development can be incorporated into their work as teachers and educators.

Sustainable development in educational studies

Since 1979, all teacher education for compulsory education in Finland has required a Master's level degree. The two-tier degree system was adopted in Finland 2005 and a Master's degree in education is equivalent to the second cycle degree in the European higher education system. Primary school teachers have science of education as their major and the topics of their Master's theses are school-related. Secondary and upper-secondary school teachers have their academic

teaching subject as their major and education as their minor. Teachers for vocational schools take their practical teaching studies in vocational teacher education schools hosted by certain polytechnics.

In order to meet the objectives of the Bologna process, a national curriculum development project was set up. At the start of the project, the representatives of all the universities involved in teacher education agreed on the principle that teacher education must equip teachers with research-based knowledge. Furthermore, skills and methods for developing teaching, cooperating at school and communicating with parents and other stakeholders were acknowledged as important competences for professional teachers at all levels of education. The aim of research-based teacher education is to combine academic and professional knowledge, that is to say theory and practice, in a meaningful way. The renewed educational studies (60 European credit units) of prospective teachers consist of three equal parts: general education, pedagogical content knowledge and guided teaching practice (Jyrhämä 2006; Niemi & Jakku-Sihvonen 2006:40).

Even though teacher education is geared towards the teaching of a certain subjects, the educational studies are common to all future teachers. Especially pedagogical content knowledge and the guided teaching practice in schools include options that make it easy to take into consideration the different aspects of education and training for sustainable development in real school life settings.

As was mentioned earlier, students who have their teaching subject as their major have educational studies as a minor. This, along with the practical training period, makes them fully qualified teachers. In the new two-tier degree system, which has just entered into force at the University of Helsinki, prospective teachers (both classroom and subject) have the opportunity of completing their two practical training periods either in one of the university's teacher training schools or then in one of the ordinary city schools and educational establishments in the Helsinki region that are part of the teacher training network. Teachers in these schools are well familiarised with the aims and content of teacher education, and know what areas needs special attention when a student is completing his or her guided teacher practice.

There are usually tens of students completing their work experience in a university's teacher training school, whereas city schools in the network will only have a maximum of two trainees at a time. Therefore, students in a non-normal school have the opportunity of observing the work that goes into developing curricula, how teachers engage with students outside curricula work, and they can get acquainted with the school environment as a part of the professional working community. In the university teacher training schools, on the other hand, trainees form a bigger group and their training happens almost entirely in the classroom even though trainees do get an overall picture of what being a teacher involves through mentoring. The advantages of completing a traineeship in the university teacher training schools as opposed to an ordinary city school are the lecturers that are used to guiding university students, students get to know other prospective teachers and they become familiar with the way the latest teaching-learning processes theories are being applied in practice.

Education for sustainable development in faculties connected to teacher education

According to UNESCO's definition of education for sustainable development, all fields of study must be involved. This has been a common shortfall in teacher education these past few years; in some areas of study sustainable development is looked at from many different angles whereas in some other disciplines even the concept of ecological sustainability is foreign.

Most of the prevalent challenges reported by members of the international network for reorienting teacher education to address sustainability can no doubt be recognized in Finnish teacher training. The findings of this representative group set by UNESCO fell into the following categories:

- Official national and provincial curriculums rarely mandate sustainability.
- Teacher certification guidelines do not mention sustainability.

- Lack of or inadequately trained professionals who are knowledgeable about ESD.
- Lack of or inadequate funding and material resources.
- Lack of or inadequate national, provincial, and local policy to support ESD.
- Lack of or inadequate institutional climate that would support the creativity, innovation, and risk-taking necessary to support transformative efforts to reorient education to address sustainability.
- Lack of or inadequate reward for institutions or faculty members who undertake ESD programs (Hopkins & McKeown 2005b).

For instance, a survey was conducted on teacher education in the arts and social sciences where recently graduated teachers were asked how they viewed their initial teacher studies. The survey was extensive, but only one of the questions of the interviews focused on sustainable development in particular. Interestingly, only two out of the 16 teachers interviewed remembered that sustainable development and its promotion had in some featured in their training. It is also revealing that when these teachers were asked to describe a definitive moment in their teacher education, not one mentioned a theme related to sustainable development (Kaivola 2004: 202–203).

Had the same questions been presented to geography or biology students or to any other students studying to become teachers in the natural sciences, the results of the survey would probably have been very different. The concept of sustainable development is firmly rooted in the natural sciences, because ecological sustainability and environmental protection are important themes in these sciences and their teacher education. The University of Helsinki's teacher education illustrates this tendency perfectly when two new subject didactic professorships were established in the behavioural sciences faculty a couple of years ago. One professorship goes by the name of geography and environmental education, the other biology education and sustainable development. At the same time, a lot of effort has been put into developing teaching in the teacher training of natural sciences in faculties of science and biosciences.

Addition has also been paid to increasing the cooperation and partnerships between society

and initial teacher education. To that effect, a new centre called LUMA was established in the Faculty of Science (Kumpula campus) in 2004. Sustainable development was a special theme of the centre in 2005, which was also the year of physics. The LUMA Centre promotes the teaching of biology, chemistry, geography, mathematics, physics and technology and enhances cross-disciplinary interaction between schools, universities and business and industry. The Centre also seeks to encourage children and young people to become involved in scientific activities. Abbreviation LUMA comes from the Finnish words for natural sciences (*luonnontieteet*) and mathematics (*matematiikka*).

LUMA Centre serves as a centre for education, research, development and co-operation. It organises two major events each year: a LUMA science day on the University of Helsinki campus during the spring time, and a whole LUMA week in the autumn, which is a national natural sciences theme week in schools and educational establishments. The centre organises several work shops for teachers, science clubs for school children and science camps for college students both during the main events and throughout the year. These are taught by university teachers and researchers as well as prospective teachers that have almost completed their studies. Sustainable development has featured in the titles of the workshops for teachers held in 2005, examples being Green chemistry in upper-secondary education; Green chemistry in primary and middle schools – soil and water; Sustainable development in the teaching of natural sciences; Unesco, teachers and sustainable development; Energy production according to the principle of sustainable development and Basic chemistry of hydrology in the spirit of sustainable development.

One of the events during LUMA week was a panel discussion on sustainable development. The panel had experts from different fields discuss education for sustainable development and life style choices. The event was attended by some hundred upper secondary students that had sent their questions to the panel either beforehand or during the event. Teachers could look up useful links and tips that had been posted on the theme week's web pages so as to help them assist their students. That same week, schools made

their own research and development projects, several of which were sent to the organisers of LUMA week so that they could be published and possibly even rewarded by giving the students a chance to present their project at next year's LUMA week. Roughly a quarter of the reports were on sustainable development themes.

Whether themes that promote sustainable development in education or sustainable development in general are included in the curricula of prospective subject teachers besides their pedagogical studies depends a lot on the academic subject. Also the fields of study that the students chose to participate in and take on as their research question for their master's thesis make a difference. Ecological sustainability is very present in the academic studies of geography, biology, chemistry and physics. Educational researchers who specialise in the teaching of geography have often also expertise in environmental education, and in biology for example a lot of the fundamentals of ecology go hand in hand with the promotion of sustainable development.

Research and development in chemistry takes the ecological and economical dimensions of sustainable development into consideration in many ways; cooperation between chemistry associations and businesses has become a permanent feature of the teacher training of future chemistry teachers. For example, in 2004, the teacher education unit of the University of Helsinki's chemistry department received Kesko's Sustainable Development Award in recognition of the teachers' on-line green chemistry package they had devised. Also the physical sciences, such as environmental physics and meteorology, are known as fields of research and development that incorporate ecologically, socially and economically sustainable development. Thanks to the publicity that international agreements on climate have received and the work that environmental organizations have put in, economically sustainable development and its promotion through, say, sustainable consumer choices have become more readily apparent in society. Sustainable development is an essential part of consumer education in the teacher education of prospective home economics and handicraft teachers.

In the teacher education of the arts and social

sciences, the absence of sustainable development in course titles and course content is more conspicuous than in the natural sciences even though the idea of promoting what is the 'good life' is not in contradiction with the fundamental values of these fields of research. Departments that provide teacher training need to be made more aware of the decade of education for sustainable development so that the goal of integrating sustainable development into all teaching in higher education is even partially achieved. Education for sustainable development can be easily integrated into the teacher training of first language and literature studies, foreign languages, history and social studies. Research into attitudes, values and appreciation are central elements of education for sustainable development, and they feature prominently in the teacher education of future psychology teachers (now considered a behavioural science) as well as religion sciences and theology.

At the University of Helsinki, the academic subject of environmental aesthetics and the departments of development studies and philosophy have taken an active interest in sustainable development. Unfortunately, due to the Bologna process, fewer students in initial teacher education can afford the luxury of studying entire minors comprising 25 to 60 study units in subjects that are not taught in compulsory schools. What is promising, though, is that students at the University of Helsinki can choose optional cross-disciplinary environmental science packages, and these include themes on sustainable development and environmental education. Most likely prospective teachers will be able to participate in at least some of the courses, and could incorporate them into their master's degree for example as compensatory studies.

International projects for ESD and lifelong learning

There are several national and international in-service training projects going on in universities that are trying to increase teachers' awareness of how education for sustainable development can be applied in practice. The projects often involve research and development activities.

One of the latest projects in this field financed by the European Union is Education for Change (EduC 2006). The project aims to enhance the competence of teachers, both school and university teachers, in terms of how to implement the concept of sustainable development in teaching and learning. The partners represent not only teacher educators of the Baltic Sea region but also NGO's like the World Wide Fund for Nature and Children's Environmental schools. The project is coordinated by the Swedish team consisting of academics from the University of Uppsala and environmental educators from WWF Sweden. In practice, the method used for implementing education for sustainable development consists of setting up study circles in compulsory schools for teachers. Study circles have turned out to be an effective means of informal education for peer coaching among adults. The support material and university level courses are disseminated under the umbrella of the Baltic University Programme focusing on fostering sustainable development in higher education in the drainage area of the Baltic Sea (BUP ESD 2006).

Another Comenius 3 projects funded by the EU that I have been engaged with was *the Training European Teachers for Sustainable Development and Intercultural sensitivity* (TETSDAIS 2004). The partners in this three-year project came from universities in Portugal, Spain (Balearic Islands), United Kingdom and Finland. Most of the academics involved were working in the field of teacher education, but national level school administration was also represented in the group. The participants shared common research interests in geographical and environmental education as well as in education for sustainable development.

The target audience for the project was European teachers and teacher educators. The main objective was to encourage the professional development of European teachers on the themes of sustainability and intercultural sensitivity and how to integrate the theme in school curricula to meet student needs. In order to achieve these goals, ideas were shared and discussed in depth amongst the partners and then summed up in three phases of action. First, the theoretical concepts connected to education for sustainability were clarified. Second, a questionnaire dealing with the environmental attitudes and values of 15-year-

old students was conducted in partner countries. Finally, the conclusions of these efforts were put into action during two in-service courses for European teachers arranged by the TETSDAIS partners and disseminated via research articles, materials and news on the project's website (see for example Cabral & Kaivola 2005).

According to a survey conducted during the TETSDAIS project's continuing education course, teachers thought that the solidarity and peer support engendered by the course as well as the co-operative learning activities that were used during the course helped them integrate education for sustainable development into their own teaching. At the end of the course, teachers considered the relationship between their work and the promotion of sustainable development.

Based on the interviews, these 15 teachers that came from seven different European countries put sustainable development into practice in the four following ways. (1) Separate projects related to either environmental education or ecological sustainability were mentioned most often. As to (2) values connected to subjects taught, teachers saw this as arising from the content of their lessons, and they also felt that the discussions and case studies that had been taken up during the course had considerably given them more focus in this respect. The most meaningful discussions, however, had to do with (3) addressing student needs in schools, mainly during class, and, (4) outside of school hours in the form of homeroom teacher duties and cooperation between parents and the school. Stemming from their everyday experiences, teachers were genuinely concerned about young people getting excluded. Teachers also felt powerless in trying to prevent their students from getting into the vicious circle of exclusion (Kaivola & Cabral 2004: 280–281).

The four themes just mentioned could work well as starting points for continuing education for teachers in education for sustainable development. Hopefully universities will become more interested in offering such courses during the UN's Decade of Education for Sustainable Development. In terms of promoting a socially sustainable development, preventing exclusion and identifying and helping students that risk getting

excluded is a very concrete task, and it is something that teachers need the support of continuing education for. Neither will one discipline or expert suffice to come up with the measures that will prevent children and teenagers from getting excluded and enhance their quality of life. A multi- and crossdisciplinary approach is also required in continuing education and teachers and other school staff need tools with which to make working together easier (cf. Hopkins & McKeown 2005a: 7). Research based teaching and sharing good practices play an important role in this as well.

10 Education for Sustainable Development in Business Schools

Liisa Rohweder

Education for sustainable development in business schools starts with the challenges related to the general societal and environmental situation and development opportunities for corporations. Since most business students go on to work in the private sector once they have graduated, it would be important to address following questions when planning business school education: Can enterprises become at the same time more responsible, competitive and economically sound? Is it possible to turn the short-sighted profit maximising to something else? In this chapter I shall consider the holistic approach and the transformative learning method as pedagogical approaches to the problem.

The sustainability challenge for business schools

Questions related to economical sustainable development have sparked a very animated debate, because business occupies such a central role in the process of sustainable development and the sustainable

management of globalisation. Depending on the goals and methods employed, enterprises can have a huge impact on the natural environment and social structures. The public discussion and stakeholders increasing interest to sustainability related issues have pushed businesses to take an active role in the process.

As a result, many companies, which have introduced policies for corporate responsibility, have found it profitable. Environmental management systems and integrated management systems have as well been judged by many companies as good business. Corporate social responsibility has been seen as a source of opportunity, innovation and competitive advantage (e.g. Porter & Kramer 2006: 1). Although the pro-activity in business life is increasing, it is still relevant to ask: how can a business be run in a sustainable way?

Because actors in business life have leading roles in the sustainable development process, their idea of what sustainable development is can turn out to be very significant in terms of the whole. Business is an area of society where economic rational thinking has traditionally set the framework and boundaries. Value rational thinking including inter-generational ethics (see chapter 4) bring the discussion to a new level.

According to a majority of economists (especially the proponents of neo-classical economics) and the business world sustainable business takes into consideration the ecological and social aspects within the boundaries of what is economically rationale. Nevertheless, the advocates of critical management theory (for e.g. Hart 1995 & 1997; Shrivastava 1995) have stressed a more value-based interpretation of sustainable development in business for over twenty years. When a business adheres to the value-based sustainable development, it integrates the ecological, socio-cultural and economic pillars of sustainable development into its business activities in accordance with what is considered just and the ideal of a good life. From the point of view of such a business, sustainable development is not business-as-usual; the business is founded on a completely new set of values.

This interpretation of sustainable development provides a strikingly new perspective of business management. The operations of the business will not

only be judged according to its economic performance of today but also according to the way its activities economically, ecologically, socially and culturally will influence future generations. This will not be possible without a paradigm shift in the values and attitudes that are currently prevailing in organizational thinking.

Business schools traditionally opt for the interpretation of sustainable development, which is in line with the prevailing paradigm accepted by business life. Critical management theory, however, questions the fact that business schools simply accept the dominant social paradigm (e.g. Alvesson & Willmott 1996: 204; Alvesson & Deetz 2000; Bradbury 2003; Kearings & Springett 2003; Welsh & Murray 2003; Brown & Macy 2004; Thomas 2005). If one is going to endorse the value-based approach of sustainable development in a business school, the teachers in charge of the education must open up their own epistemological commitments and those of the educational institution.

The epistemological commitment of a higher education establishment should, in my opinion, be hermeneutic. Hermeneutical epistemology states that the world can be explained in several ways and that it can only be approached in a holistic manner. From this perspective it is essential to encourage the teachers and students to value rationale thinking and to evaluate the dominant economic rationale (Springett 2005: 147).

Holistic approach combined to transformative learning method, which I originally developed in my doctoral thesis the year 2001 (Rohweder 2001a), is one possibility to take these aspects into consideration in education for sustainable development in a business school context. A holistic approach and transformative learning method leave it to the students themselves to figure out the meaning and goals associated with sustainable development (Rohweder 2004). Holistic approach accepts that profit making and economic soundness are the aims of businesses, but it also rises up the value related dimension of sustainable development. The starting point is that by providing jobs, investing capital, purchasing goods, and doing business, corporations have a profound and positive influence on society and on wellbeing of people. On the other hand, perceiving sustainable development

as shared value rather than as environmental damage control or as a PR campaign will require dramatically different thinking in business (e.g. Porter & Kramer 2006: 13).

Using the holistic approach to gear ourselves towards sustainable development

The holistic approach is based on the underlying principle of environmental education whereby education about (knowledge), education for (values) and the promotion of action for sustainable development should have equal weight when planning the learning process (e.g. Palmer 1998; Rohweder 2004). This is also in accordance with the critical environmental management research, which stresses

that values and attitudes need to change before a company can engage in inter-generational pro-sustainable business.

Applying a holistic approach in education for sustainable development helps students become aware of their place in the surrounding society and environment – thus clarifying the role of companies in the big picture; Successful companies need a healthy society. At the same time, a healthy society needs successful companies. The holistic approach strives to guide students in their own decision-making and to make them aware of the consequences that their decisions may have, i.e. to make them enlightened citizens. Teaching will then focus on constructive thinking, creative problem solving and constructive procedures for sustainable development instead of specific theories and methods. Figure 1 depicts the different dimensions of the holistic approach.

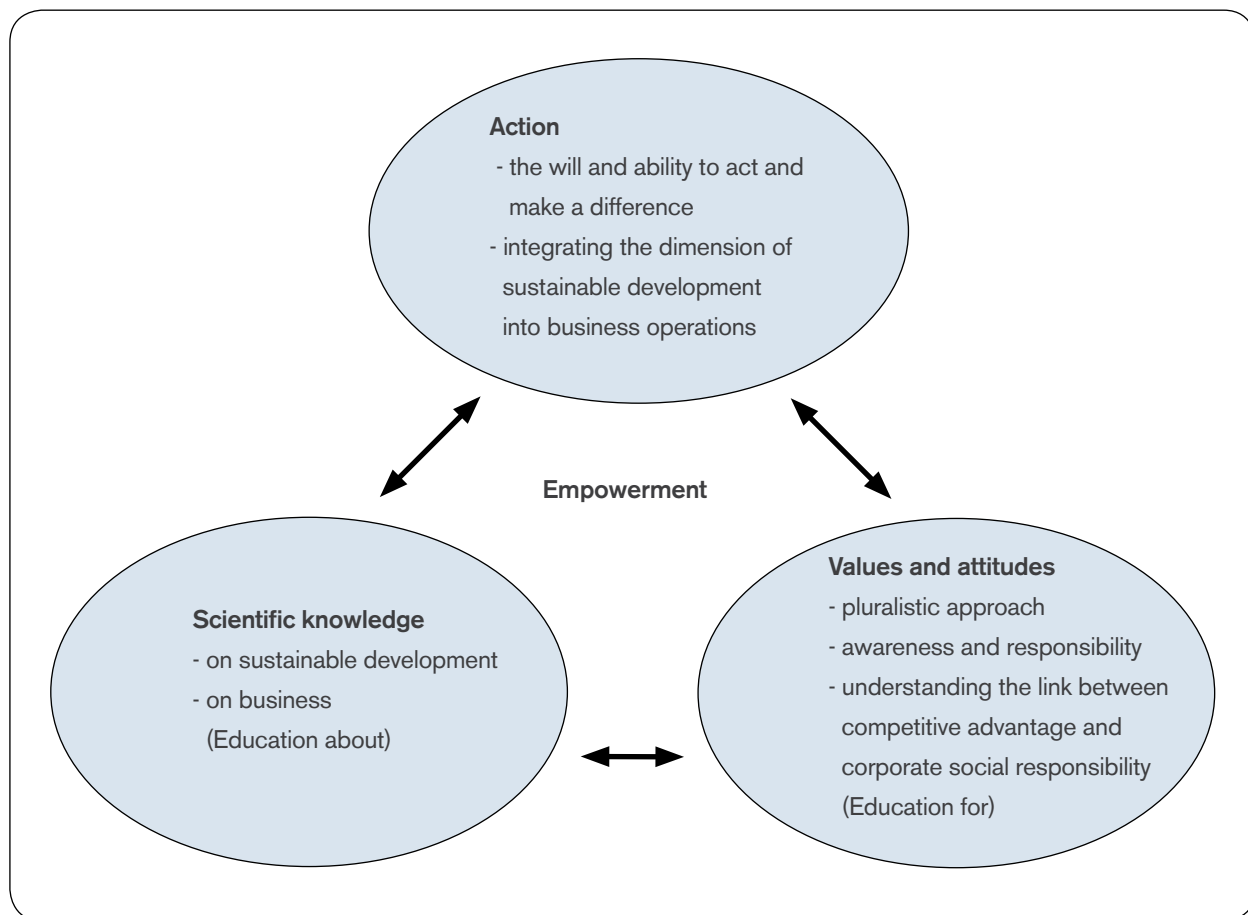


Figure 1. The holistic approach in business schools for sustainable development.

Although the holistic approach emphasises the meaning of values and attitudes, it is not about force-feeding students certain values. It is about value pluralism. When values are acknowledged and made transparent, students acquire an analytical approach to information and they become conscious of their relationship to life, the environment and the role of businesses in society.

Higher education tends to shy away from teaching that explicitly affects values and attitudes. Firstly, there is a belief that attitudes and values are shaped during childhood, and secondly, the general rule is that higher education should strictly focus on objective information and not subjective values. Many researchers, however, believe that cognitive development necessary to ethical thinking continues throughout life and that ethical thinking is a worthwhile and rewarding endeavour no matter what age one is. Moreover, one should not forget that all information is tied to values and interests as well. While it has been recognised that societal decisions are not value-free, not much attention has been given to the fact that information or facts are never value-free either.

Furthermore, it must be acknowledged that value and information-based teaching cannot be separated from one another. Values motivate learning and vice versa. When information on environmental or societal questions is presented in relation to a student's world view, values and background, a student will be more motivated to assimilate the information. Information on sustainable development increases a student's sense of responsibility and sensitivity to related issues, which are fundamental elements of responsible behaviour.

A transformative learning method

The holistic approach can be put into practice using a constructivism based teaching method called transformative learning. It has its roots in organizational learning theory and it also draws on the theoretical basis of environmental education (Rohweder 2004). In transformative learning student centeredness, collective and contextual approach to learning play central roles. Sterling (2005a) and Wals

(2006) are also strong proponents for the importance of integrating these aspects into the learning process in higher education.

In the transformative learning method student is in the centre of the learning process. The student is responsible for learning and the role of the teacher is to guide and encourage the student instead of being an authority. Teacher needs to instruct students to grasp concepts, to assimilate information in a constructive manner and to develop the skills needed in the subject at hand. Student-centricity sees the student as an active participant who builds and creates information and who is then capable of assimilating newly learnt experiences to previous knowledge and who can accommodate earlier information constructs to better correspond to new circumstances. Transformative learning is all about the learning process and not the learning result. In other words, the focus of education is what happens after a student has left the business school, and how the process that was initiated during education is to continue once a student is in business life.

One could say that the goal of transformative learning is to get rid of "business as usual" – thinking. It implies searching inquisitively into new ways of thinking and proceeding. "Traditional" learning as opposed to transformative learning can lead to situations where existing practices are taken as a given. For instance, when a problem related to sustainable development arises students try to solve it based on past experiences and traditional models. Teachers' role in transformative learning is to encourage students to solve the problems from a new perspective and prepare them to face the unknown. The objective is that the student distances him- or herself from the sort of thinking where the reasoning is that "this is how it has always been done or thought of". Learning for sustainable development requires that the complex nature of phenomena be acknowledged and that the whole be understood. Students need to be able to elaborate alternative solutions, take decisions and critically evaluate consequences and the new possibilities and challenges that may arise from these consequences.

Transformative learning is a collective process of teachers and students (Wals 2006:49). The method supposes the teachers to consider themselves learners

as well. For students to become involved in something requires active participation and a dialogue with co-learners and teachers. In transformative learning method students construct their own information and solutions to problems in co-operation and dialogue with the others involved in the learning process. When a student practices decision-making related to sustainable development in a collective learning situation (e.g. problem based or contradictory information), his or her ability to manage conflicting situations (which are inevitable in changes that promote sustainable development) will improve. This is also a way to develop students a sense of ownership in the learning process (Wals 2006: 49).

Transformative learning emphasise the importance of an open learning environment (contextual learning). A human cannot live in isolation away from society. Constructivism stipulates that learning and the object of learning are an indistinguishable part of the socio-cultural framework in which the learning takes place. This implies that information is always constructed in a certain context and that a person will put together a picture of the surrounding reality and him or herself by selecting and interpreting information and by reflecting on the feedback that s/he gets on his or her actions. It is a challenge for teaching to develop authentic and inspiring learning environments that give students the opportunity to practice their skills. When looked at from this angle, the rigid disciplinary structures that block systematic and holistic ways of looking at the world need to be broken down (See also Wals 2006: 46).

Conclusions

The role of business schools in the sustainable development process has only recently become an issue discussed (Galea 2004; Egri & Rogers 2003). This can be due to the fact that education for sustainable development in business schools has a rather short history (Rohweder 2001b; Roome 2005: 160). Presently, education related to sustainable development is based on traditional economic and business life thinking (Springett 2005: 148). As education for sustainable development has turned out

to be difficult in business schools, it would appear that sustainable development is the challenge of a decade for them (Roome 1998; Pfeffer & Fong 2002; Wheeler, Zohar & Hart 2005; Rohweder 2003).

According to Marshall (2004), among others, a profound revision of curricula and teaching methods is needed to ensure that sustainable development gets taken into consideration adequately. The integration of sustainability will never lead to anything fundamentally new if the institution is not prepared to re-think its academic mission. Thus, it is important to take into consideration the following points when formulating the goals of education for sustainable development in a business school:

- What is the role of business in society?
- What is the aim of education from sustainable development perspective?
- Is education for sustainable development based on pedagogical content knowledge or is it based on the general teaching traditions of the institution or science in question?

In this article I have given one idea of how to transform business education towards sustainable development. If the holistic approach and transformative learning method are accepted, it would be important to take into account the following elements when planning the content of separate courses or the whole curriculum:

- giving due recognition to the experiences and knowledge that students have acquired prior to their entry into business school,
- accepting value pluralism,
- accepting that no information is value free,
- developing critical and democratic thinking,
- making students aware of the many different choices and their consequences and
- providing students with tools to deal with conflicting situations.

In a post modern world, pathways towards sustainable business schools or other higher education institutions are unlikely to develop without friction, controversy and conflict as the world is characterized by diverging

interests, values, perspectives and constructions of reality. The nature of sustainability requires a fundamental change of epistemology, and therefore for education. It is not a small challenge, but it is worth-while aiming towards. As Sterling (2005a:50) puts it:

Sustainability is not just another issue to be added to an overcrowded curriculum, but a gateway to a different view of curriculum, of pedagogy, of organizational change, of policy and particularly of ethos. At the same time, the effect of patterns of un-sustainability on our current and future prospects is so pressing that the response of higher education should not be predicted only on the "*integration of sustainability*" into higher education, because this invites a limited, adaptive, response... We need to see the relationship the other way around – that is, the necessary transformation of higher education towards the integrative and more whole state implied by a systemic view of sustainability in education and society.

11 Promoting Sustainability through University Education and Research in Technology

Simo Isoaho and Tuula Pohjola

Scientific and technological knowledge occupy an increasingly important role in all societies whether they are developed or developing countries. All political strategies stress education and research as being one of the key components for implementing these strategies, as is also the case with sustainable development.

This chapter studies the various aspects connected to universities in their efforts to promote sustainability through education and research in technology. We shall first look at the societal role of universities, the challenges of sustainability and the potential of education and research for sustainability, after which we will discuss training in environmental and sustainability management.

Universities and technology

All universities have a special societal role: to maintain and to increase understanding of humankind in their respective societies. They are expected to produce understanding that creates new opportunities for common welfare. They should also study human activities scientifically through critical thinking so as to improve human life patterns. This is why political institutions have considered the scientific autonomy of universities as being one of the key constitutional rights in many countries. It is important to remember this background when we think of universities as promoters of sustainability within our societies' political and economic systems, as that is where the patterns of development are determined, i.e. what is important to do and not to do. People with university degrees are messengers of these issues as specialists and citizens. They are the ones who can develop the necessary knowledge and skills for doing things differently.

Technical devices and solutions have greatly benefited human life. People can protect themselves against natural conditions with better clothing and housing. Means of agricultural production and transport have diminished dependence on local parameters in nutrition. The amount of physical work and occupational dangers has decreased for many people. Through telecommunication people have increasingly better access to information. In large part thanks to technologies, the lives of many have gained in amenity, sometimes also content of life via various experiences.

Finnish philosopher George von Wright (1992) wrote that technological innovations have evidently blessed humankind in many ways, but that their long term influence on our physical environment and psychic welfare may become problematic. He is particularly concerned as to whether the present technological production patterns are biologically sound for human beings. He is not only referring to the relationship between man and nature, but also to our mental capabilities to deal with complex technological systems. His worries can easily be seen as justified when we consider, for example, existing human health risks caused by changes in our chemical

environment and loss of biodiversity, the use of technologies in violent systems, and the possible negative effects of our present life style for future generations.

It is obvious that present day universities are executing and searching for their societal role in the "cross fire" of various, sometimes even contradictory, interests coming from political and business actors. It is a big challenge for universities to produce understanding that particularly from a sustainable development perspective would help decision-makers to combine various policies and strategies coherently. Can universities respond to this challenge by only deepening their activities as more and more sector based and applied understandings? Or should they also return to the fundamental questions, such as what is scientific knowledge compared to knowledge generally; when should university activities earn the status of scientific work? Keeping these questions clear and active in our minds would minimize the creation of false morals and beliefs, unintentionally or purposely, in the name of science.

René Descartes (1641) points out how reasoning can lead to errors. He begins by arguing that human willpower always has wider limits than our understanding. Then he points out that the power of willing or the power of understanding is not itself the source of errors; errors only arise when our willpower becomes greater than our understanding of the issue concerned. This wisdom from the early era of the development of modern sciences was already calling for ethics in science. Successful minimization of scientific errors would maintain and increase the sustainability basis of our societies. It seems that particularly (this poses considerable risk) avoiding of scientific errors is remarkable challenge for applied sciences, traditional ones as well as new ones.

Sustainable development, the test of humankind

Sustainability and *sustainable development* are commonly used both in private and political contexts as positively valued expressions. Sometimes the political jargon of sustainable development seems

to be used also in academic writing almost as such. This is most typical when speaking about the three parallel pillars known as the ecological, economic and social dimensions. Use of such jargon suggests that the ideas and the principles of sustainability are clear and self-evident. However, many deeper studies (e.g. Rees 1990) about sustainability point to the opposite. These two conflicting understandings may form a crucial hindrance to progressing beyond what we have already achieved in our societies. The dilemma can be seen, for example, so that universally many political strategies have only two categories for this issues: “sustainable” and “others”. The category for non-sustainable has been omitted. Such an approach tempts people to see sustainable development as just one sector among many others. However, the big challenge is precisely to integrate the goals of sustainability into all human activities.

It seems that conceptually there is a need of only two main approaches for steering human paths towards higher sustainability. The ecological approach shows human life in the context of nature (ecological systems on various levels); our dependency on abiotic and biotic factors and the prerequisites of life. The social approach shows what we are as human beings towards each others and how we as a biological species are consuming natural resources and changing ecological systems. Sustainability represents a harmony which should exist between ecological and social factors to maintain human life.

The anthropogenic material and energy flows (products, wastes and emissions) and the related changes in our environments are created by human social systems, i.e. modern humankind is using natural resources primarily for organizing social relations among individuals and among aggregations of human beings. Politics, economics, education and research are the key processes of the social approach through which social relations are organized.

To make it highly effective, the issue of sustainability requires two education approaches: a) training of specialists, for e.g. environmental engineers, and b) training which is integrated to the all other fields of specialization in universities, for e.g. law, sociology, economics and electrical engineering. The latter approach is necessary for three reasons. Firstly, despite

their academic training, university graduates as citizens need to understand the sustainability issues that correspond to their qualifications. Secondly, proper cooperation between specialists in sustainability issues is the basis for fruitful communication. Thirdly, only specialists are capable of implementing the changes that concretely promote sustainability, for example, when an architect designs a building. The Tampere University of Technology has adopted the approaches prescribed above so as to promote sustainable development in a comprehensive manner.

Technological knowledge for promoting sustainability

Technological knowledge focuses on the management of anthropogenic material and energy flows. The overall goal for sustainable development is the technical per capita minimization of material and energy consumption, emissions, materials to be discarded and changes in biodiversity of species and albedo of the atmosphere and surface of the earth. Technological knowledge can also be used to enlarge the potential of the social availability of products.

A product, when understood widely as a material product, energy or service based on energy and material products, is the first key concept in applied technological knowledge. Our human needs give reason to the product. From the point of view of sustainability, a product network (Isoaho & Nurmi 2006) is the second key concept. When all the products needed for production of an individual product can be identified, we can trace all the producers and activities and their respective premises and production locations. The product network provides us with the information we need to calculate overall energy and material consumption, emissions and wastes, and to locate harmful changes in our environment. This information is important in both the ecological and social approaches. In the ecological approach we can identify the actions that are most effective and the locations for implementing them within the product network concerned. Also, considering research and development activities, the product network should be the minimum with

which technological innovations are valued from the viewpoint of sustainable development.

Considering production sites as companies or public utilities, the main goal is to maximize the use of raw materials and auxiliaries for the products concerned and the transfer of these products to the consumption markets with minimized losses. This all requires good housekeeping, and especially quality management, storage and transport management, energy management, environmental management and overall risk management, and their regular upgrading. Preventive maintenance, advanced process control, product and production design and use of environmental technologies and possibly external environmental services for minimizing emissions and the amount of discarded material are key actions of the modern production. The key issue is continuous improvement; to make products with less material and with less harmful materials, with lower energy consumption levels and with reduced emissions. Making products recyclable after they have fulfilled their initial function is a challenge of today. It should be possible to prolong the effective life span of a product with repair, modifications and new components. These issues are an important part of environmental management at the company level.

Training in environmental management

This part of the chapter focuses on the role of environmental and sustainability management in engineering training. First, the text gives a brief review of environmental training in Finnish technical universities, and also on the past of environmental management in production industry. Then the importance of environmental management will be considered and finally the necessity of enlarging the training focus on sustainability management will be discussed.

Historical review of environmental education in Finnish technical universities

The 1960s became in many developed countries a decade representing a political breakthrough in environmental awareness. Since then among others USA and Nordic countries have been pioneers in passing environmental legislation. Also, during that era the first efforts (USA in 1970) on environmental impact assessment (EIA) were done, although around twenty years later EIA became more widely into use. Also in Finland, the basis for extensive environmental protection created in the 1960s, during which e.g. the environmentally oriented laws on water pollution and use of waters (based on the revision of the Water Law from the year 1902), targeting especially the forest industry and municipalities, were passed. Waste Management Act and Air Pollution Control Act came into force in 1978 and 1982, respectively.

Forty years ago, the focus of environmental education was mainly on various engineering solutions for decreasing the waste water loads generated by industrial facilities and municipalities. Concepts such as environmental management or corporate social responsibility were not known, and knowledge about harmful environmental impacts was much more limited than now. Helsinki University of Technology started the first introductory study course on ecology in the beginning of the 1970s. First study courses on environmental engineering for e.g. air pollution control and waste management were established a bit later. Also, a multidisciplinary approach in organizing engineering education had not yet been accepted as widely as it is now. Although wider perspective literature was already available in the 1970s (e.g. Baumol & Oates 1975) it took over a decade before this knowledge was started to be included also in engineering studies.

The 1980s and early 1990s was a period in which quality management systems were introduced and established in companies. Following “the quality period”, a new tool known as Environmental Management System (EMS) was developed in the beginning of the 1990s. The British Standard BS 7750 was the first one, published in 1992. Since then

a standardized environmental management approach has been progressively developed, according to the international environmental standard ISO 14001 and the European standard EMAS, Environmental Management Audit Scheme. The roots of environmental management training also reach back fifteen years, to the publication of the first books on environmental management in Europe. However, environmental management is quite a new field when considered alongside the training programs of universities in Europe or other industrial countries. Development in EMS standardization has also led to new elements in environmental management studies; looking at how to build an EMS and how to apply the standards. The new topics, such as environmental accounting, environmental risk management, design for recycling, life cycle assessment, material flow analysis and corporate social responsibility have been included to environmental education curricula.

Environmental versus sustainability viewpoint to business operations

Environmental norms and standards are important basic drivers for companies to manage environmental issues and to develop strategic planning. However, today this is not enough. The persons responsible for environmental aspects of production, products, or the supply chain, should be aware not only of current and upcoming environmental legislation in operational processes but also of current and future requirements posed by company shareholders, media, and other stakeholders and interest groups. Furthermore, other important driving forces that should be dealt with quality and environmental standards are environmental risks and liabilities as well as “greening competition” in general. Science and technology opportunities or “push” emerging from research, development and innovation activities offer continuous and inexhaustible opportunities to develop more sustainable energy and material technologies. From this perspective, the hypotheses of Porter and van der Linde (1996) on the crucial importance of environmental issues to future competitiveness of companies are still of great relevance. According to their conclusion, the way an industry responds to

environmental problems may in fact be a leading indicator of its overall competitiveness. They see that a truly competitive industry is more likely to take up a new standard as a challenge and respond to it with innovation.

The tradition of environmental education has laid the basis for education for sustainable development. In the field of environmental education, models for planning, teaching and learning have been developed. Corresponding procedures and models for sustainability management (SM) are mainly still missing. Despite the confusion which in some extent seems to exist about whether the sociological and socio-economic aspects of SM should or should not be included in training, some important themes have been agreed. These are e.g. equality, democracy, global citizenship, justice, multiculturalism, human rights, anti-racism, participation, sense of community, co-operation, poverty-reduction and prevention of marginalisation. Principally, there is no need for a big debate about topics to be included in SM training, because none of the topics can hardly make harm for anyone if they are taught by respecting the codes of science. Sustainable development is a story about everything and everybody.

Although the social and economic aspects of sustainable development are as equally important as ecological sustainability, the emphasis in present training is still often traditional focusing on ecologically and also economically sustainable development. For example, Rohweder (2001a) writes that environmental training in Finnish business polytechnics is mostly focused on economic and ecological issues lacking the aspect on socio-cultural dimension. The focus of future training programs should be built on the main topics of corporate social responsibility; the economic, ecological and social aspects. In the long run, our global business has to be based on sustainability management because if we do not take care of the planet and people we have no resources with which to operate a global business.

May corporate social responsibility (CRS) become true in business?

In all Finnish technical universities (Isoaho 2002), the training in environmental management has been offered to all students in some extent, mostly as voluntary basis. Training in sustainability issues is still limited to fewer number of study courses. There seem to be a clear demand for developing training in sustainability management as a part of strategic overall management in business, in order to increase knowledge of corporate social responsibility for future experts and managers educated in technical universities. One training model could be MBA (Master of Business Administration) courses, which cover the three areas of CRS: economic, environmental and social responsibility. The MBA courses could also be offered to academic employees who are already dealing with environmental and social issues in companies. These kinds of MBA courses would support companies for improving the performance of their business operations from economic, environmental and social viewpoints.

Industrial countries like EU countries, USA, Canada and Australia have undersigned many international programs for improving economic, ecological and social issues. Business cultures in sustainability management will develop only slowly, if issues of sustainable development are not systematically included in strategic overall management, and if managers are not committed also to these ethical principles and values. If managers lack sufficient knowledge of corporate responsibility and its main aspects – economic, environmental and social issues – sustainability management cannot be properly accomplished in organizations. Corporate social responsibility can be improved when the top and middle management is educated to integrate not only financial issues but also environmental and social issues in strategic overall management.

12 Sustainable Development in Natural Resources and Environment Studies

Anne Virtanen and Anne-Marie Salonen

Sustainable development is a formidable challenge for the natural resources and environment studies. The concept of sustainable development arose out of an acute awareness of environmental problems and a concern for nature's reduced carrying capacity. The sustainable exploitation of natural resources will require a whole new level of awareness and an alternative way of doing everyday things with nature no longer being perceived as a resource for the taking but rather as a habitat for other living creatures and future generations. Professionals working with natural resources and the environment are in a key position when we seek to find ecologically sustainable ways of exploiting, shaping and protecting our living environment so that its economic exploitation, cultural diversity and social well-being are ensured in the future.

What does sustainable development imply for people working within the natural resources and environment branch? What would expertise in

sustainable development entail? These are the two questions we shall focus on in this paper. Through examples, we will demonstrate how the different dimensions of sustainable development can be taken into consideration in the training leading up to such expertise.

The many different meanings assigned to nature and the environment

The underlying assumption of the sustainable development discourse is that there is something untenable, or unsustainable, about the present situation. Unsustainability is understood differently depending on where you are coming from: natural sciences are concerned about the imbalance in nature's ecology; the social and health sciences believe the well-being and health of people and communities needs attention; economics interpret the insufficiency of natural resources and global business as a threat to economic growth and stability and so on and so on. With the natural sciences and environmental branch what is at stake are the ecological aspects of nature. The unsustainable use of natural resources, acidification and eutrophication, the rampant use of synthetic chemicals, climate change etc. – these are what originally sparked the environmental debate which has been going on since the 1970s. In the 1990s, a new concept – sustainable development – became an important part of this debate because it has served to draw attention to economic and socio-cultural factors as well as ecological ones.

If we are to be completely honest with ourselves, it must be said that environmental questions and the discourse on sustainable development all stem from an anthropocentric way of thinking. Threats to nature's ecological system cause concern, and yet environmental problems are largely engendered by people and the prime goal of sustainable development is to preserve the planet for our future descendents. The conceptual idea of an environmental problem is based on a modern-day utilitarian notion of the environment and nature: nature, natural resources and the environment exist for the sole purpose of man. In

the long run, such a way of thinking is short-sighted, because it does not take into account the finiteness of natural resources nor does it take into account the limited capability of renewable resources to renew themselves.

As environmental problems have become more acute, and people more aware, people's perceptions of nature and the environment have gradually altered. Some have started to use the term ecocentric, which refers to a nature-centred approach, to describe this shift (cf. O'Riordan 1989; Pietarinen 2000). According to the ecocentric approach, humans must adapt their life styles to nature's conditions meaning that people can only exploit nature in so far as this does not jeopardize nature's ability to renew itself. The ecocentric approach represents post-modern thinking, and with it the opportunity to participate, holism, the search for stability, the environment as a social construct and feminism (Scott & Gough 2003: 51). The notion of sustainable development, on the other hand, recognises that nature sets down limits to what humans can do, but it does not turn a blind eye to economic competitiveness or social needs.

If sustainable development is our aim, we need to review our understanding of what we mean by "environment". The modern concept of the environment is based on natural science: the environment is something physical that can be touched and observed. The idea is that the environment can be studied using scientific methods, and that scientific methods can also help us understand environmental problems and discern solutions for them. Making a chemical analysis of the environment, evaluating the condition of waterways, observing changes in flora – these are all examples of how the state of the environment can be assessed and restored in a scientific manner.

In addition to the objective and dispassionate approach just described, nature and the environment can be looked at from a subjective, humanistic point of view. "Environment" and "nature" do not mean the same to everybody; our personal observations and experiences imbue our perceptions of the surrounding environment with personal meaning. We could use the phrase *mindscape* when we refer to subjectively interpreted and experienced environments that

we physically share with other people. There is a particular concept of “place” inherent in mindscapes and subjective environments. In the humanistic approach “place” refers to living environments that carry personal meaning – to places that we live in. We can, therefore, make a distinction between the abstract theoretical concept of nature (space) used in the natural sciences and the subjective meaningful environment (place) used in the social sciences. From a humanistic point of view, a place cannot even exist without a person that chooses to make that particular place in nature his or her surrounding, his or her environment. Only a person living in a particular environment, a particular place, gives it meaning.

The environment and nature can also be seen as being socially constructed. Socially constructed in the sense that on the one hand you have environments shaped by humans and on the other you have environments and parts of nature that we assign particular meaning to. For the most part, these are socially shared meanings; we observe what is around us and we designate discursive meaning to what we see in a manner that we are used to when speaking about nature and the environment.

These are all very important points to remember when we consider the ways in which education for sustainable development could be integrated into natural resources and environment studies. Traditionally, these branches have approached the environment as a reality that can be physically sensed and objectively observed. Contaminated waterways, changes in flora and fauna etc. – these are all approached using methods from the natural sciences. One should not forget, however, the subjective or personal when contemplating criteria upon which to evaluate a sustainable living environment or nature’s carrying capacity. The same physical environment can mean different things to different people: one will consider it his or her neighbourhood, another will remember it from their childhood and a third person might think of the area as a source of material and income. In terms of the natural resources and environment sector, sustainable development is a social way of thinking; it is a question of finding more sustainable solutions to socially defined problems that stem from “unsustainable” ways of proceeding and producing.

Engaging sustainable development in the field of natural resources and environment

People who have received their education in the natural resources and environment sector will go on to work in nature businesses, in the environmental departments of companies and municipalities, in organizations; they might also end up working as educators themselves or in various development projects. Sustainable development acquires a more specific meaning once it is looked at in individual sectors; the forestry and timber sector will not be wrestling with the same problems as the agricultural one or the landscaping one. Even so, sustainable development is bringing together very different sectors in the sense that people are moving away from the modern dualistic way of perceiving the world towards a holistic integrated perception.

The underlying assumption of the natural resources and environment sector is that the ecosystem and natural resources set a limit on what humans can do. This in turn is connected with economic profitability and whether an activity is acceptable to society and the community. These premises also provide the groundwork for the Finnish Government’s sustainable development programmes. In 1998, the government adopted a sustainable development programme where sustainable development is said to be the sustainable exploitation of natural resources, balanced economic growth and ensuring that the prerequisites of well-being are passed on to future generations. In 2005, the government adopted a well-rounded programme for sustainable consumption and production that addresses a wide spectrum of sustainable development related themes. It paints a vision of increasing well-being nationally and globally within nature’s carrying capacity (Kohti kestäviä valintoja 2006:5). Self-sufficiency in food production, local and organic food production as well as nature businesses are now aspired goals of a sustainable development society.

Environmental technology, renewable low emission energy sources and the extended and efficient use of present structures not only make ecological sense but economic sense as well. Lately, the social dimension has gained more ground, and the most important

thing at this stage for the natural resources and environment sector would be to adopt an integral approach to sustainable development. It is not enough to pay attention to nature's ecological carrying capacity or whether production is economically efficient because the environment, nature and natural resources have social and cultural meanings assigned to them as places of residence, as sources of health, well-being, recreation and communality.

Figure 1 demonstrates how sustainable development and its dimensions link in with themes in the natural resources and environment sector. The important thing is to realize how the dimensions of sustainable development are interconnected. It is also crucial to take note of the fact that sustainable development does not only mean nature conservation and dealing with environmental problems. It is also about social well-being, cultural diversity and economic growth.

Sustainable development is a global concept. It has been argued that economic processes are connected to changes that are happening in different areas, these being, for instance, relocation of companies, the "placelessness" of capital and the logistical chain of production. Similarly, changes in local activities and environment will have global repercussions in some way or another. We will now turn our attention to the pedagogical themes of the natural resources and environment sector. We will be looking at them from a regional, Finnish perspective.

Forestry and the timber industry

Around 70 %, which translates as 20 million hectares, of Finland's surface area is covered by forest. Most forests are managed efficiently, which means forestry plays a central part in how nature is valued over time.

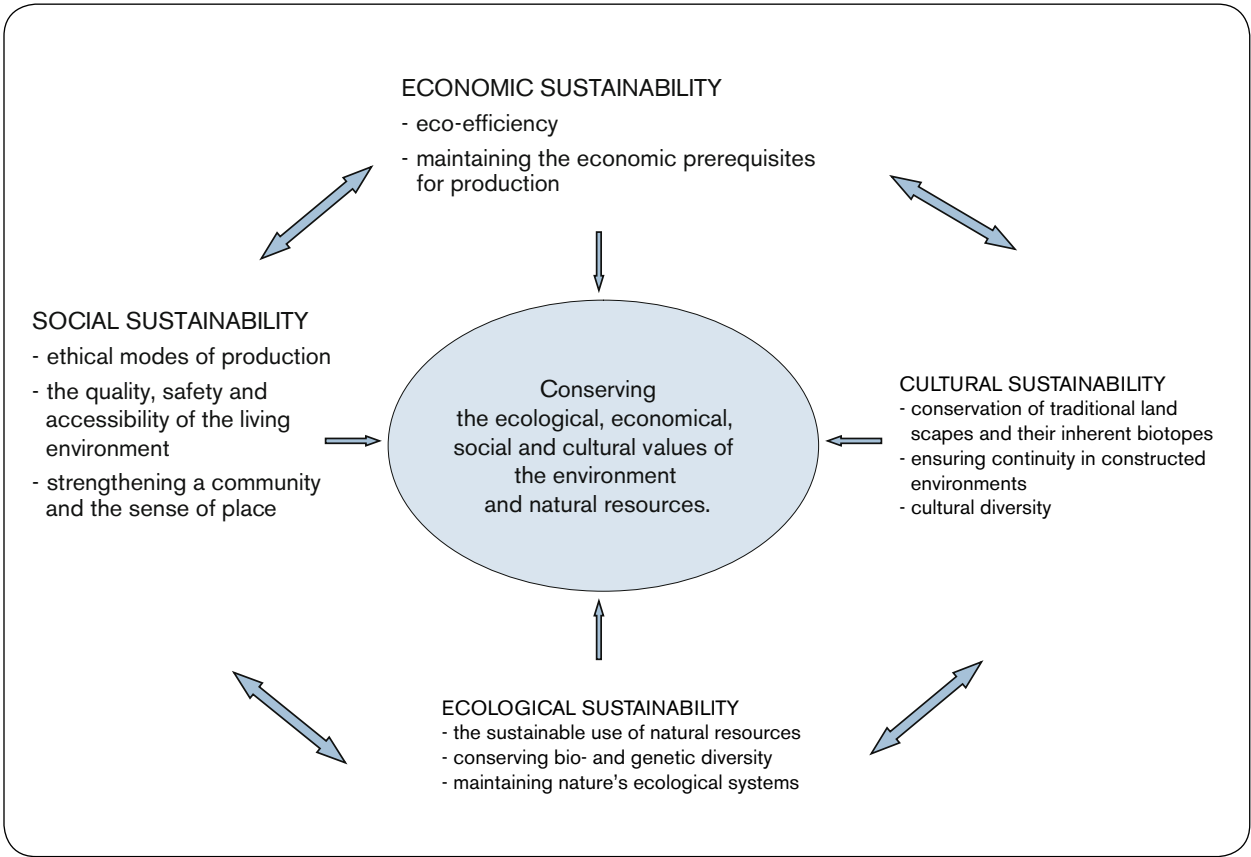


Figure 1. Where sustainable development and the natural resources and environment sector interconnect.

Forestry has an effect on biodiversity, the landscape and economic development. The active management of forests accelerates tree growth and economic output, but this is often at the expense of biodiversity and waterways. Landscapes change too as a result. Then again, depending on how you look at it, commercial forests offer open recreation areas. Conservation areas are established so as to preserve the biodiversity of forests. Natural elements also contribute to this: storms, fires caused by lightning, insects and fungi. Alterations caused by forestry are in many ways detrimental to the life cycles of many species, which in turn affects biodiversity. For instance, lack of rotting wood can cause endangered species to go extinct. This is more widely recognised in modern-day forestry, which is why not all debris is cleared and some wood is left to rot once logging has occurred. Even so, forest machines leave behind engine grease and carbon emissions that are incompatible with the forest's ecosystem. (Hakala & Välimäki 2003: 312–327).

Sustainable forestry and timber production takes into consideration the whole forest sector, i.e. from afforestation to logging all the way to pulp and paper mills. Gaining control of the whole chain of production means evaluating customers' preferences regarding paper and tree use, and steering them so as to have them favour recycling and recycled paper products. It is no easy task finding the balance between economically viable forestry and timber production and long term conservation of forest biodiversity. The sustainable development of the forest sector has been reinforced by a forest certificate suitable for Finland's conditions. The certificate is awarded based on forest management and use, verification of origin of timber and external inspections (see more FFCS 2005).

Agriculture and rural industries

Sustainable agriculture produces clean, healthy and safe products for all age groups in an economically viable way and under nature's terms. Central features include eco-efficient farming, conservation of nature's biodiversity, livelihood, conservation of rural environments and traditional biotopes. Ethical questions are an undeniable part of agriculture as well:

how is the health and well-being of livestock being taken into account; what values are people driven by; whose well-being is it that is being produced? In the years to come, more attention will have to be paid to the possibilities of bio- and gene technology, eco-efficient technological innovations, bioenergy, the aging rural population and the self-sufficiency of Finnish food production.

Environmental subsidies are important tools with which to promote sustainable development, and the ecological dimension of sustainable development in particular. They aim to reduce the environmental impact of agriculture and to maintain the biodiversity and particular landscape of an area. Environmental subsidies constitute a financial steering mechanism, and they cover the costs that farmers incur from environmental protection measures and additional landscaping. The system will be reformed in 2007, which means an increase in mandatory measures. These include the planning and monitoring of environmental protection in farming; letting fallows green; the fertilizing and liming of crops, plant protection; headlands and protective strips, as well as biodiversity and maintaining the overall landscape. The European Union's subsidy system will eventually have to comply with WTO rules for trade in agricultural products meaning fewer direct subsidies and the redirection of subsidies (Vähemmästä enemmän ja paremmin 2005: 24).

What is essential in agriculture, as in any other mode of production that complies with the principle of sustainable development, is that nature and its ecosystems are used so that their capacity to thrive and rejuvenate is not impaired. Eco-efficient farming brings together nature's economy and the human economy in a sustainable way. A thorough investigation of the farming process is not enough when trying to establish the sustainability criteria of the Finnish food chain. The whole production process must be put under the magnifying glass, from farming methods to food industries. Just like with any other product, the material flows, the lifespan of production and the products it produces, their environmental as well as socio-economic impacts can and must be traced in agriculture. In practice this can lead to a comprehensive set of environmental labels

and certificates that let consumers know they have just bought clean food that has a minimal impact on the environment.

Besides farming, rural industry also includes countryside and nature travelling, the selling of natural produce and other nature related services. These businesses operate on at least the following ecological criteria: their activities have a reduced impact on the environment and nature, their exploitation of nature's resources is sustainable and they nurture nature's biodiversity. Businesses that are directly linked with nature can increase people's knowledge of nature, which in turn can have a positive influence on the relationship people have with nature thus making them more sensitive to environmental issues. A positive and caring attitude towards nature grows over time from personal experience, and adventure trips, hikes and positive nature experiences are only going to enhance it. Entrepreneurship is, however, governed by economic criteria and this means that natural values should be adjusted to the business's economic possibilities without neglecting questions related to social well-being or recreation. The fundamentals of social equality should also be taken into account: whose land is being used, whose well-being is it for and what possibilities do different groups have of taking part in the activity? Respecting and following local cultural values strengthens the local identity.

The horticulture and landscape planning

The horticulture and landscape planning combine both ecological principles and aesthetical concerns related to a living environment's beauty and pleasantness. Landscape planning can also affect how healthy an environment is for people, as for instance air quality. Environmentally responsible and environmentally friendly industrial gardening and local landscape planning adhere to nature's ecological laws of nature and recognize people's socio-cultural values and appreciations. Environmentally protective gardening methods include recycling of irrigation waters, the use of renewable energies, contributing to the knowledge on organic pesticides and advocating their use, composting of plant waste and using

biodegradable material in green house cultivation, for instance.

The fisheries and environment studies

Finnish waterways suffer mainly from eutrophication and the release of excess nutrients. Fish stocks are an important source of nutrition – on a global scale they constitute the second source of nutrition for humankind after agriculture. Equally on a global scale overfishing and unsustainable fishing methods have destroyed fish stocks and their living habitats. In Finland, river dams have had a negative impact on certain fish stocks, because they prevent river spawning salmon fish stocks from reproducing. On a national scale other fish stock are on the whole robust even though in some areas catches might be considerably smaller (Hakala & Välimäki 2003: 203–204). The fishing industry would benefit from the conservation of waterways in their natural state, maybe even their restoration as well, as from fishing restrictions that take into account the critical limits of fish stock. On a wider scale, the restoration of waterways and the maintenance of water quality ensures the survival of fish stocks and thus the future of the fishing industry.

Sustainable development and the environment sector

In the education sector for sustainable development the emphasis is on understanding the interaction between people and their living environment and trying to make this relationship conform to sustainable development. From an environmental perspective this means understanding and knowing how to preserve the ecological, economic, cultural and social values of both rural and urban communities.

An ecological perspective on environmental matters is about preventing negative environmental impacts, operating in a manner that respects nature and the environment, removing and containing environmental problems, using environmentally friendly technology and knowing how your behaviour impacts on the environment and its values. An economic perspective will additionally bring criteria from the corporate

world. This is commonly referred to as eco-efficiency. In concrete terms this means developing and exploiting the environment for human benefit so that the operation remains economically viable at the same.

A socially sustainable environment refers to a human living environment that is pleasant and functional. This implies not only physical possibilities offered by the physical environment, but also a psychological sense of living in a pleasant environment. Social sustainability is characterised by safety, functionality, communality, a positive local identity and a stimulating environment. Culturally sustainable environments are sites that have been defined as valuable by a certain group like a nation or local community, and they consist of historical buildings, traditional landscapes, new architectonic exhibits etc.

Competences in the natural resources and environment sector

In 2006, a study was conducted on the competence of Finnish university of applied sciences degree programmes. The aim was to harmonize the Finnish tertiary education system with that of other EU countries. The natural resources and environment sector branches out into several degree programmes, and the competence of each one was evaluated.

A degree programme in sustainable development makes you into a qualified environmental planner. The basic training of an environmental planner comprises all the pillars of sustainable development (cf. figure 2). A thorough knowledge of the state of nature and its ecosystems is the starting point from which the environment's development can be redirected onto a more ecologically sustainable path.

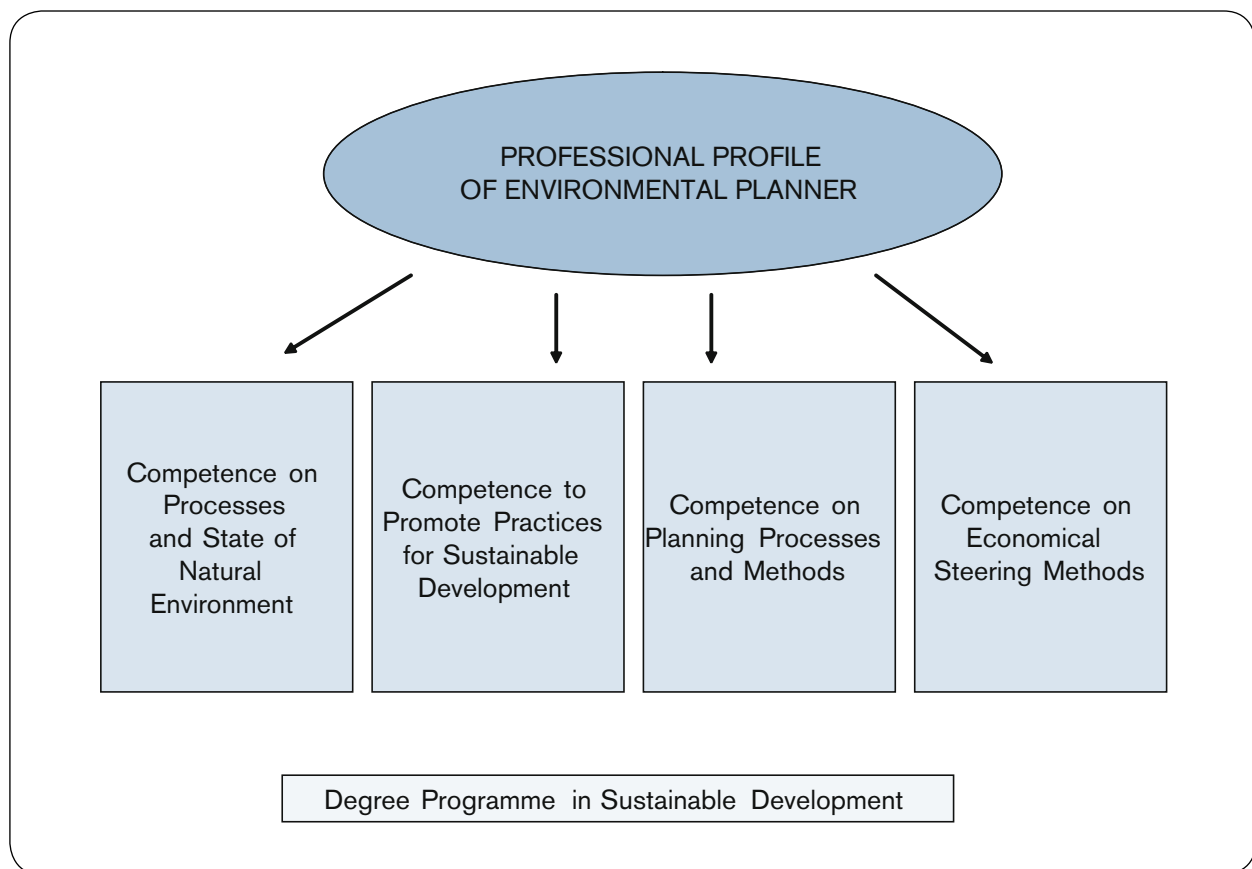


Figure 2. Areas of competence in the Sustainable Development Degree Programme (Based on: Ammattikorkeakoulujen... 2006).

An environmental planner must also be able to exert influence and promote sustainable development on a personal and societal level. It is also good to have a basic knowledge in economics and to have the ability to adapt economic steering methods so that the opportunity for economic growth is not inadvertently wasted when putting into practice ecological and social sustainability. In addition to having the necessary educational background, a professional working in sustainable development should be able to make good use of knowledge capital while engaged in planning and development work.

All other natural resources and environment degree programmes were also evaluated. All degree programmes included at least the following competences: knowledge of processes and the state of the natural environment, economic management and economic profitability, being able to observe environmental impacts and knowing how to deal with them and knowing how to exploit natural resources sustainably (Ammattikorkeakoulujen... 2006). Experts mention areas of competence that are related to all possible themes found under sustainable development even though they tend to emphasise themes from ecological and economic sustainability. Human welfare and cultural values should be given more attention in the natural resources and environment study programmes.

An example of a virtual sustainable development course: the challenge of sustainability

This course was put together by economists and experts from the natural resources and environment department at the Laurea University of Applied Sciences. It was held in spring 2006. The course was international and was part of the Baltic Sea Region sustainable development cooperation network initiative. 48 students representing five different nationalities and eight educational establishments enrolled in the course. The following educational establishments were represented: the Laurea University of Applied Sciences, Sydväst University of Applied

Sciences, the Turku University of Applied Sciences from Finland; the Jan Evangelista Purkyně University from the Czech Republic; the Pskov State Polytechnic Institute from Russia; the University of Bielsko Biela from Poland, and the University of Alcalá and the University of Extremadura from Spain. English was the teaching language by default.

The course was set up on a virtual Optima teaching platform, which contains links to study material, tools for group work and discussion, a calendar, assessment and feedback. The discussion tools enable everyone to take part in the debate, but there is also the option of continuing the discussion in a smaller group, as group interaction is then more likely to induce students to learn. The group tutor can also take part in the discussion by answering students' questions or by giving direct feedback.

The course was based on constructivism and that is why it did not readily contain any theoretical texts. Instead, students had to look for them elsewhere through the links provided. There is a wealth of information available on sustainable development both on the Internet and in books. That is why the emphasis of the course was on assignments and independent study.

The course began with a study of the student's persona after which students were to examine the surrounding environment so as to gain a local perspective. From a local perspective students proceeded onto a national level and then finished the course on a global level. Assignments consisted of formal essays, posters, group assignments, and self and peer assessment. At the end of the course groups merged the terminology lists they had been accumulating throughout the course (figure 3).

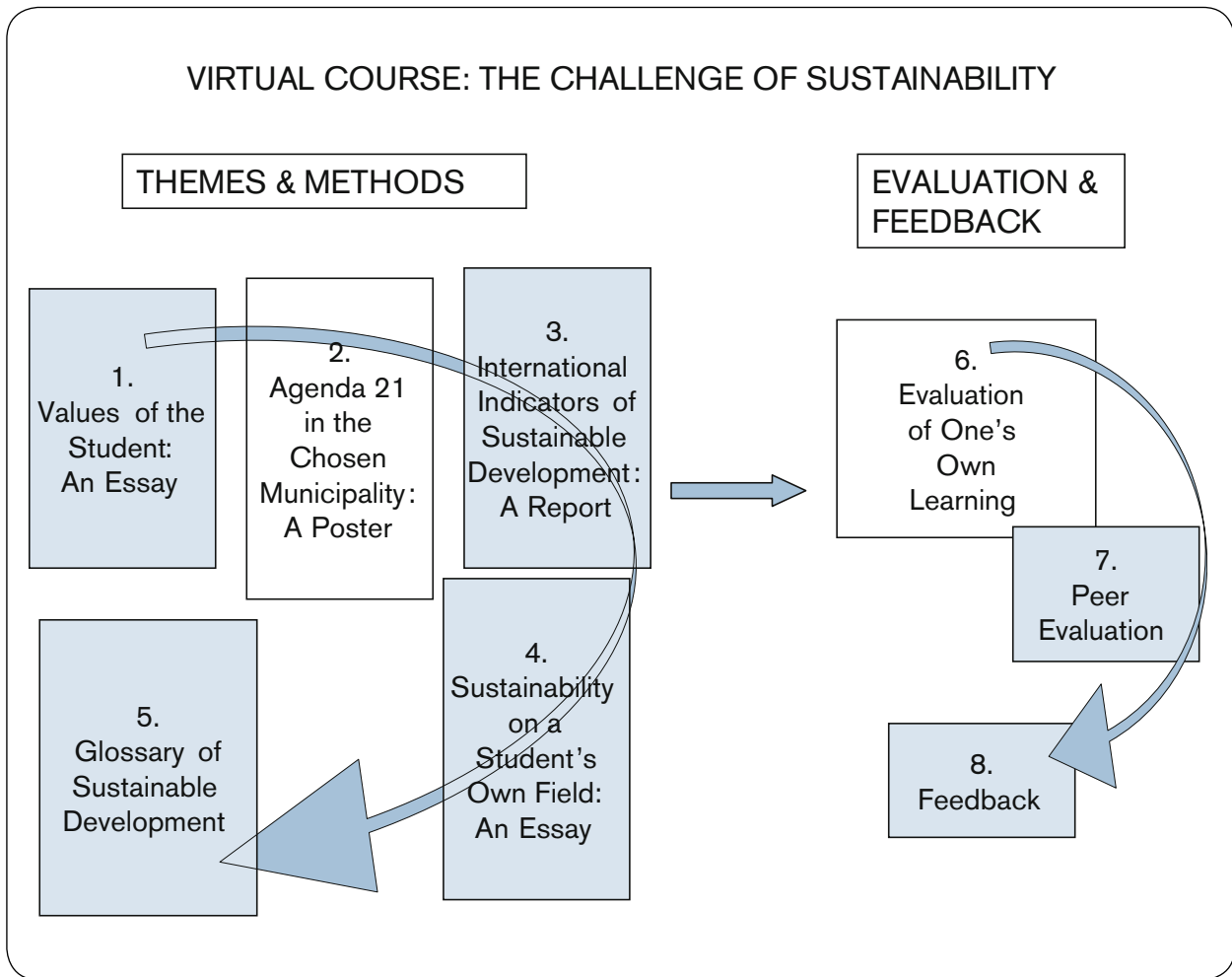


Figure 3. Themes and working methods used in the virtual sustainable development course.

Students were required to actively participate in discussions and course work. This enhanced collegial learning. Practically all students were satisfied with the level of English being used in the course: students felt it increased their vocabulary, and their sustainable development vocabulary in particular. The use of Optima was new for 81% of the students and 40% thought Optima was an easy working medium. Two thirds of students felt they had learned to use Optima right, to write texts and to save files in their own folders.

Most were happy with the themes covered during the course. Students would have liked to learn more on the history of environmental protection, economically sustainable development and the way sustainable development features in the EU's in-house work. The Agenda 21, on the other hand, was studied at length, and some students felt it even went a bit overboard. The course gave students a solid overview of sustainable development, as can be seen from the following student feedback:

Sustainable development is very important to me so my opinion about it hasn't really changed during this course: I still find very important to try to promote sustainability. My understanding has probably expanded – now I realize even better, how many different aspects sustainability can have and that sustainability can happen in many ways and levels.

A virtual working environment enables students located in many different places to study and communicate with each other simultaneously. In this particular case, however, not all students were convinced by the benefits of virtual learning because they still sat in the same classroom and could thus exchange ideas face-to-face. Foreign students liked using the Internet, and appreciated the possibilities it offers for looking up information. Web discussions were lively and many said they learned from the problems that others had encountered, and which were then solved collegially. All in all, students were pleased with the course because it was international and because it offered a change from traditional delivery methods.

Achieving sustainability through a multi-branch and integrating vision

Sustainable development requires that we critically re-evaluate our ways of thinking. When striving for sustainable development, we should take into consideration the ecological, economic, social and cultural meaning of nature and the environment. In the natural resources and environment branch this means seeing nature as more than just an exploitable resource. Nature and the environment have inherent value as well as aesthetical, ethical, social and ecological meanings – and one must not forget its economic meanings either.

In tertiary education it is important to take into consideration changes in the environment and society, and changes in the meanings attached to sustainable development imposed by place and time. Achieving a common understanding of sustainable development and accepting the need for sustainable development and the values it necessarily entails is essential. Being

fluent in sustainable development requires viewing current practices critically and coming up with a shared guiding principles. This in turn can only be achieved by applying technical-economic, scientific and social skills to practices that are currently unsustainable. In the natural resources and environment sector it means adhering to a holistic approach so that possible consequences on natural capital, human welfare, social integrity and economic competitiveness are taken into consideration.

13 From National to Global Cooperation – the Baltic Sea Region as an Example

Paula Lindroos

Higher education occupies an important position in shaping the way in which future generations learn to cope with the complexities of sustainable development. But characterised as both interdisciplinary and problem-based, sustainable development is not an easy area for education or for research. International cooperation can provide new tools and opportunities for universities to develop their interdisciplinary competences, to modernise their curricula and to make their education more international.

This chapter presents experiences from two regional networks for education for sustainable development in higher education; the Baltic University Programme (BUP), and the Baltic Sea Sustainable Development Network. Both networks support the regional and international strategies of the Baltic 21E-programme and the UN Decade for Sustainable Development 2005–2014.

The driving forces behind the networks have been a common concern for the region, the multidisciplinary organization of participating establishments, a common interest to enhance sustainable development in daily activities, teaching and learning, and a shared

interest in regional development and research. The networks have attracted many different disciplines, as partners represent economy, culture, environment, medicine, science, technology and social sciences. Heterogeneity has been taken on as a positive challenge, as it is assumed that it is in the combination of different areas of research and education that this will give rise to something new – and thus be in line with the holistic view which permeates education for sustainable development.

The main activities of the networks include course development and organisation, seminars and meetings for teachers and researchers, students' activities, and capacity building through seminars and projects¹.

These two networks are good examples of the ways in which education can benefit from a broad platform of knowledge and experiences and where new approaches could be identified through cooperation. Education for sustainable development requires new approaches in both teaching and learning and the concept of “learning from each other” is a good way to move forward.

Multi- and interdisciplinary approaches in education and in research

One can generally say that in order to learn about sustainable development, one must be acquainted with several different branches of science. Learning about sustainable development is guided by a principle of organizing science and at the same time focusing on the problem solving capabilities of the students. This means both content *and* learning methods become important for the courses. Students need to know about models that show how to organize knowledge and need to be familiarized with different theories of knowledge, and they need to be provided with a context for information that could otherwise be out of reach for them. At the same time, students should be provided with instruments to deal with complexity and they should be taught how to effectively take

responsibilities. Special attention should therefore be given to problem solving capabilities.

Hardly any university department can alone provide the expertise needed for a whole course and this is the main reason why cooperation is needed. Although internal cooperation within universities themselves and between local universities is certainly an option, international cooperation is nonetheless strongly recommended because cooperation and networking prove to be good preconditions for complex problem solving. Dialogue and sharing of experiences in different cultural settings challenge the students in their learning processes.

As courses are multi- or interdisciplinary, they obviously also attract students from different disciplines. There is a risk that some students might experience these courses as too difficult or too easy – depending on their educational background. Even so, meetings and discussions between these students mostly turn out to give the courses added value in itself.

At universities, courses on sustainable development are traditionally hosted by environmental science departments, but there is a wide range of other faculties and departments that offer tuition as well. Examples from the Baltic University Programme include departments of international relations, English philology, geography, technology, medicine, and political science. Additional course material can also bring added value to normal course texts and text books etc. As an example, one can mention the Ivan Franko National University of Lviv in Ukraine, where the sustainable development course material is integrated into the international relations study programmer's language training.

Higher education is by definition based on research. Because of the traditional divisions between disciplines in academic institutions, multi- or interdisciplinary research can become even more problematic than multi- or interdisciplinary education. The first problem is the divide between the cultures of different disciplines. This cultural gap is wider the longer the distance between the academic disciplines is. The

¹A web site on education for sustainable development can be found at www.balticuniv.uu.se/esd.

second gap is between research and applied research, as research which decision makers or enterprises can make use of is often not of a high quality in academic terms.

According to the OECD, there are three different types of interdisciplinary research:

- *Multidisciplinary*: autonomy of the different disciplines; does not lead to changes in the existing disciplinary and theoretical structures;
- *Interdisciplinary*: formulation of a uniform, discipline-transcending terminology or common methodology; cooperation within a common framework shared by the disciplines involved.
- *Transdisciplinary* (also known as cross-disciplinary): research based on a common theoretical understanding accompanied by a mutual interpenetration of disciplinary epistemologies.

Network courses and projects focus on understanding systems. This is where interdisciplinarity becomes necessary. For example, in water management courses, river basin management is new to most universities, while traditional water management components have already been part of the curriculum for several years. Additionally, case studies are important components of the Baltic University Programme courses. They contribute to a broadening of the knowledge about the region, and help students to understand practical problem solving better.

The networks provide the resources

International cooperation is important for addressing complex regional problems. This is the lesson learned in the two networks. Science by definition is universal, and science-based education has to become more international in order to follow the rapid development of knowledge. When it comes to the Baltic Sea Region, one can say that regional solutions are needed for

regional problems, and that these can only be reached through international cooperation.

The improvement of the environmental condition of the Baltic Sea depends almost entirely on the inhabitants of the drainage basin. Unfortunately the vast majority do not perceive themselves as living in such a basin, nor do they think they have anything to do with the sea. To change this is an important educational task. The Baltic University Programme and the Baltic Sea Sustainable Development Network have been established so as to achieve that.

The internationalisation of education is welcomed by most students. Of course all students cannot travel, but all can be involved in some aspect of the networks. We can call this virtual mobility, in contrast to traditional physical mobility. Different distance education methods facilitate virtual mobility among students of the Baltic Region and are therefore a welcome addition. Case studies are also important tools in broadening knowledge about the region.

Teachers and researchers from the whole region have actively participated in the production of study materials, and this broad involvement gives the networks an outstanding quality. Experts have contributed to the conceptual development and they have produced cases and models. One example of extensive cooperation within the Baltic University Programme is the book *Environmental Science- Understanding, protecting and managing the Environment in the Baltic Sea Region*² (Rydén, Migula & Andersson 2003), which involved some 80 researchers and teachers from 12 countries.

Collaboration and partnerships at an international level are also underlined in several documents and charters where universities commit themselves to promote sustainable development. One of them is the Copernicus-Campus charter with more than 300 signatures. This charter³ was endorsed in 1991, and it is presently being revised. Recently in April 2005, the Graz declaration⁴, was adopted on the occasion of the launch of the UN Decade of ESD for higher education institutions.

² Its chapter on sustainable development is available on the BUP website for ESD www.balticuniv.uu.se/esd

³ See www.copernicus-campus.org

⁴ See www.uni-graz.at/sustainability/Graz_Declaration.pdf

Putting the student first

The recommended teaching and learning methods in education for sustainable development place the student in the centre. Active participation and action competence are considered important learning outcomes, and therefore discussions, group work, case studies, presentations, international cooperation etc. are much employed.

As the courses' main strengths students will mention the international contacts acquired during courses and project work. They also appreciate the possibility to get to know the region and the modern study materials and learning approaches. Communication is sometimes hindered by the absence of a common culture of communication.

English is the main language of communication within the networks. It is sometimes called *Baltic English*, so as to emphasize that English is native to none of the countries in the networks. This enhances international education and cooperation between course groups. As the courses are in English, they are attractive to foreign students. English is not, however, the only reason, as international students naturally also want to learn about the country and the region they visit.

Students also have the possibilities to meet in person, although at a much smaller scale. Each year, students from all courses and countries in the Baltic University Programme come together for a common meeting. These meetings often deal with regional planning, development and cooperation. Students prepare presentations on given themes, which are then combined with study visits and role plays where they, for e.g. create sustainable societies. And since 1998, students from all countries have been invited to participate in a sailing tour of the Baltic Sea, which is organised every summer. Sailing together as a crew is an adventure with a high educational potential. Students learn how to cooperate in an international surrounding, as keeping the ship going in the right direction is not an easy task. Students also prepare

presentations, which they present and discuss with experts at seminars on board.

Local and regional partnerships

Cooperation with external partners in applied projects is seen as an important aspect of education for sustainable development. Competence development is thus promoted not only among students, teachers and researchers, but also outside universities in the private and public sector as well. One such example is the project Baltic University Urban Forum (BUUF) with 20 cities and 15 universities in 9 countries in the Baltic Sea region. The project focused on the development of strategies for sustainable development, and it turned out to be a learning experience of high magnitude for all participating partners.

There has also been cooperation with national and local TV companies in Finland, Latvia and Poland. Part of the material produced has been integrated in case studies, which in turn are used in courses. Some of the films have been broadcast on TV channels for the general public, as for example the TV series *Mission Possible*, which is part of the *A Sustainable Baltic Region* course.

The networks and plans for the future

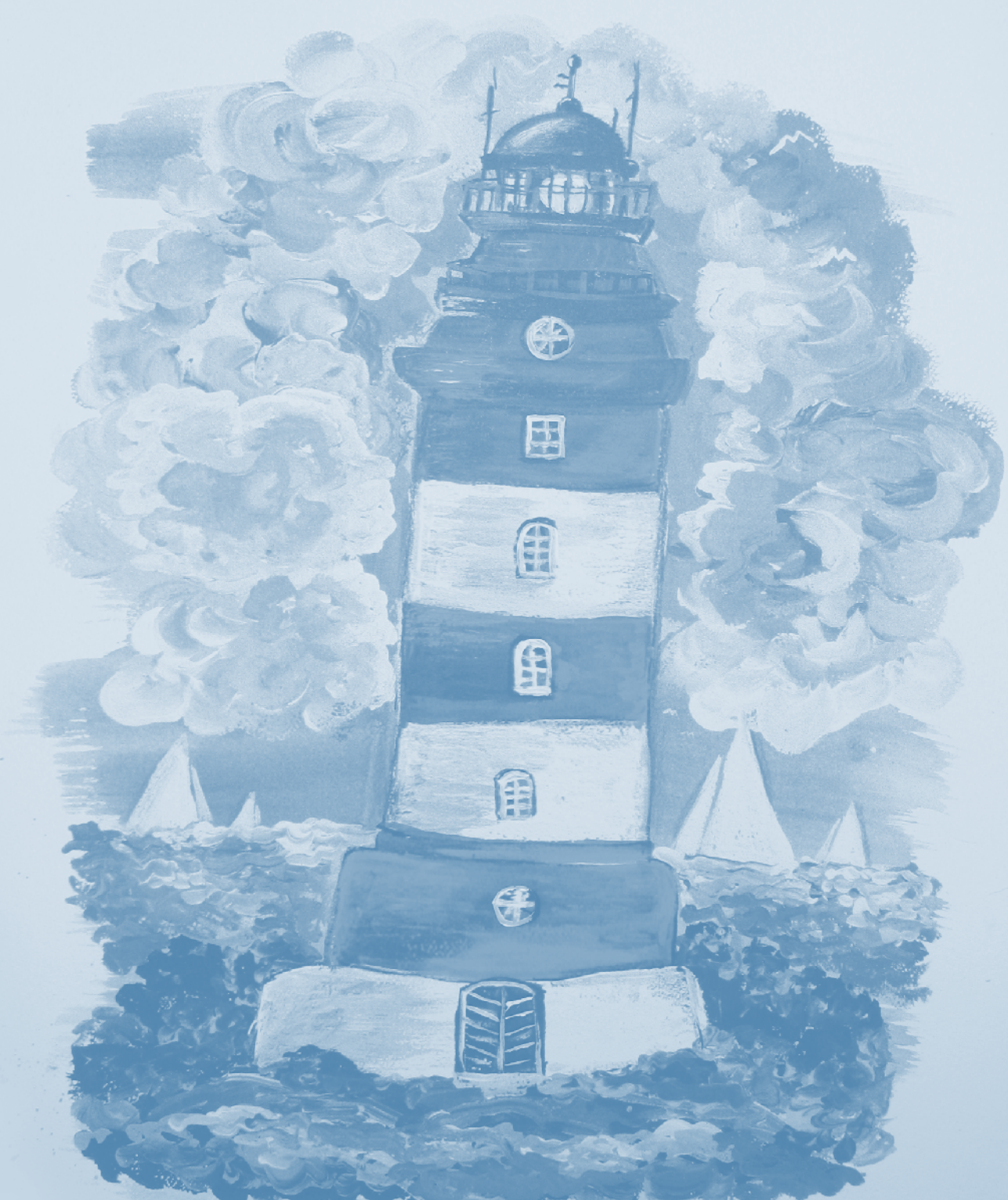
The Baltic University Programme started in 1991, and it has become one of the largest networks in the world with more than 180 universities and tertiary education organizations in all of the 14 countries in the drainage area of the Baltic Sea. The network is coordinated by a secretariat at Uppsala University in Sweden together with 13 national centres in the Baltic Sea region countries. The Finnish centre is situated at Åbo Akademi University⁵.

The activities of the Baltic Sea Sustainable Development Network started in 2004 and it has

⁵Homepage www.bup.fi

played an important role for development and cooperation in education for sustainable development among universities of applied sciences in Finland. It was this network that got Finnish universities of applied sciences to participate in international cooperation with other tertiary education establishments in the Baltic Sea Region. The network encompasses all the countries with the Baltic Sea Region and includes 35 higher education institutions.

In Finland, cooperation between the networks will become even more important, because some of the participating establishments belong to both networks. In fact, the Finnish Ministry of Education endorses a vision whereby the two networks would be amalgamated into one sustainable development network. Cooperation within such an extensive and all-encompassing network would combine academic research and applied projects in a fruitful way and sustainable development could be enhanced both in research and in practice when implementing regional development. Common courses would provide channels for sharing knowledge among different actors even wider than either of the networks alone. In this way the networks can contribute together to the common aim, a sustainable regional development.



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14 In Order to Become Sustainable, the World Needs Education

Lars Rydén

As many others, I think we live in a schizophrenic world. Rapid economic development, ever growing stock markets, is one aspect of our industrialised societies. Some countries such as China, but also Russia and the neighbouring three Baltic states, show growth rates in the order of 7–11 % annually. At the same time we are increasingly concerned that the natural systems we depend on may collapse. Climate change is the most obvious and acute of these treats. Storms and floods, believed to be caused by climate change, lead to damages on forests, buildings, roads and infrastructure. Costs are enormous. Almost everyone seems to accept that we are in a period of human-caused climate change. 2006 was the warmest year on the planet since the 1750s when measurements started, and 2007 is projected to be even warmer due to the Nino phenomenon.

The two sides of our dilemma are coupled. Economic development during more than a century has incessantly emitted carbon dioxide from the burning of coal, oil and gas to our common global atmosphere, to the extent that we have changed the

entire planetary system. We are talking about large-scale changes and time horizons of centuries. It is not surprising that it takes a while for most individuals to come to grips with this. Humans are biologically constructed to perceive, react to, and care for those in the immediate surrounding. Not something on the other side of the planet and in the next generation.

This is where education has a key, an indispensable, role. We all need, and especially the coming generation needs, to see ourselves as part of a global process. We need to see the planet as a whole. This can be provided for by education. Teachers who work to provide this will be supported by Internet connections, travels, economic globalisation, and satellite pictures etc. In this there is a side of globalisation not often enough discussed: responsibility! Responsibility for our common planet and responsibility for the humankind we are part of.

“We are not passengers on spaceship earth; we’re the crew. We’re not just residents on this planet, we’re citizens. The difference in both cases is responsibility.”

Russel Schweikart, Apollo 9 Astronaut

One way to start is to tell a new kind of history, the history of the use of the planet and its resources. In his book *“Something New Under the Sun”*, history professor John McNeill gives some key figures that aptly illustrate the situation: in the hundred years between 1900 and 2000, while the global population has increased fourfold, industrial production has exploded to forty times its original size. The global economy has grown 14, energy use 16 and carbon dioxide emissions 17 times over. In contrast, the area covered by forests has decreased and is now 0,8 times the size in 1900. For individual species, the situation can look even grimmer: for each blue whale swimming the oceans in year 2000, there were four hundred just a hundred years earlier.

Man’s place in “development” has simply become so overriding as to obscure the view of an ecologically sound development. Growth in most cases, be it the number of cars, consumption of fresh water, loss of rainforests or the use of fertilizers, has been exponential - ever larger – as a quick glance at relevant statistics will show. Today this growth has come to a point

where the globe’s carrying capacity has already been surpassed. We live not only on the production but also use the capital. If continued, this will inevitably lead first to the decrease of the carrying capacity, and ultimately to the decrease of human consumption as there is simply not much left to consume, and what is left will be much more costly to extract.

ESD and global change – to understand systems

Climate change is today a concern for many researchers from natural to social sciences and humanities. Some of the results of this activity should have a place in basic education. Everyone needs to know about the shrinking ice cap in the arctic, decreased rainfall in already dry areas, and storms and floods in others. This is not only a question of natural sciences. It is well penetrated by economists. The best known publication may be the very comprehensive (some 700 pages) report by a team led by the World Bank economist Sir Nicholas Stern to the British Prime Minister Tony Blair in November 2006. In economically conventional (neo-classic) ways the cost of climate change is calculated twice. Firstly the estimation is given that about 1 % of GDP, the Gross Domestic Product, that is the value of all services and products in society, will be needed to combat climate change. Secondly the report maintains that if climate change continues an economic depression of some 20 % of GDP is likely to occur. Actions have to be efficient within a ten years perspective. These general conclusions are supported by several other studies.

Climate change will have very far-reaching consequences for our societies, but also for biology. The changing distribution of many species and the threats posed by climate change for some of them will have consequences also for us. Growth areas and conditions of agriculture and forestry will change. The polar bear will lose its territory as the arctic ice melts, and the smaller creatures, the insects, will change its distribution pattern, for example parasites will move north.

Climate change illustrates a very central issue for sustainability clearly: the *systems view* of

things. In the field of climate change we see that industrial production, car traffic, climate, biology, social consequences for many countries, etc are all interlinked. Systems understanding is not only a theoretical issue in education. It is also an aspect of the pedagogy of education for sustainable development. To really understand the systems properties students need to work with the whole picture. It may be done through project work, inter-disciplinarity, more cooperation, more listening to others etc. They are all part of the key skills to be developed in ESD.

It should be pointed out the both the Stern report and the Intergovernmental Panel of Climate Change, IPCC, have websites with excellent material for self-study or for teachers. Sustainability science rates dissemination of knowledge much more important than traditional, often disciplinary, science does. Education for sustainability is thus constantly fed by researchers to get good educational material.

ESD and the Baltic Sea – to understand flows

There are also reasons to be concerned about our common water body, the Baltic Sea. Everyone who lives close to the Sea or visits in summers knows that algal blooms and overgrown coasts become increasingly worse in summers. Fish are more scarce and expensive, and the formerly basic food – cod – can sometimes not be found at all. How should we understand this unsustainable development?

The basic word here is *eutrophication*, the Sea is *overfed*. The food comes from agriculture, but also as sewage from cities, and traffic exhausts. Nutrients, nitrogen and phosphorus, are not taken care of in the way they were in the traditional agricultural society. Instead an ever-ongoing fertilisation of the fields results in a linear flow of nutrients to the waters and in the end to the Baltic Sea, our common big “sink”. As the concentration of nutrients is increasing at some point it becomes so large that it will have serious consequences, such as massive algal growth, and depleting the bottoms of oxygen.

Flows is another basic concept in sustainability and in ESD. Natural flows are cyclic, that is accumulation

is avoided. Our man-caused anthropogenic flows are too often linear. They give rise to an accumulation of material in the end, be it in the sea or in the atmosphere or on the garbage dump. In fact we treat the sea and the atmosphere as garbage dumps. It is the linear flow of carbon from the fossil sources to the atmosphere, which causes the climate change.

All linear flows at some point cause systems change and are thus not sustainable. Destructive *linear flows* in our world today include flows of carbon, nitrogen, phosphorous and several metals.

Industrial production is another example of a linear flow. Until recently, almost 98 % of all European industrial production ended up on the landfill as waste. We live in waste society. This is now rapidly improving. Everything from organic waste to television sets and car tyres are recycled under European Union Directives. Legislation is a major reason for this, but also the industrial production itself becomes more economic with more recycling. Waste, such as paper and glass, is increasingly seen as a resource. Today 50 % of the material coming to European paper mills are recycled paper, and about the same for glass. Natural resources are saved and energy costs in the production have decreased considerably.

The management of waste as resources rather than letting them add to a linear flow and become an environmental problem touches on the private life and lifestyle of many people. This should also be an important part of ESD. When theoretical concepts such as linear flows become practical and part of everyday life it is adding to the pedagogy of ESD.

How to live on the planet and share resources

So what about the basic concern? Will the planet be able to support us in the future? Much sustainability science has studied this question. Perhaps best known is the global footprint network. The footprint is the number of hectares on the surface that we actually use for our livelihood. It is easy to perceive in terms of the surface needed to grow food, or trees which turn into wood or paper for us, or energy to heat our houses. But in fact all services which can be translated into

a material use can be expressed as hectare. It should be emphasised that normally the larger part of the footprint is used for absorption of emissions, such as carbon dioxide, nutrients, or other pollutants.

The human footprint can be understood as a collection of *ecosystem services*. Production of food is an ecosystems service and so are all the other footprints. We depend on such services. In a recent large-scale global project – the Millennium Ecosystems Assessment – coordinated by the United Nations, a survey was made of these systems and their status. The results, reported in 2005, were partly alarming looking at the poor state and shrinking size of several ecosystems. There is also much information on how to manage ecosystems in the report. Some of the examined ecosystems are in the Baltic Sea region and can be visited. The ecosystems view of the world is a key one and should be part of basic ESD.

The total footprints of the world are very unevenly distributed. There is on average 1,8 hectares available for each individual on the planet. But in Finland the inhabitant use about 7 hectares. Is this fair? The equal distribution of the resources of the world is much discussed as so-called intra-generational equity. Are the Finns using resources of someone else, or should we say that it is just fine because the resources are nationally available?

In addition to the uneven distribution on space there is also an uneven distribution in time. Today humankind uses more than what is in the long-term available. This *overshoot* is about 25–30 % and is slowly destroying the carrying capacity. It will be felt by future generations more than by us. To deprive them of their possibilities to support themselves is not sustainable. This is to violate inter-generational equity, much emphasised by the Brundtland Report. There are no final answers to these questions, and they need to be discussed.

Developing and introducing sustainability – industrial production

Industrial production is much of the basic reason for the un-sustainability of our present world. Is it

possible to change industrial production to make it more sustainable? Industrial production was made possible through the large-scale use of fossil fuels, and the construction of more or less ingenious machines. All of this is unsustainable for the simple reason that it relies on a non-renewable resource, fossil fuel, and that the production processes themselves are typically extremely inefficient. Efficiencies are often in the order of 30–50 % of input material, and sometimes even much lower.

This is not necessary. Since some ten years back industries have been challenged by the concept of *cleaner production*. Instead of fighting pollution, industrial production should take place in such a way that the pollutants never appear. Early application of the cleaner production strategies led first to a series of rather simple changes in a production line. It included for example saving energy by proper insulation, making use of material in a careful way and managing resources efficiently. As the strategy is further developed, it leads to entirely new processes. Today we are in some cases approaching what is called sustainable chemistry, green engineering or even zero emission.

When the non-product output (waste) from one activity is fed into another one as an input (resource) we have created *industrial symbiosis*. Industrial symbiosis is an important part of the general strategy of recycling. As more material is used more carefully, a recycling society develops. It is supported by the European Union IPP Directive (Integrated Product Policy), which, if fully implemented, would approach a sustainable industrial production. It is especially noteworthy that a careful calculation of all costs in connection with pollution shows that it is very high. Traditional calculation may correspond to some 20 % of the true costs achieved by e.g. Environmental Management Accounting procedures. Thus zero emission strategies are supported by an increasing interest for economics of proper resource management.

To properly implement these new insights and knowledge engineers, economists and others in the industrial sector need competence development, that is ESD for professional education. It is noteworthy that the introduction of environmental management

systems – and even more so the integrated management systems – according to international standards, such as EMAS or ISO 14000 all have education as an integral and important part. Also the licensing of industrial production according to the IPPC Directives of the European Commission includes a considerable component of competence development.

Planning and management professions

In 2005 the 50 % level of urbanisation was passed on the planet as a whole. In western countries this happened some time back, and typically many countries and states in Europe and USA today have close to 80 % urbanisation. Large-scale urbanisation is a phenomenon that was propelled by industrialism and is part of the development that led to our present unsustainable world.

Why are cities unsustainable? In principle one would assume that it is more environmentally friendly to live close together to reduce the need of travel and to improve economic exchange – trade and business – and provide more opportunities for social development. However cities were from the beginning struck by difficulties. Improper management of water, waste and other types of pollution made city life difficult. Several of these old problems have been solved today. But we have new problems. Instead of less we have more transport. Instead of less social problems we often have more social problems and criminality. Instead of less environmental impacts we often have more of them. The footprint of a city is often approaching 1000 times the surface area of the city itself.

Cities of today are typically flooded by cars, and plagued by congestion. Air pollution, again due to car traffic, is typically very serious. Over 100 years mobility has increased from about 1 to 50 km/day. Both “forced” and “free” mobility are on the increase. An increasing share of our money, energy and space is used for mobility. But it is not sustainable. Most mobility depends on car use and fossil fuels. Mobility is not “smart”. In a nutshell, absurd as it may sound, modern society pretends that space does not exist!

What competences are needed to create sustainable cities? Is it at all possible? This has been the topic of a large number of projects created in the follow-up after the 1992 Rio conference and the Habitat agenda. In the Baltic University Programme, we see it as the city has to manage three limited resources. These are the material resources, the urban space and the people or, if one wishes, the human resource. Cities ought to introduce sustainability management systems, based on resource perspective, in all planning. They should take special care of human resources and place emphasis on systems understanding.

Final words

Sustainability has many aspects. Here I have tried to emphasise that education for sustainable development needs understanding of basic concepts such as systems and flows, needs the adoption of new learning styles such as cooperation and application, needs a new regard for the value dimension such as equity and justice, but also should include practical and technical skills.

Many researchers in the field seem to approach a consensus of what sustainability consists of, and point to key factors how to promote it: Governmental policies in which the growth-centred policies now dominate need to adopt sustainability as a main goal. Secondly, energy management needs to be dramatically restructured, leaving oil and other fossil fuels behind. Thirdly, support of education on all levels is essential. Sustainable production and consumption patterns are also on the agenda as a key concern.

To be sure, we will not be able to approach sustainability on our own. It is not only that we depend on each other; it is also that it will simply be too difficult. Cooperation may start on the local level but increase to include ever-larger circles of common interests, support, and strategic relationships. One level, which often is disregarded, is the regional one, referring to so-called meta-regions, consisting of groups of neighbouring countries. Regional cooperation was emphasized as an important strategy in Johannesburg. We work in this way in the Baltic Sea region. Regional cooperation is also touching

the university world as university networks with sustainable education on the agenda are emerging in many parts of the world. We have one of the largest of them, the Baltic University Programme, in our own region. It should be perceived as a possibility and it will hopefully be able to be a provider and a source of inspiration for all the countries in the Baltic Sea region in our work for a common – and sustainable – future.

15 The Paradigm of Sustainable Development and Education – Reflections on the Past and on the Future

Monica Melén-Paaso

Old wise people used to say that history is repeating itself. It is rumoured that a wise man in South America has said: *“Imagine shooting an arrow. The farther you pull back the string on your bow, the farther your arrow will fly.”* It is the same for our comprehension of the world. The farther we look back into our history, the more we will understand about where we are going and what the future has in store for us.

Søren Kirkegaard believes that life must be lived forwards, but can only be understood backwards. That is the reason why reflections concerning the future must start with reflections over the past.

This chapter will deal with the paradigms of sustainable development as a basis for education for sustainable development. Based on reflection of the past we try to take stock of which policy development phase we are in now and what might be our challenges in the future.

The development of the international policy framework

The UN Conference on the Human Environment held in Stockholm in 1972 was the first of its kind to discuss the impending problems caused by unbridled development. On the agenda were pollution, the use of natural resources, the living environment, environmental education, communication, and social and cultural matters. The meeting in Stockholm in 1972 thus put environmental concern on the global political agenda for the first time.

In 1987 the UN World Commission on Environment and Development published their report entitled *Our Common Future*, which would lead to many international follow-up meetings and processes. The report was especially significant because it articulated for the first time what sustainable development means: “Sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs”. This so-called Brundtland Report paved the way for the UN’s Earth Summit, which was held in Rio de Janeiro, Brazil, in 1992. The conference led to a declaration and a comprehensive plan of action, Agenda 21. With Agenda 21, sustainable development acquired the international aims necessary to propel it forwards, and it also became an established concept in international politics.

The Rio Declaration on Environment and Development (1992) consists of 27 principles. According to principle 1, human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature. According to principle 3, the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations. According to principle 4, in order to achieve sustainable development, environmental protection must constitute an integral part of the development process and cannot be considered in isolation from it.

After the Rio Meeting in 1992, the shift from a concern for the environment to a concern for a sustainable development was further developed at

the Johannesburg meeting (Rio + 10) in 2002. Here we find a conscious shift from trying to identify environmental problems to trying to find solutions to environmental problems. Accordingly, it was recognised that environmental problems could no longer be the prerogative of the natural sciences, but that management and policy (i.e. social sciences) were also needed when posing questions and looking for solutions.

In Johannesburg in 2002 the paradigm and its focus underwent a concrete change: the interconnectedness of the three dimensions of sustainable development, the economic, social and ecological, was emphasised and the stress was on implementation.

In the most important document after the Johannesburg Summit - the “Plan of Implementation” – the importance of a few key strategies for attaining sustainable development were underlined. These included the promotion of sustainable production and consumption, the importance of which had been mentioned already in principle 8 of the Rio Declaration (1992). The Johannesburg Summit also emphasised the importance of regional cooperation in promoting sustainable development. Baltic Sea Region cooperation is a fine example of such cooperation. Globalisation ushered in issues such as economy, culture, democracy, health and education on the global agenda for sustainable development. Not the least, education was put forward as a key strategy for change. Education for Sustainable Development, ESD, started its way towards the attention it has today.

Where in the international policy framework do we stand now?

There is no one established universal definition of sustainable development, nor is there a universal model of education for sustainable development. While there is a general consensus on the principles of sustainability and their underlying concepts, differences according to local contexts and priorities will prevail. Therefore, content, context and relevance become important aspects of quality.

In Rio a special emphasis was placed on environment and development; however, the

ecological dimension had to be supported by the economic and social dimensions. At the Johannesburg Summit sustainable development was defined as an entity which comprises the equally important and reciprocal dimensions of ecology, economy and socio-culture. The Johannesburg Conference was the first global conference to convene under a title containing the term “sustainable development”.

The Johannesburg Summit showed that the world leaders’ vision of how to promote the development of the world in a sustainable way had changed since Rio. In ten years the world had changed to the extent that, in our concern about our common future, the ecological dimension of sustainable development could no longer be given a special position. Also the other two dimensions – the economic and the socio-cultural – should be taken into consideration in a mutually reinforcing way.

But what has happened in practical terms in our societies? The paradigm has shifted and the focus is now mainly on two of the three dimensions - the ecological and the economic. For instance, industries increasingly consider the concerns for our common future in their production. Trade unions throughout the world have been active in encouraging the reduction and more controlled use of dangerous substances, both in defence of the workplace and in an effort to safeguard the local environment from the dispersion of dangerous substances and to protect nature around the workplace.

Probably everyone today is following with greater interest and seriousness what is happening in nature. Climate change and its repercussions affect all countries and all people on the planet. Climate change is linked not only to production but also to consumption, where personal choices can make a difference. Most citizens seem to have assimilated a culture of consumerism and uncritically equated it with their well-being and with the growth of products and goods, without being aware that in the long-term a throw-away culture will produce too much pollution and destroy the environmental capacity of the planet.

But the socio-cultural dimension of sustainable development - the dimension which has to do with the content of education, research and culture - is

still in the shadow. At the same time Europe’s social model – its system of welfare and social protection – is regarded by many as the jewel in the crown; it is what helps to give European societies their distinctive quality of social cohesion and caring for the vulnerable. Over recent years, however, the social model has come under great strain in many states within Europe – unemployment, for example, remains too high in many countries. At the same time, growing performance pressures on the labour market is causing burn-out and depression among employees. The human being’s sustainability seems to be at risk.

One of the features of globalisation is that production is organised in a new way all around the world. Planning, marketing and managing the production process takes place in one place, while actual production, subcontracting, and distribution are located elsewhere. As the service sector has grown, employment relationships have changed, too. Fixed-term and part-time contracts have become fairly common, and work and leisure have become intertwined for many people. A growing proportion of work has an intellectual character and is based on expertise and an increasing amount of work is carried out at home. All this affects the employees’ well-being and quality of life.

The Johannesburg Summit (2002) wanted to lay special emphasis on the social dimension of sustainable development. There are many definitions of this dimension. According to one of them, when we speak of a “sustainable” social system, we mean a system which respects and applies a whole series of social values, such as democracy, respect for human rights, legal settlement of conflicts, tolerance, and fair distribution of the amenities of life, thus ensuring that the tensions inherent in any social system are not heightened to a point where the system itself is endangered.

Reform of the European social model is a matter of urgency if we want to live up to the expectations of society and its citizens. The social model has to go hand in hand with the quest to regenerate growth. The weaker performers in Europe can learn a good deal from states that have coped more effectively. But more radical changes need to be contemplated in the face of the impact of globalisation, rapidly increasing

cultural diversity and changing demography. The famous British sociologist Anthony Giddens argues in his new book “Europe in the Global Age” that the traditional welfare state needs to be rethought. We have to bring life-style change into the heart of what ‘welfare’ means. Moreover, environmental issues must be directly connected to other citizenship obligations. These innovations have to be made at the same time as Europe’s competitive position is upgraded.

What kind of challenges are we really facing?

In her New Year’s Speech on 1 January 2007 the President of Finland, Ms. Tarja Halonen stated among other things the following:

The world is not a fair and just place naturally. It is up to us, the people in it, to make it so. Our efforts are needed both at home and abroad. In today’s world peace, security and welfare of people are indivisible. Everyday, the human rights of millions of people are violated all around the world through gender discrimination, ethnic discrimination or religious discrimination. Famine, extreme poverty, exploitation, armed conflicts and terrorism are a fact of life in today’s world. In many countries the building of a dignified and sustainable development simply starts by combating hunger and contagious diseases and by providing education. The help of the more affluent countries and people is needed to realize these efforts. (www.tpk.fi)

Human well-being is assumed to have multiple constituents, including the basic material for a good life, such as secure and adequate livelihood, enough food at all times, shelter, clothing, and access to necessities; health, including wellness and a healthy physical environment, such as clean air and access to clean water; good social relations, including social cohesion, mutual respect and the ability to help others and provide for children; security, including access to natural and other resources, personal safety and security from natural and human-made disasters; and freedom of choice and action, including the opportunity to do what one values doing and being. Freedom of choice and action is influenced by other

constituents of well-being, notably education, and it is also a precondition for other elements of well-being, particularly equity and fairness.

European development is still more focused towards technological innovations and services that address ecological problems, although social issues are gaining more importance. Education and training in these societies is increasingly highly valued and seen as one of the critical success factors of the future Europe in terms of retaining an advantage in an increasingly competitive world. Key dimensions of re-orienting education towards sustainability involve individuals and societies in the values of equality, tolerance and respect for nature. Ethics and values thus need to take a stronger place in education in the future. Even achieving a fair global economy requires shared values and global ethics.

The debate on globalisation strategy goes on. We should not underestimate, nor be naive about, the power of globalisation as an agent of sustainable development. We should not shun discussion, debate or even argument, as long as we keep our sights on our common interests and are able to shape our policies accordingly. As Finland’s President Tarja Halonen said in her speech:

Finland must be able to stand tall in international competition, and we must keep Finnish society fair and equitable. Finland cannot observe world events from the sidelines. Achieving a fair global economy requires shared values and global ethics. Finland is, and should be, involved in building a more just world. This is morally appropriate and also in our own interests.

This statement is transferable also to other countries.

How does all this affect higher education for sustainable development? At least one conclusion to be drawn is that in addition to reaching the goals set out for education and research for sustainable development, we must try to strengthen the ethical and cultural basis of sustainable development. In Johannesburg in 2002, world leaders boldly talked of human dignity, the fundamental relationship between man and nature, consumption patterns which abase humanity and of the need to find the right ethos for humankind. Surely there can be no nobler challenges

than these – especially for higher education.

As a reflection on earlier deliberations in this chapter – could it be that sustainable development in reality is more of a “means” or a “process” than it is a “target”? Or is sustainability the target and development the process? If these questions are worth even reflecting on, then we have to start a new phase in the discussion on sustainability. But – as Einstein reputedly has said – we will need new ways to solve problems, which we have caused with the old ways of thinking.

The new vision of education emphasises a holistic and interdisciplinary approach to developing knowledge and skills needed for a sustainable future, as well as the necessary change in values, behaviour and lifestyles. It should be remembered that sustainable development is a moral precept as well as a scientific concept. Sustainable development is linked as much with notions of peace, human rights and fairness as it is with theories of ecology and global warming. While sustainable development involves natural sciences, economics and policy-making, it is primarily a matter of culture and concerned with the values people cherish and the ways we perceive our relationship with others and with the natural world. Education for sustainable development should be based on an integrated approach to the processes of economic, societal-cultural and environmental development. Creating links between these three dimensions in a mutually reinforcing way demands a deep and ambitious way of thinking about education.

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Biographies

Editing Board

Monica Melén-Paaso, Phil.Lic., works as Counsellor for Education at the Department for Education and Science Policy at the Finnish Ministry of Education(1980–). Previously she held an academic post at the Department for Education of the University of Helsinki (1974–1980). Assignments related to her duties as Counsellor and Coordinator of sustainable development and development policy matters at the Department include: the Ministry’s Representative on the Government Committee preparing the Johannesburg Summit (2002) on Sustainable Development (2000–2003) and on the Government Committee creating a National Programme to Promote Sustainable Consumption and Production(2003–2005); National Coordinator of the Baltic21E Programme, “An Agenda 21 for Education in the Baltic Sea Region” (2002–); Chair of the Committee on Education for Sustainable Development (ESD) of the Ministry of Education (2002–2006); International Coordinator of the Finnish Co-Lead Party Team for the Baltic 21E programme (2005–); National Liaison of the UN Decade (2005–2014) on Education for Sustainable Development – DESD; Member of the UNECE Steering Committee on ESD (2005–).

Ossi V. Lindqvist, Professor, was elected chairman of the Finnish Higher Education Evaluation Council

from 2000 to 2003 and again for a second term from 2004 to 2007. Until his retirement in May 2004, PhD. Lindqvist served as professor and director at the Institute of Applied Biotechnology at the University of Kuopio, Finland, where he had also served as Rector from 1990 to 1998. He was chairman of the Finnish University Rectors’ Council from 1993 to 1997, member of the National Council for Science and Technology Policy from 1996 to 1999, and he is a lifetime foreign member of the Royal Swedish Academy of Agriculture and Forestry. He was professor at the University of Dayton, Ohio, USA from 1970 to 1972. He has extensive research experience in fish and cray fish biology and fisheries management, also in Africa. He has had several speaking engagements with the World Bank, the Council of Europe, among others, in the field of higher education management and quality assurance. He has participated in evaluations of universities in several European countries, but especially in Central and East Europe, the Baltic countries, and the Russian Federation.

Lars Rydén, Professor, is initiator and Director of the Baltic University Programme, at Uppsala University since 1991. He has been member of the Uppsala Forum for Research Ethics, and an initiator and member of Uppsala Research Ethics seminar from 1984. He was an Associate Professor of Biochemistry at Uppsala University and guest researcher in USA and France. Lars Rydén was appointed Professor by

the Swedish Government in 1999 and Doctor HC at Kaunas University of Technology in 2001, and member of several international university associations. He has published extensively in biochemistry and biotechnology, written for the general public in these areas, as well as articles on ethics, and textbooks both for school and university level. In the Baltic University Programme he has written and edited a series of books on environmental science, sustainability science and regional development. The publications include Environmental Management I–IV, about 1200 pages (2006–07) (together with a series of co-workers in several countries); Sustainable Community Development. I–IV (2004) (L. Rydén, ed.); Environmental Science (2003) 824 pp (with P. Migula and M. Andersson,); The Baltic Sea Region–Cultures, Politics, Societies (2002) (W. Maciejewski, editor, L. Rydén co-author and co-editing), and Sustainable Baltic Region (1997) I–X (L. Rydén, ed. and co-author).

Taina Kaivola, Adjunct Professor, runs a pedagogical unit in the Faculty of Science at the University of Helsinki. Her current research and development interests are improving the quality of teaching in higher education and probing the student engagement in science studies. She has published several articles and books on e.g. teacher education and professional development of teachers, youth research, and geographical education. Education for sustainable development is a premier theme in her international academic networks and research as well as in the books she has edited recently. PhD. Kaivola is a secretary of Special Interest Group of research on education for sustainable development of the Finnish Educational Research Association, and invited working member of the Geographical Society of Finland.

Liisa Rohweder, PhD. (econ.), is responsible for sustainable development and corporate social responsibility related studies, research and development at Haaga-Helia University of Applied Sciences. She also lectures at the Eco-Business masters programme at the University of Helsinki. She functions as the Finnish international coordinator for the Baltic 21 E-programme for universities of applied sciences. She has

published several books and articles on education for sustainable development and environmental and safety management. PhD. Rohweder has been nominated as a member of the Committee on Education for Sustainable development of the Ministry of Education (2002–2006) and a steering group member of the Åbo Akademi National Resource Centre for ESD (2007–2009). She holds several commissions of trust such as a member of the board of trustees of WWF. Before her academic career she used to work 10 years in the oil and chemical industry both in research and management positions.

Authors

Heljä Antola Crowe is a Professor of Education at Bradley University in Illinois, USA. As the William T. Kemper Teaching Excellence Fellow she coordinates the Professional Development Schools project in Peoria for Bradley University. She is the author of research and pedagogical publications. PhD. Antola Crowe has also conducted numerous refereed and invited presentations and workshops locally, nationally and internationally on e.g. learner empowerment, pedagogy in all areas of the curriculum, cross-cultural competence and diversity, and wellbeing.

Simo Isoaho, Senior Lecturer, is from Tampere University of Technology, where he is responsible for teaching in environmental engineering and sustainable development. He has been involved in several international environmental training programmes, particularly in the context of UN, EU and former Eastern Europe. He was the chair of higher education working group for preparing Baltic 21 ESD and later the national university level coordinator for the agenda concerned. Presently, his research group is focusing in information management and analysis of material and energy flows. Isoaho is the member and reviewer of editorial board of Waste Management and Research.

Antti Kalliomäki is currently Minister of Education (2005–). He has previously served as Minister deputising for the Prime Minister, Minister of Finance (2003–2005) and Minister of Trade and Industry

(1995–1999). He has been a Member of Parliament since 1983, representing the Social Democratic Party. Before his distinguished political career he worked as physical education teacher (1973–1991).

Johanna Kohl has studied both social policy (Soc. Lic.Sc.) and ecology (B.Sc.). In her PhD. thesis she has studied interdisciplinarity and challenges of cooperation and communication. She works as a project manager in Finland Futures Research Centre. The themes of her major projects are Towards Sustainable Education and Social Sustainability as a Future Resource. In addition, she participated in the national Commission for Sustainable Consumption and Production 2003–2005.

Paula Lindroos, PhD., is director of the Centre for Continuing Education at Åbo Akademi University in Turku. She works as an expert in many national and international working groups, networks and projects. She is an adviser to the coordinator of the Baltic21 Education sector, and a member of the international board of the Baltic University Programme (www.balticuniv.uu.se). PhD. Lindroos is coordinating the project National resource centre of education for sustainable development in higher education (2007–2009).

Ikka Niiniluoto, PhD., is a well known and highly respected philosopher and mathematician, serving as the Professor of theoretical philosophy at the University of Helsinki since 1981. Currently he is on leave from his position, having been appointed as Rector of the University of Helsinki in 2003. Professor Niiniluoto holds several positions of trust; he is among others the chairman of The Finnish Council of University Rectors. One of the main contributions to the philosophy of science, particularly to the topic of verisimilitude or truth approximation, is his *Truthlikeness*, (1987) Synthese Library, Springer. Another notable publication is *Critical Scientific Realism*, (1999) Oxford University Press.

Tuula Pohjola is a Professor of Environmental and Quality Management at the Helsinki University of Technology. She is the Head of the Industrial

Development and Leadership Laboratory at the Department of Industrial Engineering and Management. D.Sc. (Tech.) Pohjola is also a Director of Master of Quality (MQ) and Master of Environmental Management and Accounting (MEMA) Programmes at the Lahti Center of the Helsinki University of Technology.

Anne-Marie Salonen, Phil.Lic. (analytical chemistry), is working as a senior lecturer in Turku University of Applied Sciences in the degree programme of Sustainable Development. She has been in charge of degree programme manager and international cooperation with universities in Baltic Sea Region, Europe, South America and Africa. She has published several text books and conducted virtual courses. She has been chairman of the Agenda21 working group for the estate of Health Care and Welfare at Turku University of Applied Sciences.

Anne Virtanen, PhD. (geography), is working as a senior lecturer in Laurea University of Applied Sciences in the degree programme of sustainable development. Her expertise fields are education for sustainable development in environmental studies and sustainable urban and rural development.

Lili-Ann Wolff, M. Sc. and M. Ed., is a fulltime Ph.D. student in Doctoral School on Bildung, Learning and Late Modernity at the Faculty of Education at Åbo Akademi University and also a member in the research project Creating Sustainable Futures at University of Helsinki. Wolff has a broad experience in practical environmental education, teacher training, project management and international knowledge networking. She is a member in IUCN's Commission on Education and Communication.

Mauri Åhlberg, PhD., is a Professor of Biology and Sustainability Education at University of Helsinki, Honorary Visiting Professor at Exeter University, a member of scientific committees of 2005 and 2007 World Environmental Education Congresses, a member of the Forum Science and Innovation for Sustainable Development (AAAS). Professor Åhlberg is internationally known for his theories and tools for

ESD. He is the chairman of Special Interest Group of research on education for sustainable development of the Finnish Educational Research Association. Homepage <[www.helsinki.fi /people/mauri.ahlberg](http://www.helsinki.fi/people/mauri.ahlberg)>

Contributors

Jukka Haapamäki, M. Soc. Sc., serves as a Senior Advisor at the Finnish Ministry of Education, Department for Education and Science Policy. Among his duties in the field of sustainable development he has operated as a secretary for the Committee on Education for Sustainable Development (ESD) of the Ministry of Education (2005–2006). This Committee published the publication Sustainable development in education; Implementation of Baltic 21E programme and Finnish strategy for the Decade of Education for Sustainable Development (2005–2014).

Kati Kaivanto, artist. Kati Kaivanto's work of art on the cover of this book depicts the warning signal of a beacon on the ecology of the sea and nature. Kaivanto has been working as an air hostess for almost thirty years. In the past few years, however, she has found herself devoting more and more time to the art of painting – just like her father Kimmo Kaivanto, who is also an artist. Kati spent her childhood in central Finland, an area rich in lakes, and has ever since had a very strong attachment to lakes and seas. This she conveys in her artwork. Kaivanto once saw a little white lighthouse in Italy. As it happens, she had already started her first lighthouse painting. It was in Italy that she realized how she should finish the painting. She had seen “a beacon of the future”.

Laura Murto is a Finnish translator and interpreter who grew up in Belgium, Finland, France and Australia. She studied political science at the University of Helsinki and wrote her Master's thesis on environmental politics. She now works as a translator for the Finnish Defense Forces and a freelance interpreter for the European Union.

Additional Reading and Internet Resources

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**University of Aberdeen Centre for Philosophy,
Technology and Society**

<http://www.abdn.ac.uk/cpts/>

This centre has an interesting programme on ethics and technology, including environmental ethics and global ethics.

Internet Resources

Arne Naess

<http://www.philosophenlexikon.de/naess.htm>

Baltic University Programme

<http://www.balticuniv.uu.se/>

Baltic21

<http://www.baltic21.org>

Convention on Biological Diversity

<http://www.biodiv.org/>

The Earth Charter Initiative

<http://www.earthcharter.org/>

Ecospheric ethics

<http://www.ecospherics.net/>

GREEN, Global Rivers Environmental

<http://www.green.org>

Education Network Henry David Thoreau

<http://www.geocities.com/~freereligion/1thorea.html>

The Factor 10 Institute

<http://www.factor10-institute.org>

**The Online Ethics Center for Engineering and
Science – Rachel Carson**

<http://onlineethics.org/moral/carson/index.html>

Rene Descartes (1595-1650)

[http://oregonstate.edu/instruct/phl302/
philosophers/descartes.html](http://oregonstate.edu/instruct/phl302/philosophers/descartes.html)

Published in the publication series of the Ministry of Education in 2007

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www.yliopistopaino.helsinki.fi
ISBN 978-952-485-304-0 (nid.)
ISBN 978-952-485-305-7 (PDF)
ISSN 1458-8110

Helsinki 2007